



International Exchange of Professionals - Thematic Event in Sustainable Development

Date: November 11-13, 2025

Venue: Grand Prince Hotel Osaka Bay, Japan



The 10th Annual Global Congress
of Knowledge Economy



The 7th World Congress
of Education



The 13th Annual World Congress
of Ocean



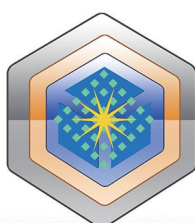
The 11th World Energy Congress



The 12th Annual World Congress
of Food and Nutrition



The 6th International Congress
of Environment



The 9th Annual World Congress
of Smart Materials



The 3rd World Congress
of AI Industry



The 3rd Smart Manufacturing
Forum

International Exchange of Professionals - Thematic Event in Sustainable Development

Date: July 22-24, 2026

Venue: Helsinki, Finland

CALL FOR

- Plenary/Keynote Speakers
- Session Chairs, Speakers and Attendees
- Co-organizers and Supporting Organizations
- Collaborative Partners, Media and Journals
- Sponsors, Exhibitors and Posters



CONFERENCE HIGHLIGHTS

- Integrating 6 Parallel Scientific Meetings
- Leading Lectures, Posters and Exhibition Opportunity
- Big Party to Celebrate with 200+ Participants
- Diversified Program and Culture Activities
- Exchange Ideas, Build New Networks and Foster Friendships

CONTACT

FOR WCO



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FOR WCE



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FOR WEC



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FOR GCKE



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FOR WCFN



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FOR ICE



Mr. Andy Liu
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Hosting Organization



World High Technology Society

Operating Organizations



BIT Group Global Ltd.



Shenzhen Center for
International Exchange of Personnel

Supporting Organizations



China Association for
International Exchange of Personnel



IMarEST

Exhibitor



Sea Solar Power Inc.

Media Partners



Program Committee

Executive Chair

Dr. Xiaodan Mei, President, BIT Group Global Ltd., China

Scientific Advisory Board Members

The 10th Annual Global Congress of Knowledge Economy (GCKE-2025)

Dr. Andreas Koch, Professor and Co-Director of the Center for Ethics and Poverty Research, University of Salzburg, Austria

Dr. Badri Narayanan Gopalakrishnan, Co-Founder and Partner, Infinite Sum Modelling LLC, USA

Dr. Bijan Tadayon, CEO, Z Advanced Computing, Inc., USA

Dr. Chaman L. Sabharwal, Professor, Missouri University of Science and Technology, USA

Dr. Chong Leong Gan, Senior Manager, Broadcom Limited, Malaysia

Dr. Felix Arndt, Professor, Leicester Castle Business School, UK

Dr. Giovanni Perillo, Professor, University of Naples Parthenope, Italy

Dr. Hossein Hosseinkhani, Shareholder and Owner, Matrix HT, Inc., USA

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Dr. Raffaella Conversano, Professor, University of Bari, Italy

Dr. Ute Dietrich, Professor, HTW Berlin, University of Applied Science, Germany

Mr. Yu Tack Kim, Team Leader, Korea Battery Industry Association, South Korea

The 7th World Congress of Education (WCE-2025)

Dr. Andreas Zehetner, Professor, University of Applied Sciences Upper Austria, Austria

Dr. Baruch Offir, Professor, School of Education, Bar-Ilan University, Israel

Dr. Christoph Meinel, President and CEO, Hasso Plattner Institute for IT-Systems Engineering, Germany

Dr. Dirk Rohr, Professor, University of Oldenburg, Germany

Dr. Elaine Chapman, Deputy Head, University of Western Australia, Australia

Dr. Helen Y. Sung, Adjunct Professor, Alliant International University, USA

Dr. Hiroshi Ishida, Professor, University of Tokyo, Japan

Dr. Jacqueline E van Muijlwijk-Koezen, Vice Dean, Amsterdam Institute of Molecular and Life Sciences, Vrije Universiteit Amsterdam, the Netherlands

Dr. Jean-Paul Close, Founder, STIR Foundation Eindhoven, the Netherlands

Dr. Joseph Prud'homme, Director, Institute for Religion, Politics and Culture, Washington College, USA

Dr. Katrin Liebers, Professor, Leipzig University, Germany

Dr. Liliana Rodrigues, Professor, University of Madeira, Portugal

Dr. Michael Owen, Dean and Professor, Faculty of Education, Brock University, Canada

Dr. Timothy C. Van Deusen, Associate Professor, Yale University School of Medicine, USA

Dr. Tsukasa Daizen, Director, Research Institute for Higher Education, Hiroshima University, Japan

Air Vice-Marshal Prof. Rich Withnall, Director of Defence Healthcare, Defence Medical Services, UK

Dr. Vincent Wayne Mitchell, Professor, University of Sydney, Australia

The 13th Annual World Congress of Ocean (WCO-2025)

Ms. Abigail-Laure Kern, UNESCO Chair in Technologies for Development, Cooperation & Development Center, Switzerland

Mr. Andreas Bullwinkel, Landlord & CEO, Container Terminal Wilhelmshaven Jade Weser Port-Marketing GmbH & Co. KG, Germany

Dr. Andreas Nordseth, Director General, Danish Maritime Authority, Denmark

Dr. Angelica M. Baylon, Director, Maritime Academy of Asia and the Philippines, Philippines

Dr. Baoguo Han, Professor, School of Civil Engineering, Dalian University of Technology, China

Mrs. Barbara Amerio, President, Permarmare Group, Italy

Dr. Charles C Zhou, CEO, Cascade Clean Energy, Inc., USA

Mrs. Charlotte Ahrendt Steen, Deputy Director-General, Danish Maritime Authority, Denmark

Dr. Elias Boletis, Director, Wartsila, the Netherlands

Dr. Eric Rolf Hansen, President, Economic Transformations Group, Inc., USA

Mr. Esa Nikunen, General Director, Environment Services, City of Helsinki, Finland

Mr. Gerhard Aulbert, Global Head Ship Recycling, DNV GL, Norway

Mr. George Guy Thomas, Creator of Satellite-Based AIS, Former US Science & Technology Advisor for Maritime Domain Awareness, USA

Dr. Henrik Schmidt, Professor & Director, Massachusetts Institute of Technology, USA

Dr. Ikuo Yamamoto, Professor, Nagasaki University, Japan

Mr. James Fanshawe, Chairman, UK Masrwg, UK

Mr. James Huang, Vice President, DNV GL, Norway

Prof. Jian Lu, Group Leader of Coastal Water Resource Protection and Sustainable Utilization, Yantai Institute of Coastal Zone Research, Chinese Academy of Sciences, China

Dr. Jin Wang, Vice President, Engineering COTEC Offshore Engineering Solutions, USA

Dr. Koh Chan Ghee, Professor, Department of Civil and Environmental Engineering, National University of Singapore, Singapore

Prof. Laurence McCook, Head of Oceans Conservation, World-Wide Fund for Nature Hong Kong, Hong Kong, China

Mr. Michael G. Zell, Chairman, Svenska Skeppshypotek, Sweden

Dr. Ove T. Gudmestad, Professor, University of Stavanger, Norway

Mr. Paul Holthus, Founding President & CEO, World Ocean Council, USA

Dr. Pichai Sonchaeng, Founder President, Samudhabhipat (Marine Power) Foundation; Director, BUU Innopolis, Burapha University, Thailand

Mr. P. Foerd Ames, Inventor & Owner, OWECO Ocean Wave Energy Company, USA

Mr. Roger Johnston, CEO, Pilbara Ports Authority, Australia

Dr. Tetsuya Hiraishi, Professor, Disaster Prevention Research Institute, Kyoto University, Japan

Dr. Tai-Wen Hsu, Vice-President, Professor, National Taiwan Ocean University, Taiwan

Mr. Yiqiang Xiang, Professor & Director, College of Civil Engineering and Architecture, Zhejiang University, Research Center for Submerged Floating Tunnel, CCEA, ZJU, China

Mr. Yves De Leeneer, President Elect, Board Member, IMarEST, Singapore

Porf. Yasuo Arai, President, International Association of Institutes of Navigation, Japan

The 11th World Energy Congress (WEC-2025)

Dr. Andrew Murdoch, CEO, Arche Energy Pty Ltd., Australia

Dr. Bin Yang, Associate Professor, Washington State University, USA

Dr. Cengiz S. Ozkan, Professor, University of California-Riverside, USA

Dr. Gento Mogi, Associate Professor, The University of Tokyo, Japan

Dr. Gordon Huang, Fellow, Canadian Academy of Engineering; Canada Research Chair & Professor, University of Regina, Canada

Mr. Hang Yue, CEO/Founder, Engineering Intelligence on You, Healthcare Data Analyst, Healthcare Data Practical Science, Johns Hopkins Healthcare LLC, USA

Dr. Jie Tang, Practice Manager, The World Bank, Singapore
Dr. Les Alexander, President and CEO, The Battery Innovation Center, USA
Dr. Marcantonio Catelani, Professor, University of Florence, Italy
Mr. Ray Noble, Operations Director, Welink Energy, UK
Dr. Renal Backov, Professor, CRPP-UPR CNRS University of Bordeaux, France
Dr. Rocío Perez de Prado, Associate Professor, University of Jaen, Spain
Dr. Sam Goldman, CEO, D.light, USA
Dr. Shixue Dou, Distinguished Professor, University of Wollongong, Australia
Dr. Zhao Ma, Professor, China Electric Power Research Institute, China

The 12th Annual World Congress of Food and Nutrition (WCFN-2025)

Dr. Ayman Sayegh, Professor, Tuskegee University, USA
Dr. Catherine B. Frederico, Professor, Newbury College, USA
Dr. Christopher John Smith, Professor, Manchester Metropolitan University, UK
Dr. Encarnacion Moyano, Professor, University of Barcelona, USA
Dr. Frank Thies, Reader, University of Aberdeen, UK
Dr. Harumi Okuyama, Professor Emeritus, Nagoya City University, Japan
Dr. Haydar Ozpinar, Professor, Istanbul Aydin University, Turkey
Dr. Jacek Namiesnik, Professor, Gdansk University of Technology, Poland
Dr. Jacqueline McCormack, Professor, University of Ulster, UK
Dr. Joan Claria, Professor, University of Barcelona, Spain
Dr. Juergen Schrezenmeir, Professor, Clinical Research Center Kiel, Germany
Dr. Julie Dennis, Founder, Natural Community, USA
Dr. Kin-Fah Chin, Professor, University Malaysia, Malaysia
Dr. Kit L. Chin, Professor, Southern University Agricultural Research and Extension Center, USA
Dr. Kathleen Liang, Professor, University of Vermont, USA
Dr. Luc Tappy, Professor, University of Lausanne School of Biology and Medicine, Switzerland
Dr. Mario Ciampolini, Professor of Pediatrics, University of Florence, Italy
Dr. Nur Hassan, Head of Course-Undergraduate Engineering, CQ University Australia, Australia
Dr. Peter Guilfoyle, Vice President, Northwest Analytics, USA
Dr. Renaudin Nathalie, Public Affairs Officer, Edenred, France
Dr. Sandrine Blanchemanche, Director, French National Institute for Agricultural Research, France
Dr. Sebastien Marque, Director, Danone Research, France
Dr. Shancy Rooze, Head, University Children's Hospital Queen Fabiola, Belgium
Dr. Simon Eisner, Founder & CEO, Allwin Ltd., Sweden
Dr. Sirpa Kurppa, Research Professor, MTT Agrifood Research Finland, Finland
Dr. Soranit Siltharm, Director, Mahidol University, Thailand

Dr. Susan Lurie, Professor, Volcani Center ARO, Israel

Dr. Yie-Hwa Chang, President, Mediomics LLC, USA

The 6th International Congress of Environment (ICE-2025)

Dr. Amrane Abdeltif, Director, Technological Institute of Rennes, France

Dr. Andrea Bencsik, Professor, Univerzita J. Selyeho of Komarno, Slovak

Dr. Francesco Lops, Associate Professor, University of Foggia, Italy

Dr. Giorgio Dodero, President, IPG Industrial Project Group Srl., Italy

Dr. Giovanni Perillo, Professor, National Agency of Digital Transformation, Italy

Dr. Hülya Coskun, Associate Professor, Rumeli University, Turkey

Dr. Joanna Piotrowska - Woroniak, Bialystok University of Technology, Poland

Dr. John van Genderen, Professor, University of Twente, the Netherlands

Dr. Jozef Sabol, Associate Professor, Police Academy of the Czech Republic in Prague, Czech Republic

Dr. Kim Choon Ng, Professor, King Abdullah University of Science & Technology, Saudi Arabia

Dr. Masakazu Anpo, Special Honor Professor and International Advisor, Fuzhou University, China; Emeritus Professor of OPU, Japan

Dr. Muhammad Wakil Shahzad, Senior Lecturer, Northumbria University, UK

Dr. Peter Lilienthal, CEO, HOMER Energy Global Microgrid Lead, UL Renewables, USA

Dr. Peter Lohmander, Professor, Swedish University of Agricultural Sciences, Sweden

Dr. Srikanth Narasimalu, Program Director & Principal Research Scientist, Energy Research Institute, Nanyang Technological University, Singapore

Dr. Tadeusz Szumiata, Associate Professor, Radom University, Poland

Dr. Ursula A. Vavrik, Director, NEW WAYS Center for Sustainable Development, Austria

Dr. Xiaoe Yang, Professor, MOE Key Lab of Environmental Remediation and Ecological Health, Zhejiang University, China

Dr. Xiaolu Tang, Professor, Chengdu University of Technology, China

Dr. Xiaowu Huang, Associate Professor, Environmental Engineering, Guangdong Technion-Israel Institute of Technology, China

The 9th Annual World Congress of Smart Materials (WCSM-2025)

The 3rd World Congress of AI Industry (WCAI-2025)

The 3rd Smart Manufacturing Forum (SMF-2025)

Dr. Anjan Ghosh, Professor, Dhirubhai Ambani Institute of Information and Communication Technology, India

Dr. Biswaranjan Senapati, Parker Hannifin Corporation, USA; University of Arkansas at Little Rock, USA

Dr. Bouyer Etienne, Adjunct Director, CEA, France

Dr. David Bassir, Professor, University of Technology of Belfort-Montbéliard, France

Dr. Donald L. G. Sturgeon, CEO & CTO, Multifibers LLC, USA

Dr. Evangelos Hristoforou, Professor, National Technical University of Athens, Greece

Dr. Fabrizio Nardo, CEO & Director of Technology, Antifemo S.r.l., Italy

Dr. Francois Trochu, Adjunct Professor, Ecole Polytechnique de Montreal, Canada

Dr. Hairong Lei, Research Staff Engineer, ASML HMI, USA; Executive Vice President of Trademarkia, USA

Mr. Hadi Moztaazadeh, Senior Technology Officer, University of Warwick, UK

Dr. Lidietta Giorno, Director, Institute on Membrane Technology of the National Research Council of Italy, Italy

Dr. Milica Curcic, Senior Research Associate, Institute of Physics Belgrade, Serbia

Pr. Nour-Eddine Fenineche, Professor, The University of Technology of Belfort-Montbéliard, France

Dr. Oleksandr Malyuskin, Senior Lecturer, Queen's University Belfast, UK

Dr. Sanjeev Sanghi, Professor, Indian Institute of Technology, India

Dr. Selvi Kannan, Senior Lecturer, University of Tasmania, Australia

Dr. Vitalyi Igorevich Talanin, Full Professor and Scientific Consultant, Khortytsia National Academy, Ukraine

Dr. Wael Zatar, Dean and Professor, College of Engineering and Computer Sciences, Marshall University, USA

Program Coordinators

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WCFN

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ICE

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WCSM & WCAI & SMF

Ms. Snowy Liang / snowy.wcsn@gala-loc.com

Welcome Remark

Distinguished Guests, Esteemed Colleagues, and Friends,

On behalf of the organizers, it is with immense pleasure that we welcome you to the International Exchange of Professionals - Thematic Event in Sustainable Development 2025! This exciting event, convening from November 11th to 13th at Grand Prince Hotel Osaka Bay, Osaka, Japan, promises to be a landmark gathering.

We are proud to be hosted by the World High Technology Society, operated by BIT Group Global Ltd. and Shenzhen Center for International Exchange of Personnel. We also extend our gratitude to the esteemed supporting organization China Association for International Exchange of Personnel and IMarEST.

This unique conference integrates nine distinct parallel meetings, encompassing a wide range of sustainable development disciplines:

- The 10th Annual Global Congress of Knowledge Economy
- The 7th World Congress of Education
- The 13th Annual World Congress of Ocean
- The 11th World Energy Congress
- The 12th Annual World Congress of Food and Nutrition
- The 6th International Congress of Environment
- The 9th Annual World Congress of Smart Materials
- The 3rd World Congress of AI Industry
- The 3rd Smart Manufacturing Forum

Through meticulous preparation, we are delighted to welcome over 250 specialists from 41 countries and regions. This esteemed gathering fosters a vibrant exchange of knowledge and collaboration. As always, our mission is to connect leading academic scientists and researchers across diverse fields, such as economy, education, ocean, knowledge, energy, environment, food, nutrition, material, AI industry, and manufacturing. This platform allows for the sharing of groundbreaking ideas and advancements within sustainable development. The conference offers a wealth of learning and networking opportunities, including keynote lectures, posters, exhibition and engaging oral talks.

We are thrilled to have you join us! Together, let's make this event a resounding success.

Sincerely yours,



Dr. Xiaodan Mei
Executive Chair

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List of Organizations and Event Organizers

Welcome Remark

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Floor Plan

Program

Keynote Forum

Speakers' Profiles

Mr. Paul Holthus, Prof. Sergei Prants, Dr. Qiang Xu, Dr. James Wang,

Prof. Dr. Jacqueline E. van Muijlwijk-Koezen, Dr. Julie Furst-Bowe, Dr. Jan Kazmierczak,

Dr. Simon Thomas, Dr. Hugh Glass

The 10th Annual Global Congress of Knowledge Economy (GCKE-2025)

GCKE 01: Tech Innovation & Digital Transformation

Speakers' Profiles

Dr. Leslie Paul Thiele, Dr. James R. Stone III, Dr. David J. Smith, Dr. Nikolaos Milonas,

Dr. Nicolaj Hannesbo Petersen, Dr. Ioana Filipas, Dr. Francois Marmier, Dr. Mark van der Pas,

Dr. Yvonne Kabeya Saini, Dr. Sally Dzingwa

GCKE 02: Smart Cities, Geography and Urban Economics

Speakers' Profiles

Dr. Yaron Ergas, Dr. Valentina Colcelli, Mr. Manoj Dalaya, Dr. Andreas Koch, Dr. Jan Veuger,

Mr. Andrew Gardiner, Dr. David de Wild, Dr. Abood K. Alamoudi

GCKE 03: Artificial Intelligence, Industrial, Manufacturing Engineering

Speakers' Profiles

Dr. Ute Dietrich, Dr. Lucas Zimmer, Dr. Ibrahim Abdullahi, Dr. Felix T. S. Chan, Dr. Irina Illina,

Dr. Doron Netzer, Dr. Deivison Feitosa Silva, Dr. Ji-Jen Hwang, Dr. Hyun-A Park

GCKE 04: Economic Governance & Sustainable Development

Speakers' Profiles

Dr. Souad Lajili Jarjir, Dr. Arthur Charpentier, Mr. Mathieu Sollier, Dr. Jianghong Liu,

Dr. Paulo Alves Pardal, Dr. Amna Javed, Dr. Anjali Prashad

GCKE 05: Energy, Environment and Climate

Speakers' Profiles

Dr. Harold L. Dodds, Ind. Ing. Stefano Ambrosini, Mr. Michael Storch, Mr. Craig Applegath,
Dr. Bernard Twarog, Dr. Natangue Heita Shafudah

GCKE 06: Management of Technology Education and Research

Speakers' Profiles

Dr. Baruch Offir, Dr. Syh-Jong Jang, Dr. Gilbert Paquette, Dr. Clair Andersen, Dr. Takeo Higuchi,
Dr. Rupam Saran

GCKE 07: Video Forum

Speakers' Profiles

Dr. Viacheslav Kalashnikov, Ms. Lynda Hamadene, Mr. Luis Pisco, Dr. Anatoly Davidovsky

The 7th World Congress of Education (WCE-2025)**WCE 01: Higher Education Forum (I)**

Speakers' Profiles

Dr. Elaine Chapman, Dr. Ohashi Yoshie, Dr. Hassan Al-Derham, Dr. Julie Furst-Bowe, Dr. Yiping Wu,
Dr. Peyman Ghassemi Pour Sabet, Ts. Dr. Capt. Manivannan Subramaniam, Dr. Carlos A. V. Costa,
Dr. Ana Thudichum Vasconcelos, Dr. Mehmet Deniz Demircioğlu

WCE 02: Disruptive Edu-Tech Forum

Speakers' Profiles

Dr. Kaoru Sumi, Dr. William T. Tarimo, Dr. Jean-Eric Pelet, Dr. Dena Gilby, Dr. David Okoth,
Dr. Marcia J. Mackey, Dr. John Sabatini, Dr. Martin Žagar, Dr. Jing Song

WCE 03: Medical and Health Education Forum

Speakers' Profiles

Dr. Grazyna Nowak-Starz, Dr. Lacroix Valérie, Dr. Dorota Rębak, Dr. Prashant Jindal,
Dr. Mariola Wojciechowska, Dr. Agnieszka Strzelecka

WCE 04: Higher Education Forum (II)

Speakers' Profiles

Dr. Jennifer Stokes, Prof. Dr. Jacqueline E. van Muijlwijk-Koezen, Dr. Anita Bledsoe-Gardner,
Dr. Sue Walker, Dr. Jacqueline J. Schenk, Dr. Stefaniya Alisauskiene, Dr. Julija Grigenaite,
Dr. Qing Wu, Dr. Ulla Damber, Prof. Dr. Dagmar Reichardt, Dr. Julie Cwikla

WCE 05: STEAM Education Forum

Speakers' Profiles

Dr. William Yip, Dr. Richard Cangro, Dr. Ofira Ayalon, Dr. Vanina Lorenzi, Dr. Christine Chancogne, Dr. Peer Mohideen Sathikh, Dr. Santa Gregorj-Santini, Dr. Jorge Manuel dos Reis Tavares Duarte

WCE 06: Humanities and Social Science Education Forum

Speakers' Profiles

Dr. Mutsuko Tendo, Dr. Jean-Paul Close, Dr. Davina D. Rousell, Dr. Doreen Frencheater, Dr. Kalpana Mukunda Iyengar, Dr. Claudia Marinho Wanderley

WCE 07: Video Forum

Speakers' Profiles

Dr. Marja-Liisa Tenhunen, Dr. Oksana Ivanova, Dr. Lorenzo Manera, Mr. David Wortley, Dr. Mahtash Esfandiari, Dr. Aliya Khalid, Dr. Ephraim Grossman, Dr. Ricardo León Bórquez, Dr. Mirosław Kowalski, Dr. Anita Famuła-Jurczak, Dr. Roseanne L. Flores

The 13th Annual World Congress of Ocean (WCO-2025)**WCO 01: Ocean Economy and Maritime Law**

Speakers' Profiles

Dr. Feier Chen, Dr. Hermann Held, Dr. Moshe Agami, Ms. Qingliu Ren, Dr. Salvatore Vitale, Mr. Nobuto Yamaguchi, Mr. George Ossipov, Ms. Ramat Jalloh, Dr. Hari Narayan Veettath Brelviv

WCO 02: Ocean Engineering, Science and Technologies

Speakers' Profiles

Dr. Victor Dyomin, Ts. Dr. Captain Manivannan Subramaniam, Mr. Earl J. Dodd, Dr. Yael Edelman-Furstenberg, Dr. Dariusz Popielarczyk, Dr. Natascha Oppelt, Mr. Yoshinari Oguro, Dr. Kun Yang, Dr. Tomasz Templin, Dr. Céphas Xuma, Dr. Marilyn J. Bruno

WCO 03: Ocean Energy Development and Utilization

Speakers' Profiles

Mr. James H Anderson, Dr. Yanbin Wang, Mr. Andy Billcliff, Dr. Jinglong Yao, Mrs. Cindy Wilcox

WCO 04: Smart Port, Green Shipping

Speakers' Profiles

Mr. Olli Soininen, Mr. Guangrong Zou, Mr. Airam Díaz, Mr. Stathis Anagnostou, Captain Yoss Leclerc, Mr. Dana A. Goward

WCO 05: Aquaculture and Fisheries

Speakers' Profiles

Mr. Paolo Bray, Dr. Weixin Ding, Mr. Marcel Franz, Dr. Bosiljka Mustać, Mrs. Ana Olivert

WCO 06: Ocean Management and Environment Protection

Speakers' Profiles

Dr. Michikazu Kojima, Dr. Xin Liu, Ms. Chika Sato, Mr. Nigel Bowen-Morris, Mr. Chenxi Sun

The 11th World Energy Congress (WEC-2025)**WEC 01: Latest Research and Development on Energy and Its Application**

Speakers' Profiles

Mr. David Robert Cavanagh, Dr. Juergen Knorr, Dr. Pascal Briois, Dr. Jun Pan, Dr. Jianxu Zhou, Dr. Kilyong Choi, Dr. Sergey N. Martyushov

WEC 02: Global Energy Policies, Market and Future Trends

Speakers' Profiles

Dr. Ervin Tal-Gutelmacher, Dr. Izabela Barbara Sztangret, Dr. Kornelia Przedworska, Dr. Somayeh Mohammady, Dr. İbrahim Gurer

The 12th Annual World Congress of Food and Nutrition (WCFN-2025)**WCFN 01: Research and Development for Food and Nutrition Science**

Speakers' Profiles

Dr. Toshio Inui, Dr. Satoshi Matsuda, Mr. Kento Hamada, Dr. Sevim Kandis Sever, Dr. Hanaa Ahmed Abokoura, Dr. Ekkehart Paditz, Dr. Nur Suhaidah Binti Sukor

The 6th International Congress of Environment (ICE-2025)**ICE 01: Hot Topics in Environment Field**

Speakers' Profiles

Dr. Tinatin Doolotkeldieva, Dr. Jungyu Park, Dr. Styliani Sofianopoulou, Dr. Vassilis Dedoussis, Dr. Arminda do Paco, Dr. Margarida Catalao-Lopes, Dr. Ruili Zhao, Dr. Joaquim Gois, Dr. Antonio Fiuza, Mr. Craig Applegath, Dr. Hulya Coskun, Dr. Xiaowu Huang, Dr. Elie Fereche Itoba-Tombo

ICE 02: Video Forum

Speakers' Profiles

Dr. Abderrahim Benmoussat, Dr. Andrii Polyvianchuk

The 9th Annual World Congress of Smart Materials (WCSM-2025) & The 3rd Smart Manufacturing Forum (SMF-2025)

WCSM 01: Smart Materials Structures, Engineering and Manufacturing

Speakers' Profiles

Dr. Iryna Bashynska, Dr. Stuart Wiesner, Dr. Victor Eduardo Comparan Padilla, Dr. Younseon Wang,
Dr. Gong Zhang, Dr. Yu Zheng, Dr. Anil Kumar Pabby, Mr. David Wortley, Dr. G. D. Ransinchung R. N

WCSM 02: Smart Optical, Electronic and Magnetic Materials

Speakers' Profiles

Dr. Cecil Bruce-Boye, Dr. Seiji Fukushima, Dr. Wen Huang, Dr. Tsang-Ling Sheu, Dr. Sergiu Lionte,
Dr. Claude R Phipps, Dr. Chi-Hsiang Hsieh

WCSM 03: Future Trends and Applications of Smart Materials

Speakers' Profiles

Dr. Raj Das, Dr. Didier Devaux, Dr. Paweł Pasierb, Mr. Manoj Dalaya, Dr. Tudor Oarga,
Dr. Bogdan Varga, Dr. Dan Moldovanu, Dr. Nicolae Cordoș, Dr. Horațiu Cărbăușan, Dr. Gabriel Prunean,
Dr. Nicolae Vlad

The 3rd World Congress of AI Industry (WCAI-2025)

WCAI 01: AI Industry

Speakers' Profiles

Dr. Hsing-Yu Tuan, Dr. Michael Short, Dr. Tino Krüger-Basjmeleh, Dr. Elena Troubitsyna,
Dr. Martin Klimo, Dr. Henry Hexmoor, Dr. Victor Dyomin, Dr. Lucia Knapcikova, Dr. Tiffanie Zaugg,
Dr. Shenbo Zhou

Posters & Papers

Dr. Ekkehart Paditz, Dr. Tiziana Pepe, Dr. Erland G. Kolomyts, Dr. Andrii Polyvianchuk,
Ms. Katarzyna Kozubal, Ms. Weronika Gura, Ms. Patrycja Gaćkowska-Gondek,
Dr. Katarzyna Cholewa-Kowalska, Mr. Jun-Yu Wang

Event Schedule

Time: November 11-13, 2025

Venue: Grand Prince Hotel Osaka Bay, Japan

Date	Time	Program	Place
November 10, 2025 (Monday)	09:00-21:00	Registration	Lobby, First Floor
November 11, 2025 (Tuesday)	09:00-09:10	Opening Ceremony	Sapphire & Crystal, Second Floor
	09:10-11:55	Keynote Forum	
	12:00-13:00	Lunch	Prince-AB, Third Floor
	13:30-16:50	GCKE 01: Tech Innovation & Digital Transformation	Yamato A, Fifth Floor
	13:30-16:45	GCKE 02: Smart Cities, Geography and Urban Economics	Yamato B, Fifth Floor
	13:30-16:45	WEC 01: Latest Research and Development on Energy and Its Application	Kamo, Fifth Floor
	13:30-17:10	WCE 01: Higher Education Forum (I)	Katsura, Fifth Floor
	13:30-17:35	WCO 01: Ocean Economy and Maritime Law	Yoshino, Fifth Floor
	13:30-17:35	WCSM 01: Smart Materials Structures, Engineering and Manufacturing	Tatsuta, Fifth Floor
	15:15-15:30	Coffee Break	Lounge Area, Fifth Floor
	18:30-20:30	Welcome Banquet	Prince-AB, Third Floor
November 12, 2025 (Wednesday)	08:30-11:50	GCKE 03: Artificial Intelligence, Industrial, Manufacturing Engineering	Yamato A, Fifth Floor
	08:30-11:45	GCKE 04: Economic Governance & Sustainable Development	Yamato B, Fifth Floor
	08:30-11:50	WCE 02: Disruptive Edu-Tech Forum	Katsura, Fifth Floor
	08:30-11:20	WCE 03: Medical and Health Education Forum	Kamo, Fifth Floor
	08:30-12:30	WCO 02: Ocean Engineering, Science and Technologies	Yoshino, Fifth Floor
	08:30-11:45	WCSM 02: Smart Optical, Electronic and Magnetic Materials	Tatsuta, Fifth Floor
	10:15-10:30	Coffee Break	Lounge Area, Fifth Floor
	12:00-13:00	Lunch	Sapphire & Crystal, Second Floor

Event Schedule

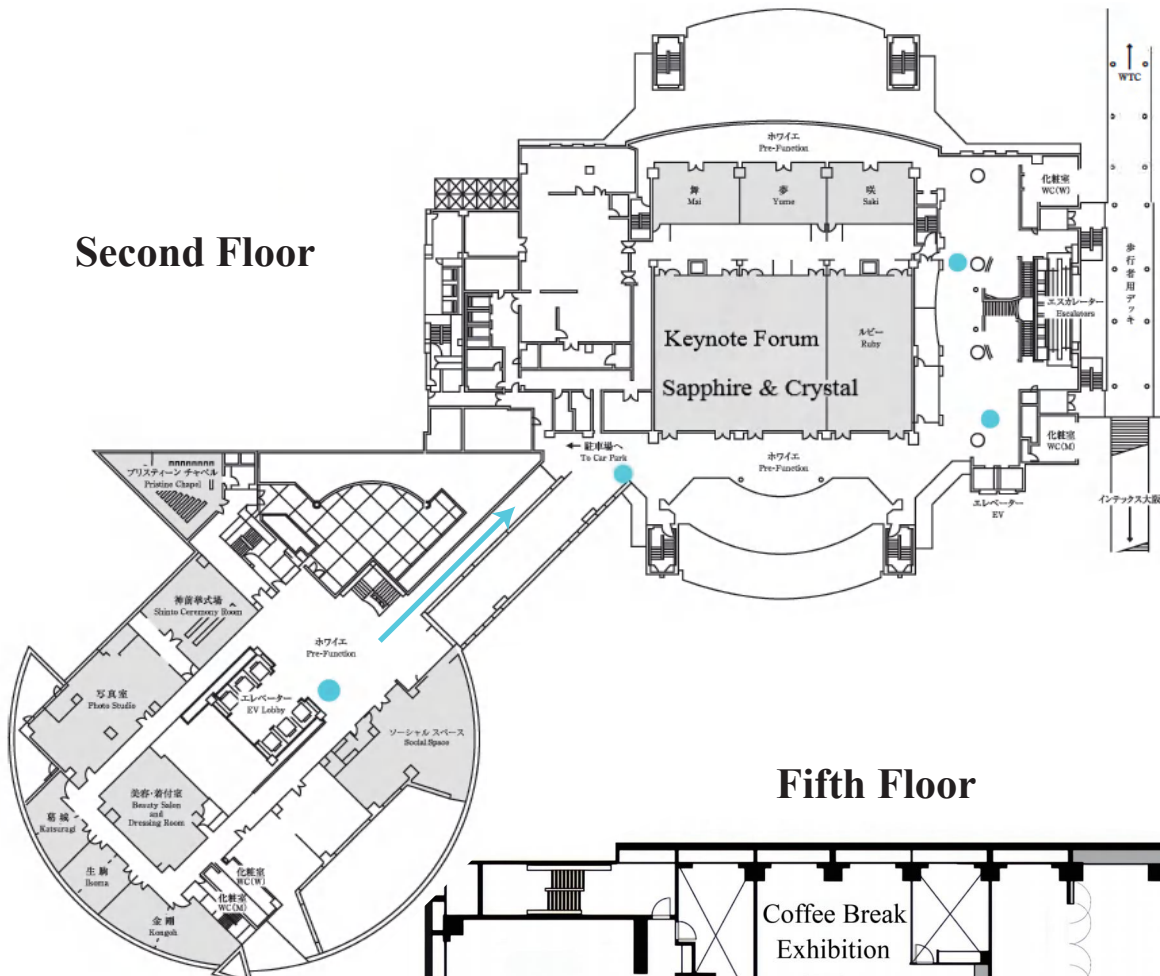
Time: November 11-13, 2025

Venue: Grand Prince Hotel Osaka Bay, Japan

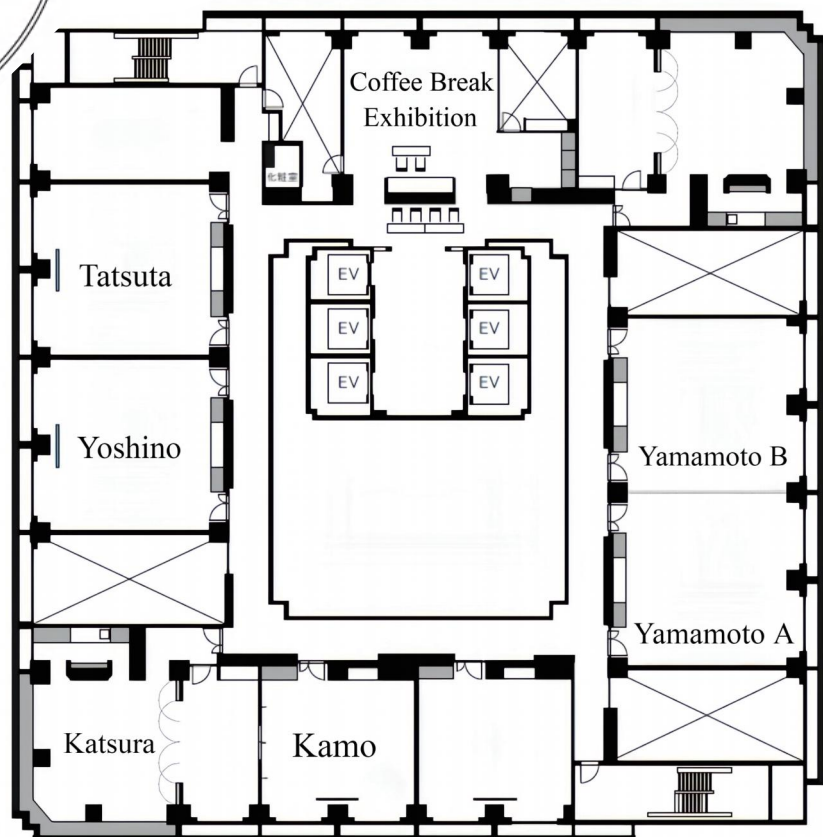
Date	Time	Program	Place
November 12, 2025 (Wednesday)	13:30-16:20	GCKE 05: Energy, Environment and Climate	Yamato A, Fifth Floor
	13:30-17:10	WCE 04: Higher Education Forum (II)	Yamato B, Fifth Floor
	13:30-16:45	WCFN 01: Research and Development for Food and Nutrition Science	Kamo, Fifth Floor
	13:30-18:10	ICE 01: Hot Topics in Environment Field	Katsura, Fifth Floor
	13:30-15:15	WCO 03: Ocean Energy Development and Utilization	Yoshino, Fifth Floor
	15:30-17:35	WCO 04: Smart Port, Green Shipping	
	13:30-17:10	WCAI 01: AI Industry	Tatsuta, Fifth Floor
	15:15-15:30	Coffee Break	Lounge Area, Fifth Floor
November 13, 2025 (Thursday)	08:30-11:20	GCKE 06: Management of Technology Education and Research	Yamato A, Fifth Floor
	08:30-11:45	WCE 05: STEAM Education Forum	Yamato B, Fifth Floor
	08:30-10:15	WCO 05: Aquaculture and Fisheries	Yoshino, Fifth Floor
	10:30-12:15	WCO 06: Ocean Management and Environment Protection	
	08:30-10:15	WCE 06: Humanities and Social Science Education Forum	Kamo, Fifth Floor
	10:30-12:15	WEC 02: Global Energy Policies, Market and Future Trends	
	08:30-11:45	WCSM 03: Future Trends and Applications of Smart Materials	Tatsuta, Fifth Floor
	10:15-10:30	Coffee Break	Lounge Area, Fifth Floor
	12:00-13:00	Lunch	Sapphire & Crystal, Second Floor
November 11-13, 2025	09:00-17:30	Posters & Exhibition	Lounge Area, Fifth Floor

Floor Plan

Second Floor



Fifth Floor



Program

Time: November 11-13, 2025

Venue: Grand Prince Hotel Osaka Bay, Japan

Registration

Time: 09:00-21:00, November 10, 2025 (Monday); **Place:** Lobby, First Floor

Opening Ceremony

Time: 09:00-09:10, November 11, 2025 (Tuesday); **Place:** Sapphire & Crystal, Second Floor

Keynote Forum

Time: 09:10-11:55, November 11, 2025 (Tuesday); **Place:** Sapphire & Crystal, Second Floor

Moderator **Dr. James Wang**, Professor and Director of the eVTOL Research & Innovation Centre, Nanyang Technological University, Singapore

09:10-09:15 **Moderator's Introduction**

09:15-09:35 **Title:** Global Private Sector Leadership for the Sustainable Blue Economy
Mr. Paul Holthus, Founding President and CEO, World Ocean Council, USA

09:35-09:55 **Title:** Ocean Fronts and Sustainable Fishery
Prof. Sergei Prants, Member of the Russian Academy of Sciences; Head of Department of the Ocean and Atmosphere Physics, Pacific Oceanological Institute of the Russian Academy of Sciences, Russia

09:55-10:15 **Title:** Engineering Metal-Organic Frameworks for Energy Applications
Dr. Qiang Xu, Chair Professor, Southern University of Science and Technology, China; Fellow of Engineering Academy of Japan

10:15-10:35 **Title:** Future Applications of AI and Smart Materials in Aircraft Design
Dr. James Wang, Professor and Director of the eVTOL Research & Innovation Centre, Nanyang Technological University, Singapore

10:35-10:55 **Title:** The Academic Teacher as Change Agent in the Age of AI
Prof. Dr. Jacqueline E van Muijlwijk-Koezen, Chief Education Officer (Vice-Rector Education), Vrije University Amsterdam, the Netherlands

10:55-11:15 **Title:** Digital Transformation in Higher Education: Maximizing Student Success
Dr. Julie Furst-Bowe, Provost and Academic Vice President, Georgian Court University, USA

11:15-11:35 **Title:** Remarks on the Importance of Knowledge About the Inhabitants of Transformed Urban Organisms in "Smart City" Projects
Dr. Jan Kazmierczak, Professor, Faculty of Organization and Management, Silesian University of Technology, Poland

11:35-11:55 **Title:** Advancing Electronics Using Graphene
Dr. Simon Thomas, Founder and CEO, Paragraf, UK; Fellow of Royal Academy of Engineering
Dr. Hugh Glass, Product Manager, Paragraf, UK

The 10th Annual Global Congress of Knowledge Economy (GCKE-2025)

GCKE 01: Tech Innovation & Digital Transformation

Time: 13:30-16:50, November 11, 2025 (Tuesday); **Place:** Yamato A, Fifth Floor

Chair **Dr. Mark van der Pas**, Managing Director, Uffective; Lecturer, Maastricht University, the Netherlands

Co-chair **Dr. Nicolaj Hannesbo Petersen**, Researcher, Incubator & Project Manager, UCL University College, Denmark

13:30-13:35 **Chair's Introduction**

13:35-13:55 **Title:** Artificial General Intelligence, The End of Work, And the Gamification of Life
Dr. Leslie Paul Thiele, Distinguished Professor, University of Florida, USA

13:55-14:15 **Title:** Artificial Intelligence, Robotics and Their Impact of the Future Labor Market
Dr. James R. Stone III, Director, National Research Center for Career & Technical Education at the SREB, USA

14:15-14:35 **Title:** The Neural Web: Harnessing IoE and Neuromarketing to Revolutionize Modern Marketing Strategies
Dr. David J. Smith, Professor of Management and Associate Dean, Rinker School of Business, Palm Beach Atlantic University, USA

14:35-14:55 **Title:** Challenges and Opportunities in Technology Transfer: A Review
Dr. Nikolaos Milonas, Professor Emeritus, National and Kapodistrian University of Athens, Greece

14:55-15:15 **Title:** Strategic Management and Business Model Innovation: Navigating the Knowledge Economy Through Socio-Cognitive Innovation with the Blank Business Model Canvas
Dr. Nicolaj Hannesbo Petersen, Researcher, Incubator & Project Manager, UCL University College, Denmark
Editor-in-Chief of the International Journal of Strategic Management and Innovation

15:15-15:30 **Coffee Break**

15:30-15:50 **Title:** Project Management on Digital and Sustainable Organizational Transformation
Dr. Ioana Filipas, Associate Professor, University of Strasbourg, France
Dr. Francois Marmier, Associate Professor, University of Strasbourg, France

15:50-16:10 **Title:** Less Is More: A Practitioner's Guide to Maximising IT Investments
Dr. Mark van der Pas, Managing Director, Uffective; Lecturer, Maastricht University, the Netherlands

16:10-16:30 **Title:** Social Media Shopping Activities, Emotions, and Loneliness on Well-being in South Africa
Dr. Yvonne Kabeya Saini, Senior Lecturer, University of Witwatersrand, South Africa

16:30-16:50 **Title:** Towards a Robust and Integrated Data Strategy for a University of Technology
Dr. Sally Dzingwa, Institutional Registrar, Central University of Technology Free State, South Africa

GCKE 02: Smart Cities, Geography and Urban Economics

Time: 13:30-16:45, November 11, 2025 (Tuesday); **Place:** Yamato B, Fifth Floor

Chair **Dr. Andreas Koch**, Professor and Co-Director of the Center for Ethics and Poverty Research, University of Salzburg, Austria

Co-chair **Dr. Jan Veuger**, CEO, CORPORATE Real Estate Management, the Netherlands

13:30-13:35 **Chair's Introduction**

13:35-14:00 **Title:** How Can We Estimate the Market Potential of Sustainable Tourism?
Dr. Yaron Ergas, Director of Research and Statistics, Ministry of Tourism, Israel

14:00-14:25 **Title:** Elements of European Law for a Legal Modelling of Urban Digital Twins
Dr. Valentina Colcelli, Senior Researcher, Italian National Research Council (CNR), Italy

14:25-14:50 **Title:** Adaptive Reuse of Buildings: Smart Systems & Policy
Mr. Manoj Dalaya, Co-President, KGD Architecture, USA

14:50-15:15 **Title:** The Local Matters in Urban Economics
Dr. Andreas Koch, Professor and Co-Director of the Center for Ethics and Poverty Research, University of Salzburg, Austria

15:15-15:30 **Coffee Break**

15:30-15:55 **Title:** Urban Facility Management: A Quantitative and Quality Study
Dr. Jan Veuger, CEO, CORPORATE Real Estate Management, the Netherlands

15:55-16:20 **Title:** Applying Complexity Theory to Understanding Small Business Grant Programme Impact in Syria
Mr. Andrew Gardiner, Independent Researcher, Former International Committee of the Red Cross Delegate, Australia
Dr. David de Wild, Independent Aid & Development Adviser, De Wild Consulting, Switzerland

16:20-16:45 **Title:** Implementing Smart Sustainable Cities in Saudi Arabia: A Framework for Citizens' Participation Towards SAUDI VISION 2030
Dr. Abood K. Alamoudi, Assistant Professor, Imam Abdulrahman Bin Faisal University, Saudi Arabia

GCKE 03: Artificial Intelligence, Industrial, Manufacturing Engineering

Time: 08:30-11:50, November 12, 2025 (Wednesday); **Place:** Yamato A, Fifth Floor

Chairs	Dr. Ibrahim Abdullahi , Data Intelligence Lead, John G Russell (Transport) Limited, UK Dr. Hyun-A Park , Assistant Professor, Honam University, South Korea
08:30-08:35	Chair's Introduction
08:35-08:55	Title: Digital Twins as Enablers for Intelligent and Sustainable Control in Manufacturing Systems Dr. Ute Dietrich , Professor, HTW Berlin, University of Applied Science, Germany
08:55-09:15	Title: Supply Chain Disruptions: Firm-Level Evidence from the 2011 Tohoku Earthquake Dr. Lucas Zimmer , Permanent Professor, INSEEC Grande Ecole, France
09:15-09:35	Title: Data-Driven Digital Twins: AI-Enabled Asset Optimization in Transport and Manufacturing Systems Dr. Ibrahim Abdullahi , Data Intelligence Lead, John G Russell (Transport) Limited, UK
09:35-09:55	Title: Enhancing Urban Circular Economy Efficiency: Integration of Artificial Neural Networks with Fuzzy Dynamic Network Slack-Based Measure Dr. Felix T. S. Chan , Chair Professor and Vice Dean, Macau University of Science and Technology, Macao, China
09:55-10:15	Title: Challenges of Automatic Speech Recognition Dr. Irina Illina , Associate Professor, Lorraine University, LORIA-INRIA, CNRS, France
10:15-10:30	Coffee Break
10:30-10:50	Title: Clalit AI – the C-Pi Platform for Proactive and Preventive Interventions Dr. Doron Netzer , Professor, Division of Community Medical Services, Clalit Health Services, Israel
10:50-11:10	Title: Leveraging DevOps Tools and AI to Enhance Agile Project Delivery Dr. Deivison Feitosa Silva , Researcher, UNINOVE – University Nine of July, Brazil
11:10-11:30	Title: The Evolution of Combined Arms Warfare in the AI Era: Technological Empowerment, Tactical Adaptation, And Insights from the Ukraine Conflict Dr. Ji-Jen Hwang , Associate Professor, Defense and Security Program, Rabdan Academy, UAE
11:30-11:50	Title: Securing Tomorrow: Human-Centric Technologies Toward 5 th Industrial Revolution Era Dr. Hyun-A Park , Assistant Professor, Honam University, South Korea

GCKE 04: Economic Governance & Sustainable Development

Time: 08:30-11:45, November 12, 2025 (Wednesday); **Place:** Yamato B, Fifth Floor

Chair	Dr. Arthur Charpentier , Professor, University of Quebec in Montreal, Canada
Co-chair	Dr. Jianghong Liu , Senior Lecturer in Economics and Finance, London Metropolitan University, UK
08:30-08:35	Chair's Introduction
08:35-09:00	Title: Do Training Programs Improve Awareness of Sustainable Finance? Dr. Souad Lajili Jarjir , Professor, University of Lorraine, France
09:00-09:25	Title: Fairness and Insurance: Disentangling Illegitimate and Indirect Discriminations Dr. Arthur Charpentier , Professor, University of Quebec in Montreal, Canada
09:25-09:50	Title: Strategic Financial Architecture Underpinning the Global Digital Economy's Next Frontier Mr. Mathieu Sollier , CEO & Founder, Strategic Metrics Asset Management, Switzerland
09:50-10:15	Title: The Role of Fintech from Digital Savings to Reduce Income Inequality and Enhance Economic Development in Emerging and Developing Asia (EMDA) Countries Dr. Jianghong Liu , Senior Lecturer in Economics and Finance, London Metropolitan University, UK
10:15-10:30	Coffee Break
10:30-10:55	Title: The European Union's Approach to Implementing a Sustainable Finance Framework Dr. Paulo Alves Pardal , Professor, University of Lisbon, Portugal
10:55-11:20	Title: The Role of Sustainable Transportation in the Knowledge Age: Case of Ride-Hailing Service Dr. Amna Javed , Senior Lecturer, Japan Advanced Institute of Science and Technology, Japan
11:20-11:45	Title: International Climate Finance Flows into India (2015-2021) and Required Investment Dr. Anjali Prashad , Assistant Professor, University of Delhi, India

GCKE 05: Energy, Environment and Climate

Time: 13:30-16:20, November 12, 2025 (Wednesday); **Place:** Yamato A, Fifth Floor

Chair	Mr. Michael Storch , CEO, Mangold Photovoltaik GmbH, Germany
Co-chair	Ind. Ing. Stefano Ambrosini , CEO, Waste Management Specialist s.r.l., Italy
13:30-13:35	Chair's Introduction
13:35-14:00	Title: Energy Choices and Consequences-2025 Update Dr. Harold L. Dodds , IBM Professor of Engineering and Department Head Emeritus, University of Tennessee Nuclear Engineering Department (UTNE), USA
14:00-14:25	Title: Case Study: Mata de São João, Brazil. From 0% to 70% Separate Door-to-Door Waste Collection in Only Three Months Ind. Ing. Stefano Ambrosini , CEO, Waste Management Specialist s.r.l., Italy
14:25-14:50	Title: Innovations in Photovoltaics: The Future of Energy Generation with Tandem Solar Cells Mr. Michael Storch , CEO, Mangold Photovoltaik GmbH, Germany
14:50-15:15	Title: Connecting the Dots: Climate Adaptation Lessons from the Frontlines of Innovation and Hope Mr. Craig Applegath , Partner, DIALOG, Canada
15:15-15:30	Coffee Break
15:30-15:55	Title: Leveraging Advanced Statistical Methods to Optimize Renewable Energy Shares in Hybrid Systems Under Climate Variability: A Case Study of PV and Wind Power in Europe Dr. Bernard Twarog , Assistant Professor, Cracow University of Technology, Poland
15:55-16:20	Title: Integrated Renewable Energy Solutions in Namibia: Leveraging Green Hydrogen, Biomass Pellets, And Organic Waste for Sustainable Energy Transition Dr. Natangue Heita Shafudah , Senior Lecturer, University of Namibia, Namibia

GCKE 06: Management of Technology Education and Research

Time: 08:30-11:20, November 13, 2025 (Thursday); **Place:** Yamato A, Fifth Floor

Chair	Dr. Gilbert Paquette , Emeritus Professor, TELUQ University, Canada
Co-chair	Dr. Syh-Jong Jang , Distinguished Professor, Center for General Education, Asia University, Taiwan
08:30-08:35	Chair's Introduction
08:35-09:00	Title: Teacher-Student Interactions and Learning Outcomes in a Distance Learning Environment: A Forty-Five-Year Journey from Theory to Practice Dr. Baruch Offir , Professor, Bar-Ilan University, Israel
09:00-09:25	Title: ChatGPT on University Instructors' Profession Development and Students' Self-Regulated Learning Dr. Syh-Jong Jang , Distinguished Professor, Center for General Education, Asia University, Taiwan

- 09:25-09:50 **Title:** Knowledge Management for Technology-based Education Planning and Delivery in the Artificial Intelligence Era
Dr. Gilbert Paquette, Emeritus Professor, TELUQ University, Canada
- 09:50-10:15 **Title:** Using Technology to Share Story of Place
Dr. Clair Andersen, Associate Professor, Higher Education Advisor, University of Tasmania, Australia
- 10:15-10:30 **Coffee Break**
- 10:30-10:55 **Title:** A Comprehensive Framework of the Idea-Marathon System (IMS) for Creativity Education and Training: Applications Across Business, Industry, Innovation, Higher Education, K-12, Early Childhood, And Senior Well-being
Dr. Takeo Higuchi, Executive Director, Idea-Marathon System Institute, Japan
- 10:55-11:20 **Title:** Preservice Teachers Learning to Teach with Artificial Intelligence and Metacognitive Strategies
Dr. Rupam Saran, Professor, Medgar Evers College, The City University of New York, USA

GCKE 07: Video Forum

- 01 **Title:** Consistent Conjectural Variations Equilibrium for a Bilevel Human Migration Model
Dr. Viacheslav Kalashnikov, Professor and Researcher, Autonomous University of Nuevo Leon, Mexico
Co-authors: Daniela Osorio-Gonzalez, Jose Guadalupe Flores-Muniz, and Nataliya Kalashnykova
- 02 **Title:** The Contribution of GIS to the Sustainable Management of Water Resources in Algeria
Ms. Lynda Hamadene, University of Science and Technology Houari Boumediene, Algeria
- 03 **Title:** Multi-level Smart Charging and Grid Balancing
Mr. Luis Pisco, R&D Engineer, EDP R&D, Portugal
- 04 **Title:** The Impact of the Development of the Digital Economy on Biodemographic Indicators of Human Development in the World System in the Global Knowledge Economy
Dr. Anatoly Davidovsky, Associate Professor, Belarusian State University of Informatics and Radio Electronics, Russia

The 7th World Congress of Education (WCE-2025)

WCE 01: Higher Education Forum (I)

Time: 13:30-17:10, November 11, 2025 (Tuesday); **Place:** Katsura, Fifth Floor

Chair	Dr. Julie Furst-Bowe , Provost and Academic Vice President, Georgian Court University, USA
Co-chair	Dr. Carlos A. V. Costa , Professor Emeritus, Faculty of Engineering, University of Porto, Portugal
13:30-13:35	Chair's Introduction
13:35-13:55	Title: Drawing upon Multidisciplinary and Multi-sector Teams to Enhance Assessment Processes in Higher Education Dr. Elaine Chapman , Deputy Head, University of Western Australia, Australia
13:55-14:15	Title: The Maladjustment Dynamics of Teachers Commonly Seen in Modern Japan: From the Perspectives of Psychoanalysis, Group Analysis, and Mentalization Dr. Ohashi Yoshie , Professor, Kyoto Bunkyo University, Japan
14:15-14:35	Title: The Role of the National University in a New Era Dr. Hassan Al-Derham , Past President, Qatar University, Qatar
14:35-14:55	Title: Embedding Micro-Credentials in Educational Programs Dr. Julie Furst-Bowe , Provost and Academic Vice President, Georgian Court University, USA
14:55-15:15	Title: An Ethnographic Study of Foreign Language Teachers' Professional Anxiety and Identity Adaptation in the Age of AI in Higher Education Dr. Yiping Wu , Associate Professor, School of Foreign Languages, Zhejiang Gongshang University, China
15:15-15:30	Coffee Break
15:30-15:50	Title: The Contributory Model of Intercultural Competence: A Psychosocial Approach Dr. Peyman Ghassemi Pour Sabet , Lecturer, The University of Western Australia, Australia
15:50-16:10	Title: Sustainability and Digital Advancement in Maritime Transportation – A Proposal to Future Proof Maritime Academia Ts. Dr. Capt. Manivannan Subramaniam , Chief Executive, Akademi Laut Malaysia, Malaysia
16:10-16:30	Title: Engineering Epistemology Revisited: Embedding Sustainable Development Dr. Carlos A. V. Costa , Professor Emeritus, Faculty of Engineering, University of Porto, Portugal
16:30-16:50	Title: Integrating Design Thinking and Arts in Education: Skills, Inclusion, And Pedagogical Transformation Dr. Ana Thudichum Vasconcelos , Professor, University of Lisbon, Portugal

16:50-17:10 **Title:** Activating Broca's and Wernicke's Areas to Facilitate the Transition from Pre-Intermediate to Intermediate English Proficiency
Dr. Mehmet Deniz Demircioğlu, Lecturer, Bursa Uludağ University, Turkey

WCE 02: Disruptive Edu-Tech Forum

Time: 08:30-11:50, November 12, 2025 (Wednesday); **Place:** Katsura, Fifth Floor

Chair **Dr. Jean-Eric Pelet**, Professor, KMCMS, France

Co-chair **Dr. Marcia J. Mackey**, Professor, Central Michigan University, USA

08:30-08:35 **Chair's Introduction**

08:35-08:55 **Title:** Emotionally Intelligent Educational AI and Future Learning Support: Building Equal Relationships with Artifacts

Dr. Kaoru Sumi, Professor, Future University Hakodate, Japan

08:55-09:15 **Title:** Beyond the Pandemic Pivot: An Agile Framework for Pedagogy in Times of Crises

Dr. William T. Tarimo, Assistant Professor, Connecticut College, USA

09:15-09:35 **Title:** GenAI Benefits VS Hidden Ecological Costs: An Empirical Study of GenAI Adoption Among Students

Dr. Jean-Eric Pelet, Professor, KMCMS, France

09:35-09:55 **Title:** Designing Ed Tech for Equity—Developing Creative and Agile Thinkers for Today and the Future

Dr. Dena Gilby, Professor, Endicott College, USA

09:55-10:15 **Title:** Online Education: Designing Your First Online Course? Success Strategies for Beginners

Dr. David Okoth, Instructional Design and Technology Specialist, University of Northern Colorado, USA

10:15-10:30 **Coffee Break**

10:30-10:50 **Title:** Higher Education in the Age of Artificial Intelligence: Challenges, Opportunities, and Implications for Social Justice

Dr. Marcia J. Mackey, Professor, Central Michigan University, USA

10:50-11:10 **Title:** Scenario-Based Assessment in the Age of Generative AI: Making Space in the Education Market for Alternative Assessment Paradigms

Dr. John Sabatini, Distinguished Research Professor, University of Memphis, USA

11:10-11:30 **Title:** Educational Micro-Credentials in Integration and Deployment of Telemedicine

Dr. Martin Žagar, Professor, RIT Croatia, Croatia

11:30-11:50 **Title:** Rethinking Education in the Age of AI: Cultivating Cognitive Flexibility and AI Literacy in High School Education

Dr. Jing Song, Academic Principal, Springboard International Bilingual School, China

WCE 03: Medical and Health Education Forum

Time: 08:30-11:20, November 12, 2025 (Wednesday); **Place:** Kamo, Fifth Floor

Chair	Dr. Lacroix Valérie , Professor, Saint-Luc University Hospital, Belgium
08:30-08:35	Chair's Introduction
08:35-09:00	Title: The Importance of Patient Communication in the Education of Medical Students and the Use of the TOM Application Dr. Grazyna Nowak-Starz , Professor, Jan Kochanowski University in Kielce, Poland
09:00-09:25	Title: Enhancing Junior Surgeons Proficiency with Evolving Surgical Technologies Dr. Lacroix Valérie , Professor, Saint-Luc University Hospital, Belgium
09:25-09:50	Title: Medical Simulation in Preparation for Medical Profession Dr. Dorota Rębak , Associate Professor, Jan Kochanowski University in Kielce, Poland
09:50-10:15	Title: Transforming the World of Medical Devices and Healthcare Solutions Using Industry 4.0 Technologies Dr. Prashant Jindal , Professor, Panjab University, India
10:15-10:30	Coffee Break
10:30-10:55	Title: Health Behaviors of Adolescents Resulting from Preferred Lifestyles – A Report from Research Among Secondary School Youth in the Świętokrzyskie Region in Poland Dr. Mariola Wojciechowska , Associate Professor, Jan Kochanowski University in Kielce, Poland
10:55-11:20	Title: Effect of COVID-19 Pandemic on Health Behaviors of Students of Medical Specialties from the Aspect of Psychological Support Based on a Polish Example Dr. Agnieszka Strzelecka , Associate Professor, Jan Kochanowski University in Kielce, Poland

WCE 04: Higher Education Forum (II)

Time: 13:30-17:10, November 12, 2025 (Wednesday); **Place:** Yamato B, Fifth Floor

Chair	Prof. Dr. Jacqueline E. van Muijlwijk-Koezen , Chief Education Officer (Vice-Rector Education), Vrije University Amsterdam, the Netherlands
Co-chair	Dr. Sue Walker , Professor, Southern Cross University, Australia
13:30-13:35	Chair's Introduction
13:35-13:55	Title: Global Challenges, Local Lessons: Australian Pedagogical Innovation, the ADEPT Framework for Enabling Pedagogy, And Curriculum Development for Widening University Participation Dr. Jennifer Stokes , Associate Professor, University of South Australia & Adelaide University, Australia

- 13:55-14:15 **Title:** Designing for Dialogue: How Digital Environments Shape Trust, Safety, And Quality in Peer Feedback in Higher Education
Prof. Dr. Jacqueline E. van Muijlwijk-Koezen, Chief Education Officer (Vice-rector Education), Vrije University Amsterdam, the Netherlands
- 14:15-14:35 **Title:** A New Academic Frontier: Responding to Paradigm Shifts in Global Higher Education
Dr. Anita Bledsoe-Gardner, Dean, Johnson C. Smith University, USA
- 14:35-14:55 **Title:** Teaching about/to/for Diversity: Exploring a New Pedagogy of Teacher Education
Dr. Sue Walker, Professor, Southern Cross University, Australia
- 14:55-15:15 **Title:** Ethical Issues in Participatory Research and Co-design in Education
Dr. Jacqueline J. Schenk, Associate Professor, Erasmus University Rotterdam, the Netherlands
- 15:15-15:30 **Coffee Break**
- 15:30-15:50 **Title:** Supporting Teachers to Personalise Education for Autistic Children in an Inclusive Setting
Dr. Stefanija Alisauskiene, Professor, Vytautas Magnus University, Lithuania
Dr. Julija Grigenaite, Assistant Professor, Vytautas Magnus University, Lithuania
- 15:50-16:10 **Title:** The Trends of Training Model for Cultivating Talents in Art and Design in AI Era
Dr. Qing Wu, Professor, Wuhan University of Science and Technology, China
- 16:10-16:30 **Title:** How to Make School Development Projects Sustainable. Insights from 15 Different Attempts to Improve Practices with and without Results
Dr. Ulla Damber, Associate Professor, Mid Sweden University, Sweden
- 16:30-16:50 **Title:** Translation, Foreign Language Acquisition and Transculturality: The Japanese Experience of Italophone Writer Dacia Maraini
Prof. Dr. Dagmar Reichardt, Professor, Latvian Academy of Culture, Latvia
- 16:50-17:10 **Title:** Modernizing STEM Education: Connecting STEM Challenges to Future Workforce Pathways
Dr. Julie Cwikla, Distinguished Professor & Director, University of Southern Mississippi, USA

WCE 05: STEAM Education Forum

Time: 08:30-11:45, November 13, 2025 (Thursday); **Place:** Yamato B, Fifth Floor

Chair **Dr. Richard Cangro**, Professor and Director of Music Education, Western Illinois University, USA

08:30-08:35 **Chair's Introduction**

- 08:35-09:00 **Title:** Revolutionizing Education: The Power of Drama-Based Pedagogy in Engaging 21st-Century Learners
Dr. William Yip, Director, Beijing Jheng Drama & Education Research Institute, China; Board Member & Deputy Secretary-General, Beijing Jheng Charitable Foundation
- 09:00-09:25 **Title:** Communicating in, about, and through Music: Language Arts and Music Education
Dr. Richard Cangro, Professor and Director of Music Education, Western Illinois University, USA
- 09:25-09:50 **Title:** Walk Between the Trees and Talk the Change: Trainers Insights on Climate Change Education in Forest Schools
Dr. Ofira Ayalon, Professor, University of Haifa, Israel
- 09:50-10:15 **Title:** Project-Based Learning in a Brewing-Oriented Curriculum: A 3-Year Pedagogical Journey
Dr. Vanina Lorenzi, Associate Professor, University of Corsica Institute of Technology, France
Dr. Christine Chancogne, Lecturer, University of Corsica Institute of Technology, France
- 10:15-10:30 **Coffee Break**
- 10:30-10:55 **Title:** From STEM to STEAM: The Importance of Arts in Technical Education
Dr. Peer Mohideen Sathikh, Associate Professor, School of Art, Design and Media, Nanyang Technological University, Singapore
- 10:55-11:20 **Title:** Making Sustainable Development Practices Real for Students: An Interdisciplinary Project-based Approach
Dr. Santa Gregorj-Santini, Lecturer, University of Corsica Institute of Technology, France
- 11:20-11:45 **Title:** Women's Projects for Art and Design Education at University: Visual Artist and Graphic Designers - Two Case Studies
Dr. Jorge Manuel dos Reis Tavares Duarte, Associated Aggregated Professor, University of Lisbon, Portugal

WCE 06: Humanities and Social Science Education Forum

Time: 08:30-10:15, November 13, 2025 (Thursday); **Place:** Kamo, Fifth Floor

- Chair** **Dr. Jean-Paul Close**, Founder, STIR Foundation Eindhoven, the Netherlands
- 08:30-08:35 **Chair's Introduction**
- 08:35-08:55 **Title:** Family Education and Democracy in Post-1945 Japan
Dr. Mutsuko Tendo, Professor, Miyagi Gakuin Women's University, Japan
- 08:55-09:15 **Title:** A New Era, Also for Education
Dr. Jean-Paul Close, Founder, STIR Foundation Eindhoven, the Netherlands

- 09:15-09:35 **Title:** Land and Orature: Learning that Rises Above and Beyond Colonialism and Awakens a Lifelong Journey of Healing and Well-being
Dr. Davina D. Rousell, Research Associate, University of Alberta, Canada
Dr. Doreen Frencheater, Language Keeper, University of Alberta, Canada
- 09:35-09:55 **Title:** Kahani Literacy Project: Culturally Efficacious Story Writing
Dr. Kalpana Mukunda Iyengar, Assistant Professor of Practice, University of Texas at San Antonio, USA
- 09:55-10:15 **Title:** Intercultural Dialogue as Main Strategy to Tackle Misinformation: The Creation of the Brazilian Media and Information Literacy Olympiad
Dr. Claudia Marinho Wanderley, Permanent Researcher, State University of Campinas (UNICAMP), Brazil

WCE 07: Video Forum

- 01 **Title:** The Role of Artificial Intelligence in Shaping the Future of Education
Dr. Marja-Liisa Tenhunen, Rector, Dimitrie Cantemir Christian University, Finland
- 02 **Title:** Content and Language Integrated Learning (CLIL) Approach to Teaching Multilingualism: Theory and Practice
Dr. Oksana Ivanova, Associate Professor, Pyatigorsk State University, Russia
- 03 **Title:** AI Literacy and Distributed Creativity
Dr. Lorenzo Manera, Researcher, University of Modena and Reggio Emilia, Italy
- 04 **Title:** The Impact of AI on Education and Lifelong Learning
Mr. David Wortley, Non-Executive Director, World Lifestyle Medicine Education Services, UK
- 05 **Title:** Analyzing the Relationship Between Sense of Belonging with Perception of Academic - Confidence, Stress, and Exclusion for College Students with Different Demographics
Dr. Mahtash Esfandiari, Director, Department of Statistics and Data Science at UCLA, USA
- 06 **Title:** Critical Aspirations and Agency Amid Global Uncertainty
Dr. Aliya Khalid, Course Director, Lady Margaret Hall, UK
- 07 **Title:** Social Anxiety and Learning Disorders - The Case of Learning Difficulties and Interpersonal Distance Anxiety
Dr. Ephraim Grossman, Department of Education, Ariel University, Israel
- 08 **Title:** Recognition Accreditation Supporting Teachers
Dr. Ricardo León Bórquez, Professor and President, World Federation for Medical Education, UK
- 09 **Title:** Moral Competences of 20th Century Teachers (Analyses and Reflections)
Dr. Mirosław Kowalski, Assistant Professor, University of Zielona Góra, Poland
- 10 **Title:** The Importance of Father-Son Communication in the Educational Process
Dr. Anita Famula-Jurczak, Professor, University of Zielona Góra, Poland

- 11 **Title:** Educating the Next Generation of Scientists: From Early Childhood to Undergraduate Education

Dr. Roseanne L. Flores, Professor, Hunter College of the City University of New York, USA

The 13th Annual World Congress of Ocean (WCO-2025)

WCO 01: Ocean Economy and Maritime Law

Time: 13:30-17:35, November 11, 2025 (Tuesday); **Place:** Yoshino, Fifth Floor

Chair **Dr. Hermann Held**, Professor, Chair Sustainability & Global Change, University of Hamburg, Germany

13:30-13:35 **Chair's Introduction**

13:35-14:00 **Title:** Evaluation Modelling Green Shipping Technologies: A Techno-Economic-Energy-Environment Complex Systems Approach

Dr. Feier Chen, Vice Chief, Research Institute of Coastal & Shipping Management, School of Ocean and Civil Engineering, Shanghai Jiao Tong University, China

14:00-14:25 **Title:** Probabilistic Time to Collapse as a Risk Communication Tool

Dr. Hermann Held, Professor, Chair Sustainability & Global Change, University of Hamburg, Germany

14:25-14:50 **Title:** The Just Allocation of Captured Forage Fish - Human Food or Fish Food?

Dr. Moshe Agami, Ecologist, School of Plant Sciences and Food Security, George S. Wise Faculty of Life Sciences, Tel Aviv University, Israel

14:50-15:15 **Title:** Defining and Constructing Islandness

Ms. Qingliu Ren, Faculty of Geographical Science, Beijing Normal University Zhuhai, China

15:15-15:30 **Coffee Break**

15:30-15:55 **Title:** The Ship Financing Portal of the European Union

Dr. Salvatore Vitale, Professor of International Law of Economics, UNIDAV University, Italy; Senior Partner of Vitale & Partners, International Law Firm, Italy

15:55-16:20 **Title:** Legal Liability in Maritime Incidents Involving AI-Oriented or Non-Human Operational Advanced Technology

Mr. Nobuto Yamaguchi, Managing Partner, Tokyo Sanno Law Office, Japan

16:20-16:45 **Title:** Specifics of Vessel Operation in Ice Conditions and Northern Sea Route Area

Mr. George Ossipov, Naval Architect, Surveyor, Director of Marinex ITS Ltd., St. Petersburg, Russia; Vice-President of National Association of Insurance Adjusters, Russia

16:45-17:10 **Title:** One Ocean, One Law: Unification of Maritime Law and Its Importance for the Effective Protection of the Ocean

Ms. Ramat Jalloh, Lecturer, IMO International Maritime Law Institute, Malta

17:10-17:35 **Title:** Legal Aspects of Ship Recycling

Dr. Hari Narayan Veettath Brelviv, Partner, United Maritime Law Chambers, India

WCO 02: Ocean Engineering, Science and Technologies

Time: 08:30-12:30, November 12, 2025 (Wednesday); **Place:** Yoshino, Fifth Floor

Chair **Mr. Earl J. Dodd**, Co-Founder & CTO, MMersive Technology, Inc., USA

08:30-08:35 **Chair's Introduction**

08:35-08:55 **Title:** Applications of Underwater Digital Holography Technology for Ocean Exploration

Dr. Victor Dyomin, First Vice-Rector, National Research Tomsk State University, Russia

08:55-09:15 **Title:** Technical Reference (Tr) Books on Competence Standards and Performance Criteria for Liquefied Natural Gas (Lng) Floating Storage Unit (Fsu)

Ts. Dr. Captain Manivannan Subramaniam, Chief Executive, Akademi Laut Malaysia, Malaysia

09:15-09:35 **Title:** MMersive: STEAM Powered Immersive EdTech for Ocean Science and Conservation

Mr. Earl J. Dodd, Co-Founder & CTO, MMersive Technology, Inc., USA

09:35-09:55 **Title:** Predicting Marine Ecosystem Responses: Lessons from Young Fossil Records

Dr. Yael Edelman-Furstenberg, Head, Marine Geology Division, Geological Survey of Israel, Israel

09:55-10:15 **Title:** Methodology for Precise Monitoring of River Bottom Changes Using Geodetic and Hydroacoustic Techniques

Dr. Dariusz Popielarczyk, Dean of Faculty of Geoengineering, University of Warmia and Mazury, Poland

10:15-10:30 **Coffee Break**

10:30-10:50 **Title:** Remote Sensing of Coastal Environments – The Concept of Land To-Sea (L2S) Mapping Using Earth Observation Data

Dr. Natascha Oppelt, Professor, Kiel University, Germany

10:50-11:10 **Title:** Estimation of Chlorophyll-a Concentration in Hiroshima Bay Using Landat-8/9 Data

Mr. Yoshinari Oguro, Professor, Hiroshima Institute of Technology, Japan

11:10-11:30 **Title:** Machine Learning Methods Comparison for Maritime Wireless Signal Strength Prediction

Dr. Kun Yang, Professor, Zhejiang Ocean University, China

11:30-11:50 **Title:** An Analysis of the Spatio-Temporal Distribution of Recreational Boating Tourism Traffic on Inland and Coastal Waters

Dr. Tomasz Templin, Researcher and Consultant, Faculty of Geoengineering, University of Warmia and Mazury, Poland

11:50-12:10 **Title:** Antibacterial Properties of Marine Bacteria Isolated from The New Caledonia Coast Against Methicillin-Resistant Staphylococcus Aureus

Dr. Céphas Xuma, Ph.D. Student, Institute Pasteur of New Caledonia, New Caledonia

- 12:10-12:30 **Title:** Aequor's Products Mimic Nature's Remedy for Micro and MacroFouling (Video)
Dr. Marilyn J. Bruno, CEO, Aequor Inc., USA

WCO 03: Ocean Energy Development and Utilization

Time: 13:30-15:15, November 12, 2025 (Wednesday); **Place:** Yoshino, Fifth Floor

Chair **Mr. Andy Billcliff**, CEO, Menter Mon Morlais Ltd., UK

13:30-13:35 **Chair's Introduction**

13:35-13:55 **Title:** Ocean Thermal Energy Can Be Economical Today
Mr. James H Anderson, President, Sea Solar Power, USA

13:55-14:15 **Title:** Progress and Challenges of Key Technologies in Deepwater Drilling Engineering
Dr. Yanbin Wang, Professor, China University of Petroleum, China

14:15-14:35 **Title:** Morlais Tidal Energy, The Long Voyage, Latest Position
Mr. Andy Billcliff, CEO, Menter Mon Morlais Ltd., UK

14:35-14:55 **Title:** Spatiotemporal Characteristics of Offshore Wind and Wind Energy Potential in Sri Lanka
Dr. Jinglong Yao, Deputy Director, China-Sri Lanka Joint Center for Education and Research, Chinese Academy of Sciences, China

14:55-15:15 **Title:** Kelp Grown in the Open Ocean as Abundant Feedstock for Renewable Fuels (Video)
Mrs. Cindy Wilcox, President, Marine BioEnergy, Inc., USA

WCO 04: Smart Port, Green Shipping

Time: 15:30-17:35, November 12, 2025 (Wednesday); **Place:** Yoshino, Fifth Floor

Chair **Mr. Guangrong Zou**, Senior Scientist, Senior Project Manager, VTT Technical Research Centre of Finland, Finland

15:30-15:35 **Chair's Introduction**

15:35-15:55 **Title:** From Data Silos to Shared Intelligence: The Role of the Maritime Single Window in Smart & Green Ports and Shipping
Mr. Olli Soinen, Head of Programs, Fintraffic VTS, Finland

15:55-16:15 **Title:** Digitalization and Decarbonization for Business and Environmentally Sustainable Ports - A Finnish Case
Mr. Guangrong Zou, Senior Scientist, Senior Project Manager, VTT Technical Research Centre of Finland, Finland

16:15-16:35 **Title:** Naval Repair Sector: New Drydock and Shipbuilding Capabilities at the Port of Santa Cruz De Tenerife
Mr. Airam Díaz, Deputy Director, Ports of Tenerife, Spain

16:35-16:55 **Title:** The Lines of Cold Ironing and Port Electrification
Mr. Stathis Anagnostou, Executive Director, Strategy, Business Development & Transformation, Hellenic Electricity Distribution Network Operator S.A., Greece

- 16:55-17:15 **Title:** Digitalization of Ports' Organization & Operations
Captain Yoss Leclerc, President and CEO, Logistro Consulting International Inc., Canada
- 17:15-17:35 **Title:** Safe Navigation in a World of GPS/GNSS Jamming and Spoofing (Video)
Mr. Dana A. Goward, President, Resilient Navigation and Timing Foundation, USA

WCO 05: Aquaculture and Fisheries

Time: 08:30-10:15, November 13, 2025 (Thursday); **Place:** Yoshino, Fifth Floor

- Chair** **Dr. Bosiljka Mustać**, Professor, University of Zadar, Croatia
- 08:30-08:35 **Chair's Introduction**
- 08:35-08:55 **Title:** The Role of Certifications in Promoting Sustainable Exploitation of Ocean Resources
Mr. Paolo Bray, Founder and Director, Friend of the Earth and Friend of the Sea, Italy
- 08:55-09:15 **Title:** Conversion of Coastal Wetland to Mariculture on Greenhouse Gas Footprint
Dr. Weixin Ding, Professor, Institute of Soil Science, Chinese Academy of Sciences, China
- 09:15-09:35 **Title:** Intelligent Processing for a Changing Ocean: Technological Pathways for Sustainable Fish Supply
Mr. Marcel Franz, CEO, BAADER ASIA PTE. Ltd., Singapore
- 09:35-09:55 **Title:** The Occurrence of Wild Fish in the Vicinity of Aquaculture Cages: A Case Study of Bogue (Boops Boops) from the Adriatic Sea (Croatia)
Dr. Bosiljka Mustać, Professor, University of Zadar, Croatia
- 09:55-10:15 **Title:** The High Seas Treaty and Sustainable Fisheries
Mrs. Ana Olivert, Independent Legal Consultant and Researcher, Suva, Fiji

WCO 06: Ocean Management and Environment Protection

Time: 10:30-12:15, November 13, 2025 (Thursday); **Place:** Yoshino, Fifth Floor

- Chair** **Mr. Nigel Bowen-Morris**, Partner, Stephenson Harwood, UK
- 10:30-10:35 **Chair's Introduction**
- 10:35-10:55 **Title:** Countermeasures on Plastic Pollution in East and Southeast Asian Countries
Dr. Michikazu Kojima, Chief Senior Researcher, Institute of Developing Economies, Japan External Trade Organization, Japan
- 10:55-11:15 **Title:** Green Environment Evaluation Indicators for Coastal Green Substations
Dr. Xin Liu, Professor & Associate Dean, School of Economics and Business Administration, Chongqing University, China
- 11:15-11:35 **Title:** A Case Study on the Application of Nagasaki Restoration Coral Reef Technologies in Ecotourism
Ms. Chika Sato, Biotechnology Engineer, M. M. Bridge Co., Ltd., Japan
- 11:35-11:55 **Title:** Maritime Legislation and the Environment
Mr. Nigel Bowen-Morris, Partner, Stephenson Harwood, UK

11:55-12:15 **Title:** Framing Analysis of Japan and China's Response to Fukushima's Nuclear-Contaminated Water Discharge: Technical Rationality vs Local Experience
Mr. Chenxi Sun, Ph.D. Candidate, School of National Security and Emergency Management, Beijing Normal University Zhuhai, China

The 11th World Energy Congress (WEC-2025)

WEC 01: Latest Research and Development on Energy and Its Application

Time: 13:30-16:45, November 11, 2025 (Tuesday); **Place:** Kamo, Fifth Floor

Chair **Dr. Pascal Briois**, Associate Professor, University of Technology of Belfort-Montbéliard, France

13:30-13:35 **Chair's Introduction**

13:35-14:00 **Title:** Geothermal Energy and Its Application to Integrated Energy Systems and Low Carbon Fuel Production

Mr. David Robert Cavanagh, Managing Director, Integrated Energy Pty Ltd., Australia

14:00-14:25 **Title:** Modified CANDU Reactor MCR as an Early-Deployable Nuclear Workhorse

Dr. Juergen Knorr, Professor Emeritus, Technical University Dresden, Germany

14:25-14:50 **Title:** Application of PVD Technology for SOFC to Increasing Lifetime

Dr. Pascal Briois, Associate Professor, University of Technology of Belfort-Montbéliard, France

14:50-15:15 **Title:** Advancing Metal Halide Perovskites: Stability Strategies and Multifunctional Applications

Dr. Jun Pan, Professor, Zhejiang University of Technology, China

15:15-15:30 **Coffee Break**

15:30-15:55 **Title:** Investigation on Coupling Oscillation of the Water-diversion Hydropower System and Further Engineering Application

Dr. Jianxu Zhou, Professor, Hohai University, China

15:55-16:20 **Title:** Characteristics of Concentration Distribution Through the Exposure Route from Emission Sources in Small Multi-Purpose Industrial

Dr. Kilyong Choi, Associate Professor, Anyang University, South Korea

16:20-16:45 **Title:** Numerical Simulation of Deflagration Appearance in Hydrogen-Air Mixtures Turbulent Viscous Flows (Video)

Dr. Sergey N. Martyushov, Professor, Moscow Aviation Institute-National Research University, Russia

WEC 02: Global Energy Policies, Market and Future Trends

Time: 10:30-12:15, November 13, 2025 (Thursday); **Place:** Kamo, Fifth Floor

Chair **Dr. Izabela Barbara Sztangret**, Professor, University of Economics in Katowice, Poland

- 10:30-10:35 **Chair's Introduction**
- 10:35-10:55 **Title:** Prospects for Alkaline Exchange Membrane (AEM) Electrolysis
Dr. Ervin Tal-Gutelmacher, CEO, Hydrolite Ltd., Israel
- 10:55-11:15 **Title:** From Compliance to Commitment: The Impact of the CSDD Directive on Corporate ESG Awareness and Practices
Dr. Izabela Barbara Sztangret, Professor, University of Economics in Katowice, Poland
- 11:15-11:35 **Title:** Out of the Blue: Can Blue Coal Redefine the Polish Fuel Market?
Dr. Kornelia Przedworska, Assistant Professor, University of Economics in Katowice, Poland
- 11:35-11:55 **Title:** Empowering the Future Grid: Model Predictive Control for Intelligent Hybrid Microgrid Automation
Dr. Somayeh Mohammady, Lecturer, School of Electrical and Electronic Engineering, Technological University Dublin, Ireland
- 11:55-12:15 **Title:** The Share of Hydropower Energy in Energy Demand of Turkey and Its Sustainability
Dr. İbrahim Gurer, Professor, Baskent University, Turkey

The 12th Annual World Congress of Food and Nutrition (WCFN-2025)

WCFN 01: Research and Development for Food and Nutrition Science

Time: 13:30-16:45, November 12, 2025 (Wednesday); **Place:** Kamo, Fifth Floor

- Chair** **Dr. Satoshi Matsuda**, Associate Professor, Shizuoka University, Japan
- 13:30-13:35 **Chair's Introduction**
- 13:35-14:00 **Title:** Oral Intake of Degalactosylated Whey Protein Increases Peripheral Blood Telomere Length in Young and Aged Mice
Dr. Toshio Inui, CEO, Saisei Mirai Clinic Group, Japan
- 14:00-14:25 **Title:** Engineering of Composting Plants for the Treatment and Recycle of Waste Foods
Dr. Satoshi Matsuda, Associate Professor, Shizuoka University, Japan
- 14:25-14:50 **Title:** The Mechanisms and Nutritional Treatments for Sarcopenia
Mr. Kento Hamada, Institute of Science Tokyo, Japan
- 14:50-15:15 **Title:** Oral Calcium Butyrate Attenuates Colonic and Cerebral Inflammation and Tissue Pathology Across Aging in Rats
Dr. Sevim Kandis Sever, Assistant Professor, MedEra Nutrition, Turkey
- 15:15-15:30 **Coffee Break**
- 15:30-15:55 **Title:** Microencapsulation of Bacillus Megaterium Humic Acid-Supplied Alginate Beads Enhances Tomato Growth and Suppresses the Root-Knot Nematode Meloidogyne Javanica under Greenhouse Conditions
Dr. Hanaa Ahmed Abokoura, Professor, Soils, Water, and Environment Research Institute, Agriculture Research Center, Egypt

- 15:55-16:20 **Title:** Chrononutrition for Infants: Better Sleep Through Chrononutrition with Melatonin-Rich Night Milk from Non-Pooled Cow's Milk (video)
Dr. Ekkehart Paditz, Professor, Center for Applied Prevention, Germany
- 16:20-16:45 **Title:** The Role of Vegetable and Fruit Learning Modules in Early Childhood Education: Insights from Preschool Educators (video)
Dr. Nur Suhaidah Binti Sukor, Senior Lecturer, University Malaysia Sabah, Malaysia

The 6th International Congress of Environment (ICE-2025)

ICE 01: Hot Topics in Environment Field

Time: 13:30-18:10, November 12, 2025 (Wednesday); **Place:** Katsura, Fifth Floor

- Chair** **Dr. Arminda do Paco**, Professor, University of Beira Interior, Portugal
Co-chair **Dr. Margarida Catalao-Lopes**, Associate Professor, Lisbon University, Portugal
- 13:30-13:35 **Chair's Introduction**
- 13:35-13:55 **Title:** The Degrading Capacity of Bacteria Species to the Maximum Threshold Concentration of Pesticides in Vitro and in Vivo Conditions
Dr. Tinatin Doolotkeldieva, Professor, Plant Science and Plant Protection Department; Head, Plant Protection Centre, Kyrgyz National Agrarian University After Name K. I. Skryabin, Kyrgyzstan
- 13:55-14:15 **Title:** ABC-Process for Carbon-Neutral and Energy-Independent Wastewater Treatment
Dr. Jungyu Park, Associate Professor, Chosun University, South Korea
- 14:15-14:35 **Title:** Integrated Sustainability Assessment of Biomass Power Plants Using Tree Pruning Residues in Greece
Dr. Styliani Sofianopoulou, Professor, University of Piraeus, Greece
- 14:35-14:55 **Title:** Sustainability Assessment of End-of-Life Wind Turbine Management Using LCA and TOPSIS
Dr. Vassilis Dedoussis, Professor Emeritus, University of Piraeus, Greece
- 14:55-15:15 **Title:** How Sustainable and Circular Can the Health Industry Be?
Dr. Arminda do Paco, Professor, University of Beira Interior, Portugal
- 15:15-15:30 **Coffee Break**
- 15:30-15:50 **Title:** Challenges in Energy Access, Energy Transition and Inequality
Dr. Margarida Catalao-Lopes, Associate Professor, Lisbon University, Portugal
- 15:50-16:10 **Title:** Financial Development, Environmental Regulation, and Firms' Pollution Emission: Evidence from China
Dr. Ruili Zhao, Associate Professor, Shanghai University of International Business and Economics, China

- 16:10-16:30 **Title:** Statistical Contributions to the Study of Contamination in Abandoned Mining Areas. The Case Study of the Vale das Gatas Mine-Portugal
Dr. Joaquim Gois, Assistant Professor, Porto University, Portugal
- 16:30-16:50 **Title:** Life Cycle Assessment of Ore Extraction from a Lithium Mine
Dr. Anonio Fiuza, Emeritus Professor, Porto University, Portugal
- 16:50-17:10 **Title:** ADAPT! Building Prototype for Climate-Adapted Urban Housing
Mr. Craig Applegath, Partner, DIALOG, Canada
- 17:10-17:30 **Title:** Building Resilience in a Dual-Risk Cities: Climate Change Problematic and Earthquake Challenges in Istanbul
Dr. Hülya Coskun, Associate Professor, Rumeli University, Turkey
- 17:30-17:50 **Title:** Anoxic Polyhydroxyalkanoates Production by Mixed Microbial Cultures
Dr. Xiaowu Huang, Associate Professor, Guangdong Technion-Israel Institute of Technology, China
- 17:50-18:10 **Title:** Recycling Biodegradable Waste to Combat Poor Solid Waste Management in Lubumbashi, Democratic Republic of the Congo
Dr. Elie Fereche Itoba-Tombo, Lecturer and Researcher, Cape Peninsula University of Technology, South Africa

ICE 02: Video Forum

- 01 **Title:** Linfluence of Materials from Natural Sources on the Environment and Sustainable Development
Dr. Abderrahim Benmoussat, Professor, Tlemcen University, Algeria
- 02 **Title:** Smart Ecologization of Cities Based on Optimal Investment Strategies for Energy Modernization of Buildings
Dr. Andrii Polyvianchuk, Professor, Vinnytsia National Technical University (VNTU), Ukraine

The 9th Annual World Congress of Smart Materials (WCSM-2025) & The 3rd Smart Manufacturing Forum (SMF-2025)

WCSM 01: Smart Materials Structures, Engineering and Manufacturing

Time: 13:30-17:35, November 11, 2025 (Tuesday); **Place:** Tatsuta, Fifth Floor

- Chair** **Mr. David Wortley**, Vice President, International Society of Digital Medicine, UK
- Co-chair** **Dr. Stuart Wiesner**, Head of R&D, Aluminium Rheinfelden Alloys GmbH, Germany
- 13:30-13:35 **Chair's Introduction**
- 13:35-14:00 **Title:** Leveraging AI for Smart Circular Manufacturing: Challenges and Opportunities
Dr. Iryna Bashynska, Professor, AGH University of Krakow, Poland
- 14:00-14:25 **Title:** Comparison Between Structural Components in Recently Developed Aluminum HP-DC Alloys with Magnesium and Steel Constructions
Dr. Stuart Wiesner, Head of R&D, Aluminium Rheinfelden Alloys GmbH, Germany

- 14:25-14:50 **Title:** Density Functional Study of Silver/Reduced Graphene Oxide Nanohybrid
Dr. Victor Eduardo Comparan Padilla, Researcher, Center for Research in Applied Chemistry, Mexico
- 14:50-14:15 **Title:** Semiconductor Scaling Challenges: Bottom-Up Area Selective Deposition for Next-Generation Devices
Dr. Younseon Wang, Staff Engineer, Samsung Electronics, South Korea
- 15:15-15:30 **Coffee Break**
- 15:30-15:55 **Title:** Construction and Application of Circularly Polarized Luminescent Materials Based on Achiral Polymers
Dr. Gong Zhang, Associate Professor, Henan University of Technology, China
- 15:55-16:20 **Title:** Shape-Memory Effects of Polymer Blends and Composites Enabled by the Control of Phase Morphology and Particle Distribution
Dr. Yu Zheng, Associate Professor, Sichuan University, China
- 16:20-16:45 **Title:** Role of New Materials in Large Scale Fukushima Radioactive Waste Water Treatment: Current Scenario
Dr. Anil Kumar Pabby, Ex-Senior Scientist, Bhabha Atomic Research Centre, India
- 16:45-17:10 **Title:** The Role of Smart Digital Twins
Mr. David Wortley, Vice President, International Society of Digital Medicine, UK
- 17:10-17:35 **Title:** Carbon-Efficient Pavement Solutions: Geopolymer Concrete with Recycled Asphalt Pavement Aggregates
Dr. G. D. Ransinchung R. N., Professor, Indian Institute of Technology Roorkee, India

WCSM 02: Smart Optical, Electronic and Magnetic Materials

Time: 08:30-11:45, November 12, 2025 (Wednesday); **Place:** Tatsuta, Fifth Floor

- Chair** **Dr. Cecil Bruce-Boye**, Professor, automITe GmbH., Germany
- 08:30-08:35 **Chair's Introduction**
- 08:35-09:00 **Title:** Real-Time Capable IoT Based Middleware Architecture
Dr. Cecil Bruce-Boye, Professor, automITe GmbH, Germany
- 09:00-09:25 **Title:** Functionalization of Liquid Crystal Loaded Metasurface
Dr. Seiji Fukushima, Professor, Kagoshima University, Japan
- 09:25-09:50 **Title:** On-chip Rolled-up Nanomembrane Passive Electronic Components
Dr. Wen Huang, Professor, Hefei University of Technology, China
- 09:50-10:15 **Title:** Intelligent Object Differentiation via Contour Extraction for Real-Time Streaming on UAV
Dr. Tsang-Ling Sheu, Director & Professor, Wireless Broadband Communications Research Center and National Sun Yat-Sen University, Taiwan
- 10:15-10:30 **Coffee Break**

- 10:30-10:55 **Title:** LaFeSi-based Magnetocaloric Materials Analysis: Thermal Performance and Endurance Results
Dr. Sergiu Lionte, R&D Manager, Magnoric SAS, France
- 10:55-11:20 **Title:** Laser Sails for Photon Pressure Propulsion to Relativistic Speeds
Dr. Claude R Phipps, Photonic Associates, LLC Santa Fe NM, USA
- 11:20-11:45 **Title:** Influence of Homoepitaxial Layer Thickness on Flatness and Chemical Mechanical Planarization Induced Scratches of 4H-Silicon Carbide Epi-Wafers
Dr. Chi-Hsiang Hsieh, Ph.D. Candidate, National Yang Ming Chiao Tung University, Taiwan

WCSM 03: Future Trends and Applications of Smart Materials

Time: 08:30-11:45, November 13, 2025 (Thursday); **Place:** Tatsuta, Fifth Floor

- Chair** **Mr. Manoj Dalaya**, Co-President, KGD Architecture, USA
- Co-chair** **Dr. Bogdan Varga**, Professor, Technical University of Cluj-Napoca, Romania
- 08:30-08:35 **Chair's Introduction**
- 08:35-09:00 **Keynote Speech**
Title: Multifunctional Composite Materials – From Development to Deployment
Dr. Raj Das, Professor and Deputy Head of Department, RMIT University, Australia
- 09:00-09:25 **Title:** Challenges to Develop Thin Lithium Metal Electrode for the Next-Generation of Solid-State Batteries
Dr. Didier Devaux, Research Scientist, CNRS, France
- 09:25-09:50 **Title:** Modification of Microstructure, Crystal Structure, Phase Composition and Electrical Properties of Selected ABO₃-Type Materials for Electrochemical Energy Conversion
Dr. Pawel Pasierb, Professor, AGH University of Science and Technology, Poland
- 09:50-10:15 **Title:** Sequestering Carbon in Concrete: Enhancing Sustainability in Construction
Mr. Manoj Dalaya, Co-President, KGD Architecture, USA
- 10:15-10:30 **Coffee Break**
- 10:30-10:55 **Title:** Materials-Driven Optimization of CAV Platforms with Hydrogen Fuel Cell Propulsion
Dr. Tudor Oarga, **Dr. Bogdan Varga**, **Dr. Dan Moldovanu**, **Dr. Nicolae Cordoș**, Technical University of Cluj-Napoca, Romania
- 10:55-11:20 **Title:** Fuel Cell Hydrogen Mobility
Dr. Bogdan Varga, Professor, Technical University of Cluj-Napoca, Romania
- 11:20-11:45 **Title:** Comparative Analysis of Implementation and Operational Costs Between BEBs and FCEBs
Dr. Horatiu Carausan, **Dr. Bogdan Varga**, **Dr. Gabriel Prunean**, **Dr. Nicolae Vlad**, Technical University of Cluj-Napoca, Romania

The 3rd World Congress of AI Industry (WCAI-2025)

WCAI 01: AI Industry

Time: 13:30-17:10, November 12, 2025 (Wednesday); **Place:** Tatsuta, Fifth Floor

Chair	Dr. Michael Short , Professor & Associate Dean (Research & Innovation), Teesside University, UK
Co-chair	Dr. Henry Hexmoor , Professor, Southern Illinois University, USA
13:30-13:35	Chair's Introduction
13:35-13:55	Keynote Speech Title: Strategic Electrode Development: Bridging Material Design and Battery Performance Dr. Hsing-Yu Tuan , Professor, National Tsinghua University, Taiwan
13:55-14:15	Title: Innovations in AI and Robotics: Towards a Full-Scale EV Battery Recycling Industry in the UK Dr. Michael Short , Professor & Associate Dean (Research & Innovation), Teesside University, UK
14:15-14:35	Title: Quo Vadis, Logistics? The Role of AI and Robotics Navigating the Rise of Automation Dr. Tino Krüger-Basjmeleh , Senior Robotics Expert, KION Group STILL GmbH, Germany
14:35-14:55	Title: Challenges in the Development of Dependable Autonomous Systems Dr. Elena Troubitsyna , Professor, KTH – Royal Institute of Technology, Sweden
14:55-15:15	Title: Generating of Near Anomalies Dr. Martin Klimo , Professor Emeritus, Zilina University, Slovakia
15:15-15:30	Coffee Break
15:30-15:50	Title: The Gap Between Artificial General Intelligence and Generative Artificial General Intelligence Dr. Henry Hexmoor , Professor, Southern Illinois University, USA
15:50-16:10	Title: Application of AI for in situ Monitoring of Artemia Salina Population Using a Submersible Digital Holographic Camera Dr. Victor Dyomin , First Vice-Rector, National Research Tomsk State University, Russia; Head, Laboratory of Radiophysical and Optical Methods for Environmental Research, Russia
16:10-16:30	Title: Contemporary Research About the Digital Transformation of Manufacturing Companies Dr. Lucia Knapcikova , Associate Professor, Technical University of Kosice, Slovakia
16:30-16:50	Title: Artificial Intelligence: An Untapped Opportunity for Equity and Access in STEM Education Dr. Tiffanie Zaugg , Post Doc., University of Central Florida, USA

- 16:50-17:10 **Title:** GCA²Net: Global-Consolidation and Angle-Adaptive Network for Oriented Object Detection in Aerial Imagery
Dr. Shenbo Zhou, Researcher, National Key Laboratory of Optical Field Manipulation Science and Technology, Chinese Academy of Sciences, China

Posters & Papers

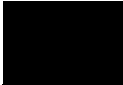
- WCFN 01 **Title:** Circadian Rhythmicity of Serum and Milk Melatonin Concentrations in Cows: Systematic Review
Dr. Ekkehart Paditz, Professor, Center for Applied Prevention, Germany
- WCO 02 **Title:** European Fisheries Enhancement Through 'Omic' Characterization and Seafood Production from Underutilized Fish Species
Dr. Tiziana Pepe, Full Professor, Department of Veterinary Medicine and Animal Production, University of Naples "Federico II", Italy
- ICE 03 **Title:** Phytocoenotic and Soil Signs of Current Global Warming on the Boreal Ecotone of the East-European Plain
Dr. Erland G. Kolomyts, Professor, Institute of Basic Biological Problems, Russia
- ICE 04 **Title:** Smart Ecologization of Cities Based on Optimal Investment Strategies for Energy Modernization of Buildings
Dr. Andrii Polyvianchuk, Professor, Vinnytsia National Technical University (VNTU), Ukraine
- WCSM 05 **Title:** Borate Bioactive Glasses with High Calcium Content
Ms. Katarzyna Kozubal, Ph.D. Candidate, AGH University of Krakow, Poland
- WCSM 06 **Title:** Injectable Hydrogels Based on Chitosan-Gelatin Biomaterials as Carriers of Biologically Active Compounds
Ms. Weronika Gura, Ph.D. Student, AGH University of Krakow, Poland
- WCSM 07 **Title:** CoO as a Modifier of Bioactive Borate Glasses
Ms. Patrycja Gackowska-Gondek, Ph.D. Candidate, AGH University of Krakow, Poland
- WCSM 08 **Title:** Laser-Directed Energy Deposition of Bioactive Glass on Ti-6Al-7Nb Titanium Alloy Substrate with Highly Refined Grain Structure
Dr. Katarzyna Cholewa-Kowalska, Associate Professor, AGH University of Krakow, Poland
- WCSM 09 **Title:** Calculating the Active Volume of Dislocation Nucleation of Third-Generation Semiconductor Silicon Carbide Using Nanoindentation
Mr. Jun-Yu Wang, Ph.D. Student, National Sun Yat-sen University, Taiwan



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Osaka, Japan

Keynote Forum



Keynote Forum

Moderator

Dr. James Wang, Founder, Professor and Director of the eVTOL Research & Innovation Centre, Nanyang Technological University, Singapore

Time: 09:10-11:55, November 11, 2025 (Tuesday)

Place: Sapphire & Crystal, Second Floor



Title: Global Private Sector Leadership for The Sustainable Blue Economy

Mr. Paul Holthus

Founding CEO Emeritus
World Ocean Council
USA

Abstract

The ocean is increasingly crowded with more users and a greater range, intensity and duration of activity. This creates complex challenges for ocean businesses regarding environmental impacts, conflicts among users, and interaction with other values, e.g. conservation. Many of the critical issues affecting the ocean use are cross-cutting and the best efforts by a single company, or an entire industry sector, are not enough. Multi-sectoral ocean industry leadership and collaboration can catalyze global ocean economy cooperation to address shared ocean sustainable development challenges and bring business benefits through synergies and economies of scale. To achieve this, it is necessary to have a structure and process to bring together ocean industries (shipping, ports, offshore energy, submarine cable, fisheries, aquaculture, cruise and coastal tourism, marine technology, etc.) as well as the legal, insurance, innovation and investment communities to catalyze global leadership and collaboration in addressing shared responsibility, stewardship in support of a sustainable global ocean economy. Since 2009, the World Ocean Council (WOC) has been creating the world's largest Blue Economy business network, with 35,000+ industry, investment and innovation stakeholders from around the world and across the sectors. WOC is undertaking concrete efforts to engage the private sector in addressing Sustainable Blue Economy issues, including: ocean governance/policy; marine spatial planning/ocean zoning; maritime clusters and sustainable development, marine sound; marine pollution; the Arctic; biofouling/marine invasive species; marine mammal impacts; port reception facilities, marine debris, and plastics; adaptation of ports and coastal infrastructure to sea level rise/extreme weather events; data collection by ocean industries (ships/platforms of opportunity); social license and the Blue Economy; blue carbon/ocean CO2 removal, ocean regeneration, sea basin scale maritime industry collaboration for sustainability.

Biography

Mr. Paul Holthus has been advancing ocean business and sustainable development since the 1990's and founded the World Ocean Council (WOC) in 2009. As the global Blue Economy Business and Investment Organization, the WOC brings together the ocean private sector to create leadership, collaboration and action on "Corporate Ocean Responsibility" in the world's original and largest global ocean business and sustainability organization. The WOC is recognized, accredited to and has partnership agreements with a growing number of U.N. agencies, international business organizations, etc. Paul created the WOC Sustainable Ocean Summit (SOS), the only premier high-level global ocean business and investment event on sustainability and the WOC Global Blue Finance Summit (BlueFIN), the only high level annual gathering on investment and ocean sustainability. Paul is a frequent speaker at international ocean, industry, sustainability and investment events. He was one of 5 people invited to be a member of the UN Secretary General's Expert Group on Oceans for the 2012 Rio+20 conference. He is the only international ocean industry organization representative invited to address the UN General Assembly. He has been invited to be on the Advisory Boards of an increasing number of ocean investment entities.

Mr. Holthus has worked on ocean sustainable development since the early 1980's, in over 30 countries - working with UN agencies, companies, communities, industry associations, international non-governmental organisations and foundations.

He has held senior positions with UNEP and international environmental organisations, including at The Nature Conservancy, where he originated the "Coral Triangle" concept. He later served as Deputy Director for the IUCN Global Marine Programme. Paul is a graduate of the University of California and University of Hawaii, was a Fulbright scholar in Australia and is an East-West Center alum.

Title: Ocean Fronts and Sustainable Fishery

Prof. Sergei Prants

Member of the Russian Academy of Sciences

Head of Department of the ocean and atmosphere physics, Pacific Oceanological Institute of the Russian

Academy of Sciences

Russia

Abstract

The issue of where and when fishermen decide to fish remains an important factor to achieving sustainable fisheries. The ocean fronts are characterized by a confluence of waters with different properties. These features promote aggregation of nutrients, phytoplankton and zooplankton contributing to creation of oases of marine life in the oceanic desert for marine habitants, from small pelagic fish to seabirds and top predators. The new approach has been developed in the recent years for capturing frontal features based on the extraction of Lagrangian fronts in chaotic oceanic flows. In this approach, the relevant indicators of water motion are computed to provide information on the origin, advection history, 'age' and other properties of water masses. We review the achievements in diagnostics of ocean fronts with the focus on their role for fisheries. The location of Lagrangian fronts can be calculated in the real time with satellite-derived velocity fields under any weather conditions and in the areas with small contrasts of sea surface temperature. The proximity of fishing ground for different species to location of the fronts is shown with the help of statistical tests in different seas and oceans based on numerous catch reports of fishing vessels. The physical mechanisms at fronts, that may provide favorable conditions for foraging and feeding, are discussed. These results may help in avoiding the risk of overfishing and bycatch. We also emphasizes the importance of fronts in marine ecology, sustainable fisheries and in making decisions on the organization of marine protected areas.

Biography

Prof. Sergei Prants is the head of Dept. of Ocean and Atmospheric Physics at Pacific Oceanological Institute (Vladivostok, Russia). His research activity includes different aspects of physics and ecology of the oceans with a particular focus on development of Lagrangian methods to study ocean fronts, eddies and marine life. He published recently reviews on fisheries and marine life at Lagrangian fronts in the prestigious scientific journals. He received PhD in Phys. and Math. in 1981 and Dr. Sci. degree in 1992 and was elected to Russian Academy of Sciences in 2022. Sergei has worked as visiting researcher in Lebedev Physical Institute (Moscow), Courant Institute of Mathematical Sciences at New York University, Institute for Pure and Applied Mathematics at University of California in Los Angeles, Galilei Institute for Theoretical Physics (Florence, Italy) and gave lectures at Xi'an Jiao Tong University (Xi'an, China) and Nanjing University of Information Science and Technology (Nanjing, China). He authored and coauthored more than 200 peer-reviewed articles in journals indexed in the Web of Science core collection and a few books with the present Hirsch citation index of 31. Prof. Prants entered the top 2% of the most cited scientists in the world by the number of citations in Scopus and in the top 0.5% of the most influential scientists by Scholar GPS (2024). He is a member of editorial boards of five scientific journals and is the winner of the International Zaslavsky Award in nonlinear science and complexity (2014).

Title: Engineering Metal-organic Frameworks for Energy Applications

Dr. Qiang Xu

Chair Professor

Southern University of Science and Technology (SUSTech)

China

Abstract

We have successfully synthesized a number of porous metal-organic frameworks (MOFs) and developed their new applications as catalysts, as supports for metal nanoparticles and as templates/precursors for synthesis of nanostructured materials. Porous carbons and carbon composite materials have been synthesized by using MOFs as templates/precursors and the resultant materials display high specific surface areas and excellent electrochemical properties as electrode materials for electric double-layered capacitor (EDLC) and as electrocatalysts for various applications, including fuel cells and metal-air batteries. This talk will discuss the catalytic and energy applications of MOF-derived nanomaterials.

Biography

Dr. Qiang Xu received his Ph.D. in 1994 from Osaka University. He worked as Prime senior researcher in AIST and Adjunct professor of Kyoto University and Kobe University before moving to SUSTech as Chair professor in 2020. His research interests include the chemistry of nanostructured materials and their applications, especially for catalysis and energy. He is on a number of editorial/advisory boards of journals, including EnergyChem (Editor-in-Chief), Coordination Chemistry Reviews (Associate Editor), Chem, Matter, and Advanced Energy Materials. He received Thomson Reuters Research Front Award in 2012, Humboldt Research Award and Ichimura Prize in 2019 and Japan Society of Coordination Chemistry (JSCC) award in 2024, and was recognized a highly cited researcher (2014-2023) by Thomson Reuters/Clarivate Analytics and among top 100 chemistry scientists by Research.com. He is Fellow of the Engineering Academy of Japan (EAJ), European Academy of Sciences (EURASC), and National Academy of Sciences, India (NASI).

Title: Future Applications of AI and Smart Materials in Aircraft Design

Dr. James Wang

Professor and the Director
The eVTOL Research and Innovation Centre
Nanyang Technological University
Singapore

Abstract

Today AI and smart materials are not used in aircraft design and manufacturing. This presentation explores the challenges of adopting them in a highly regulated aerospace industry and how these new technologies could potentially be inducted into the aerospace field.

Biography

Dr. James Wang is an internationally renowned expert in eVTOL aircraft and helicopter design and business strategy. His advice and consultations are highly sought after. He has worked on over thirty different rotorcraft development programs around the world in the last 35 years. He was a Senior Vice President at Leonardo Helicopters. He is now a Professor and the Director of the eVTOL Research and Innovation Centre at Nanyang Technological University. Dr. Wang received his degrees in Aeronautical Engineering and in Engineering and Computer Science from M.I.T and degrees in Aerospace Engineering from the University of Maryland. He holds numerous patents and international awards.

Title: The Academic Teacher as Change Agent in the Age of AI

Prof. dr. Jacqueline E. van Muijlwijk-Koezen

Chief Education Officer (vice-rector education)

Vrije University Amsterdam

the Netherlands

Abstract

The academic teacher's role has traditionally spanned teaching, research, and management. In recent years, however, **valorization**—turning academic knowledge into societal impact—has been added to this already demanding portfolio. With the rise of generative AI, these responsibilities are no longer just a matter of balancing tasks: they are reshaping what it means to be an academic teacher.

From the **teacher's perspective**, the challenge is to sustain agency and identity. How can academics remain credible role models when AI blurs traditional boundaries of expertise? From the **student's perspective**, the teacher continues to embody the *Nature of Science*, integrating research into education and modeling the curiosity, rigor, and ethical responsibility that define scientific inquiry.

At the **programme level**, generative AI tools diminish the centrality of content delivery but make the teacher's role as designer of meaningful learning activities more essential than ever.

At the **institutional level**, academic teachers hold the key to implementing educational strategies. Supporting them through training and community building is critical. At VU Amsterdam, the Center for Teaching and Learning (CTL) takes up this role as a *hub* for community, an *incubator* for innovation, a *temple* for shared values, and a *sieve* for identifying sustainable practices.

Taken together, these perspectives show that academic teachers are not passive transmitters of knowledge, but **active architects of learning and transformative agents shaping the university's future** in the era of AI.

Biography

Prof. dr. Jacqueline van Muijlwijk is a distinguished academic and leader in the field of chemistry and pharmaceutical sciences. She currently serves as the Chief Education Officer at Vrije Universiteit Amsterdam, where she has held various leadership roles since 2006. Jacqueline's extensive experience includes positions such as Vice Dean of the Faculty of Science and Full Professor of Innovations in Human Health & Life Sciences. Her academic journey began with a Ph.D. from Vrije Universiteit Amsterdam and Leiden University, focusing on the design and synthesis of antagonists for the human adenosine A3 receptor.

Throughout her career, Jacqueline has been actively involved in educational innovation, receiving multiple awards for her contributions, including the Science Teaching Innovation Award. She has also played significant roles in various boards and committees, such as the Supervisory Board of the Theological University Utrecht and chairing the Executive Board of European Consortium ULLA. Her dedication to integrating education and research is evident in her numerous publications and successful grant applications.

Jacqueline's work style is characterized by her commitment to collaboration and leveraging networks to enhance educational and research outcomes. She emphasizes the importance of academia's role in society, advocating for a reciprocal relationship where both the academic community and society at large recognize and utilize each other's strengths. Jacqueline is dedicated to fostering partnerships that underscore the societal relevance of academic work while ensuring that the contributions of academia are clearly communicated and valued.

Title: Digital Transformation in Higher Education: Maximizing Student Success

Dr. Julie Furst-Bowe,
Provost and Academic Vice President,
Georgian Court University,
USA

Abstract

Over the past decade, there has been continued improvement in how technology can be used to maximize success in traditional, hybrid and online classrooms. This presentation will discuss the application of a number of digital tools that are successfully being used to enhance student learning in colleges and universities. These tools include, but are not limited to, simulation, virtual reality and artificial intelligence. Examples from several institutions will be shown.

Biography

Dr. Julie Furst-Bowe has held executive leadership positions at several colleges and universities across the United States, including the University of Wisconsin-Stout, Southern Illinois University, Chippewa Valley Technical College, Arkansas Tech University, Winona State University and Georgian Court University. She received her doctorate in education from the University of Minnesota and has published and presented nationally and internationally on the topic of performance excellence in higher education. She serves as a peer reviewer for the Higher Learning Commission and as an assessor for the Government Excellence Program in the United Arab Emirates.

Title: Remarks on the Importance of Knowledge About the Inhabitants of Transformed Urban Organisms in “Smart City” Projects

Prof. Jan Kazmierczak

Faculty of Organization and Management
Silesian University of Technology
Poland

Research Interest

Production Engineering, Innovation Management, Assessment of Social Impact of New Technologies and Products (Technology Assessment - TA), Knowledge Management, Engineering of Needs, New Directions in Education

Abstract

The authors of many published works on transforming urban organisms into “smart organisms” (Smart Cities – SC) seem to treat the presence of users in these spaces – primarily city residents – in an overly simplistic manner. For example, a statistical approach is commonly used to describe the population of city residents, even when authors refer to the diversity of SC end users. As a result, readers of such studies get the impression that a smart city is designed for the “average user,” even though the authors of the study acknowledge in their content their recognition and understanding of the diversity of such users. If we divide SC projects into Smart City 1.0, Smart City 2.0, and Smart City 3.0, as proposed by Cohen, then for SC 1.0 and SC 2.0 projects, such a statistical and objective treatment of end users of urban space can be considered justified to some extent. However, in the case of Smart City 3.0 projects, city residents must be treated as entities that have a real impact on, for example, the directions of development of the space they inhabit or the priorities in this area. The article aims to provoke discussion and therefore presents a very subjective set of questions/issues to which, in the author's opinion, the scientific world has not yet provided clear answers. In the rest of the presentation, the author presents both his experiences related to involving residents in the transformation and development of their city, as well as the preliminary results of focus group research on city residents' knowledge of the Smart City paradigm. The article's conclusions address both general methodological issues and specific practical problems related to the knowledge required for residents to live in a modern city.

Keywords: Smart City, inhabitants, knowledge

Biography

Prof. Jan Kazmierczak, D.Sc., Faculty of Organization and Management (former Dean of the Faculty, Silesian University of Technology, Gliwice, Poland. Polish Academy of Sciences, Member of the Committee on Production Engineering, advisor of the Committee on Acoustics. President of the Polish Society of Technology Assessment. Recently (2007 – 2015) Member of the Sejm (Parliament) of the Republic of Poland, Chairman of the Parliamentary Sub-Committee on Science and Higher Education, Vice Chairman of the Parliamentary Committee on Innovation and New Technologies, (2001 – 2007) Vice-Mayor of the City Gliwice, President of the City Council. Areas of Research Projects: expertise in implementing and assessing innovations, mainly in areas like Smart City and Industry 4.0, management of data, information and knowledge, implementations of tools of CMMs class (Computerized Maintenance Management systems) and ERP (Enterprise Resource Planning) in industrial practice, analysis of vibroacoustic hazards in labor environment, development of acoustic maps using GIS technology, Technology Assessment.

Title: Advancing Electronics Using Graphene

Dr. Hugh Glass and Dr. Simon Thomas

Product Manager
Paragraf
UK

Abstract

Semiconductors have become the lifeblood of the world, the ‘new oil’ as many have put it and certainly the accelerating market growth seems to indicate this. These materials lie at the heart of everything we now do and are essential for the continued on-going march of technology. It’s fair to say that without semiconductors the global economy would collapse, not just from market impact but quite literally collapse due to the lack of technology that those markets operate on.

As we accelerate deep tech development, achieving greater and greater advances at an increasing rate the chips we make from semiconductors are put under higher and higher demands reaching limitations not just of the chips but the semiconductor materials themselves.

Marvellous innovations have been achieved over the past few decades delivering wondrous technologies from LLM verging on AI to Quantum Computing, and the more impressive underlying innovations continue to serve these applications from 3D chip arrays through to heterogeneous chip manufacturing, matching the challenges the applications throw at them.

- But can we keep developing semiconductor chip solutions and technologies at this rate?
- And ultimately at what cost?

Driven by the increasing performance criteria, resulting in exponentially increasing chip power densities, it is widely accepted that by the year 2030 computing alone will demand more than 20% of the world’s generated energy, if we continue along our current technology demand trajectory. This accelerating requirement is underlying a more concerning issue, that by 2035 it is predicted global power demand will outstrip supply posing challenges across the grid for critical systems infrastructure.

Even if massive resources were dedicated to scaling global energy generation and infrastructure today, it is simply not possible to provide capacity to meet this demand. This is even more stark if we want to ensure we continue the energy transition to renewable, green sources.

So, if we are to continue our technological progress and provide the energy that technology requires, we require a significant change in approach, we need an approach that targets providing continuing device performance progression as well as lowering product power demand.

The past decade has seen the innovation of several new materials and indeed materials classes, from silicon carbide, diamond and gallium oxide through to 2D materials and MXenes all of which are offering step change performance characteristics compared to today’s incumbent semiconductors. However, it is the realm of two-dimensional materials that has sparked the greatest hope as it is these new materials that have demonstrated, at least in the lab, the ability to improve device performance markedly and simultaneously lower power demand significantly.

Paragraf has recently developed graphene, the world’s first isolated 2D material, into the first real world two-dimensional material products demonstrating the promise of these limited dimension materials of delivering significantly higher performance characteristics and order of magnitude power demand reductions.

However, important questions still remain;

- How do we bring these new materials into the standard semiconductor device or product build toolkit?
- And subsequently, how do we scale appreciably to head off the impending energy nexus of supply and demand?

This talk will introduce the background and current status of two-dimensional materials with a focus on graphene in next generation technologies. It will look at the achievements so far, the benefits we are already seeing, the roadmap for the future and ultimately where we can expect these advanced materials to take technology in the long term.

Biography

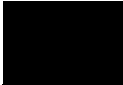
Dr. Hugh Glass is the Head of Product management at Paragraf, with wide ranging responsibilities including product strategy, ensuring the product vision matches market requirements and overseeing product life from idea through to market. Having worked on the technology since its infancy, starting as a scientist when Paragraf was first spun out of The University of Cambridge, Hugh has a deep knowledge of the technology and its potential, which is now being applied in a more commercial role. Previously Hugh achieved his Ph.D. through the Nano Doctoral Training Centre at the University Cambridge, an interdisciplinary course covering chemistry, physics and engineering, focusing on the growth and characterisation of novel battery electrode materials.



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Osaka, Japan

The 10th Annual Global Congress of Knowledge Economy (GCKE-2025)



GCKE 01:

Tech Innovation & Digital Transformation

Chair

Dr. Mark van der Pas, Managing Director, Uffective; Lecturer, Maastricht University, the Netherlands

Co-chair

Dr. Nicolaj Hannesbo Petersen, Researcher, Incubator & Project Manager, UCL University College, Denmark

Time: 13:30-16:50, November 11, 2025 (Tuesday)

Place: Yamato A, Fifth Floor

Title: Artificial General Intelligence, The End of Work, And the Gamification of Life

Dr. Leslie Paul Thiele

Distinguished Professor
University of Florida
USA

Abstract

In 1930, the father of macroeconomics, John Maynard Keynes, predicted the end of work. If the rate of technological progress and accumulation of capital continued unabated, Keynes forecast, humanity's "economic problem," the struggle for subsistence, would be solved by 2030. Humanity would then face its "permanent problem:" how use its leisure "to live wisely and agreeably and well." Keynes believed that voluntary challenges must become the "bread" that gets thinly spread on the "butter" of wealth and leisure.

In 1978, the halfway point to Keynes' predicted end of work, Bernard Suits, a Canadian philosopher, argued that once technology had ended the scourge of scarcity, human beings would occupy their leisure and develop their capacities by playing games.

Industry leaders predict that Artificial General Intelligence will be achieved by 2030. Smart machines will then outperform human beings in virtually all tasks, eradicating the need for toil. If Keynes, Suits, and technology leaders are correct, our species have only a few years to figure out how to learn to live wisely and agreeably and well in the absence of work. My presentation considers the aptness of this prediction and whether a digital culture centered on games can well address humanity's permanent problem.

Keywords: Artificial Intelligence, gamification, digital culture

Biography

Dr. Leslie Paul Thiele is a Distinguished Professor in the Department of Political Science at the University of Florida. His interdisciplinary research focuses on political thought, technology, sustainability, and the intersection of political philosophy and the natural sciences. His central concerns are the responsibilities of citizenship and the opportunities for leadership in a world of rapid technological, social, and ecological change. Currently, he serves as the Specialty Chief Editor for Politics of Technology, in *Frontiers in Political Science*. His journal articles have appeared in: *American Political Science Review*; *Political Theory*; *Perspectives on Politics*; *Polity*; *Theory and Event*; *Theoria*; *Environmental Ethics*; *Canadian Journal of Political Science*; *New Political Science*; *Politics and the Life Sciences*; *Journal of Modern History*; *Policy Studies Journal*; *Journal of Environmental and Sustainability Science*; *International Journal of Sustainability in Higher Education*; and *Alternatives*, among others. He has published 10 books, including *The Art and Craft of Political Theory* (Routledge 2019), *Sustainability* (Polity 2024) and *Human Agency, Artificial Intelligence, and the Attention Economy: The Case for Digital Distancing* (Palgrave Macmillan 2025).

Title: Artificial Intelligence, Robotics and Their Impact of the Future Labor Market

Dr. James R. Stone III

Director

National Research Center for Career & Technical Education at the SREB

United States

Abstract

Artificial intelligence (AI) and robotics are revolutionizing industries around the globe, ushering in advancements that are transforming the nature of work. As with any new technology, AI and robotics offer numerous benefits, e.g., increased corporate profits, increased efficiency, and workplace safety. As with earlier technologies, e.g., the internal combustion engine, AI/robotics hold the promise of creating new job categories and eliminating old. However, AI/robotics raise new and different concerns about the future of human employment. The early evidence shows automation replacing humans performing repetitive tasks, perhaps as many as 47% of U.S. jobs in the near term by some estimates. But displacement is not limited to repetitive tasks. Autonomous robotic surgeons, receptionists, teachers, artists, construction workers, and others show the ability of these new technologies to replicate human cognitive, emotional, and/or physical tasks, and the implications for wages, employment, and income distribution are profound. And, have the potential to aggravate existing economic inequality. It is also possible that more radical improvements will emerge in the coming decade as the models get larger, hardware improves, more data are used, and research continues. The effects on the future labor market could be commensurately greater than anything seen so far.

Keywords: AI, Robotics, Workforce

Biography

Dr. James Stone, (Ed.D.) is an Emeritus Professor, University of Minnesota; Distinguished University Scholar, University of Louisville and currently serves as the director on the National Research Center for Career and Technical Education at the Southern Regional Education Board. Dr. Stone has maintained an active program of research over the past 40 years. He has been responsible for more than \$40 million in external research grants focusing primarily on the role of schools in linking youth and adults to the workplace. He was the lead researcher on the Math-in-CTE study of contextualizing math in occupational curricula and co-lead researcher on several studies of career pathways. He has authored or co-authored more than 100 reports of research, journal articles, or books. He is currently leading a US Department of Education funded study of meeting the professional needs of regional tech-center directors. He has presented more than 400 papers, speeches and workshops including invited presentations in Belarus, China, England, Germany, Korea, Japan and Taiwan. Previously he served on the Editorial Board of the Journal of Vocational Education Research and as Editor.

Title: The Neural Web: Harnessing IoE and Neuromarketing to Revolutionize Modern Marketing Strategies

Dr. David J. Smith

Professor of Management, Associate Dean
Rinker School of Business, Palm Beach Atlantic University
USA

Abstract

An in-depth exploration of how the integration of the Internet of Everything (IoE) and neuromarketing is transforming the marketing landscape is provided. The paper begins by defining IoE and its role in connecting people, processes, data, and devices to create a seamless flow of real-time consumer insights. It then delves into neuromarketing, explaining how understanding cognitive and emotional responses to marketing stimuli can drive highly personalized and impactful campaigns. Through a detailed literature review and applied examples, the paper examines how businesses are leveraging these technologies to create adaptive, emotion-driven strategies that resonate with consumers on a deeper level. The discussion culminates in actionable recommendations for marketers to incorporate IoE-driven insights and neuromarketing techniques into their strategies, emphasizing the potential for these technologies to drive customer engagement, enhance brand loyalty, and shape the future of marketing.

Keywords: Internet of Everything, neuromarketing, personalized marketing, proactive consumer insight

Biography

Dr. David Smith is a Professor of Management and Associate Dean in the Rinker School of Business at Palm Beach Atlantic University in South Florida, and a Managing Partner at MacKenzie, Fraser and Smith, marketing firm. Formerly a management consultant with Arthur Andersen and the Association for Export Development, he has worked with the Department of Commerce, Small Business Administration, Foreign Agricultural Service, Export Development Corporation and numerous economic trade and development groups on projects leading to the expansion of both U.S. and Canadian international marketing efforts. Included in his consulting experience has also been work with various Fortune 500 firms seeking international market expansion, export capital acquisition, and enhanced global operations and logistics. Having over 35 years of international experience, he has forged valuable contacts throughout the world often speaking at national and international conferences on the topics of Strategic Management, Marketing and International Business. Dr. Smith's consulting client list has included firms such as Chevron, Nestle, Siemens, Century21 and American Express. Finally, he is a noted academic researcher, with over 100 academic peer reviewed publications, presentations and books.

Title: Challenges and Opportunities in Technology Transfer: A Review

Dr. Nikolaos T. Milonas

Emeritus Professor

Academic Advisor, Archimedes Center for Innovation and Entrepreneurship

National and Kapodistrian University of Athens

Greece

Abstract

Technology transfer is a vital process of moving innovation from laboratories to commercial applications fostering economic growth. In this paper we review papers that deal with various aspects of technology transfer process. This process is not without challenges. Disputes over ownership and in sharing the benefits, inherent risks and difficulty in valuing new innovations, difficulties in university-industry collaborations, and funding gaps for early-stage research are the main obstacles in moving technology into business applications. When eventually technology transfer succeeds, there are real opportunities for economic growth and new product development, new partnerships across borders, collaborations through open innovation, solving real world problems faster, and opportunities to address societal needs.

Keywords: Technology transfer, innovation, open innovation, funding gaps

Biography

Dr. Nikolaos T. Milonas holds a Ph.D. in Business from the City University of New York. He is Emeritus Professor of Finance at the National and Kapodistrian University of Athens (NKUA) and currently serves as Academic Advisor at Archimedes Center of Innovation and Entrepreneurship. He has taught at the University of Massachusetts at Amherst, Baruch College and ALBA. His research focuses on derivatives and energy markets with particular emphasis on institutional investment, sustainable development and ESG principles. He has published in prestigious international academic journals including the Journal of Finance and authored 7 books. Over the years, he has taken on administrative responsibilities and initiatives as Vice-Rector for Finance at NKUA, as Director at Archimedes Center and as Chairman in the Department of Business Administration at NKUA. In the business sector, he has served as Investment Director at an institutional investor, Chairman of investment committees at mutual fund companies, Advisor to banks, institutional investors and brokerage firms, Member of the Board of Directors of companies such as Emporiki Bank and the Hellenic Exchanges-Athens Stock Exchange, where he served as Chairman of the Audit Committee for a decade. He currently serves as Vice-President at the Administrative Board of IAPR.

Title: Strategic Management and Business Model Innovation: Navigating the Knowledge Economy through Socio-Cognitive Innovation with the Blank Business Model Canvas

Dr. Nicolaj Hannesbo Petersen

Research, Incubation and Project Management

Editor-in-Chief of the International Journal of Strategic Management and Innovation

Applied Research in Business and Technology

UCL University College

Denmark

Abstract

The rapid evolution of the knowledge economy, driven by digital transformation, globalization, and sustainability, necessitates innovative approaches to strategic management and business model innovation. Firms must leverage intangible assets, knowledge resources, and entrepreneurial strategies to sustain competitive advantage in this dynamic environment. While the Business Model Canvas (BMC) is a widely used tool for visualizing and designing business models, it has limitations in addressing uncertainty and rapid change. This research critically examines the BMC and introduces the Blank Business Model Canvas, a novel framework rooted in mindful organizing and sensemaking. Mindful organizing promotes attention and adaptability, while sensemaking helps firms interpret ambiguity and respond creatively to emerging challenges.

By integrating these socio-cognitive principles, the Blank Business Model Canvas offers a structured pathway for fostering creativity, adaptability, and alignment with market demands. It addresses the limitations of traditional frameworks, equipping firms with tools to design resilient and forward-looking business models. This research advances the discourse on strategic management and business model innovation by bridging theoretical and practical gaps. It provides actionable insights for practitioners and identifies pathways for firms to thrive in the knowledge economy, contributing to both scholarly understanding and real-world application.

Keywords: Mindful organizing; Business Model Sensemaking; Socio-Cognitive innovation

Biography

Dr. Nicolaj Hannesbo Petersen holds a Ph.D. in Business Administration from the University of Southern Denmark and is a researcher, incubator, and project manager at UCL University College Denmark. With over a decade of expertise in strategy, entrepreneurship, and innovation, he has served as a consultant, Head of Innovation & Entrepreneurship Incubation, and advisory board member for Business Hub Fyn. Recognized and awarded by IEEE TEMS for his research contribution, Nicolaj frequently shares insights at international academic and professional forums. He has actively contributed to international research collaboration as a Co-Editor-in-Chief, Special Issue Editor, and Handbook Editor.

As Editor-in-Chief of the International Journal of Strategic Management and Innovation at IGI Global, he promotes research on digitalization, sustainability, internationalization, innovation, management, and entrepreneurship. Blending academic rigor with practical expertise, Nicolaj contributes to advancing knowledge in strategic management and innovation.

Title: Project Management on Digital and Sustainable Organizational Transformation

Dr. Ioana Filipas¹, François Marmier² and Jean-Louis Michalak¹

1. Associate Professor, BETA Laboratory, UMR 7522 CNRS, University of Strasbourg

2. Associate Professor, ICUBE laboratory, UMR 7357 CNRS, University of Strasbourg
France

Research Interest

Project management methodology

Abstract

The aim of this presentation is to provide new insights for companies that want to achieve digital and sustainable transformation, to gain a competitive advantage. We consider dual (digital and sustainable) transformation as a new paradigm enabled by digital technologies. It brings radical improvement and innovation to an organization, to create sustainable value for its stakeholders, by strategically leveraging its key resources and capabilities. Unlike the initial technocentric approach, the “Industrie du Futur” French program is human-centric and integrates social and environmental issues.

To frame this dual transformation (digital and sustainable), the presentation aims to define a project management methodology. The contributions, based on deductive research, are: 1) a list of dynamic capabilities that influence digital transformation; 2) an approach that helps decision-makers in the company to define dual transformation strategies based on knowledge and capabilities 3) a model for qualitatively assessing the maturity level of organizations on the various axes characterizing dual transformation, 4) based on the gap observed on each axes between the current level and the strategy of the organisation, we propose a decision-making tool to determine the development strategy to be adopted for a successful organizational transformation. These various elements will thus enable the design of a realistic dual transformation project.

Keywords: Digitalization, sustainability, organizational transformation, project management, maturity model

Biography

Dr. Ioana FILIPAS, a Production Systems Engineer with a PhD in Industrial Engineering, is currently a assistant professor at University of Strasbourg and a researcher at the BETA laboratory. Her research focuses on the management of innovative projects using systems engineering and continuous improvement tools and methods. She has participated in numerous projects with industrial companies and has published her research findings in scientific journals and conferences.

Dr. François MARMIER, an industrial engineer, is currently an assistant professor at at University of Strasbourg and a researcher at ICUBE laboratory. He received his doctorate in industrial engineering from the University of Franche-Comté. His research focuses on integrating human aspects, uncertainty, and risk to make better decisions in projects, logistics, and services. He has participated in various research projects related to the development of decision systems for project management.

Jean-Louis MICHALAK, Associate Professor of Industrial Engineering Sciences and Mechanical Engineering, teaches at the University of Strasbourg. He develops teaching in the fields of both Industrial Management and business relations, carrying out numerous Consulting/Training activities. For several years, he has been developing a "Lean Management" Factory School and "Industry 4.0 demonstrator". In this context, he regularly leads working groups in the field of digital transformation of companies, allowing the construction of teaching/research projects thanks to strong cooperation between the academic and industrial worlds.

Title: Less Is More: A Practitioner's Guide to Maximising IT Investments

Dr. Mark van der Pas

Managing Director, Uffective
Lecturer, Maastricht University
the Netherlands

Abstract

Not all organisations are satisfied with the returns on their IT investments. While numerous papers offer advice on improving these returns by outlining actions to take, this paper takes a different approach. In IT, it's common to draw a red line on a planned list of projects, prioritising the investments above the line and stopping those below. With this paper we aim to give input to practitioners to move this red line to deliver more valuable investments. This is done by focusing solely on activities organisations currently undertake and challenging them to stop. We discuss practices that are diminishing returns and explain how ceasing these activities can not only boost returns and speed up time to market but also reduce cost.

Keywords: IT Management, IT investments, and IT planning.

Biography

Dr. Mark van der Pas is a guest lecturer at Maastricht University, where he obtained his doctorate and teaches IT management. He is the CEO of Uffective, a software company specialising in portfolio, resource, and asset management solutions for digital transformation, designed to enhance the decision-making impact of its customers.

In his private time, Mark enjoys not watching Netflix, enjoying Super Tuscan Sundays with delightful dinners, taking walks, spending time with friends and watching Roda JC Kerkrade. He prefers creating over consuming.

Title: Social Media Shopping Activities, Emotions, And Loneliness on Well-Being in South Africa

Dr. Yvonne Kabeya Saini

Senior Lecturer

University of Witwatersrand

South Africa

Abstract

Studies addressing the impact of social media usage on well-being are inconclusive. Current literature has mixed findings on the impact of social media usage on well-being and this research addresses the research gap as little has been explored on the impact of social media shopping activities on well-being. This study investigates the impact of social media shopping activities on well-being focusing on the mediating roles of emotions and loneliness. Drawing on Self-Determination Theory, the research examines how digital shopping experiences on social media platforms influence user's overall well-being. A cross-sectional survey of South African social media users (N = 262) was conducted, and the data were analyzed using Structural Equation Modeling (SEM). The findings reveal that social media shopping activities are positively associated with well-being, primarily through the generation of positive emotions. However, these activities can also exacerbate loneliness. The study highlights the dual potential of social media shopping activities to either enhance or undermine well-being, depending on the emotional and social context. These results underscore the importance of designing digital environments that foster positive emotional experiences. The research offers valuable insights for marketers, platform designers, and policymakers, emphasizing the need to prioritize user well-being in the digital age.

Biography

Dr. Saini is a Lecturer at the Wits Business School. She joined the WBS in 2006 where she lectures Marketing on the MAP, PDM, MBA, MMSM and other programs. The work experience for Dr. Saini started with the Government of Zambia where she worked as an Economist in the Ministry of Commerce Trade and Industry. She worked as a Business Analyst at the Zambia Privatisation Agency and Business and Information Specialist at Mckinsey & Company before joining academia in 2001.

Dr Saini taught at Monash University at the South African Campus. Before joining the Wits Business School, she was a Lecturer in Marketing at the University of Cape Town. She also holds a certificate in eMarketing offered by New Zealand Direct Marketing Association and Direct Marketing Association of South Africa and has publications in local and international journals.

Some research topics include the following: Consumer Choice, Consumer Decision Making, Factors Influencing Online Consumer Choice and Effects of social media and Consumer Behaviour. In her spare time, Dr Saini enjoys reading, cooking, walking and attending church activities.

Title: Towards a Robust and Integrated Data Strategy for a University of Technology

Dr. Sally Dzingwa

Institutional Registrar

Central University of Technology, Free State

South Africa

Abstract

The Data Strategy is essential for achieving digital transformation. By adopting a structured and robust Data Strategy, the Central University of Technology, Free State (CUT) aims to enhance institutional performance and regulatory compliance, facilitate smoother operations, improve student outcomes, and enable more efficient decision-making. The current institutional landscape is highly fragmented, with key information dispersed across multiple systems and departments. This lack of system integration leads to data inconsistencies, siloed datasets, and access limitations, which impede the university's ability to make timely, evidence-based decisions. CUT undertook a structured data maturity assessment – a collaborative effort involving key stakeholders from business support units and faculties on both campuses. The data maturity assessment is vital for enabling the university to make data-informed decisions, strengthen governance, and promote coordinated digital transformation in line with the university's Vision 2030. A customised ten-category framework was used to evaluate data maturity across CUT, providing a clear lens for assessing institutional data capabilities, readiness, and alignment with strategic goals. This assessment played a crucial role in guiding the development of an integrated, robust Data Strategy. It examined CUT's current data capabilities, identified operational and strategic gaps, and revealed opportunities to improve data governance, accessibility, and utilisation across the university. A structured questionnaire was distributed to stakeholders, and semi-structured interviews were conducted to ensure a comprehensive understanding of the university's data landscape. The assessment achieved a positive 97% participation rate across key academic, strategic and operational functions. The findings indicated an overall maturity level of 2, which is low, and provided a foundation for a practical, forward-looking Data Strategy definition. This paper offers a detailed overview of the university's current data maturity, together with specific recommendations to improve governance, support better decision-making, and encourage cross-functional alignment in data governance. It summarises key findings; provides a maturity level analysis; and prioritises actions to help the university become a more data-driven, strategically aligned institution, in line with its digital transformation goals. Targeted initiatives to close foundational gaps in governance, integration, and data capability, enabling consistent reporting, institutional alignment, and evidence-based decision-making. For CUT to progress from level 2 to Level 3 data maturity, the focus must be on formalising data governance structures, stabilising foundational data processes, improving system integration, and embedding organisation-wide standards. Strengthening these core capabilities will enable more consistent reporting, improved data quality, and more reliable, evidence-based decision-making across all functions.

Keywords: Data Strategy, Digital Transformation, Data Maturity Assessment.

Biography

Dr. Sally Dzingwa, the Institutional Registrar at the Central University of Technology, Free State (CUT), is a highly accomplished higher education executive with a distinguished record in academic governance, institutional strategy, and digital transformation. As Registrar, she provides strategic leadership in enhancing academic administration, policy development, and governance systems that foster institutional excellence and accountability. Her professional focus is on leveraging data intelligence and technology to improve business process efficiency, streamline operations, and enhance decision-making across the student lifecycle. Dr Dzingwa has not only successfully led large-scale institutional reforms, including aligning governance structures with new statutory frameworks and implementing student-centred digital systems, but also inspired others with her achievements. Her reforms have boosted operational agility and service quality, setting a high standard for institutional excellence. With a keen interest in how universities adapt within the global knowledge economy, Dr

Dzingwa presents a comprehensive view of leadership, innovation, and organisational change. She emphasises strategic approaches to utilising data to improve governance, streamline business processes, and boost student achievement in higher education.

A strong research foundation in student systems and process optimisation underpins Dr Dzingwa's professional journey. Her expertise in this area is demonstrated by her PhD from the University of KwaZulu-Natal, where her doctoral study, titled Dzingwa, S.M. (2018). The Centralised Applications System: Staff and Student Perceptions at Durban (Doctoral dissertation, University of KwaZulu-Natal), examined the efficiency and user perceptions of centralised student application systems.

Dr. Dzingwa's academic journey is marked by her commitment to continuous learning and professional development. She holds a Bachelor of Arts degree from UKZN, a Master of Administration (Research) from UKZN, which was upgraded to a PhD in 2018, and a Doctor of Administration (PhD) from UKZN, conferred in 2019. Her academic qualifications are complemented by executive education programmes in leadership, strategic management, and higher education administration. Dr Sally Dzingwa has presented at leading local and international conferences, showcasing thought leadership in university governance, data strategy, and institutional transformation.

 GCKE 02:

Smart Cities, Geography and Urban Economics**Chair**

Dr. Andreas Koch, Professor and Co-Director of the Center for Ethics and Poverty Research, University of Salzburg, Austria

Co-chair

Dr. Jan Veuger, CEO, CORPORATE Real Estate Management, the Netherlands

Time: 13:30-16:45, November 11, 2025 (Tuesday)

Place: Yamato B, Fifth Floor

Title: How Can We Estimate the Market Potential of Sustainable Tourism?

Dr. Yaron Ergas

Director of Research and Statistics
Ministry of Tourism
Israel

Abstract

Sustainable tourism has been studied and practiced for over four decades. Yet, the term remains somewhat ambiguous, as it is interpreted differently by various stakeholders in the tourism sector - namely tourists, tourism businesses, NGOs, and governments. This diversity of perspectives presents a challenge for policymakers, who must work to create a shared language and mutual understanding among all parties involved. Additionally, this lack of consensus complicates efforts to assess market potential in a consistent and meaningful way. The current study focuses on methods to accurately identify the true tourism market potential for sustainability.

Keywords: sustainable tourism, potential

Biography

Dr. Yaron Ergas currently serves as Director of Research and Statistics at Israel's Ministry of Tourism and is a member of the National Council of Statistics. Over the past decade, his work has focused on developing tools and indicators to measure tourism activity, analyzing both foreign and domestic tourism markets, identifying key trends, and modeling tourism market potential

Title: Elements of European Law for a Legal Modelling of Urban Digital Twins

Dr. Valentina Colcelli

Senior Researcher

National Council of Researcher- Italy's Consiglio Nazionale delle Ricerche (CNR)

Italy

Abstract

This paper looks at the legal implications of Urban Digital Twins (UDTs) in the relationship between technology and people, focusing on some projects developed in Italy and coordinated by the CNR. Using a multidisciplinary approach, it explores the nature of personal and mixed data as “capta”; issues related to personal data protection; and the need for a legal model that balances fundamental rights and urban governance. The so-called Data Recognition and Management Plan (DR&MP) is proposed as an operational tool for sustainable data management in UDT. The document also addresses ethical and regulatory issues related to the use of artificial intelligence in public administration (PA), highlighting the need for transparency, human control and the prevention of algorithmic discrimination. Finally, the importance of open science and post-project sustainability is emphasised. The work contributes to the construction of a taxonomy of European legal principles for UDTs based on fundamental rights, promoting a culture of legality, ethics and civic participation in urban digitalisation. In light of the European Data Strategy, a taxonomy is therefore proposed that includes: (i) data classification, (ii) contractual tools for management, (iii) ethical and legal principles for the use of AI, (iv) transparency and accountability requirements for PA, (v) sustainability and openness criteria. This taxonomy can guide the design of UDTs as a means of implementing Smart Cities in accordance with European democratic values.

Keywords: Digital Twins; Personal Data Protection; Digital Governance; Open Science

Biography

Dr. Valentina Colcelli (Ph.D.) is a Senior Researcher at the Italian National Research Council (CNR). Her main research interests focus on the interaction of domestic and European law in shaping rights and interests and market regulation. She is also interested in a general reflection on personal and non-personal data beyond the EU legal system, internal market regulation, Personal data protection, data circulation, legal and ethical issues in research and innovation activities and Artificial Intelligence, and adequate judicial protection of biodiversity considering fundamental rights. She has published books on EU integration and has written over 80 papers. She is a member of several EU-funded projects and long-lasting international research cooperation, like the H2020 and Horizon Europe. She is co-chair of the Working Group “Regulatory, Ethics, and GDPR” for the Scientific Association “European, Middle East & African for Biopreservation and Biobanking” (ESBB) and a member of the ESBB Council. She is a Visiting External examiner at the University of Malta and Independent External Ethics Advisors for European Cancer Imaging Initiative (EUCAIM project, funded under the DIGITAL programme), Techniques for prostate cancer (FLUTE) HORIZON-HLTH-2022-IND-13 action under the Horizon Europe Framework with grant agreement Nr.101095382, Optimise and predict antidepressant efficacy for patient with major depressive disorders using multi-omics analysis and AI-predictive tool – OPADE, action under HORIZON-HLTH-2022-TOOL-11-01 and in the HORIZON-HLTH-2024-DISEASE-03-13-two-stage - PREDICTFTD - Accelerating the Validation of Predictive Liquid Biomarkers for Frontotemporal Dementia Diagnosis and Subclassification. She is also a member of the ELSi team for the European Platform for Neurodegenerative Diseases (EPND), and of the Ethics Committee of University hospital “Azienda Ospedaliero-Universitaria Meyer” (AOU Meyer).

Title: Adaptive Reuse of Buildings: Smart Systems & Policy

Mr. Manoj Dalaya

Co-President
KGD Architecture
USA

Abstract

Cities hold a surplus of underused offices, but the larger opportunity is adaptive reuse—matching each structure to what it can best become, not forcing apartments everywhere. As architects and planners, we show how to turn stranded assets into vibrant places. We triage buildings with a matrix—daylight and floorplate depth, core and exit paths, column grid and load capacity, façade openings, floor-to-floor heights—then pair those traits with the right programs: housing where it fits, including education, civic and cultural space, healthcare, hospitality, maker space, and mixed-use that animates the street.

We cover right-sized, all-electric heating and cooling, fresh-air ventilation, heat recovery for hot water, sensors, sub-metering, and smart controls. We use existing-building pathways, life-safety and accessibility upgrades, and envelope strategies that limit thermal bridges. Finally, we map zoning adjustments, tax incentives, and clean-energy financing. Case vignettes show sequencing, pitfalls, and stakeholder alignment.

Learning Objectives

- Assess a building's "conversion fit" using an objective matrix (daylight and floorplate depth, core and exits, structure and load capacity, façade openings, floor-to-floor heights, service access).
- Match building traits to the right reuse program—housing where appropriate, plus education, civic/cultural, healthcare, hospitality, maker space, and mixed-use—to meet neighborhood goals.
- Apply low-carbon building system and envelope strategies (right-sized all-electric heating and cooling, fresh-air ventilation, heat-recovery hot water, sensors, sub-metering, grid-responsive controls) and navigate existing-building code pathways for life-safety and accessibility.
- Evaluate project economics by combining zoning adjustments (reduced parking, active ground floors, affordability bonuses), historic and other tax incentives, and property-assessed clean-energy or similar financing aligned with embodied-carbon targets.

Biography

Mr. Manoj Dalaya, FAIA, co-president of KGD Architecture, brings over three decades of expertise in architecture and urban design, focusing on integrating sustainability and community connectivity. His leadership in secure and high-performance spaces has earned numerous awards and recognitions. A prominent speaker on sustainable design, Mr. Dalaya's contributions to the field are shaping the future of environmentally responsible construction practices.

Title: The Local Matters in Urban Economics

Dr. Andreas Koch

Professor of Social Geography at the Department of Sociology and Social Geography
Co-Director of the Center for Ethics and Poverty Research
University of Salzburg
Austria

Abstract

Ideas and concepts of strengthening cities in their function and role as decentralized, interlinked, and local political, ecological, cultural, and economic hotspots have gained increased attention over the past two decades. Urban farming, local energy production and consumption, global city functions, or the global parliament of mayors are examples of this development, which is institutionally rooted in organizations such as C40 Knowledge City Networks. With these concepts, the traditional economic and political geography as the territory – with its powerful representation of the nation-state – has been complemented by the network approach focusing on local nodes and regional to global edges. The changing economic – as well as social and ecological – geography manifests in a growing diversity of new urban paradigms like, for example, the “Polycentric City”. The Polycentric City strives for strong local competencies and decisions, political representation, and a decentralized administration that promotes municipalism as an alternative approach to urban economics. The contribution will address this idea by illustrating the case of “Vienna polycentral” (Austria) and its strengths and challenges, considering the profound idea of localizing and interlinking economic activities.

Keywords: city networks; municipalism; polycentric city; Vienna

Biography

Dr. Andreas Koch holds a Diploma in Geography. His Ph.D. in Geography (1996) has been dedicated to potential neighborhood effects due to the meaning of information and communication technologies (ICT) in the financial sectors of Belgium, The Netherlands and Germany. His habilitation (2003) is about a theoretical transfer of system theoretical thinking from the social to the spatial (geographical) domain. Since 2007, Andreas Koch is a Professor of Social Geography at the Department of Sociology and Social Geography. Since 2010, he is co-director of the Center for Ethics and Poverty Research and the International Research Center for Ethical and Social Issues. He is treasurer of the European Social Simulation Association. Current research interests focus on the Sustainable Development Goals in the Austrian context, urban poverty, socio-demographic challenges in remote regions, and commons and commoning.

Title: Urban Facility Management: A Quantitative and Quality Study

Dr. Jan Veuger BEng MRE FRICS MSV

CEO

CORPORATE Real Estate Management
the Netherlands

Abstract

This article of the book Urban Facility Management (Veuger 2025) discusses the developments of research on Urban Facility Management (UFM) within the context of Conference(s) of Interdisciplinary Research on Real Estate (CIRRE) from 2016 to 2023 in the context of this book Urban Facility Management. This is badly the first research around UFM in the context of CIRRE. Before moving on to what the developments of UFM have been in the aforementioned period, first an analysis of this conference over eight years as to what the impact has been. From this approach I wrote the book Urban Facility Management.

This is the first interdisciplinary book on a holistic approach to Urban Facility Management (UFM) based on recent scientific insights and analysis over a defined period of eight years of research. With this book, I would like to share insights on UFM together with several other authors and specialists worldwide. With as what is UFM, the added value of UFM, the results of eight years of scientific research and finally how can we face the future of UFM.

UFM adds value by developing sustainable, resilient and vibrant cities that improve the quality of life for residents. UFM promotes economic growth and ensures efficient and effective use of resources. Through comprehensive management of real estate, infrastructure and public spaces, UFM contributes to future-proof cities that balance economic progress, environmental protection and social cohesion.

The future of urban planning will increasingly depend on UFM's role in shaping urban environments that respond to the challenges of the 21st century, including climate change, population growth and technological innovations.

Podcast first chapter book Urban Facility Management (Veuger 2025)

Keywords: Urban – facility – management – real estate - holistic

Biography

Dr. Jan Veuger Ph.D. MRE BEng FRICS MSV enjoys an international reputation as an expert in property management, innovation and finance for organizations. He received his Ph.D. from Erasmus University Rotterdam The Netherlands (2010-2014) and was appointed professor at the Institute of Business Administration Hanze University Groningen The Netherlands from 2012-2019 and professor at the School of Finance and International Business Saxion University Enschede The Netherlands from 2019-2022.

For many years, he has conducted research and consultancy/management assignments ad interim on the future of social and commercial real estate, and best practices in collaboration with clients. His work and knowledge in the field of steering for social values in conjunction with financial opportunities form the foundation for further expansion of the research and consultancy area, applying his knowledge to owners of the built environment. Now recently also in the field of Urban Facility Management. He sees it as a challenge to act as a connecting link and interpreter in management and design processes. This has been recognized (inter)nationally with six international awards in 2024-2025.

Jan has always combined his part-time academic career with practical projects. Since the publication of his dissertation 'Material Immaterial' (2014) - which is now widely used - he has been advising directors, boards and managers within government, housing associations, healthcare and education with solutions to strategic issues around real estate and housing.

Overview publications, grants and achievement 'Real Estate Management, Finance, UFM and Innovation 2007-2025' on request.

Title: Applying Complexity Theory to Understanding Small Business Grant Programme Impact in Syria

Mr. Andrew Gardiner* and Dr. David de Wild

Independent Researcher

Former International Committee of the Red Cross Delegate

Australia

Abstract

Finding a practical balance between the competing demands of economic growth and environmental sustainability will almost certainly require a better understanding of urban dynamics. Like many professions and disciplines, the humanitarian sector has struggled to understand the urban contexts in which it is increasingly required to undertake its emergency work. This presentation summarizes the work of two humanitarian professionals who are promoting the application of complexity theory to urban programming. Improving programming effectiveness requires an understanding of the well-tested models, developed by researchers within their specialist fields, rather than simply invoking general complexity theory principles. As a cautionary note, some observations will be made regarding how contemporary governance systems are ill-adapted to the management of complex systems, and are likely to constrain any complexity theory informed approach. This presentation will conclude by describing how the work of Mark Granovetter, on economically advantageous information flows in networks, influenced an evaluation of a small business support grant programme in Syria. As proof-of-concept regarding the applicability of complexity theory to an understanding of urban contexts, this information flow effect was found not only to be operative in Syria as predicted, but also contributed to a deeper understanding of household coping strategies.

Keywords: Programming Models; Network Formation and Analysis; Informal Labor Markets

Biography

Mr. Andrew Gardiner has over 20 years of experience leading emergency responses operations in often complex and high-risk environments. He is trying to get a life.

Mr. Gardiner is currently pursuing his dream of having enough time to develop the urban modelling of Prof Luis Bettencourt.

Title: Implementing Smart Sustainable Cities in Saudi Arabia: A Framework for Citizens' Participation Towards SAUDI VISION 2030

Dr. Abood K. Alamoudi, Dr. Rotimi Boluwatife Abidoye, and Dr. Terence Y. M. Lam*

Assistant Professor

Imam Abdulrahman Bin Faisal University

Saudi Arabia

Abstract

Cities in Saudi Arabia need to expand rapidly due to the rapidly growing urban population. To develop smart sustainable cities (SSC), human, social, and environmental capital investments must be expanded beyond just focusing on technology. There have been several cities that have adopted smart city labels as recognition of the advantages of smart cities. Many countries acknowledge the value of citizens' involvement in public urban planning and decision making, but it is difficult to evaluate their impact and compare it to other factors. This study aims to develop a citizens' participation framework, identify any additional stakeholder's management measures (SMM) (in addition to the ones previously developed by the authors), and explain the relationship with citizens' participation level (CPL) for driving SSC. Three rounds of the Delphi method were conducted to structure and validate the framework by the decision maker in the field of urban planning and reach a consensus of understanding the drivers of SSC. The study group was limited to 25 participants because this study focuses on the perspective of decision makers toward CP. Mean score (MS) ranking and Kendall Coefficient were used to confirm the importance of these additional stakeholders' management measures. The results suggest three main component structures of the conceptual framework, which are SMM, CPL, and Citizens' Participation Recruitment (CPR), which are all necessary for smart sustainable city outcomes (SSCO) for achieving the Future Sustainable Cities Plan (FSCP) within the context of Vision 2030 and government policy in Saudi Arabia. Using the proposed framework will enable all the stakeholders to gain a deeper understanding of SSC and their complex natures from a conceptual and practical standpoint. The contribution to knowledge of this study is by developing a conceptual framework that can support the implementation of SSC, and by providing an understanding the CPR standards and the involvement of citizens in urban development, which eliminates any debate regarding SSC.

Keywords: smart sustainable cities; citizens' participation framework; citizens' participation recruitment;

Biography

Mr. Alamoudi brings a unique mix of Architecture, Real estate, and Technology in the area of Smart Cities, and investigating the application that supports the implementation of AI, Machine learning as well as Citizens' participation. His unwavering dedication to fostering sustainable communities and embracing emerging technologies paints him as a trailblazer, shaping the future landscape of our cities.

He aims to revolutionize urban living, making it more intelligent, inclusive, and ecologically responsible. His relentless pursuit of excellence has earned him accolades and recognition within academic circles, establishing him. Mr. Alamoudi is also founder and held executive leadership roles at multiple start-up companies (Tech and Real-estate Development Companies.). Mr. almaoudi's ultimate goal is to redefine the boundaries of urban possibilities and leaves an indelible mark on the world we inhabit.

 GCKE 03:

Artificial Intelligence, Industrial, Manufacturing Engineering**Chairs**

Dr. Ibrahim Abdullahi, Data Intelligence Lead, John G Russell (Transport) Limited, UK

Dr. Hyun-A Park, Assistant Professor, Honam University, South Korea

Time: 08:30-11:50, November 12, 2025 (Wednesday)

Place: Yamato A, Fifth Floor

Title: Digital Twins as Enablers for Intelligent and Sustainable Control in Manufacturing Systems

Dr. Prof. Dr.-Ing. Ute Dietrich

Professor

HTW Berlin, University of Applied Science

Germany

Research Interest

Automation technologies in industrial and manufacturing systems, vertical and horizontal integration, AI in manufacturing, green automation

Abstract

The challenges of designing modern manufacturing systems increasingly lie in the need to harmonize efficiency, flexibility and sustainability. The digital twin is establishing itself as a key technology for implementing smart, data-driven production. As a virtual image of physical products, processes and systems, it links the real and digital worlds and enables consistent, condition-based control over the entire product life cycle.

By integrating sensor data, simulation models and AI-supported analysis processes, digital twins create the basis for predictive maintenance, adaptive process optimization and energy-efficient production. In the context of sustainable manufacturing, digital twins not only serve to optimize operations, but also as a basis for transparency and traceability across the entire product life cycle and can make a significant contribution to reducing waste, energy consumption and the use of resources. In conjunction with concepts such as the Digital Product Passport (DPP), they enable the structured ingestion, integration and exchange of sustainability-relevant data. As a result, they support reporting obligations as well as strategies for reuse, remanufacturing and recycling.

The presentation highlights the role of digital twins as intelligent control components within cyber-physical production systems. It will focus in particular on the consolidation and integration of sustainable, control-relevant data. Selected use cases from the Digital Factory Technology Lab at HTW Berlin will be used to demonstrate how the targeted integration of digital models and horizontally and vertically integrated data can achieve not only technical, but also ecological and economic benefits.

Keywords: digital twins and green automation; horizontal- and vertical data integration; intelligent control systems

Biography

Prof. Dr.-Ing. Ute Dietrich is now responsible for the computer science education of industrial engineers at the HTW Berlin in the Department of Computer Science, Communication and Economics. Other areas of research and teaching include digital twins and systems engineering, encompassing model-based systems engineering, digital product passport, system automation and automated manufacturing systems. She is also head of the Digital Factory Technology Laboratory for the prototypical implementation of smart factory concepts.

Title: Supply Chain Disruptions: Firm-Level Evidence from the 2011 Tohoku Earthquake

Dr. Lucas Zimmer

Permanent Professor
INSEEC Grande École
France

Abstract

In this article, we employed firm-level data from France and a difference-in-differences approach to examine how input shortages propagate through global value chains, using the Tohoku earthquake as a natural experiment. Our findings reveal an 8% relative decrease in imports for French firms sourcing inputs from Japan, with more substantial declines for those highly reliant on Japanese suppliers. This is coupled with a 12.8% relative increase in imports from China for these exposed firms. Additionally, we discover that this transition is primarily driven by the top 5% of large firms and is prominently observed within the automotive sector. Regarding the transmission of input shortages through the global supply chain, we find that this shock only affects the exports of firms with the lowest levels of inventory, exhibiting variations across sectors and a time-dependent pattern. Surprisingly, these affected firms have not adjusted their inventory strategies from just-in-time practices to safety stocks.

Keywords: Tohoku earthquake • Global value chain • Resilience

Biography

Dr. Lucas Zimmer is a permanent lecturer in economics at INSEEC Grande École, with particular expertise in international trade and the analysis of global value chains. His work focuses on the impact of global dynamics on trade flows and corporate strategies.

Title: Data-Driven Digital Twins: AI-Enabled Asset Optimization in Transport and Manufacturing Systems

Dr. Ibrahim Abdullahi

Data Intelligence Lead

John G Russell (Transport) Limited

UK

Research Interest

Big Data, Digital Twins, Internet of Things, Artificial Intelligence, Manufacturing and Transport Systems Asset Optimization

Abstract

As industries evolve toward intelligent operations, digital twins are becoming the cornerstone of data-driven decision-making across asset-intensive sectors. This talk explores how artificial intelligence and scalable data platforms are converging to enable real-time asset optimization in both manufacturing and logistics.

In a transport case study, this talk will showcase how Russell Group unified its business lines including multimodal transport operations onto a Lakehouse platform. By integrating siloed operational data, the company developed a transport digital twin capable of analyzing trailer, truck, and overall logistics performance in real time to reduce empty runs, improve utilization, and support sustainable growth.

For a manufacturing case study, a distributed digital twin framework adopted for predictive maintenance of wind turbine assets will be highlighted. This system integrates hybrid models to detect degradation early, facilitate feedback, optimize maintenance schedules, and extend asset life cycles.

These examples demonstrate how the fusion of AI, IoT, and scalable data infrastructure enables digital twins to optimize complex industrial systems. The session concludes with key lessons on architecting enterprise-scale digital twin ecosystems that drive measurable value in both manufacturing and logistics operations.

Keywords: Digital Twins, Optimization, Transport, Manufacturing

Biography

Dr. Ibrahim is a data intelligence specialist with a focus on data and AI solutions for intelligent asset management in manufacturing and supply chain systems. With a Ph.D. from Cranfield University (School of Transport and Manufacturing), his research centered on implementing digital twin technologies to optimize assets, with applications recognized by industry, such as a predictive maintenance digital twin for wind turbines. With over six years of experience across academia and industry, Ibrahim has contributed to several successful digital transformation projects in both Nigeria and the UK. As a UK global talent awardee, he currently leads data intelligence for transport optimization at Russell Group, in a Knowledge Transfer Partnership (KTP) project funded by Innovate UK between Glasgow Caledonian University and Russell Group. Ibrahim has made significant strides towards novel algorithms and data intelligence solution architecture, published and presented achievements of transport decarbonization using digital twins.

Title: Enhancing Urban Circular Economy Efficiency: Integration of Artificial Neural Networks with Fuzzy Dynamic Network Slack-Based Measure

Dr. Felix T. S. Chan* and Aria Xianya Zou

Chair Professor and Vice Dean

Department of Decision Sciences, School of Business,

Macau University of Science and Technology

Macao, China

Abstract

Cities are the primary sources of environmental issues and resource depletion. However, existing urban circular economy (CE) assessments inadequately capture the closed-loop characteristics and multidimensional sustainability criteria, while neglecting data uncertainty. To address these gaps, this study develops a Fuzzy Dynamic Network Slacks-based Measure (DNSBM) model that employs fuzzy set theory to resolve data uncertainty issues and integrates a Nonlinear Autoregressive (NARX) Artificial Neural Network (ANN), to optimize Decision Making Units (DMUs) efficiency across economic, environmental, and social dimensions. The model's effectiveness is validated using real-data from 107 cities in the Yangtze River Economic Belt over the period of 2011–2023. The proposed model shows robustness with minimal fluctuation due to α changes; efficiency exhibits a slow upward trend with the highest values in downstream regions and during the environmental protection stage. Most of the cities require further efficiency improvements. While the integration of the ANN model enhances predictive accuracy, it also increases computation time. The main innovation of this study is by proposing a closed-loop dynamic evaluation framework that covers three dimensions. It uses fuzzy set theory to handle data uncertainty and integrates a neural network to optimize inefficient DMUs, thereby enhancing efficiency and robustness of the DNSBM model.

Keywords: Urban Circular Economy, Nonlinear Autoregressive (NARX), Artificial Neural Network (ANN), Fuzzy Dynamic Network Slacks-based Measure (DNSBM).

Biography

Prof. Felix Chan received his B.Sc. Degree in Mechanical Engineering from Brighton University, UK, and obtained his M.Sc. and Ph.D. in Manufacturing Engineering from the Imperial College of Science and Technology, University of London, UK. Prior joining Macau University of Science and technology, Prof. Chan has many years of working experience in other universities including The Hong Kong Polytechnic University; University of Hong Kong; University of South Australia; University of Strathclyde. His current research interests are Logistics and Supply Chain Management, Operations Research, Production and Operations Management, Distribution Coordination, Decision Making, AI Optimisation. To date, Prof. Chan has published over 16 book chapters, over 470 SCI/SSCI referred international journal papers and over 330 peer reviewed international conference papers. His total number of citations > 23,000, h Index= 75. Prof. Chan is a chartered member of the Chartered Institute of Logistics and Transport in Hong Kong. Furthermore, based on a recent research group of Stanford University about the impact of scientists (Top 2% listed), Prof. Chan has been ranked Top 2% worldwide, in 5 consecutive years (2020-2024).

Title: Challenges of Automatic Speech Recognition

Dr. Irina Illina

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Abstract

An automatic speech recognition (ASR) system aims to generate the transcription (the text) of the speech uttered by a speaker. Automatic speech recognition has made great progress thanks to the spectacular development of deep learning. The deep learning methodology is language and application domain agnostic. As the recognition system is based on a statistical (stochastic) approach, a learning phase is necessary to estimate the parameters of the model. This learning requires a large corpus of transcribed speech. To obtain a high-performance system, this corpus must include a large number of speakers and a large amount of speech (several hundred hours of audio). The key to deploying these technologies is collecting massive amounts of data for every language and every application domain. For voice recognition, the notion of "domain" means that the voice data was collected under similar acoustic conditions (in the car, at home, on the plane), with a similar speech style (command, dictated speech, dialogue, etc.) and with the same accents as the target use case. To achieve state-of-the-art performance and meet user expectations, one solution is to have large amounts of training data in the field: of the order of thousands of hours of speech. Currently, the best performing and state-of-the-art systems are so-called end-to-end systems based on deep neural networks. Current RAP systems experience significant performance degradation when the conditions in which they were trained and those in which they are used differ. The causes of variability between these conditions can be related not only to the native language of the speaker, but also to the acoustic environment. This environment adds disturbing components to the speech signal. The high variability of the speech signal induced by ambient noise is one of the important sources of ASR performance degradation. Under these conditions, taking into account ambient noise is one of the major challenges to have a high-performance ASR. A large part of the success depends on the ability to take these noises into account in the ASR. In this presentation we offer an overview of the state of the art in the field of automatic speech recognition. We will present state-of-the-art recognition systems and discuss some open problems.

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Keywords: Automatic Speech Recognition, Natural Language Processing, Machine Learning

Biography

Dr. Irina Illina received the Diploma in Computer Engineering in Russia in 1988 and Ph.D. degrees in Computer Science in France in 1997. After one year as a post-doctoral researcher in Carnegie Mellon University, Pittsburgh, USA, she became an Assistant Professor with the University of Lorraine, France. She received the habilitation degree of University of Lorraine in 2005. Her research interests include deep learning for large vocabulary speech recognition, robust speech recognition, language model contextualisation and hate speech detection. She has authored or co-authored more than 100 papers in international and national journals and conferences. She participated in European projects, national projects, evaluation campaigns, and several industry contracts.

Title: Clalit AI - The C-Pi Platform for Proactive and Preventive Interventions

Dr. Doron Netzer

Professor

Division of Community Medical Services,

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Abstract

Clalit is the largest HMO in Israel, insuring more than 4.7 million individuals. It is also one of the largest integrated HMOs worldwide, second in size only to Kaiser Permanente in the US. C-Pi - Clalit Proactive and Preventative Interventions - is a flagship innovation platform developed internally by Clalit, by the joint collaborative efforts of the Community Care Division, the Information Systems and Digital Division, and Clalit Innovation. This innovative and unique platform combines big data, artificial intelligence and complex decision algorithms, all integrated to give guidance the primary care physicians at the point of care, providing them with evidence-based personalized insights.

The vision of the C-Pi platform in those patients will receive proactive and preventive care, suitable to their current condition. These objectives are perused by crossing the most updated clinical guidelines with the patient's data in an attempt to identify care gaps and providing the primary care physician with actionable and handy knowledge to promote good clinical practice. In addition, the platform also integrates AI-based prediction models that help the physicians to identify high-risk patients for proactive interventions. The former name of the project was POEMS - patient oriented evidence that matters -meaning that we aim to treat our patients in order to improve their morbidity and to reduce their mortality. One of the clinical conditions for which the C-Pi platform provides clinical recommendations is diabetes mellitus, a major issue at the primary care clinic. In the nineties, there were only three main treatment options: Sulphonylureas, Metformin and Insulin. Fortunately, nowadays there are more than 60 medication options, each of them with different pros and cons. It is almost impossible for primary care physicians; responsible for providing evidence-based care, to remember all the different medication options, the inclusion and exclusion criteria used in their clinical trials, and the adverse effects that may be relevant for a specific patient. We thus used the current guidelines from the American Diabetes Association, integrated them with the options offered by the Israeli health services basket, in order to identify to right medication for the right patient, considering the patient's full medical history, including comorbidities such as atherosclerotic disease, heart failure, and chronic kidney disease. Each personalized treatment recommendation in the platform is provided along with detailed explanations and references form resources such as Dynamed (www.dynamed.com). In the same manner, expert committees create an ideal "clinical pathway" for each clinical condition, enabling patients to automatically "travel" through these pathways every single day and gather their personalized recommendations. This is already happening these days, with more than 1000 physicians, approximately one third of the primary care physician of Clalit, who are already using the C-Pi platform. Another clinical condition that is addressed by the C-Pi platform is Hepatitis C. With the availability of new and very effective drugs to treat the Hepatitis C virus, the WHO is aiming to declare the world as free from hepatitis C by 2030. In March 2023, we added clinical recommendations relevant for this condition to C-Pi, in order to help with the global battle against Hepatitis C. We developed an AI algorithm that integrates the various patient characteristics to identify patients at high risk for Hepatitis C. These patients can then be proactively sent to an antibody blood test. Patients with positive antibody test results are sent to perform a PCR test, and those who are found to be active carriers will be presented to the physician at the C-Pi platform with treatment recommendations. The platform helps to guide the physicians to prescribe one of two relevant anti-viral treatments for hepatitis C, after checking the cross reaction between the patient's chronic medications and the potential treatments. Obesity is a global epidemic and is a challenge for family doctors. The treatment is complex and varied. The CPI innovation allows the doctor to view the patient's data (data extracted from the digital data in the medical record and the laboratory) the results are presented to the physician in a friendly and clear way and advice upon the best treatment according to the latest medical literature. A new drug that has passed all the regulatory processes and is approved for use will be updated in the system within a few days accompanied by

clear instructions regarding the form of administration, with a reference to the medical literature BY January 2025, we are aiming to launch the C-Pi decision support module for the management of hyperlipidemia according to the latest European and Israeli guidelines, along with the C-Pi module for primary CVD prevention. These modules will be supported by remote monitoring at the patient's own home, using blood pressure and glucose sensors that can broadcast the output directly to the patient record and into the C-Pi platform. C-Pi is a ground breaking platform for clinicians, and as such we also put substantial efforts to continuously improve its usability and user experience – our routine quote is that for a busy physician 3 clicks for an answer are 2 clicks too many.

Biography

Specialist in family medicine, in his current position head of the community medical services division at Clalit, Israel. Trust for cross-organizational medical policy based on evidence-based medicine. Chairman of the Medical services basket Committee at Clalit and the founders of the hospital at home for general inpatient care. Formerly deputy director of Meir Hospital at Kfar Saba.

Developer and chief researcher of the flagship project of Clalit health services: CPI-CLALIT PROACTIVE AND PREVENTATIVE INTERVENTION, a project that combines personalized medicine, Evidence based medical databases, artificial intelligence and a complex computer algorithm, which guides the doctor during a visit, to provide evidence-based appropriate treatment.

Chief researcher, in groundbreaking articles about the corona virus, which were published in leading journals worldwide: NEJM, Nature Medicine, Nature Communication & Rheumatology that led global decisions in the treatment of the corona epidemic.

Title: Leveraging DevOps Tools and AI to Enhance Agile Project Delivery

Dr. Deivison Feitosa Silva* and Dr. Renato Penha

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Abstract

The integration of DevOps tools into agile projects is becoming increasingly important in modern software development. Modern software development increasingly leverages DevOps tools within agile projects for faster releases and enhanced stability. This paper explores the synergy between Agile methodologies and DevOps practices, instrumental in accelerating software delivery, collaboration, and quality. Crucially, it investigates integrating Artificial Intelligence (AI) with DevOps tools to amplify agile project effectiveness and efficiency. Leveraging AI models optimizes the software development lifecycle, enhancing decision-making and ensuring robust, efficient project delivery, particularly in automated testing, predictive analytics, and intelligent monitoring. Employing a Multivocal Literature Review (MLR) of 217 materials (133 academic articles, 84 gray literature), this study identified and categorized DevOps tools and their agile project applications. Results revealed seven primary DevOps tool categories and proposed an integrated model for their effective application across agile project lifecycle stages. The study offers theoretical insights into DevOps-Agile interplay. Practically, the proposed model guides organizations enhancing software development efficiency amidst emerging DevOps tools, including AI and Machine Learning (ML) in your project managements. Its originality lies in providing comprehensive, integrated models for DevOps tool adoption in agile contexts, addressing a significant literature gap.

Keywords: Agile, Artificial Intelligence, DevOps, Machine Learning, Organizations, Project Management.

Biography

Prof. Dr. Deivison Feitosa Silva - Ph.D in the Postgraduate Program in Administration-Project Management - PPGP - UNINOVE with International Module in Project Management - ISEG University of Lisbon (Portugal, Ph.D Information System – USP Brazil; M.Sc. master's in administration with professional qualification in Project Management - UNINOVE. International Module in Project Management - Bentley University (Boston - USA) and UNINOVE, MBA in IT and Two graduation in IT, Executive in the IT area, with strong skills in 31 years with IT and projects in more than 29 countries. And Prof. Dr. Renato Penha - Postdoctoral degree and PhD in Business Administration from University Nine of July UNINOVE. Master's degree in project management from UNINOVE. Specialist in Database Administration and Information Technology Management from Faculdade de Informática e Administração Paulista (FIAP). Bachelor's degree in Database Processing from Universidade Bandeirante de São Paulo. Permanent professor and researcher in the Graduate Program in Project Management (PPGP) at UNINOVE and Executive in IT – Manager.

Title: The Evolution of Combined Arms Warfare in the AI Era: Technological Empowerment, Tactical Adaptation, And Insights from the Ukraine Conflict

Dr. Ji-Jen Hwang

Associate Professor

Defense and Security Program, Rabdan Academy

UAE

Abstract

This presentation explores how data-linked kill chains and advanced algorithmic warfare are transforming combined arms warfare, using the Russo-Ukrainian war as a critical case. It analyzes how technological accelerators compressed decision cycles, enabled AI-driven coordination, and shaped tactical and strategic dynamics. The findings reveal that while these tools amplify doctrinal practices, adaptive adversaries limit their impact. Integrating algorithmic systems into coherent doctrine is essential to unlock their transformative potential in future warfare.

Biography

Dr. Ji-Jen Hwang is an Associate Professor at Rabdan Academy, Abu Dhabi, United Arab Emirates. His research examines the evolving character of warfare, with a particular focus on the intersection of military doctrine, emerging technologies, and strategic competition. He has published on topics including Stephen Biddle's Modern System theory, algorithmic warfare, and the operational lessons of the Russo-Ukrainian war. Dr. Hwang collaborates with leading academic and policy institutions across Asia and the Middle East and is actively engaged in international defense dialogues on AI-enabled military transformation.

Title: Securing Tomorrow: Human-Centric Technologies Toward 5th Industrial Revolution Era

Dr. Hyun-A Park

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Abstract

This paper emphasizes that technological development in the era of the Fifth Industrial Revolution (Industry 5.0) must be grounded in human-centeredness and sustainability. As cutting-edge technologies such as AI, IoT, robotics, and biotechnology converge to form a super-smart society, human values, ethics, and individualized experiences must be given top priority. This paper explores the potential of a new industrial ecosystem where humans and machines coexist harmoniously through human-centered technology design, ethical responsibility, and eco-friendly innovation. The paper analyzes key characteristics of the Fifth Industrial Revolution—human-centeredness, sustainability, hyper-connectivity, and ethical and social reflection—and examines the evolution of AI service technologies (e.g., XR, BCI, and explainable AI). It also proposes strategic directions for human-technology convergence innovations such as collaborative robots, personalized healthcare, and personalized services. It discusses practical challenges through data accountability, the incorporation of privacy, security, and ethics, ecosystem expansion, and change management strategies. It also proposes future challenges and solutions for human-machine collaboration, as well as an ethics and governance model. Based on this, the innovation of Industry 5.0 derives an integrated vision and policy implications centered on social values, ethics, and sustainability.

Keywords: Industry 5.0, Human-Centric Technology, Ethical Governance

I. Introduction

1.1, The Fifth Industrial Revolution and the Shift in the Service Technology Paradigm

The Fifth Industrial Revolution (Industry 5.0) goes a step further than the Fourth Industrial Revolution's focus on automation and data-driven productivity maximization, presenting "human-centeredness," "sustainability," and "reflection of ethical and social awareness" as core axes of industrial innovation. While previous digital transformations have partially overlooked human values and individuality, technology now demands a new paradigm that embraces multidimensional values such as human agency, creativity, well-being, diversity, and responsibility. The European Union's AI Act and OECD innovation policies clearly identify human-centered management, customized and ethical technology design, and the establishment of a sustainable industrial structure as key challenges of the 21st century. In line with these changes, both policy and empirical research indicate the rapid expansion of development strategies that pursue customized services across all convergent technologies, including AI, IoT, robotics, and biotechnology [1-6].

1.2, The Role of Human-Centered Technology in the Fifth Industrial Revolution

The role of human-centered technology is to combine inherently human values, such as creativity, empathy, and ethical judgment, with the precision and efficiency of cutting-edge technologies like artificial intelligence (AI), automation, and robotics, ensuring that technological innovation goes beyond simply increasing efficiency and productivity. Human-centered technology, through collaboration between humans and machines, aims not to replace humans but rather to enhance human capabilities and improve the quality of life. By creating an environment where humans, robots, and AI work together, machines perform repetitive and dangerous tasks, while humans handle creative and strategic decision-making. In this process, technology enhances productivity, precision, and safety, while humans play a central role in complex problem-solving, innovation, and emotional services. Specifically, through collaborative innovation, customization and flexibility, realizing social value, and

expanding the meaning of work, it contributes to customized production and services, improved employee welfare and safety, enhanced industrial sustainability, improved job value and quality, and increased social trust and technology acceptance [1, 7-9].

II. Evolution of AI service technology in the Fifth Industrial Revolution

A super smart society has a structure in which different high-tech technologies such as AI, IoT, bio, and robots are converged and connected in real time. Among these, technologies such as extended reality (XR), brain-computer interface (BCI), AI-based service design, and bespoke (personalized) service, which enable customized experiences, are emerging as core elements of the Fifth Industrial Revolution's service innovation. XR (extended reality) and BCI provide high-level immersive interfaces that integrate the physical and virtual worlds, enabling truly personalized experiences and qualitative leaps in human-machine interaction in healthcare, education, and public services. For example, XR-based immersive education detects and analyzes learners' cognitive states, emotional changes, and feedback in real time, while BCI enables customized smart home control and remote rehabilitation for the disabled, elderly, and patients with special needs through brain cognition and biosignal-based interactions [1,6, 9-14].

In addition, AI-based natural language processing, predictive analytics, multimodal interfaces, digital therapeutics, and smart manufacturing are rapidly commercializing solutions for personalized consulting, recommendations, diagnosis, and risk management. Innovative principles (e.g., fairness, transparency, and accountability) such as data sovereignty, privacy protection, and explainable AI play a crucial role in implementing convergent services, which become a prerequisite for technological trust and citizen acceptance. In the financial sector, AI enhances efficiency and accessibility through real-time risk prediction and personalized financial product recommendations. While in public administration, AI chatbots and automated services provide customized administrative support to citizens. These AI service technologies emphasize the role of improving productivity and complementing human creativity throughout the industry [2, 4,15-19]

III. Analysis of the Fifth Industrial Revolution service technologies.

In this Section, we analyze current and future technology trends to develop solutions and governance models.

3.1. Human-centered innovation through human-technology convergence (collaborative robots, personalized medicine, personalized services)

A key strategy of the Fifth Industrial Revolution is the establishment of a new structure where humans and digital technologies collaborate. In other words, it is the establishment of a 'human-machine collaboration ecosystem'. Collaborative robots (cobots) utilize artificial intelligence, sensors, and machine learning to track and collaborate with humans and workers in real time, automating simple, repetitive tasks and freeing humans to focus on creative work. Collaborative robots are being deployed in manufacturing, healthcare, blood sample processing, logistics, and injectable assembly, simultaneously improving production speed and safety. Cases of legal and ethical management systems for shared human-robot responsibility are also being continuously reported [1,3,6,9,20-24].

Personalized medical care is widely applied to new models, including AI- and big data-based precision diagnosis and predictive analysis, and the integration of genetic and personal health data. These include personalized protocols for individual patients, digital therapeutics, AI-robot collaborative rehabilitation, and AI-guided navigation surgery. AI diagnostic systems at major domestic and international hospitals, medical robot errands, autonomous transportation within hospitals, and automated biometric recognition are also expanding into the Fifth Industrial Revolution [4,11,25-30]

In the personalized services sector, AI-based customer experience prediction, data-driven hyper-personalized recommendations, and customized administrative services in the finance, education, and public sectors are gaining momentum. These services, which is combined with multimodal AI, explainable algorithms, AI-UX dynamic adjustment technology, and privacy-enhancing design, are dramatically improving customer satisfaction, well-being, and inclusiveness [16, 18, 19, 31-36].

3.2. Embedding data accountability and explainable AI technologies

Strengthening data sovereignty and explainable AI (XAI) are fundamental to the design of the Fifth Industrial Revolution ecosystem. Engaged with international regulations such as the GDPR and the EU AI Act, these are becoming core standards for industrial and public innovation. Data minimization, anonymization, decentralized identifier (DID)-based identity verification, policy-based DRM (data rights management), and ensuring explainability throughout the entire AI decision-making process have become essential requirements at the product and service planning stage [10,16,17,37].

XAI evolves beyond simple understanding into practical technical implementation, real-time monitoring, error and bias detection, governance, and citizen-participatory algorithm verification, which covers field-public-consumer confidence. Systematically incorporating fairness, diversity, and accountability into social impact assessments (including personal data use and service algorithms) is essential to technological and policy innovation [10,15-17].

3.3. Internalization of privacy, security, ethics, and Ecosystem expansion and change management

Privacy and multi-layered security systems have become important requirements for new ICT service platforms and services based on sensitive XR and BCI data. Risk management, transparency, and ethical governance must be supported throughout the entire process, including data masking, de-identification, legal audits, insurance, and crisis response simulations. Furthermore, ensuring the social responsibility of AI, robots, and data-using companies and securing public trust are essential policy requirements [2,16,17,38].

Industrial / public platforms of B2B and B2G (Business to Government) are expanding into innovation models over various sectors, including healthcare, education, safety, and administration. In particular, a practical field-centered R&D process—"verification → commercialization → redesign"—is being empirically proven to be a key of national competitiveness, where industry/the public/citizens interact through a virtuous cycle of user-based feedback loop [2,4].

3.4. Specific case studies of collaborative robots, customized healthcare, and personalized services

In this paper, we analyze the practical impact of human-technology interaction through specific examples such as collaborative robots, personalized healthcare, and personalized services. In the case of collaborative robots, collaboration between humans and cobots on an automobile assembly line demonstrated a 15% reduction in cycle time and improved safety, demonstrating both increased productivity and an expanded role for human creativity. However, the legal oversight of the human-robot shared liability system and the implementation of safety protocols are emerging as challenges. In personalized healthcare, AI-based genetic analysis (IBM Watson Genomics) and digital therapeutics enhance treatment efficacy through patient-specific protocols, but data privacy and algorithmic bias are indicated as major risks. In the case of personalized services, AI recommendation systems (in the finance and shopping sectors) have improved customer satisfaction by 20-30%, but social distrust stemming from excessive data collection and lack of transparency poses challenges for change-management. These examples demonstrate that human-technology interactions can achieve both efficiency and inclusiveness in the future, however also suggest that strengthening security and risk management is essential [18,19,21-24,26-28,33-35].

IV. Future Challenges and Solutions for Human-Machine Collaboration

Human-machine collaboration in the era of the Fifth Industrial Revolution combines advanced intelligence and automation with human creativity, ethics, and social sensitivity. Future challenges and solutions are broadly discussed from technological, social, organizational, and ethical perspectives. Technological convergence and the imbalance in collaboration have both positive and negative effects on jobs, role division, and job satisfaction. Skill gaps and retraining issues demand new digital, data, and ethical capabilities from field workers and employees. The internalization of ethics, trust, and security, as well as the delay in organizational culture and leadership, are also key challenges.

Solutions include role optimization and flexible collaboration design, strengthening continuous education and reskilling systems, embedding ethics and security and building trust, participatory governance and organizational culture innovation, and strengthening sustainability and inclusiveness. This will build a complementary structure where repetitive and risky tasks are handled by robots and AI, while creativity and decision-making are led by

humans. It will also increase trust and inclusiveness through digital competency training, explainability, and citizen participation [1].

4.1. An Ethics and Governance Model for Human-Centered Collaborative Systems

4.1.1. Ethical Principles: Internalizing Human-Centered Values

In the Fifth Industrial Revolution (Industry 5.0), the ethics and governance model for human-centered collaborative systems must be designed as a systematic framework that ensures that technological and human interactions go beyond the simple pursuit of efficiency and embrace social responsibility, human dignity, and sustainability. This model focuses on proactively preventing ethical dilemmas, privacy violations, and bias issues that may arise in an environment where cutting-edge technologies such as AI, robots, and the Internet of Things (IoT) harmoniously collaborate with human creativity, emotion, and ethical judgment, while ensuring transparency and participation.

This model consists of three core layers (ethical principles, governance organizational structure, implementation policies, and implementation framework), each interconnected and dynamically operated through continuous feedback loops. This is based on the "human-in-the-loop" principle, which prioritizes human-centered values in technological innovation, and reinforces legal and social compliance by reflecting international regulations such as the EU AI Act and ISO ethics standards [1,9]. The following Fig1 is showing the "Governance Model for Human-Centered Collaborative Systems".

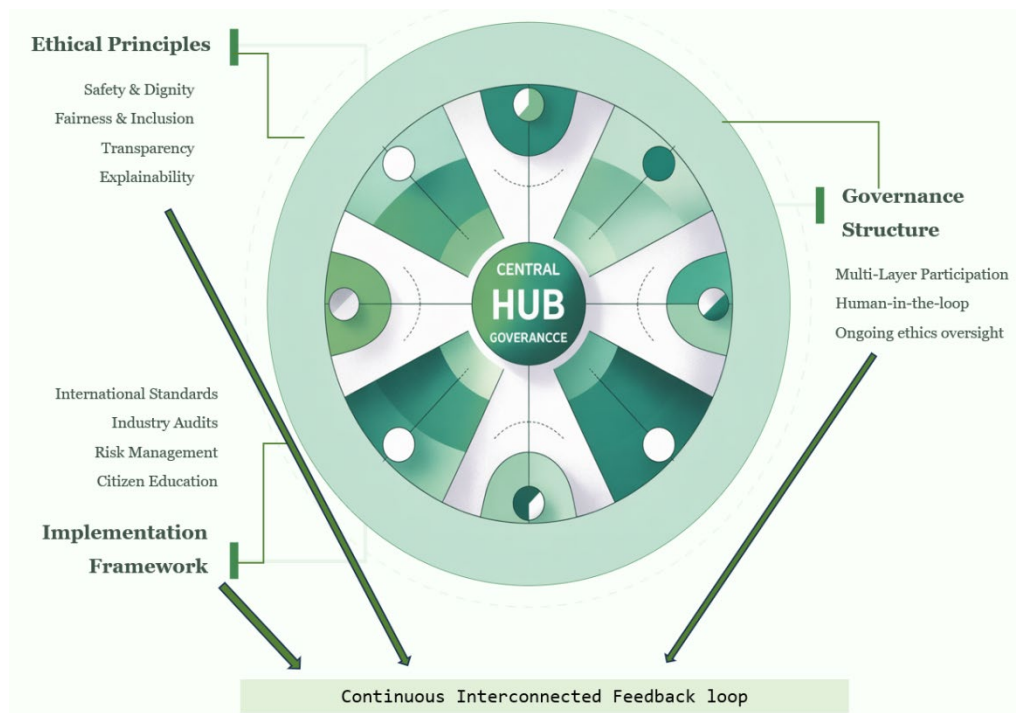


Fig 1. Governance Model for Human-Centered Collaborative Systems

4.1.2. Governance Organizational Structure: Multi-tiered Participation and Oversight System

The governance organizational structure is a multi-layered, participatory system that oversees the collaboration between technology and humans. It emphasizes a democratic decision-making process that includes management, field workers, technical experts, citizens, and stakeholders.

Multi-layer participatory governance establishes an ethics committee representing internal and external stakeholders, granting them input and voting rights at all stages of the system design, operation, and evaluation. This contributes to the early detection and correction of technological bias and social inequality issues. Fig2 shows the "Governance Structure".

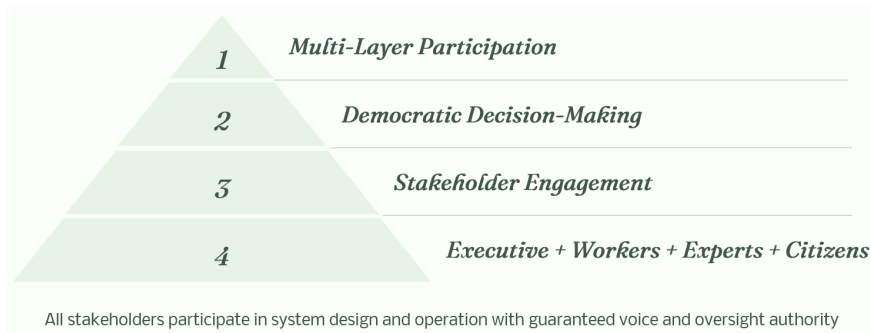


Fig 2. Governance Structure

The human-in-the-loop principle limits the autonomous operation of AI and robots and allows for real-time human intervention as the final decision-maker and supervisor. For example, we introduce a protocol to ensure that the robot's proposal is not executed without human approval at the manufacturing site. Continuous ethics oversight and social monitoring are implemented through periodic audits and reports issued by independent audit departments and citizen-participatory oversight bodies, quantitatively and qualitatively assessing the social impacts of technology (e.g., job changes or privacy risks). This structure builds social trust through a transparent reporting system linked to external regulatory bodies, rather than simply internal rules. Furthermore, cost-effective digital platforms (e.g., cloud-based ethics dashboards) are utilized to enhance implementation, particularly when applied to small and medium-sized enterprises (SMEs) or the public sector [1,43-45]. Fig 3



shows the “Human-in-the-Loop Framework”.

Fig 3. Human-in-the-Loop Framework

4.1.3. Implementation Policy and Implementation Framework: Substantive Compliance and Continuous Improvement

The implementation policy and implementation framework provide specific guidelines and mechanisms for the practical implementation of ethical principles and governance structures. It develops industry-specific protocols based on international standards (e.g., the EU AI Act and the ISO 26000 Ethics Management System). The risk response system includes simulation training and emergency protocols to predict and respond to potential failures of AI and robotic systems (e.g., algorithmic errors or cyberattacks). Citizen education programs will also enable users and the general public to understand and engage with the ethical implications of the technology. Sustainability management indicators measure the environmental impact (e.g., energy consumption optimization) and social contribution (e.g., inclusive job creation) of technology by applying SDGs (Sustainable Development Goals) and ESG (Environment, Social, and Governance) criteria, and ensure transparency through annual reports.

This framework embeds ethics checkpoints at each stage of the technology development lifecycle (design, testing, deployment, and maintenance) and ensures accountability by enabling the traceability of all decisions

through a blockchain-based audit log. Furthermore, it lowers implementation barriers through low-cost tools for SMEs (e.g., open-source ethics toolkits) and government support policies (e.g., tax incentives and certification systems), and strengthens international cooperation for ethical compliance in global supply chains (e.g., the G7 AI Ethics Guidelines). This implementation framework emphasizes the dynamic nature of the model, allowing the technology to evolve to realize social value through continuous monitoring and feedback loops [1, 9].

V. Conclusion

The Fifth Industrial Revolution clearly points the way toward the mutual complementarity and symbiosis of humans and technology. In a hyper-smart society, technological innovation must not simply focus on efficiency, but rather lead to the creation of customized service technologies that embody human-centered values, social inclusion, responsibility, and sustainability. This paper presents a multi-layered, human-centered, and ethics-based convergence technology strategy applicable and scalable to real-world industrial and public sectors, and delves into how AI research, policy and institutional design, and industrial ecosystem innovation should organically integrate.

Future research and policies should focus on concrete, empirical examples that embody human values, such as collaborative robots, customized healthcare, and personalized services, along with field-centered change management, AI and data systems with explainability and accountability, and governance innovations that involve citizens. This will allow the Fifth Industrial Revolution to become a future industry and society that simultaneously realizes true human-centered innovation and social and environmental sustainability.[1,3,4,6,20].

Acknowledgements

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Research Interest

Generative AI, FANET (Drone) security, Convergence Security, LLM based AI service solution., Medical Information Security, DB Security, privacy enhancing technology, cryptographic protocols, data mining

Biography

Prof. (Dr.) Park, Hyun-A received her BS degree from the Department of Mathematics at Korea University, Seoul, in 2003, and the MS and PhD degrees in Information Security from Korea University, Seoul, in 2005 and 2010, respectively. She conducted joint research as a Visiting Researcher in Japan in 2008 and at the University of Arizona in the United States in 2010 with the support of the Korean government. Since 2011, she had worked as a researcher/ lecturer at institutions such as KISTI, Konkuk University, and so on. Since 2015, she has been a tenured professor at KyungDong University, where she conducted research on medical information security as the PI of a research project supported by the NRF of Korea. Since 2020, she has moved through Silla University to Honam University, where she has continued to teach information security in the Dpt. of Computer Engineering. She has published over 50 international papers and several patent registrations, and won several awards in domestic paper competitions. She has conducted research as a PM and co-researcher in about 20 research projects, and has reviewed over 200 papers as a reviewer. She serves as a Program Committee Member for several international conferences every year, and is currently serving as an Associate Editor or Editor for several journals (including SCIE-level journals).



GCKE 04:

Economic Governance & Sustainable Development

Chair

Dr. Arthur Charpentier, Professor, University of Quebec in Montreal, Canada

Co-chair

Dr. Jianghong Liu, Senior Lecturer in Economics and Finance, London Metropolitan University, UK

Time: 08:30-11:45, November 12, 2025 (Wednesday)

Place: Yamato B, Fifth Floor

Title: Do Training Programs Improve Awareness of Sustainable Finance?

Dr. Souad Lajili Jarjir, Carmen González-Velasco, Isabel Feito-Ruiz, Marcos González-Fernández, Pilar Sierra-Fernández, Yolanda Fernández Santos, Rubén Arrondo García, Sigrid Vandemaele, and Anneleen Michiels*

Professor of Finance

Université de Lorraine, CEREFIGE, F-54000 Nancy

France

Abstract

Many initiatives worldwide aim to improve financial knowledge through training programs at different levels of education. In this context, it is worth highlighting that sustainable finance knowledge should receive attention in line with the global challenges (climate change, social and economic inequalities, etc.) that society is facing. Implementing (short) training programs in educational curricula may be an effective way to improve students' knowledge and practical skills. The aim of this paper is to analyze the efficacy of short sustainable finance training programs in fostering sustainable financial awareness and attitudes among university students. This research focuses on how these programs influence participants' understanding of financial sustainability, interest in financial matters, and decision-making competencies that include environmental, social and governance dimensions. The methodology is based on a quasiexperimental, pretest-posttest design, using validated questionnaires carried out by students from different universities. Our results reveal that short training programs positively influence knowledge and interest in sustainable financial matters. Keywords: Financial literacy, financial education, sustainable finance, students, training programs.

Keywords: Financial literacy, financial education, sustainable finance, students, training programs.

Biography

Pr. Souad Lajili Jarjir is a Professor of Finance at the University of Lorraine and a research member of CEREFIGE. She holds a Ph.D. in Finance from the University of Paris Dauphine (France). An active member of the academic community, Professor Lajili serves on the scientific committees of several international conferences and participates in the review of doctoral dissertations (Ph.D. and HDR). Her research interests encompass asset pricing models, socially responsible investing, and green and sustainable finance. Professor Lajili previously served as Finance Chair at the *Institut de Recherche en Gestion* and as Executive Dean of the *IAE Gustave Eiffel School of Management*. She has been a member of the Doctoral School Council (SJPEG) at the University of Lorraine since 2021 and has served on the Board of Directors of the French Finance Association (AFFI) since 2024. Her teaching expertise spans portfolio management, asset pricing, financial markets, and investment.

Title: Fairness and Insurance: Disentangling Illegitimate and Indirect Discriminations

Dr. Arthur Charpentier

Professor

University of Quebec in Montreal,
Canada

Abstract

Discrimination is the act, practice or instance of categorical rather than individual separation or distinction. This is precisely how actuaries make their decisions: broad categories that have the effect of attributing to the group as a whole certain characteristics that are indicated statistically by membership of the group, but which may not be possessed by any particular member of the category. In other words, actuaries cannot think of individuals as anything other than members of a group. This logic is opposed to the individualization made possible by artificial intelligence (massive data and black-box algorithms), but it poses many challenges in terms of fairness. What is unique in the insurance field is that {even statistical discrimination, which by definition is devoid of any malicious intent, poses significant moral and legal problems}. Why? Because, on the one hand, policymakers would like insurers to treat their policyholders equally, without discrimination based on race, gender, age or other characteristics, even if it makes statistical sense to discriminate in this way. But risk is often statistically correlated with the same characteristics that policymakers would like to prohibit insurers from taking into account.

Keywords: AI; biases; discrimination; fairness; insurance; predictive modelling

Biography

Dr. Arthur Charpentier, Ph.D., Fellow of the French Institute of Actuaries, is full professor at UQAM, Montreal, Canada, and Université de Rennes, in France. He is member of the editorial board of the *Journal of Risk and Insurance*, the *ASTIN Bulletin*, and *Risks*. He edited, a few years ago, *Computational Actuarial Science with R* (CRC), and more recently wrote *Insurance, Biases, Discrimination and Fairness* (Springer). He is also the former director of the *Data Science for Actuaries* program of the French Institute of Actuaries. He is a Louis Bachelier Fellow, and his recent work is about climate change and predictive modeling insurance, more specifically in the context of fairness and discrimination.

Title: Strategic Financial Architecture Underpinning the Global Digital Economy's Next Frontier

Mr. Mathieu Sollier

CEO & Founder

Strategic Metrics Asset Management

Switzerland

Title: The Role of Fintech from Digital Savings to Reduce Income Inequality and Enhance Economic Development in Emerging and Developing Asia (EMDA) Countries

Dr. Jianghong Liu

Senior Lecturer in Economics and Finance
London Metropolitan University
UK

Abstract

This study investigates the impact of fintech-enabled digital savings on income inequality in Emerging and Developing Asia countries. Using panel data from 30 countries and the Cambridge Center for Alternative Finance ecosystem indicators, the analysis applies a spatial durbin model to examine how digital savings platforms affect financial inclusion and gini coefficients. Results indicate that digital savings can help reduce inequality when supported by robust infrastructure and inclusion strategies, though usage gaps persist. The findings highlight the potential of digital savings as a key element for advancing equitable finance across regions.

Biography

Dr. Jianghong holds her Ph.D. in Finance from the International Capital Market Association (ICMA) Centre at the Henley Business School, University of Reading, where she also served as teaching assistant. Additionally, she holds an MLitt in International Business from the School of Management at the University of St Andrews. Her academic journey led her to London Metropolitan University in 2019, where she assumed her current role. Prior to this, Jianghong held positions as an associate lecturer in Banking and Finance at both the Guildhall School of Business and Law, London Metropolitan University and the Business School at London South Bank University.

Title: The European Union's Approach to Implementing a Sustainable Finance Framework

Dr. Paulo Alves Pardal

Professor

University of Lisbon

Portugal

Abstract

Sustainable finance plays a central role in the European Union's agenda. In view of the major challenges posed by climate change and environmental degradation, it was considered that the financial system should play a crucial role in achieving a greener and more sustainable economy. Consequently, several legislative measures have been adopted by the European Union, notably to increase market transparency (e.g. disclosure) and to create innovative instruments to identify and label environmentally sustainable activities (e.g. taxonomy). In addition, regulatory and supervisory mechanisms have been strengthened. Furthermore, the European Union's legislative framework has been improved. However, it should not be forgotten that the dangers posed by climate change and biodiversity loss are global.

Key words: Sustainable finance; European Union; Climate change.

Biography

Ph.D. in Legal and Economic Sciences from the University of Lisbon Law School (2011). Master's Degree in Legal and Community Sciences from the University of Lisbon Law School (2001). Postgraduate Diploma in European Studies from the European Institute of the Faculty of Law of the University of Lisbon (1996). Law degree from the University of Coimbra Law School (1988).

Assistant Professor at the Faculty of Law of the University of Lisbon, having taught various curricular units on the Undergraduate, Postgraduate, Master's and Ph.D. programmes. He is also Professor of the Degree in European Studies at the School of Arts and Humanities of the University of Lisbon.

Researcher at CIDEEFF - Centre for Research in European, Economic, Financial and Tax Law of the Faculty of Law of the University of Lisbon.

Author of books and articles, particularly in the areas of European Union Law, Economic Law and Public Finance.

Title: The Role of Sustainable Transportation in the Knowledge Age: Case of Ride-Hailing Service

Dr. Amna Javed* and Youji Kohda

Senior Lecturer

Japan Advanced Institute of Science and Technology (JAIST)

Japan

Research Interest

Transformative Knowledge Management, Service Science, Platform Business, Creating Shared Value, Human-AI Value Co-creation, Business Management, Financial Systems

Abstract

In the Knowledge Age, where digital innovation and data-driven systems shape societal progress, sustainable transportation plays a crucial role in promoting economic efficiency, social equity, and environmental management. This study explores **the role of ride-hailing platforms, particularly InDrive in Pakistan**, in advancing sustainable transportation by addressing critical platform-related challenges such as user welfare, algorithmic fairness, pricing transparency, and environmental impact. Unlike traditional ride-hailing models that prioritize profit maximization, InDrive adopts a **negotiation-based pricing mechanism**, empowering both riders and drivers to agree on fair fares, thus fostering mutual trust and social equity. The research highlights how InDrive's **community-centered approach** supports inclusivity and empowerment in developing markets while integrating **digital literacy and behavioral adaptation** as tools for sustainability. Furthermore, the platform's potential to promote eco-conscious practices such as shared rides and optimized routing demonstrates its contribution to reducing congestion and emissions. However, achieving true sustainability requires continuous innovation in data ethics, regulatory compliance, and user engagement. This study contributes to the discourse on **sustainable mobility ecosystems** by showing how platform-based transportation can evolve from transactional models to socially responsible and knowledge-driven systems that align economic success with the well-being of society and the environment.

Keywords: Sustainability, Knowledge-driven systems, Ride-hailing service

Biography

Dr. Amna Javed is a Senior Lecturer at the Graduate School of Knowledge Science, Japan Advanced Institute of Science and Technology (JAIST), Japan. She teaches classes on social research methods, Next-Generation Management of Technology (MOT), Innovation Theory and Methodology for Social Competencies to Master and Doctoral course students. She has 6 doctoral course and 10 Master course students for minor research. She has 4 years of work experience in service science and 3.5 years of experience in transformative knowledge management. She has more than 20 papers in Scopus, more than 35 reputed international and domestic conferences, 3 books and 1 eBook chapter by IGI publishers, Palgrave, and Springer, and has been granted 12 research awards and 14 project research fundings. She is affiliated with international conferences (ICIM, AHFE, and others) as session chair, co-chair, scientific advisory board member, and technical committee member. She is an Editorial Board Member of Social Sciences & Humanities Open (Springer) and the Smart Law & Business Review (SLBR). She has attended more than 10 faculty development programs. Her areas of research specialties include value creation, service design, education science, service science, Islamic banking and finance, and knowledge management.

Title: International Climate Finance Flows into India (2015-2021) and Required Investment

Dr. Anjali Prashad

Assistant Professor

University of Delhi

India

Abstract

India's action on climate change mitigation and adaptation is in line with the climate policy path laid down in its Nationally Determined Contribution (NDC)-2020 (NDC 2020), emphasising on three pillars of sustainable development, namely, economic, social and environmental. India committed to transform its development path to a low carbon footprint economy. The first set of deliberations by India was towards establishing its non-fossil fuel energy capacities. It aims to transform the cumulative electric power installed capacity composition to 50-50 per cent from renewable to non-renewable sources. In this backdrop, the essential task is to mobilise resources and direct financial investments in building clean energy sectors and in areas of environmental protection.

This discussion attempts to find answers to the following questions-

- (1)What are the key international sources of climate finance in India?
- (2)What has been the average annual inflow from these sources during the study period?
- (3)What has been India's share of the USD 100 billion annual climate finance pledged by developed countries vis-à-vis other recipient countries?
- (4)What is the required investment to achieve the targeted installed electricity capacity using renewable sources?

Biography

Dr. Anjali Prashad is currently an assistant professor at Ramanujan College, University of Delhi to undergraduate students of B.A. Honors Economic, B.A. Programme and B. Com Honors. Dr. Prashad joined as a Research Consultant (Professional Service Agreement) in September 2015 at the Development Planning Center of Institute of Economic Growth, University of Delhi Enclave. She was awarded her Ph.D. in 2016 and M. Phil in 2012 in Economics from the Centre for International Trade & Development, School of International Studies, Jawaharlal Nehru University. Her expertise lies in the area of applied econometrics with core focus in climate change, derivative markets and banking regulations. Her publications are listed with World Development Sustainability, Cleaner and Circular Bioeconomy, Global Journal of Emerging Market Economies and Economic Political Weekly. She spearheaded several policy-research projects of NITI Aayog-GoI, 15th Finance Commission-GoI and international projects under Bavarian University Funding Program and German Research Foundation.

 GCKE 05:

Energy, Environment and Climate**Chair**

Mr. Michael Storch, CEO, Mangold Photovoltaik GmbH, Germany

Co-chair

Ind. Ing. Stefano Ambrosini, CEO, Waste Management Specialist s.r.l., Italy

Time: 13:30-16:20, November 12, 2025 (Wednesday)

Place: Yamato A, Fifth Floor

Title: Energy Choices and Consequences-2025 Update

Dr. Harold L. Dodds,

IBM Professor of Engineering and Department Head, Emeritus
University of Tennessee Nuclear Engineering Department
USA

Research Interest

Energy Policy

Abstract

With the world's population increasing from eight billion currently to approximately nine billion by the year 2040, achieving a healthy lifestyle for all people on earth will depend, in part, on the availability of affordable energy, especially electricity. This presentation considers the various choices, or options, for producing electricity and the consequences associated with each option. The options are fossil, renewables, and nuclear. The consequences associated with these three options are addressed in five different areas: public health and safety, environmental effects, economics, sustainability, and politics. All options are needed, but some options are better than others when compared in the five areas. This presentation is a brief summary of a short course entitled "Energy Choices and Consequences", which was initially created by the author several years ago and is continuously updated. The presentation will provide updated information through October of 2025.

Keywords: Electricity production, renewables, fossil, nuclear

Biography

Dr. Dodds joined the University of Tennessee Nuclear Engineering Department in 1976 after working for DuPont at the Savannah River Laboratory for six years. He began serving as Department Head in early 1997 and led the department to a Top Ten national ranking by U.S. News and World Report. He also previously worked at the Oak Ridge National Laboratory and the National Aeronautics and Space Administration. Dr. Dodds has served as a consultant to several American, Canadian, and Dutch research organizations. He serves on External Advisory Boards for nuclear engineering programs at The Ohio State University, Virginia Commonwealth University, and Harbin Engineering University (China). He is also a past member of the Accreditation Board of the National Academy for Nuclear Training within the Institute of Nuclear Power Operations, a past member of the National Board of Directors of the American Nuclear Society (ANS), and a past member of the National Board of Directors of the Nuclear Energy Institute. Dr. Dodds has received many awards during his career including the ANS Arthur Holly Compton National Teaching Award. He is a Licensed Professional Engineer, a Fellow of ANS, and the author of over 200 technical publications. More detailed information about Dr. Dodds is available online at

Title: Case Study: Mata de São João, Brazil

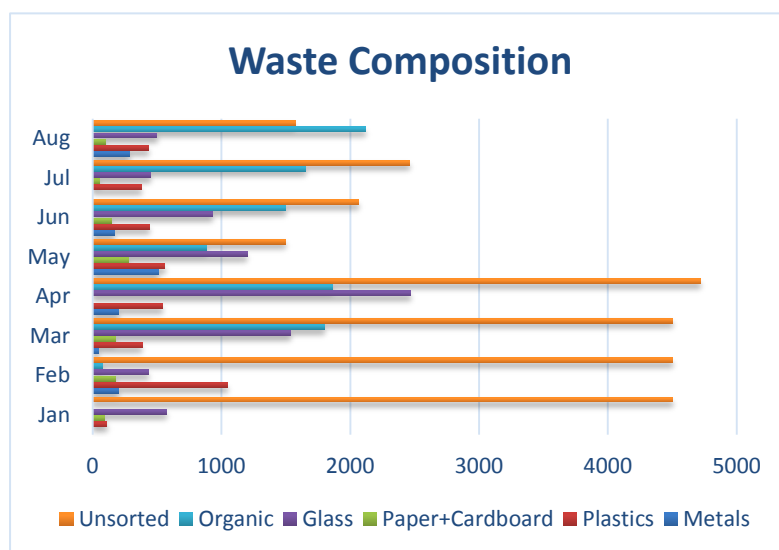
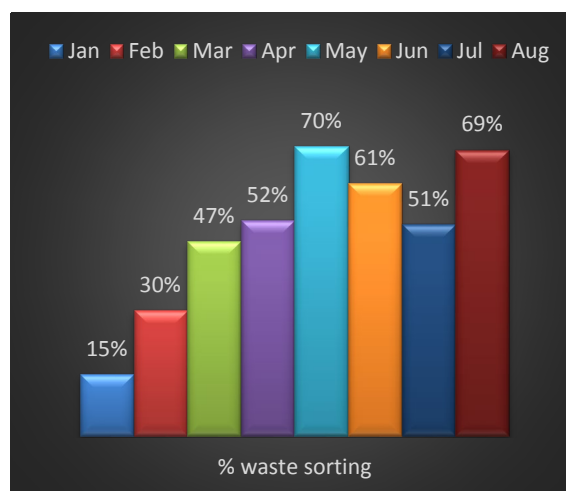
From 0% to 70% Separate Door-to-Door Waste Collection in Only Three Months

Ind. Ing. Ambrosini Stefano - CEO Waste Management Specialist s.r.l. –

<http://www.wastemanagementspecialist.it> - stefano.ambrosini@gmail.com - +393401452159

Abstract

The village of **Santo Antônio**, located in the municipality of **Mata de São João** (Bahia State, Brazil), was selected as the ideal site for a pilot project on separate waste collection, designed for scalability and replication across Latin America. This study, a collaboration between **Stefano Ambrosini** (WMS srl) and **Anderson Laudano** (A3L Engenharia), focused on a tourist destination with approximately 212 permanent residents and a high influx of tourists, particularly during the high season (December–March). The preparatory phase commenced at the end of **2022** with site visits and strategic coordination among local stakeholders (including Coca-Cola Solar, Carbogreen Ambiental, the Municipality of Mata de São João, Instituto Prospera, and AMASA) and Italian partners (Sartori Ambiente, Sumus Italia).



The **2023–2024** fiscal years were dedicated to logistical analysis, preparation of the **triage** center, and the importation of necessary consumables and containers.

The operational launch, preceded by an essential training phase for households and residents on the new separation/sorting system, took place in **April 2025**. The results were **immediate**: the average separate collection rate reached **60%**, peaking at **70%** in May and August. In the first four months, the average reduction in waste sent to landfill was **60%**, decreasing from 7 tons/month to 1.5 tons/month.

This outcome is exceptionally

significant, considering that, according to a 2021 study, only **4%** of Brazil's 27.7 million tons of recyclable waste was actually recycled. The project's success underscores the effectiveness of a targeted, methodological, and participatory approach to waste management.

Keywords: Waste Collection, Recycling, participatory process, Mata de São João

Biography

Stefano Ambrosini is an **Industrial Engineer** and the Sole Director of Waste Management Specialist s.r.l.

He specializes in **Waste Management & IT**, with professional experience spanning over 100 municipalities globally. His diverse background includes studies in **International Politics** (University of Oslo) and **Russian Foreign Policy** (MGIMO), complementing his technical expertise.

Title: Innovations in Photovoltaics: The Future of Energy Generation with Tandem Solar Cells

Mr. Michael Storch

CEO

Schwaebisch Gmuend

Germany

Research Interest: Description of the technical and economic possibilities of the solar industry

Abstract

Solar cells have been in use since the 1950s. It took about 40 years for the demand for renewable energy for the peak. Thanks to recent developments, we have now reached a new threshold of efficiency: The Tandem Cell. What technological advancement are there? Is there really an increase in efficiency? What potential applications are there? What impact does this technology have on future energy supply?

Keywords: Tandem solar cell, perovskite solar cell, Solar energy, use of regenerative energy, solar efficiency

Biography

Mr. Michael Storch is a professional marketing manager and sales expert for at least 20 years. During this time, he has trained over 250 salespeople and companies working in sales. Since 2004, he has worked as a manager for Mangold Photovoltaik company in Schwaebisch Gmuend, Germany, overseeing thousands of solar installations. He is a certified solar expert, accredited by German TÜV Rheinland, ID number 0000032237. He is a member of the independent expert community in Germany. He is a certified specialist for VARTA Batterie systems. He is a solar expert and premium partner of QCells Solar in Germany. He is the initiator of the Schwaebisch Gmuend environmental symposium for the public. Since 2009 he has also been a book author for the Einhornverlag Schwaebisch Gmuend and work as state-approved lecturer in adult education.

Title: Connecting the Dots: Climate Adaptation Lessons from the Frontlines of Innovation and Hope

Mr. Craig Applegath

Partner
DIALOG
Canada

Abstract

The Twenty First Century Imperative Podcast was created to explore how we can respond to the escalating climate, ecological, and social challenges of our time. Through in-depth conversations with global leaders and changemakers, I've gathered diverse, actionable insights into climate adaptation and mitigation.

In this presentation, I outline five urgent challenges we face: (1) worsening climate impacts like severe heat events, flooding and wildfires, (2) fragile infrastructure and urban systems, (3) the disconnect between technological solutions and political/social will, (4) the mental health toll of climate anxiety, and (5) the need for bold, systemic transformation.

Drawing from podcast interviews, I will spotlight inspiring examples: Jeff Schnurr empowers off-grid communities with solar energy; Rahul Mehrotra designs for resilient urbanism in India; Michelle Xuereb bridges creativity and engineering for integrated solutions; Klaus Hoppe demonstrates how cities like Freiburg can lead through policy; and Geoff Smith shows how private-sector leadership can drive carbon accountability.

These stories show that solutions already exist—we need leadership to connect the dots. I'll conclude with a reflection: hope is not passive. It's built through collaboration, courage, and systems thinking. Attendees will leave with renewed purpose and tools to advance a climate-resilient future.

Keywords: Climate Change, Inspiring change makers, Hope is not passive

Biography

Mr. Craig Applegath is an architect, urban designer, and biologist specializing in sustainable and climate-adapted design at the intersection of built environments and natural ecosystems. Craig focuses on zero-carbon, climate-adapted buildings, campuses, and communities, integrating mass timber in higher education, healthcare, and affordable housing projects. As Chair of the Mass Timber Institute Craig champions innovative low-carbon wood construction. The Founding Partner of DIALOG's Toronto studio, Craig holds degrees from the University of Toronto, Dalhousie University, and Harvard's GSD. Craig has taught climate change adaptation at the Daniels Faculty of Architecture at the University of Toronto, hosts of the Twenty First Century Imperative podcast, and speaks internationally, driven by his passion for addressing environmental challenges through design.

Title: Leveraging Advanced Statistical Methods to Optimize Renewable Energy Shares in Hybrid Systems Under Climate Variability: A Case Study of PV and Wind Power in Europe

Dr. Bernard Twarog

Assistant Professor

Cracow University of Technology

Poland

Abstract

This study presents a comprehensive approach to optimizing the energy mix in hybrid photovoltaic – wind power systems across Europe under the influence of climate variability. Utilizing high-resolution ($0.25^\circ \times 0.25^\circ$) daily meteorological data from 1980 to 2022—including solar irradiance, wind speed, and temperature—the research quantifies both gross and net available energy, accounting for technical constraints of renewable energy systems.

To determine the optimal shares of solar and wind components, the study applies Markowitz Portfolio Theory (MPT), enabling risk-return trade-offs in energy supply strategies. Climate trends and variability are assessed through Mann-Kendall trend tests at a 5% significance level, while Monte Carlo simulations are employed to generate 10-year probabilistic forecasts of key climate variables.

Using these forecasts, the energy mix in hybrid systems is re-optimized to evaluate the potential impact of future climate conditions on renewable energy production. A financial analysis, based on a 2 MW hybrid system (1 MW solar, 1 MW wind), estimates the projected changes in daily revenue from energy sales across European countries. Results reveal regional disparities: daily losses of up to –150 EUR in Southern Europe and gains reaching +135 EUR in Northern and Central regions, such as the British Isles and Eastern Germany.

The findings underscore the importance of adaptive energy planning, emphasizing the role of integrated climate forecasting, advanced statistical modeling, and economic evaluation in enhancing the resilience and profitability of hybrid renewable energy infrastructures under changing climate conditions. Visual representations of the results support the discussion on regional strategies to manage financial risks and leverage emerging opportunities in the renewable energy sector.

Biography

Dr. Eng. Bernard Twaróg is an Assistant Professor at the Institute of Water Engineering and Management, Cracow University of Technology. His research focuses on hydraulic engineering, water management, hydrology, hydroenergy, and modeling of hydrotechnical processes. He applies advanced analytical and computational methods, including Computational Fluid Dynamics (CFD), Monte Carlo simulations, risk analysis, and optimization of water management systems.

He has been affiliated with the Cracow University of Technology since 1989, where he has served as Deputy Director for Research (2009 – 2011), Head of the Department of Water Management (2012 – 2013), and Dean's Plenipotentiary for Student Research Activities (1992 – 2003, 2016 – 2024). Previously, he worked as Deputy Director for Water Resources at the Regional Water Management Board in Kraków (2002 – 2004) and as a Consultant for the World Bank in Washington, D.C. (1999 – 2001).

Dr. Twaróg has broad international experience, collaborating with universities in Frankfurt am Main, Dresden, and Darmstadt, and participating in projects related to small hydropower development and water system optimization.

He is a member of the European Association of Environmental and Resource Economists (EAERE), the Polish Hydrological Association, and the International Association for Hydro – Environment Engineering (IAHR). His work has been recognized with numerous awards, including the Gold Badge of the Cracow University of Technology and the Prof. Joachim Lenz Foundation Award for international scientific cooperation.

Title: Integrated Renewable Energy Solutions in Namibia: Leveraging Green Hydrogen, Biomass Pellets, and Organic Waste for Sustainable Energy Transition

Dr. Natangue Heita Shafudah

Projects Coordinator, Namibia Green Hydrogen Research Institute;
Senior Lecturer, University of Namibia
Namibia

Abstract

Namibia faces a critical need to diversify its energy portfolio and reduce dependency on imported electricity, particularly in light of rising demand and climate resilience imperatives. This study explores the potential of an integrated renewable energy approach that combines green hydrogen, biomass pellets, and organic waste-to-energy systems as a pathway toward a sustainable energy transition. Namibia's abundant solar and wind resources position it as a viable hub for green hydrogen production, which can serve both domestic consumption and export markets. Simultaneously, underutilized agricultural and forestry residues present significant opportunities for biomass pellet production, offering clean fuel alternatives for industrial and household use. Furthermore, organic waste from urban and rural settings can be harnessed for biogas and compost, addressing both energy needs and environmental concerns. This integrated model not only supports energy security and rural development but also aligns with Namibia's national development goals and international climate commitments. The paper emphasizes policy recommendations, investment frameworks, and capacity-building strategies necessary to unlock the full potential of these renewable resources in Namibia's energy landscape.

Keywords: green energy, biomass, bio-to waste

Biography

Dr. Natangue Heita Shafudah is a Namibian physicist and renewable energy specialist renowned for his contributions to material science and green hydrogen research. He currently serves as a Senior Lecturer in the Department of Physics, Chemistry & Materials Science at the University of Namibia (UNAM). Additionally, he holds the position of Projects Coordinator at the Namibia Green Hydrogen Research Institute (NGHRI), a UNAM initiative dedicated to advancing Namibia's green hydrogen economy. HE got his B.Sc. in Physics, M.Sc. in Physics, Specialist in Laser and Optical Science, Doctor's degree (Ph.D.) at Kogakuin University of Technology and Engineering (KUTE).



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GCKE 06:

Management of Technology Education and Research

Chair

Dr. Gilbert Paquette, Emeritus Professor, TELUQ University, Canada

Co-chair

Dr. Syh-Jong Jang, Distinguished Professor, Center for General Education, Asia University, Taiwan

Time: 08:30-11:20, November 13, 2025 (Thursday)

Place: Yamato A, Fifth Floor

Title: Teacher-Student Interactions and Learning Outcomes in a Distance Learning Environment: A Forty-Five-Year Journey from Theory to Practice

Prof. Baruch Offir*, Baruch Offir, Ingrid Barth, Aryeh Ben- Chayim, and Michal Aflalo

Professor

Bar-Ilan University

Israel

Abstract

This paper describes a remote learning project that enabled high school students in peripheral areas to participate in an introductory university course without leaving the supportive framework of their high schools. This project was based on the first author's foundational work on remote learning systems during the 1970's, many years before the Internet became universal, long before social networks, and platforms such as ZOOM. We set-up a distance learning system based on point-to-point communication, which at first supported mathematics studies and then went on to other subjects. Twenty years after the initial publication of the principal study identified key interaction patterns that correlate with positive learning outcomes, the goal of the current paper is to include subsequent implementations and

extensions of the mediating teacher model across different disciplines with different target populations. The doctoral researchers who participated in the original project have since applied and adapted the mediating teacher model in their own fields: However, the consistent applicability of the core mediation principles and strategies across diverse educational settings continues to validate the crucial role of the mediating teacher in the classroom. These mediation principles have proven essential in addressing contemporary educational challenges, particularly as GenAI and digital technologies reshape the learning landscape while highlighting the irreplaceable value of classroom-based mediating teachers in remote learning projects.

Biography

Professor Baruch Offir has a BA in psychology and physiology from Bar-Ilan University, an MA in science education from the Hebrew University and a Ph.D. from the University of London. He founded and headed the project for use of computers for instruction at the IDF, during which aeronautics were taught on "PLATO" computers in Europe and Israel. He was head of the Department of Education at Ariel University, "Academy Head" of the Zefat College, founded the project for teaching mathematics in high schools via the main computer at Bar-Ilan University to two high schools. He has supervised 14 doctoral and 28 master's students and wrote numerous articles that were published in scientific journals. During all this time he also served as a lecturer at the Bar-Ilan University Department of Education. Today he is leading a long-term (40 years) project for assimilation of computers in distance learning. This project is based on years of research in the field of distance learning. In 2023, Prof. Offir published a book (in Hebrew) that summarizes his years of activity and contribution to the field, which presents the theory he formulated as a result of years of research. Prof. Niv Achituv, who was head of the Department of Business Administration, vice-president of the Tel-Aviv University and a member of the National Academy for Information Systems and Infrastructure wrote the following in the introduction to the book: "A prophet appeared in the 1970's: Prof. Baruch Offir suggested establishing distance learning systems. This proposal was raised many years before the Internet became universal, much before the beginning of social networks, and certainly before the development of software such a SKYPE, ZOOM, and their like. With a modest donation from the IBM Corporation, Prof. Offir set-up a distance learning system based on point-to-point communication, which at first supported mathematics studies and then went on to other subjects."

Title: ChatGPT on University Instructors' Profession Development and Students' Self-regulated Learning

Dr. Syh-Jong Jang

Distinguished Professor

Center for General Education

Asia University

Taiwan

Research Interest: Science and Technology Education

Abstract

ChatGPT is an emerging tool, which many university educators and students may be unaware of its existence or have only heard of it without trying or exploring its potential. However, there are currently limited studies on ChatGPT generating text and creating scientific teaching resources in the context of science education. Moreover, there is no research on how university students or teachers apply it to influence teachers' teaching or students' learning ability. The study aimed to explore how a university instructor used the ChatGPT flipped model to impact university students' perceptions of the instructor's profession development and students' self-regulated learning ability in a general education course. The research indicates that ChatGPT can assist the university instructor in sourcing text materials, facilitating class discussions, and providing individualized guidance. Additionally, ChatGPT helps the instructor find various topics and offers rich and diverse teaching content suggestions. ChatGPT provides an effective target structure, facilitating quick access to required information and reducing search time. It also assists students in finding various topics, offering suggestions, explanations, and aiding in task organization. While it offers different types of subject information and aids in task completion, students should self-evaluate the text information provided by ChatGPT to ensure correctness and suitability. The research implications of this study are presented along with relevant suggestions.

Keywords: ChatGPT, University flipped classrooms, profession development, Self-regulated learning

Biography

Syh-Jong Jang now is a Distinguished Professor at Asia University in Taiwan. He received his PhD in Science Education from the University of Texas at Austin, USA. He served associate dean of International College and the director at Center Of Cross-Strait Academic Exchange, Asia University. He also served Co-Chair and Review Committee in the Field of Science Education of MOST, Taiwan and obtained the highest Teacher Research Award from Chung Yuan Christian University. He was invited as Honor Lecture on Teaching in the Graduate School of Education at Peking University and Honor Lecture on Teaching in the School of Education at Shaanxi Normal University. He has been a visiting Professor at the University of Georgia, USA and FT PGDE(P) Program External Examiner-The Hong Kong Institute of Education. His research expertise is information technologies and TPACK from pre-service and in-service teacher level. He has published a lot SSCI-index research papers which focus on technology in teacher education and innovative science teaching in all levels. These published Journals include Computers in Human Behavior, Computers & Education, BJET, AJET, Educational Research, Higher Education, International Journal of Science Education, Journal of Computer Assisted Learning, etc. He also grants many research projects from Ministry of Science and Technology, Taiwan.

Title: Knowledge Management for Technology-based Education Planning and Delivery in the AI Era

Dr. Gilbert Paquette

Emeritus Professor

TELUQ University

Canada

Abstract

In the globalized economy of the 21st century, the proliferation and fragmentation of sources of information and expertise require knowledge management processes capable of transforming information into useful knowledge to enhance the skills and competencies of individuals and organizations. This conference will present some of the uses of AI and the Semantic Web to support Educational Engineering, seen as a central Knowledge Management process. This process is used in Higher Education and corporate training digital learning environment design and delivery, where ontologies and knowledge graphs are used by students and teachers.

First, we present an Educational Engineering process structured into four axis: knowledge and competency modeling, learning scenario design, media resources integration and online delivery process. Ontology models from the Semantic Web are used in each of these subprocesses to organize information in a platform for the design and delivery of Digital Learning Environments. Ontology modeling organizes information gathered in a variety of sources. Personalized learning scenarios provide activities using knowledge and competency ontologies. Autonomous and lifelong learning activities are supported where learners guided by ontologies look for the Web in search of learning resources. Ontologies also serve as a blueprint to annotate productions in a collaborative learning community.

Keywords: Knowledge management, Knowledge and Competency Modeling, Educational Engineering, Curriculum Design and Delivery, Symbolic and Generative AI, Semantic Web

Biography

Dr. Gilbert Paquette holds a Ph.D. from the Université du Maine (France) in Artificial Intelligence and Education. He is Emeritus Professor at University TELUQ and researcher at the Institute for Applied Artificial Intelligence he has founded in 1992 (under the name LICEF). He served as a Canada Research Chair in Cognitive and Educational Engineering for 14 years and received a Doctorate Honoris Causa from the University Pierre et Marie Curie (Paris VI). He chaired strategic projects in the field of Technology-based Education and Management including the LORNET Canadian Research Network grouping hundreds of researchers from universities and private companies. His publications include five books on Technology-based Learning, Educational Engineering, Knowledge Modeling in the Semantic Web and Distance Education. His most recent book in 2022, entitled “Learn and Teach on the Web: What Kind of Educational Engineering”, will serve as the main basis in this GCKE-25 presentation. Dr Paquette designed and coordinated the development of ontology modeling software and design and delivery platforms for online knowledge management and education. He also founded two spin-off companies from his research center and acted previously as Minister for Science and Technology in the Quebec Government in Canada.

Title: Using Technology to Share Story of Place

Dr. Clair Andersen

Associate Professor
Higher Education Advisor
University of Tasmania
Australia

Abstract

Using technology to Share a Story of Place at the University of Tasmania and enhance learning for undergraduate students, including pre-service teachers. Our goal was to research and prepare a palawa interpretation of both the traditional and contemporary aspects not only of the University and its campuses but, the lands occupied by the University, with a focus on Sandy Bay in the south and Burnie in the north of the island. This resource provides greater access to a wider audience looking to learn more about Tasmania's Aboriginal history. It is designed for everyone to use, residents, tourists, school students and undergraduate students as well as pre-service teachers and classroom teachers. This digital story of place project has revealed Aboriginal names, language and history of place to encourage greater understanding of the islands' deep history. This presentation explores the research and processes involved to engage with community to create a digital resource which shares histories and narratives of place, enhances pride in First Australian students and also educates the broader population. It will show case/demonstrate the resource and allow participants to explore.

Keywords: Aboriginal Tasmania, history, people, places.

Biography

Associate Professor Clair Andersen is the Higher Education Advisor for Aboriginal Education at the University of Tasmania in Hobart, Tasmania, Australia. Clair was Director of the Riawunna Centre at UTAS for 7 years and has been involved in Aboriginal education for more than 40 years. Her research interests are in improving education and training pathways for Aboriginal and Torres Strait Islander students, and the development of appropriate learning resources.

Her current research focuses on improving the education and health outcomes of First Australians through the inclusion of decolonizing and indigenizing content within courses at the university to enable the graduation of culturally capable graduates to address closing the inequity gap. This work involves the development of cultural understandings as a core graduate attribute.

Title: A Comprehensive Framework of the Idea-Marathon System (IMS) for Creativity Education and Training: Applications Across Business, Industry, Innovation, Higher Education, K–12, Early Childhood, And Senior Well-being

Dr. Takeo Higuchi

Executive Director

Idea-Marathon System Institute

Japan

Research Interest: Self-Building-up of Creative Backbone

Abstract

The Idea-Marathon System (IMS) is a structured and evidence-based creativity training method grounded in the daily practice of “Thinking and Writing in Continuous Notebooks.” Designed for all generations—from preschool children to senior adults—IMS provides a lifelong framework for creative development. For early learners, IMS begins with *Drawing IMS*, followed by *Question IMS*, in which children answer one question and produce a drawing each day over six years from 2200 questions. From secondary school onward, participants engage in the full IMS, generating original ideas daily. This tiered approach builds essential cognitive traits such as sustained focus, creative persistence, and meta-thinking. Supported by systematic continuation mechanisms, IMS has demonstrated effectiveness across various domains—education, research, invention, business, and the arts. The accumulation of ideas becomes not only a personal intellectual asset but also a foundation for innovation and lifelong learning.

Keywords: Idea-Marathon System (IMS), Daily Thinking and Writing in notebooks, Lifelong Creativity Development

Biography

Dr. Takeo Higuchi is the founder of the Idea-Marathon System (IMS), a lifelong creativity development method he began in 1984. Since its inception, he has recorded over 600,000 ideas across 580 notebooks. The system was originally conceived as a tool for addressing global competition during his tenure as a liaison representative of Mitsui & Co., Ltd. in Saudi Arabia. After retiring from the corporate world, Dr. Higuchi established the IMS Institute in Tokyo, Japan. He later earned his Ph.D. in Knowledge Science from the Japan Advanced Institute of Science and Technology (JAIST), where he completed a dissertation titled “Enhancement Effects of the Idea-Marathon System on Creativity.” Dr. Higuchi has introduced “Drawing IMS” to 14 kindergartens and nursery schools in Japan and has implemented “Question IMS” with over 130 elementary students annually for the past 15 years. At the higher education level, he has delivered IMS-based creativity training at numerous universities and research institutions, including Royal Holloway, University of London (since 2016). The IMS Institute has also filed multiple patents derived from ideas generated through IMS notebooks. Dr. Higuchi is the author of over 50 print books and 30 Kindle publications, including the English-language title “Idea-Marathon – Visualizing Your Thinking: The Strongest Notebook Technology.”

Title: Preservice Teachers Learning to Teach with Artificial Intelligence and Metacognitive Strategies

Dr. Rupam Saran

Professor

Medgar Evers College, The City University of New York

USA

Dr. Meenakshi Ingolo

Associate Professor

Delhi University

India

Abstract

This study explores ways to increase Artificial intelligence (AI) literacy for childhood Pre-service teachers (PSTs), challenges and concerns about AI and Chat GPT's synopsis, and impact of AI on PSTs' critical thinking skills and metacognition. The term "AI literacy" emphasizes the importance of incorporating AI to the 21st century skills for all individuals including young children in the field of education AI literacy has become an essential required skill to use as a learning and teaching tool. According to (Ng et al. 2021a), AI literacy instructional design can be developed in terms of pedagogy, content knowledge, metacognition tools and assessment.

Currently in childhood education teachers are supposed to use AI technologies to facilitate their students' learning and incorporate AI as a tool to support students' cognitive and social development. However, there are a few challenges such as lack of teachers' AI knowledge and skills. Many childhood teachers, PSTs and educators have limited technological background and lower technology competency and they need to develop and implement early AI literacy curriculum in their instructions. Often, childhood teachers tend to have a low confidence level to understand AI, and they develop a negative attitude towards AI in their day to day instruction.

Biography

Rupam Saran is Professor at Medgar Evers College, City University of New York, and Chair of the Department in the Multicultural Early Childhood and Elementary Education Department. Dr. Saran's field of specialization is developing equity and inclusive STEM learning and teaching, mathematics education for minority immigrant children, socio-mathematical authority, teacher education and mathematics teachers' mathematics identity, preparing effective mathematics teachers, educational attainment of second-generation immigrant youth in urban school. She authored the book "Model Minority Stereotype: Understanding Asian Indian Youth in South Asian Diaspora" Routledge, New York. Dr. Saran has co-authored the book, "Beyond Stereotype: Minority Children of Immigrants in Urban Schools" with Dr. Rosalina Diaz. Her forthcoming book is, "Deconstructing Media Representations of Teachers and Learners in the History of American Education" Brill Publishers, Netherlands. She has published many journal articles in the area of her research interests specifically in the area of mathematics education. Dr. Saran is presenting at NCTM and AERA Conferences since 2009.

 GCKE 07:

Video Forum

Videos could be viewed by <https://www.bitcongress.com/galatechvideo1/index.php>

Title: Consistent Conjectural Variations Equilibrium for a Bilevel Human Migration Model

Dr. Viacheslav Kalashnikov*, Dr. José Guadalupe Flores Muñiz, Dra. Nataliya Kalashnykova, and Daniela Osorio-Gonzalez

Professor and Researcher

Autonomous University of Nuevo León,

Mexico

Research Interest

Operational Research, Concepts of equilibrium, Bilevel Optimization, Variational Inequalities and Complementarity Problems

Abstract

This talk extends the human migration model to the framework of consistent conjectural variations. First, we introduce the standard multiclass human migration network equilibrium model that describes the movement of migrants between locations. Next, we introduce the concept of conjectural variations, in which migrants' conjecture about the (expected) utility of locations after their migration. We define the concept of conjectural variations equilibrium and present results regarding the conditions for its existence and uniqueness. Following that, we define the concept of consistency for the migrants' conjectures and the consistent conjectural variations equilibrium (CCVE). Finally, we describe the conditions that guarantee the existence of the CCVE.

Keywords: Human migration - Conjectural variations - Meta-game.

Biography

Dr. Viacheslav Kalashnikov, Ph.D. (in 1981) and Doctor of Habilitation Degree (in 1995) in Operations Research. Till 2000 he was Professor and Researcher at the Central Economics and Mathematics Institute of the Russian Academy of Sciences, Moscow. Since 2000 he works in Mexico, first as Professor and Researcher at the Technological Institute of Monterrey, since 2022 he works as Professor and Researcher at the Autonomous University of Nuevo León (UANL), Monterrey, Mexico. He is the author of more than 200 publications, 5 monographs and the Research Director of more than 30 Ph.D. and Master Students.

Title: The Contribution of GIS to the Sustainable Management of Water Resources in Algeria

Ms. Lynda Hamadene*, Pr. Ouahiba Bouchama, and Ing Haroun benoumelaz

University of Science and Technology Houari Boumediene (USTHB)

Algeria

Abstract

At the crossroads of geography and computer science, geomatics is the discipline that brings together a set of technologies that enable the representation, modelling and analysis of territory through the acquisition and use of geographical data. Geomatics has become an indispensable discipline that aids decision-making in the fields of land use planning, urban planning, agricultural and forestry management, risk management, transport, economics, marketing, water resource management, etc.

The issue of water is one of the major challenges facing the country's territorial policy, given its vast size and climatic and physical disparities, which are exacerbated by the demographic divide between northern and southern Algeria. Indeed, scarce resources such as water will be increasingly in demand. Faced with the need to address this situation, the use of new information technologies such as Geographic Information Systems (GIS) is becoming very interesting in order to better study, manage and evaluate the quantity and quality of these resources based on digitised and georeferenced geological, hydrological and hydrogeological data and regional information on water resource exploitation patterns.

Biography

Ms. Lynda Hamadène is an urban geographer who studied at Houari Boumediene University of Science and Technology in Algiers, Algeria. She holds a doctorate in spatial planning. Lynda Hamadène has pursued a career in urban planning, higher education and scientific research. She is the author of articles aimed at students and professionals in various fields, including urban sprawl, economic activities, food security and sustainable development. She is currently conference Master at USTHB, Algiers, Algeria.



Title: Multi-level Smart Charging and Grid Balancing

Mr. Luís Pisco, Manuel Pio Silva, and Gonçalo Lacerda*

R&D Engineer
EDP R&D
Portugal

Abstract

Energy grids are fundamental to modern society's life, enabling the continuous flow of energy between producers and consumers while maintaining a delicate balance between generation and demand. Recent developments like solar self-consumption have upgraded traditional consumers to "prosumers" who both produce and consume energy. This shift toward decentralization, motivated by personal ownership and economic incentives such as selling excess energy, has introduced new challenges in grid management. As the energy landscape becomes increasingly distributed, the traditional centralized control models are proving insufficient. Instead, collaborative and adaptive mechanisms inspired by swarm intelligence are emerging as promising alternatives. These distributed systems allow energy sources and consumers to cooperate dynamically, sharing surplus energy and maintaining grid stability more efficiently. Evolving toward decentralized, intelligent, and cooperative frameworks represents a necessary step to ensure resilience and adaptability in future energy networks, reducing CAPEX and retail agreement costs and decreasing operation risks. The values presented before were obtained by the TaRDIS project which is funded by the EU's Horizon Europe programme under Grant Agreement number 101093006.

Keywords: Prosumer, Swarm, Orchestrator, Decentralized

Biography

Mr. Luís Pisco is a R&D Engineer at EDP R&D. He holds a Master's Degree in Computer Science at Faculdade de Ciências da Universidade de Lisboa and a Bachelor's Degree in Geospatial Engineering at Faculdade de Ciências da Universidade de Lisboa. He has participated in several european projects from the HORIZON initiative such as SILVANUS, GREEN.DAT.AI and TaRDIS.

**Title: The Impact of the Development of the Digital Economy on
Biodemographic Indicators of Human Development in the World System in
the Global Knowledge Economy**

Dr. Anatoly Davidovsky,

Associate Professor

Belarusian State University of Informatics and Radio Electronics

Russia



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International Exchange of Professionals -Thematic Event in Sustainable Development
Osaka, Japan

The 7th World Congress of Education (WCE-2025)

 WCE 01:

Higher Education Forum (I)**Chair**

Dr. Julie Furst-Bowe, Provost and Academic Vice President, Georgian Court University, USA

Co-chair

Dr. Carlos A. V. Costa, Professor Emeritus, Faculty of Engineering, University of Porto, Portugal

Time: 13:30-17:10, November 11, 2025 (Tuesday)

Place: Katsura, Fifth Floor

Title: Drawing upon Multidisciplinary and Multi-sector Teams to Enhance Assessment Processes in Higher Education

Dr. Elaine Chapman

Deputy Head

University of Western Australia
Australia

Abstract

The integration of Generative Artificial Intelligence (GenAI) in the workplace is rapidly reshaping industries, altering job roles, and redefining the skills required of university graduates. GenAI is now significantly reshaping workplace demands, with automation and machine learning driving efficiencies and innovations across many industries. The shifting nature of work in this context has made the task of forecasting and fostering the skills that graduates need to succeed in the workplace more challenging than ever before. To ensure workforce readiness, universities must adopt assessment frameworks that align with industry needs, and equip students with the competencies they need to thrive in GenAI-enhanced workplaces. At present, however, little guidance is available to educators who wish to enhance their assessment practices and student learning experiences to incorporate the ethical and equitable use of GenAI. A further problem introduced by GenAI has been that these tools can increase further inequities in university assessment processes. This presentation will focus upon describing a project which aims to transform the assessment mechanisms used across the University of Western Australia to incorporate fully the ways in which GenAI is being applied in different industries.

Biography

Dr. Elaine Chapman has an undergraduate degree in psychology (First-class honours, Australian Psychological Society Award) and a Ph.D. in psychology. She has taught in the areas of child and educational psychology, psychometrics and assessment, and research design and analysis over the last 35 years in 3 different universities (Monash, USyd, and UWA). She has published in many high-impact journals within these fields. Throughout her academic career, she has held significant research leadership roles, and is currently the Deputy Head of School – Research in the UWA Graduate School of Education. She has co-founded Master's level courses in Research Methods; has been an Associate Dean Research; and Chaired Ethics Committees and Integrity Committees. She is the Editor in Chief of Education Research and Perspectives and is an Associate Editor for the British Journal of Educational Psychology and Frontiers in Psychology. She has had a lead CI role in research projects worth collectively over \$2.3 million Australian Dollars.

Title: The Maladjustment Dynamics of Teachers Commonly Seen in Modern Japan: From the Perspectives of Psychoanalysis, Group Analysis, and Mentalization

Dr. Ohashi Yoshie

Professor

Kyoto Bunkyo University

Japan

Abstract

In schools, where teachers tend to seek immediate solutions, the question of how to provide meaningful interventions has drawn considerable attention from school psychologists all over the world. The purpose of the present study is to analyze case data, including the phenomenon named “reverie of groups” from a previous study, which refers to the retention of discomfort in a group of teachers, resulting in an indirect change in problematic students. In this case study, it was initially difficult to adopt a clear policy that created immediate solutions; the psychologist and teachers experienced feelings of uncertainty. After several consultations between the psychologist and teachers however, the troubled student indirectly changed. The teachers’ attitudes became responsive and mentalizing in the aftermath. Thus, the significance of mentalizing stance in the school consultation context was demonstrated, as was the power of groups to maintain a sense of security by sustaining the capacity of mentalizing.

Biography

Dr. Ohashi Yoshie is a professor of Kyoto Bunkyo University in the Faculty of Clinical Psychology. She holds a Ph.D. in psychoanalytic psychotherapy from the International Christian University, Japan. Her areas of expertise include individual/ group psychotherapy, organization development using psychoanalytic and mentalization theories. In the last few years her research has also explored the community building in the field of school or child rearing centers in the devastated area in East-Northern area in Japan. Recently, the Japanese Association of Community Psychology has awarded the 2025 Publication Award to the book she edited (Supervised by Dr. Nobuo Aida / Edited by Yoshie Ohashi and Hiroshi Kajimoto: A Guide to Utilizing Group Approaches in Schools—Methods for School Counselors and Faculty (Booklet: Children's Minds and School Clinical Practice 10)). She is currently co-Chair of the Research Committee of International Association of Group Psychotherapy

Title: The Role of National Universities in a New Era

Dr. Hassan Al-Derham

Past President
Qatar University
Qatar

Abstract

The Fourth Industrial Revolution (4IR) is shaking things up everywhere. Digital technologies, biotech, and physical systems are all crashing together, which is totally reshaping jobs, economies, and social life. Because of this chaos, national universities are incredibly under pressure to redefine its roles and missions to adopt and accommodate for the needs and challenges of this new industrial revolution. They can't just be centers for storing knowledge; they have to step up and guide society ethically. To stay useful and relevant, they must ditch the old teaching models and transform into adaptive environments that seriously link up technology, ethics, and lifelong learning.

This paper provides a three-phase roadmap for national universities to redefine their goals and structures to match the 4IR's needs and challenges. The first phase, Short-Term, means basic foundational fixes: boosting AI/digital skills, making competency-based courses, and establishing digital credentialing and interdisciplinary structures. Next, in the Medium-Term, these initial steps have to grow into big innovation networks. This requires building national research testbeds, creating advanced computing hubs, and getting people together to connect the tech work directly with policy and ethics. Finally, the Long-Term phase sees universities becoming open learning communities. They will drive new ideas, ensure education never stops, and become the trusted experts who advise on how new technologies should be run.

Ultimately, the paper argues that a national university's long-term value will not be about how fast it grabs new technology. Instead, it will be much more about how successfully it promotes ethical thinking, flexibility, and real inclusion among its students and staff. When universities treat this transformation as a chance for genuine institutional renewal, not just a threat, they can continue to be the nation's moral and intellectual guide, actively helping society move toward a prospectus and durable future.

Keywords: Fourth Industrial Revolution (4IR); national university reform; innovation ecosystems; ethics of technology; lifelong learning; digital transformation; sustainable development.

Biography

Dr. Hassan Al-Derham, Qatar University's 6th President Dr Hassan Rashid Al-Derham is recognized for playing a major role in advancing research activity at both university and national levels.

Dr Al-Derham was the president of Qatar University between 2015 and 2023. Before that, he was the Vice-President for Research for eight years, during which he guided QU to its current position as leader of research excellence in the GCC region, which was enhanced by its continuous success in winning the largest percentage of grants from Qatar National Research Fund (QNRF).

He also served in several earlier roles at QU including Associate VP for Research and Head of Civil Engineering department at the College of Engineering.

He holds a PhD and Post-Graduate Diploma in Construction Project Management from University of South Wales, UK which followed obtaining a Master's Degree in Civil Engineering from Georgia Institute of Technology, USA. His undergraduate degree is in Architectural Engineering from North Carolina Agriculture and Technical State University, USA.

During his tenure as President of QU he led a transformation strategy to reposition the university in teaching, research and economic development role within its community. Qatar University is currently recognized as a global higher education institution.

During his term as VP for Research, Dr Al-Derham successfully developed and implemented the organization's research policies, procedures, and priorities as well as an ambitious research road map that supports national priorities.

Dr Al-Derham ' s research interests include construction productivity, project optimization, legal contracts and procurement. In 2009, along with his research team, he won Best Paper of the Year in ASCE Journal of Construction Engineering and Management.

Dr. Al-Derham is a board member of several local and international organizations including Qatar National Library and International Association for Universities.

He is also the founder and Vice Chairman of Barzan University College based in Qatar.

Title: Embedding Micro-Credentials in Educational Programs

Dr. Julie Furst-Bowe,
Provost and Academic Vice President,
Georgian Court University,
USA

Research Interest

Career Pathways

Abstract

Embedding micro-credentials into college degree programs involves integrating shorter, focused learning experiences (micro-credentials) that validate specific skills and knowledge into traditional undergraduate and graduate degree programs. This approach allows students to acquire in-demand skills and enhance their career prospects. This presentation will cover the benefits of embedding micro-credentials, along with several examples of successful implementation in various fields of study.

Biography

Dr. Julie Furst-Bowe has held executive leadership positions at several colleges and universities across the United States, including the University of Wisconsin-Stout, Southern Illinois University, Chippewa Valley Technical College, Arkansas Tech University, Winona State University and Georgian Court University. She received her doctorate in education from the University of Minnesota and has published and presented nationally and internationally on the topic of performance excellence in higher education. She serves as a peer reviewer for the Higher Learning Commission and as an assessor for the Government Excellence Program in the United Arab Emirates.

Title: An Ethnographic Study of Foreign Language Teachers' Professional Anxiety and Identity Adaptation in the Age of AI in Higher Education

Dr. Yiping Wu

Associate Professor
Zhejiang Gongshang University
China

Research Interest

Teacher development

Abstract

This study examines the professional anxiety and identity adaptation challenges faced by foreign language educators in higher education in China in the rapid advancement of Artificial Intelligence (AI) technologies. Utilizing a mixed-methods approach combining ethnographic observation and in-depth interviews, the research analyzes the key factors leading to teachers' professional anxiety, including challenges in adapting to new technologies, fluctuations in self-efficacy, and the influence of educational policies. Additionally, the study systematically investigates the specific strategies employed by teachers to cope with these challenges, such as psychological adjustment and the adoption of innovative pedagogical methods. The research also focuses on how foreign language educators reconstruct their professional identity in response to identity crises, including anxiety and self-doubt, ultimately facilitating career growth and development. The findings provide both theoretical insights and practical guidance for supporting the professional development of foreign language educators in the context of technological transformation.

Biography

Ms. Yiping Wu currently serves as the Director of the College English Department at School of Foreign Languages, Zhejiang Gongshang University. Since joining Zhejiang Gongshang University in 2001, Ms. Wu has dedicated herself to English education and teacher development, contributing extensively to both pedagogy and scholarly research. In 2015, she pursued advanced academic research as a visiting scholar at St. John's University in New York.

Ms. Wu has authored several academic papers, including publications in core journals, and has written two monographs. Additionally, she has been involved in national and provincial research projects. Recognized as an expert in English education, Ms. Wu has spearheaded educational reform initiatives and developed a provincial-level blended learning course, further cementing her influence in the field. Moreover, she has mentored students in national and provincial competitions, guiding them to prestigious awards.

Ms. Wu's academic and professional excellence has been acknowledged through several accolades, including two first prizes and two second prizes in the national-level teaching competition, and numerous awards for her leadership and exemplary contributions to education in her university.

Title: The Contributory Model of Intercultural Competence: A Psychosocial Approach

Dr. Peyman G. P. Sabet* and Associate Professor Elaine Chapman

Lecturer

The University of Western Australia

Australia

Research Interest

The Internationalization of Education

Abstract

The acceleration of globalization has heightened exposure to linguistic and cultural diversity, highlighting the need for Intercultural Competence (IC) to optimize its impact and mitigate cultural conflict. Despite its growing importance, particularly in tertiary education, the field of IC is still suffering a lack of consensus. Scholars note the absence of an agreed-upon definition, a solid theoretical framework, and effective assessment tools, problems compounded by a multiplicity of ambiguous terms and over 300 identified components in existing models. A core conceptual problem is the confusion between competence-the desired outcome, or the ability to communicate effectively and appropriately - and competencies-the underlying attributes, such as knowledge, skills, and attitudes. To address this gap, this work introduces a novel, process-oriented approach to conceptualizing IC based on a psychosocial perspective. Rather than defining what IC is, this study focuses on identifying and structuring the contributing attributes, the qualities that facilitate a person's demonstration of a high level of IC. The resulting contributory model is structured around four main categories of attributes, moving from internal psychological traits to external social behaviours: Intrapersonal Attributes, Managing Self in the Environment, Attitudes Towards Others and Interpersonal Interaction Style. This framework aims to provide greater clarity for researchers and practitioners, offering a better structured method for understanding and developing the specific qualities necessary for successful cross-cultural communication and adaptation.

Biography

Dr. Peyman G.P. Sabet is a Lecturer of Applied Linguistics at Curtin University in Perth, Australia. He holds a Ph.D. in Languages and Intercultural Education from Curtin University and is currently a Doctor of Education candidate at the University of Western Australia with a focus on educational psychology and the internationalization of Australian tertiary education. Dr. Sabet has been involved in language pedagogy and linguistics for over twenty-five years, with extensive teaching experience and numerous publications in peer-reviewed journals. His expertise lies in areas such as Pragmatic Competence, Inter/Cross-cultural Communication, Intercultural Competence (IC) in higher education, Onomastics (the study of names), Vague Language, Second Language Acquisition, and Assessment. He has authored and co-authored multiple publications, including the book *Communicating through Vague Language: A Comparative Study of L1 and L2 Speakers* (2015) and articles on topics like Generative AI and educational assessments, and the future of intercultural competence in tertiary education. Dr. Sabet serves as an Associate Editor for the *Education Research and Perspectives Journal* and Review Editor for *Frontiers in Communication*. His work contributes to the fields of Applied Linguistics and Education, particularly regarding intercultural communication and the application of language studies in a global higher education context.

Title: Sustainability And Digital Advancement in Maritime Transportation - A Proposal to Future Proof Maritime Academia

Ts. Dr. Capt. Manivannan Subramaniam

Master Mariner, FNI, FIMarEST, CMarTech, LM IK, PIND, A.MPA, MSc.ERP, PhD (Mech.Eng.)

Chief Executive

Akademi Laut Malaysia (ALAM) | Malaysia Maritime Academy

Malaysia

Research Interest

Maritime Education and Training

Abstract

The maritime industry stands at a critical juncture, navigating the dual imperatives of sustainability and digitalization. This presentation proposes a comprehensive framework for maritime academic institutions to future-proof their curricula and operations, ensuring graduates are equipped to lead the evolving sector. The analysis is structured around the six key themes, detailing how academia must address each: integrating green technologies and emissions reduction strategies into curricula; mastering advanced navigational and engineering technologies like autonomous systems; embedding safety as a core value through blended digital and traditional training; prioritizing the human element through leadership and mental wellbeing programs; and fundamentally innovating educational delivery through immersive technologies and interdisciplinary studies. Building on a review of fifteen seminal publications from leading bodies like the IMO, DNV, and McKinsey, the proposal consolidates strategic action items into four foundational pillars. The People pillar focuses on talent development and collaborative industry-academia learning. Policies and Procedures advocate for updated relevant curricula, sustainable institutional practices, and diverse career pathways. Facilities emphasize strategic investment in both physical and digital infrastructure for training and administration. Finally, the Products pillar calls for the development of robust, equitable, and continually assessed training modules aligned with industry needs. By systematically implementing this four-pillar strategy, maritime academia can transition from merely keeping pace with change to actively leading the charge towards a resilient, efficient, and human-centric maritime future.

Biography

Ts. Dr. Capt. Manivannan Subramaniam is a seasoned maritime professional who began his career onboard Malaysia's MISC Berhad pioneer LNG fleet. After extensive experience at sea, Manivannan transitioned into education, where he began as a practical/field and simulators instructor and lecturer ALAM, nurturing the next generation of maritime professionals. During his tenure at ALAM, Manivannan pursued further his academic, earning a MSc. In Emergency Response and Planning and a PhD in Mechanical Engineering, solidifying his expertise in both practical and academic maritime fields. By end of 2007 he was appointed as the ALAM's Head, Maritime Simulation & Communication Department, and transform it as the country's *premier* Maritime Simulation based Training and Research & Consultancy (R&C) Centre. He was also the lead to establish its Full Mission Ship Handling Simulator as country's major Ports recognized Marine Pilots training center. Subsequently he worked on/successfully delivered few LNG related *world first* projects, including LNG e-Learning, LNG Simulator Course (for IMO) and PETRONAS PFLNG 1. Over the years he has also led more than 105 maritime industry related applied research work. His contributions to maritime education and research works were recognized internationally, and in 2021, he was appointed as an Adjunct Professor by the American Digital University (ADU), Inc., USA. Recently he has co-authored 6 LNG related technical books, of which 5 are world first, related to LNG FSU Technical Competencies. Currently, Manivannan serves as Chief Executive of Akademi Laut Malaysia (ALAM), playing a pivotal role in shapping-steering the institution's educational strategies, academic programs and its way forward, including future-proofing the academy. His blend of hands-on maritime experience and academic leadership has positioned him as a key figure in the advancement of Maritime Education and Training (MET) in Malaysia, region and beyond.

Title: Engineering Epistemology Revisited: Embedding Sustainable Development

Dr. Carlos A. V. Costa

Professor Emeritus

LEPABE/ALICE/Faculty of Engineering

University of Porto

Portugal

Abstract

Engineering activities are everyday present in population lives since they have a decisive contribute to economic and social development due to their unique role in all sectors: production of goods and services. Due to this large scope of influence, engineering activities and their actors have an enormous responsibility in contributing positively to the sustainability transition. The other two transitions: energetic and digital must be carried in such a way that also contribute the sustainability one. This paper presents an engineering epistemological model based in three pillars: science, technology and praxis. This model is further densified in terms of competencies that engineers need to acquire during their higher education degree. These competencies spread into the cognitive and behavioral domains: knowledge, capacities and attitudes. This context of sustainable development implies not only some knowledge of the subject but also the capacity of thinking and acting in a systemic, holistic and inter and multidisciplinary way in all areas of intervention: conception, design, procurement, implementation, commissioning, production and end of life. This means solving highly complex problems frequently in a context of ambiguity, uncertainty and risk perception in medium to long term scenarios. These scenarios result from the use of life cycle thinking and the need to consider intergenerational implications. It is in these competencies domain that sustainable development have to be considered. This can be done by including some new curricular units or embedding these subjects and training in existent ones. The contents and corresponding learning outcomes have to be adapted in order to accomplish that goal. Some examples are given.

Biography

Dr Carlos A. V. Costa is professor emeritus at the University of Porto. He is its students ombudsperson. Simultaneously he is a member of the team that runs the project SDG@FEUP (University of Porto Faculty of Engineering) that aims to embed sustainable development in the engineering curricula. He has been head of the chemical and biological engineering department and dean of FEUP and coordinator of the research laboratory LEPABE (Laboratory of Process, Environment and Bio Engineering and Energy). Since the last decade of the last century he developed research in the area of Process and Environmental Systems Engineering with emphasis on sustainable development related subjects. After retirement he has been advisor for special projects of the secretary of state for higher education, president of a private association dedicated to innovation and start-ups and administrator of a company that operates in the environmental area.

Title: Integrating Design Thinking and Arts in Education: Skills, Inclusion, and Pedagogical Transformation

Dr. Ana Thudichum Vasconcelos

Professor
University of Lisbon
Portugal

Research Interest

Design for Sustainability, Design for Social Innovation, Design Thinking, Design for Non-Designers; Education and Crafts.

Abstract

This study explores the role of teaching Arts and Humanities and applying Design Thinking (DT) in building a teaching model that prioritizes a peaceful, fair, and sustainable future. Arts and Humanities contribute to the integral development of students, promoting ethical reflection, imagination, innovation, and cultural and social understanding, making participants more connected to others and to the real world.

DT, especially from the perspective of Design for Non-Designers (D4ND), offers structured methodologies that enable educators and students to apply design principles in diverse contexts, strengthening emotional processing skills.

The methodological approach analyzes the need for education to invest in the humanities. In this context, we advocate that DT can promote critical thinking skills that are fundamental to the moral development of citizens. In order to understand the potential of design, five international case studies of DT applied to the work of patients and action with students are illustrated. Conclude on the relevance of implementing DT in education, which translates into concrete impacts on the transformation of pedagogical practices, the reconfiguration of organizational cultures, and the development of innovative educational products.

Biography

President of the Center for Research and Studies in Fine Arts (CIEBA); The author and coordinator of the Master's Degree in Design for Sustainability, a partnership course within the University of Lisbon, between ISEG, the Faculty of Sciences, the Institute of Social Sciences (ICS), the Faculty of Architecture and the Faculty of Fine Arts; Coordinator of the Postgraduate Course in Service Design in Sustainable Business. Associate Professor at the Faculty of Fine Arts, University of Lisbon, in the Department of Equipment Design. She is currently a professor at the Faculty of Fine Arts of the University of Lisbon, in the Department of Equipment Design, and teaches in the bachelor's and master's programmes in Design and Design for Sustainability. At ULisboa, she teaches in the doctoral programme in Sustainability Sciences.

Researcher in the fields of Design for Sustainability, Design for Social Innovation, Service Design, Design thinking, Design for non-designers and Arts and Crafts.

Title: Activating Broca's and Wernicke's Areas to Facilitate the Transition from Pre-Intermediate to Intermediate English Proficiency

Dr. Mehmet Deniz Demircioğlu

Lecturer

Bursa Uludağ University

Turkey

Abstract

This study emerges from the belief that interdisciplinary approaches—particularly those combining language teaching, audiology, and neuroscience—can lead to highly productive insights into language learning. A recurring observation is that even highly motivated students often fail to make the expected progress in reading comprehension, including understanding, summarizing, and interpreting texts. This phenomenon cannot be solely attributed to deficiencies in general language proficiency; instead, it may stem from a combination of cognitive, neurological, or psycholinguistic factors.

The arcuate fasciculus, a key white matter tract connecting Wernicke's and Broca's areas, plays a critical role in integrating speech production and comprehension. While organic lesions or functional impairments in this pathway result in well-defined clinical syndromes, such as conduction aphasia, these conditions are rare among healthy individuals and are typically accompanied by additional neurodevelopmental symptoms.

Consequently, the difficulties faced by students are more likely to arise from subtle cognitive mechanisms rather than structural neurological deficits. Potential explanations include working memory limitations, which affect the ability to process and reorganize textual information; insufficient metacognitive strategies, such as summarizing or making inferences; interference from first-language processing strategies, particularly when navigating implicit or context-based meanings; and language-specific developmental difficulties, such as dyslexia. Additionally, weaknesses at the phonological-semantic interface may hinder vocabulary acquisition and the interpretation of meaning in context.

In conclusion, the observed challenges in reading comprehension are best understood as arising from a complex interplay of cognitive and metacognitive factors within language processing, rather than from any neurological impairment. This perspective highlights the need for pedagogical interventions that address both linguistic and cognitive dimensions of learning.

Key Words: Reading comprehension; working memory; metacognitive strategies; phonological-semantic interface; language-based dyslexia; arcuate fasciculus; psycholinguistics; cognitive processing.

Biography

Dr. Mehmet Deniz Demircioğlu began his academic career in 1985 as a lecturer at the School of Foreign Languages, Uludağ University in Bursa, Türkiye. Over the course of his 40-year professional life, he has guided countless students, playing a pivotal role in the development of their listening, speaking, reading, and writing skills.

A firm believer that language learning must begin with the cultivation of listening, Dr. Demircioğlu consistently emphasized this principle both in his classroom and in his academic publications. He has presented his research at numerous universities abroad, with a strong focus on improving receptive skills—particularly listening and reading—among learners of English as a foreign language. In order to enhance Turkish students' listening comprehension, he actively incorporated methodologies such as *Dictogloss* and the *Cornell Note-Taking System* into his teaching practice.

Upon retiring from his official post, Dr. Demircioğlu was invited to teach *Contextual Grammar* at Middle East Technical University (METU), followed by a period of lecturing on *Academic Writing* and *Exam-Oriented Question Design* at Harran University in Şanlıurfa.

Refusing to pause his academic pursuits, he turned his attention to an area of growing personal interest: speech disorders and their treatment. He completed a second master's degree at an international university in Dublin, focusing on this field, and has since embarked on a second PhD in the same domain. Throughout this journey, he has supported dozens of children facing speech difficulties and continues his dedicated work in this area today.



Driven by a deep curiosity, Dr. Demircioğlu has recently begun exploring whether English pronunciation and structural patterns can contribute positively to speech therapy. His research delves into the cognitive and neurological mechanisms involved in language learning—particularly the roles of the *Broca's area*, *Wernicke's area*, and *angular gyrus* in the human brain.

At present, he is investigating why a considerable number of highly motivated students in Uludağ University's English preparatory program are unable to progress from the pre-intermediate to the intermediate level. His findings on this issue will be presented at an upcoming international conference in Osaka, where he will deliver a comprehensive PowerPoint presentation.

Dr. Demircioğlu is married and has two daughters and a granddaughter. His wife and both daughters are, like himself, dedicated lecturers in the field of English language education.

 WCE 02:

Disruptive Edu-Tech Forum**Chair**

Dr. Jean-Eric Pelet, Professor, IAE-IEMN – Nantes University, France

Co-chair

Dr. Marcia J. Mackey, Professor, Central Michigan University, USA

Time: 08:30-11:50, November 12, 2025 (Wednesday)

Place: Katsura, Fifth Floor

Title: Emotionally Intelligent Educational AI and Future Learning Support: Building Equal Relationships with Artifacts

Dr. Kaoru Sumi

Professor

Future University Hakodate

Japan

Research Interest

Exploring affective interaction and adaptive educational technologies for fostering trust and engagement in learners.

Abstract

As AI and robotics are increasingly integrated into educational settings, there is growing demand for artifacts that function not merely as information providers, but as equal learning partners. To achieve this, real-time emotional understanding and adaptive responses are crucial. This talk explores how educational AI systems can recognize learners' emotional and cognitive states and dynamically adjust their support strategies, from the perspective of affective interaction. Specific examples will include deception detection in educational AI, emotion-based techniques for promoting behavioral change, and the design of immersive learning experiences in metaverse environments. These findings point toward new directions for building emotionally adaptive, trust-enhancing learning support systems.

Biography

Dr. Kaoru Sumi is a professor in Future University Hakodate, Japan. Prof. Sumi received her Ph.D. in engineering from the University of Tokyo. She is currently working on Persuasive technology, Affective Computing, Human Agent Interaction, Human Robot Interaction and Artificial Intelligence in Education. She previously worked at ATR MI&C Research Laboratories, Communications Research Laboratory, and Osaka University, National Institute of Information and Communications Technology and Hitotsubashi University. She was a visiting professor in British Columbia, Canada. ACM Senior Member, IEEE Senior Member, IEEE Sapporo Section Board of Directors, IEEE Women in Engineering Sapporo Section Chair. Additionally, she is the IEEE Japan Chapter WIE Coordinator, an Associate Editor for the journal *Behaviour & Information Technology* (Taylor & Francis), an Associate Editor for *Frontiers in Artificial Intelligence* (Section: Human Learning and Behavior Change), and the General Chair of Persuasive Technology 2026.

Title: Beyond the Pandemic Pivot: An Agile Framework for Pedagogy in Times of Crises

Dr. William T. Tarimo

Assistant Professor
Connecticut College
USA

Abstract

Contemporary education operates within an "age of polycrisis," where disruptions extend far beyond the COVID-19 pandemic to include geopolitical, environmental, and technological crises. This new reality necessitates the development of pedagogical models that are resilient, adaptive, and "crisis-agnostic." This presentation addresses this need by asking: What common pedagogical challenges emerge across different crises, and how can agile methodologies provide a framework for building adaptive educational models? We introduce Computer-Supported Agile Teaching (CSAT), a framework that uses technology and agile principles to improve learning processes. We detail the application of CSAT during the pandemic, which resulted in a hybrid, flexible, and semi-flipped pedagogical model. Informed by the challenges of this period, our research pivoted to explicitly address issues of equity, well-being, and inclusive pedagogy, shifting the focus from *if* technology could work to *for whom* and *under what conditions* it is most effective. The presentation concludes by synthesizing these findings with a broader literature review to propose a set of universal principles for building pedagogical resilience in an era of constant disruption.

Biography

Dr. William Tarimo is an Assistant Professor of Computer Science at Connecticut College. He earned his Master of Arts and Ph.D. in Computer Science from Brandeis University in Massachusetts.

His primary research focuses on a framework for technology-supported agile teaching and learning in higher education. This pedagogical approach uses technology to make curricular materials, methods, and goals transparent and regularly assessed. It then encourages iterative changes based on timely evidence from all parties—both students and the instructor. To facilitate this approach, Dr. Tarimo developed the Discovery Teaching (discoveryteaching.com) platform, a tool that makes classes more interactive, agile, and learner-centered.

Dr. Tarimo's other EdTech research explores how data from wearable devices—such as EEG headbands, smart rings, and smart watches—can provide feedback on the cognitive and emotional states of learners to optimize their readiness to learn. His research experience also extends to applied robotics, with a focus on computer vision, autonomous robotics, and artificial intelligence.

Beyond his academic work, Dr. Tarimo serves on the US Executive Board of the Sasamani Foundation, a non-profit organization based in Tanzania and the USA dedicated to women's and girls' empowerment, educational sponsorship, and the creation of employment opportunities.

Title: GenAI Benefits VS Hidden Ecological Costs: An Empirical Study of GenAI Adoption Among Students

Dr. Jean-Eric Pelet, Basma Taieb, Kayo Iizuka, Yihan Wang, Ana Semedo, Said Aboubaker Ettis, Alvaro Rocha, Fawzi Dekhil, Chatelain Amber, Chin-Ching Yin, Wang Jing, and Bourimech Zakaria*

Professor
KMCMS
France

Research Interest

Consumer Behavior in a Digital Environment ([See here](#))

Abstract

Generative AI (GenAI) tools like ChatGPT and DeepSeek are transforming higher education, yet their rapid adoption conceals significant environmental costs, including substantial energy and water usage per query. This study addresses a critical gap in Information Systems (IS) literature by investigating the intersection of GenAI adoption, environmental sustainability, and cultural influence. Drawing on Green IS theory and cultural frameworks, we conducted a cross-national survey of approximately 1218 students across eleven countries (China, Japan, Thailand, USA, Brazil, France, Portugal, Serbia, Taiwan, Brazil and Morocco) to assess awareness, perceptions, and behavioral intentions. Preliminary findings indicate a pervasive lack of student awareness regarding GenAI's ecological footprint, coupled with a notable gap between the desire for transparency and the willingness to alter usage habits. The research reveals significant cultural divergences in environmental concern and the acceptance of usage quotas. This study makes a foundational contribution by empirically linking cultural values to sustainable AI behaviors and proposes an Educational Impact Matrix (EIM-GenAI) to help Higher Education Institutions (HEIs) balance pedagogical benefits with ecological responsibility, fostering a more critically aware and sustainable adoption of GenAI.

Biography

Dr Jean-Eric Pelet is Professor in Information Systems and Marketing in different institutions in Paris, France. He holds an MBA in Information Systems, a PhD in Management Science, and a French Habilitation to Supervise Research (HDR) in Management. His current research interests include the metaverse, e-commerce platform interfaces, connected objects, and consumer behavior. His work has been published in a number of international peer-reviewed journals, including the European Journal of Information Systems, Systèmes d'Information et Management, Information & Management, Review of Managerial Science, Journal of Consumer Behaviour, International Journal of Wine Business Research, Journal of Wine Research, International Journal of Internet Marketing and Advertising, Journal of Retailing and Consumer Services, Journal of Product and Brand Management, International Journal of Technology and Human Interaction, International Journal of Contemporary Hospitality Management, Computers in Human Behavior Reports, International Journal of Strategic Innovative Marketing, International Journal of Virtual and Personal Learning Environments, International Journal of E-Business Research, International Journal of E-Services and Mobile Applications, and the International Journal of Retail & Distribution Management.

Title: Designing Ed Tech for Equity—Developing Creative and Agile Thinkers for Today and the Future

Dr. Dena Gilby

Professor

Walter J. Manninen Endowed Chair for Art History

Endicott College

USA

Research Interest

Educational Technology, Pedagogy, Equity and Inclusion

Abstract

Much discussion around educational technology (hereafter, Ed Tech) focuses on two areas: 1) the K-12 environment; and 2) the “digital divide.” Both of these areas are critical to addressing equity and Ed Tech, and this presentation will explore higher education’s role in designing and leveraging Ed Tech for enhancing student outcomes in creativity and agile thinking to foster success not only for their college careers, but also into their future. The presentation first outlines studies on Ed Tech and student learning, then treats the “digital divide” in education; after this, the author would like to dialog about what equity in Ed Tech can look like in the post-secondary environment, as well as what the implications are for helping students to engage responsibly, creatively, and with agility for their present and future selves.

Biography

Dr. Dena Gilby is the Walter J. Manninen Endowed Chair for Art History at Endicott College in Beverly, Massachusetts. She holds Ph.D. and Master’s degrees in Art History from the University of Wisconsin-Madison and an AB in English Literature and Classical Humanities from St. Louis University in St. Louis, Missouri. In the last few years, her research interests have included expressions of loss in ancient Greek vase painting, the use of classical myth within contemporary art, the representation of the artist in film, and the employment of art within the action genre, as well as use and analysis of immersive technologies and digital games within the art history classroom. She has presented on the topic of leveraging in the art history classroom at the conferences run by the CLUTE Institute, the iED (Immersive Education Initiative), and FATE (Foundations in Art: Theory and Education).

Title: Online Education: Designing Your First Online Course? Success Strategies for Beginners

Dr. David Okoth

Instructional Design and Technology Specialist
University of Northern Colorado
USA

Research Interest

intersection of instructional design, digital accessibility, and educational technology innovation

Abstract

In today's rapidly evolving educational landscape, crafting engaging and accessible online courses is essential, particularly for educators new to digital instruction. In my presentation, I will share practical strategies to guide beginners in designing effective online learning experiences. I will begin by emphasizing the importance of learner-centered design, advocating for a backward design approach inspired by the Understanding by Design (UbD) framework. This involves starting with clear, measurable learning outcomes, aligning assessments to these objectives, and then developing instructional activities that foster engagement and mastery. Highlighted key principles include; chunking content into manageable segments, integrating multimedia thoughtfully, and maintaining a consistent visual hierarchy to enhance readability and user experience. Accessibility is a cornerstone of inclusive education. I will highlight best practices such as using descriptive hyperlink texts, ensuring screen reader compatibility, and selecting color contrasts that cater to all learners. These strategies not only comply with global standards but also enrich the learning experience for diverse student populations. To illustrate these concepts, I will reference real-world applications and case studies from the Asia-Pacific region, showcasing successful implementations of online course designs that prioritize engagement and accessibility. These examples underscore the importance of cultural relevance and adaptability in course development. By the end of this session, participants will have a toolkit of actionable strategies to initiate and refine their online courses, ensuring they are both effective and inclusive. Embracing these foundational principles will empower educators to create meaningful and impactful online learning experiences.

Biography

Dr. David Okoth is an accomplished instructional designer and educational technologist specializing in digital equity, accessible learning design, and instructional media development. He holds a Ph.D. in Curriculum and Instruction with a concentration in Instructional Design and Technology from Virginia Tech, where his research focused on the design and development of metadata management systems for Open Educational Resources (OER). He also earned a Master's degree in Journalism with a concentration in Technology Management from Marshall University, where he developed expertise in multimedia production, digital storytelling, and technology integration in learning environments. Dr. Okoth's work spans academic, corporate, and nonprofit sectors, with extensive experience in creating accessible digital learning content, implementing instructional design frameworks, and advancing educational equity through technology. At the University of Northern Colorado, he served as an Instructional Designer and Course Developer, collaborating with faculty across disciplines to design, assess, and enhance online and hybrid courses. His projects included the development of SCORM-compliant OER modules, ADA/WCAG accessibility audits, and AI-integrated learning tools to foster student engagement and success. His scholarly contributions address critical areas such as metadata systems for digital learning, AI-enhanced learning experiences, and instructional design frameworks for diverse and multilingual learners. Dr. Okoth is committed to bridging the digital divide and advancing instructional equity, particularly in underserved and marginalized communities. His ongoing research explores the integration of adaptive learning technologies and AI-driven assessments to create inclusive, data-informed learning experiences for all students.

Title: Higher Education in the Age of Artificial Intelligence: Challenges, Opportunities, and Implications for Social Justice

Dr. Marcia Mackey

Professor

Central Michigan University

USA

Research Interest

Social justice in higher education, advocacy for the LGBTQ+ athlete, AI and social justice

Abstract

An exploration of generative AI tools within the higher education setting must include recognition of educational opportunities and concerns, while examining institution level policies. Employers expect graduates to be familiar with various AI tools and industry specific applications. As faculty and staff strive to keep up with industry trends, the larger institutions seek to develop policies surrounding AI. National organizations, state and local governments, and specific institutions of higher learning are developing policies for access and use of generative AI tools. Institutional level policies can enhance or restrict the use of generative AI tools by faculty, staff, and students. “Machines that offer immediate, concise and seemingly definitive answers to knowledge questions can be helpful to learners, teachers, and others” (UNESCO, 2023).

How might we engage students with AI to prepare them for work in their disciplines while, at the same time, providing them with the ability to critically question and contest the outputs of AI? “While the myriad real-world applications of AI in higher ed are still being discovered, institutions are generally using some form of the technology in three categories: optimizing faculty and staff time, improving teaching and learning, and automating administrative processes” (Varela, 2024).

Biography

Dr. Marcia Mackey is a professor of Sport Management and Aquatics at Central Michigan University, Mt. Pleasant, MI. She has over three decades of teaching experience in higher education, including undergraduate and graduate students. She currently teaches in the areas of sport law, organizational governance, policy, and event management; as well as lifeguarding and water safety instructors (WSI). Her research focus is advocacy for the LGBTQ+ athlete, with an emphasis on the transgender athlete. Further research in the areas of physical education (injury prevention) and the higher education learner are ongoing. Dr. Mackey has experience presenting at the state, national, and international levels. She is a member of the National Education Association (NEA) and the Michigan Education Association (MEA) Board of Directors, the National Council for higher Education (NCHE) Executive Committee Vice-President, the Michigan Association for Higher Education (MAHE) President, and holds numerous local, regional, and coordinating council positions. Her work in aquatics spans over 50 years, including teaching infants through seniors at all levels and in multiple countries, training swim instructors and lifeguards, and serving as an expert witness for aquatic legal cases.

Title: Scenario-Based Assessment in the Age of Generative AI: Making Space in the Education Market for Alternative Assessment Paradigms

Dr. John Sabatini,

Distinguished Research Professor

Department of Psychology, University of Memphis

USA

Research Interest

Learning Sciences and Assessment

Abstract

Traditional lecture and group discussion pedagogies, typically punctuated with students completing discrete-item problem sets or labs, are inefficient instructional practices that are rapidly becoming outmoded in an age of digital technologies and generative AI (GenAI). Yet these practices remain a predominant mode of delivery of instruction. Similarly, multiple-choice or short answer exams and on-demand writing assignments remain a primary method of post-secondary course assessment. These assessment practices are increasingly threatened by student use of GenAI and large language models (LLMs) such as ChatGPT in preparing or while taking exams. GenAI tools, however, are here to stay and will be part of future personal or workforce environments, so denying student access or use of them does not seem a viable long-term solution.

We argue that progressive, advanced pedagogies may never become normative practices in formal, institutional courses until we reform assessment practices to move beyond such traditional tests and exams. Scenario-based Assessment (SBA) is one of a family of performance assessments that situate assessment of knowledge and skills in social-contexts of their practical and professional application. In this presentation, I will report on progress in building GenAI-supported SBA authoring tools to support faculty in building and implementing SBAs in their courses.

Biography

Dr. John Sabatini is a distinguished research professor in the Department of Psychology and Institute for Intelligent Systems (IIS) at the University of Memphis. He is also a Visiting Professor at the University of Valencia, Spain. His research span reading literacy development, disabilities, assessment, cognitive psychology, and educational technology, with a primary focus on adults and adolescents. He has been the principal investigator (PI) of a large US Department of Education grant to develop pre-K -12 comprehension assessments as part of the Reading for Understanding (RfU) initiative and to adapt those assessments for use in adult learner programs. He has contributed to multiple R&D projects to develop educational technology systems for diverse populations including language learners, developing readers, and learners with special needs. He advises and provides technical consulting for national and international literacy surveys across the lifespan including the Program for the International Assessment of Adult Competencies (PIAAC), Progress in International Reading Literacy Study (PIRLS), Programme for International Student Assessment (PISA), and US National Assessment of Educational Progress (NAEP). His current projects include developing an Intelligent Tutoring System to teach reading comprehension strategies to adult learners and developing authoring tools powered by GenAI for post-secondary faculty to create scenario-based assessments.

Title: Educational Micro-credentials in Integration and Deployment of Telemedicine

Dr. Martin Žagar

Professor
RIT Croatia
Croatia

Research Interest

Telemedicine, Multimedia Applications, Digital Transformation

Abstract

Telemedicine has evolved into a critical element in modern healthcare systems, driven by the integration of information systems and digital technologies. However, the educational infrastructure supporting this evolution has lagged, especially in preparing healthcare professionals to navigate these systems. Developing educational resources to address identified gaps and promote effective telemedicine education and training is important and is addressed through developing micro-credentials on different telemedicine aspects. Fostering collaboration among educational institutions, healthcare providers, and industry leaders drives overall innovation in telemedicine, together with greater emphasis needed on training healthcare providers and patients to ensure the effective use of telemedicine. In this work, we outline the telemedicine landscape, characterized by legal and organizational advancements, the strategic application of ICT in healthcare, and the potential for telemedicine to enhance healthcare delivery and professional development. Continued investment in infrastructure, education, and training enables the integration of telemedicine into the healthcare system, thereby improving accessibility, efficiency, and the quality of healthcare services, and showing the need to promote innovative learning and teaching practices in digital health and telemedicine, through developing flexible micro-credentials aligned with established frameworks, addressing barriers to telemedicine adoption, enhancing cross-sectoral collaboration, and empowering students and professionals with digital health and telemedicine competencies.

Biography

Prof. Martin Žagar holds a Ph.D. in Computer Science, an EMBA, a Postgraduate Specialist in Eco-engineering, and a Scientific Advisor in Computer Sciences. Currently working at RIT Croatia and previously at the University of Zagreb, he has participated in teaching 25 courses in the field of computer science. He has received the "Roberto Giannini" award for excellence in teaching and working with students, as well as more than 15 awards for work with students and research achievements. He also received a research award from the Croatian Academy of Technical Sciences. His research interests include telemedicine, multimedia architecture and technologies, and high-performance computing. As a project leader, principal investigator, or researcher, he has participated in 15 domestic and international research projects (FP7, H2020, Interreg, Erasmus, RIT PLIG, etc.), as well as several industry projects. He has taken part in 18 international academic exchanges. As an author or co-author, he has published over 100 scientific and professional papers, delivered over 20 invited lectures, and served as the chair of technical or program committees for seven international scientific and professional conferences. He is a member of AASCIT, EAIE, HiPEAC, ISfTeH, and an associate member of HATZ.

Title: Rethinking Education in the Age of AI: Cultivating Cognitive Flexibility and AI Literacy in High School Education

Dr. Jing Song

Academic Principal
Springboard International Bilingual School
China

Research Interest

The Impact of AI on Teaching & Learning

Abstract

High school education needs to transition from traditional memorization methods of the industrial age to develop essential abilities for cognitive flexibility and AI literacy needed in modern AI-based data-intensive environments. The rapid transformation of knowledge creation and dissemination through Artificial Intelligence (AI) requires students to learn content fundamentals alongside skills for analyzing algorithmic outputs and detecting bias and synthesizing information from different subjects. This paper develops an integrated theoretical framework grounded in cognitive load management, constructivist learning, and critical thinking to cultivate cognitive flexibility and AI literacy, thereby indicating education transformation and pedagogical changes. The first part of this paper establishes the theoretical foundation which subsequent sections will analyze existing research before presenting mixed-methods study design and complete cross-disciplinary teaching modules with school-and system-level policy recommendations.

Biography

Dr. Jing Song, Academic Principal at Beijing Springboard International Bilingual School, is a distinguished educator with a background in educational leadership and linguistics. In her roles, Song Jing is dedicated to advancing education in the AI era, focusing her research on the transformative role of AI in teaching and learning. She has published papers such as "ChatGPT Enabling: From IBDP to College-ready," highlighting the potential of AI to enhance educational experiences and prepare students for future challenges. Under her leadership, students have been admitted to top-tier universities like Princeton, Cornell etc., driven by their unique passions and perseverance. Song Jing's commitment to individualized education and holistic development ensures that every student feels supported and valued, fostering an environment where each individual can thrive and reach their full potential.

 WCE 03:

Medical and Health Education Forum**Chair**

Dr. Lacroix Valérie, Professor, Saint-Luc University Hospital, Belgium

Time: 08:30-11:20, November 12, 2025 (Wednesday)

Place: Kamo, Fifth Floor

Title: The Importance of Patient Communication in the Education of Medical Students and the Use of the TOM Application

Dr. Grażyna Nowak-Starz*, Halina Król, and Roman Starz

Professor

Institute of Health Sciences, Collegium Medicum,

Jan Kochanowski University,

Poland

Abstract

Introduction: Currently in Poland, teaching standards in medical fields give special importance to interpersonal communication, which is intended to prepare students to work with patients, including transcultural ones.

Aim/objective: The aim of there Jan Kochanowski University, Kielce, Poland search was to design and create an application as a tool to facilitate the work and improve the level of knowledge in healthcare in the field of transcultural medical care.

Background: Multicultural nursing care should be based on both the knowledge about cultural and religious beliefs and values, as well as the understanding of the influence of these unique customs and ways of thinking on the matters of health, life, disease and dying.

Design: The timetable and carrying out of the pre-implementation works: choice of religions, choice list of subjects, selecting the content for individual thematic blocks, final stage in this part of the research was to translate the contents into English.

Methods: The method of scientific literature review was used in choosing the thematic content. The review included a choice of content in terms of cultural and religious determinants in medical care for selected groups of patients.

Results: The result of the carried out research was the development of the *TOM (Transcultural Medical Care)* application tool which contains the most important information in terms of the medical care of a transcultural patient.

Conclusions: The application is a valuable tool which can be used to obtain cultural competences by medical personnel during their education, and is also a tool which improves the professionalism amongst the medical workers.

Keywords: transcultural nursing, transcultural care, quality of medical care

Biography

Professor Grażyna Nowak-Starz, Dean of the Faculty of Health Sciences at the Jan Kochanowski University Medical College in Kielce, is a graduate of the Faculty of Nursing at the Medical University of Lublin, a specialist in public health. In 2024, she became a professor of medical sciences and health sciences. Her research interests focus on issues related to patient satisfaction with the medical services provided and their determinants. She took an active part in the transformation of nurse and midwife education in Poland and its adaptation to European standards. She has supervised 14 doctoral students. She has participated in international research projects, is a member of many domestic and foreign scientific societies and scientific boards of several journals. She is the author and co-author of books and original articles published in significant journals. She collaborates with many foreign centers, and also collaborated with Professor Koichi Nariyama, Vice President for the Department of Sport and Health Sciences at Osaka Sangyo University, Japan. In her professional career, she has held and holds many significant positions. It also works for the economic environment and cooperates with many medical facilities, including hospitals.

Title: Enhancing Junior Surgeons Proficiency with Evolving Surgical Technologies

Dr. Lacroix Valérie,

Professor

Cardiovascular and Thoracic Surgery

Saint-Luc University Hospital

Belgium

Research Interest

Thoracic Surgery

Abstract

Minimally invasive surgery has become increasingly prevalent across all surgical specialties, with the primary goal of enhancing patient recovery and overall quality of life. Robotic procedures, in particular, rely on highly specialized instruments, such as surgical staplers, to achieve precision and safety.

In thoracic surgery, however, not all tumors can be resected using endothoracic or minimally invasive approaches. The feasibility of resecting large or complex tumors often depends on the surgeon's expertise in open surgical techniques, which remain critical for ensuring complete tumor removal and optimizing patient survival outcomes. Mastery of these complex procedures typically requires many years of dedicated training and experience.

Nevertheless, as the number of minimally invasive and robotic operations continues to increase, junior surgeons are becoming progressively less exposed to traditional open approaches. Consequently, many are at risk of lacking the fundamental technical skills required to safely perform procedures that cannot be accomplished through minimally invasive or robotic means.

To address this challenge, surgical education and training programs must evolve to ensure adequate exposure to open surgical techniques. This may necessitate adjustments to current training curricula, including the potential extension of fellowship durations, to guarantee that future thoracic surgeons are fully competent in both minimally invasive and open surgery.

Biography

Prof. Valérie Lacroix is a cardiovascular and thoracic surgeon. She obtained her doctoral degree in 2014 with a thesis focused on blood flow modeling in peripheral arterial bypasses. She currently leads the thoracic surgery unit at the Cliniques Universitaires Saint-Luc in Brussels and is actively involved in research in both vascular and thoracic surgical fields. She has specialized in oncologic thoracic surgery and has been actively involved in the development and practice of robotic surgery since 2012. Prof. Lacroix is also a board member of the Belgian Society of Thoracic Surgery.

Title: Medical Simulation in Preparation for Medical Profession

Dr. Dorota Rębak

Associate Professor

Faculty of Health Sciences of Jan Kochanowski University in Kielce

Poland

Abstract

Medical simulation is a method and technique that allows the teaching and training of both individuals and entire therapeutic teams by recreating the conditions of a real clinical situation. It includes a wide range of educational activities based not only on the application of technological and computer objects, but above all on the essential human interactions in the sphere of communication and the experience of crisis situations. Medical simulation is always accompanied by the following stages: evaluation, verification, and discussion of the course of a specific clinical case. Depending on what evaluation criteria are established, the technical and non-technical skills of the therapeutic individuals or teams can be assessed. In medical teams working with the patient, both types of skills are extremely important and desirable. This modern teaching method allows to practice clinical skills based on acquired theoretical knowledge in a controlled, repeatable environment and is considered an effective and attractive method of acquiring skills related to specific diagnostic, therapeutic or therapeutic procedures. Medical simulation provides the opportunity to quickly acquire and consolidate professional competencies with no risk to the patient and at the same time the emotional comfort of the student. It thus creates an environment free of negative emotions, with virtually unlimited possibilities for repetition and improvement of skills, up to the expected level of competence used to carry out professional tasks independently. It therefore constitutes an optimal form of bridge between traditional exercises, carried out in university teaching halls, and contact with patients in a clinical environment.

Verification of learning should be done using repeatable examination methods, including Objective Structured Clinical Examination (OSCE). The lack of verification of learning using an objective standardised clinical examination raises concerns.

Biography

Dr. Dorota Rębak is an assistant professor in the Department of Public Health at the Faculty of Health Sciences Collegium Medicum of the Jan Kochanowski University in Kielce. She holds a PhD in Health Sciences. Longtime Deputy Director of the Institute of Health Sciences for Physiotherapy. Science and Deputy Director of the Institute. She has a degree in Public Health and Emergency Medicine. Currently the Dean for Education of the Faculty of Health Sciences Collegium Medicum of Jan Kochanowski University in Kielce. He holds a graduate degree in Management and Marketing in Finance and Banking, Public Health and a postgraduate degree in Organization and Management in Health Care. Her research interests are centered around the issues of health and professional burdens of contemporary societies. An important area of her research is the issues related to the professional fitness of representatives of medical services, taking into account the aspect of the quality of education of these professions. She is the author and co-author of publications in major scientific journals.

Title: Transforming the World of Medical Devices and Healthcare Solutions Using Industry 4.0 Technologies

Dr. Prashant Jindal

Professor

University Institute of Engineering and Technology,

Panjab University,

India

Research Interest

Industry 4.0

Abstract

Total Health Expenditure (THE) budget has been on the rise over the past few decades, which incurs anywhere between 3% to 15% of the total Gross domestic product (GDP) of a country. A significant component of the health budget is spent on health care human resource which includes physicians, nurses, technicians, medical practitioners and so on. However, there are various other components where costs can be reduced, especially for diagnostics.

The recent pandemic, has shown the world, situations where physical contact among patients and doctors became next to impossible. These situations have led to the discoveries and focus towards developing remote diagnostic devices that could save time, expenditure, travel, physical contact and at the same provide information at lightning fast speeds.

Based on the reliability of data collection from this portable device, it can either be sent to a remotely located expert or a physician for diagnosis and interpretation. Hence, the physicians' physical location becomes redundant. A further advancement into this process could be the development of a machine learning based algorithm using a relevant dataset that would provide the diagnosis automatically without intervention of an expert.

Therefore, device innovators or fabricators would opt for their preferred method of reporting and diagnosis.

Biography

I am working as a Professor in the Mechanical Engineering Department at Panjab University (PU), Chandigarh, India. I am a recipient of the prestigious Commonwealth Rutherford Post-Doctoral fellowship, awarded by the Commonwealth Scholarship Commission (CSC), UK 2018-19, through which I worked at Nottingham Trent University (NTU) in the medical design research group. Over the last 10 years, I have developed my competency in the areas of nano-composite materials fabrication and characterization, rapid prototyping, dental prosthetics, maxilla/craniofacial reconstruction techniques, medical device design and 3D designing. As Principal Investigator of a Public Funded research grant worth \$250,000/-, I established a Design Innovation Centre (DIC) under the theme- medical devices & restorative technologies with a multi-disciplinary team of faculty and students, which has over a period of time, led to various industry and hospital collaborations, within and outside India.

I have nearly 50 International publications to my name, including several high impact journals across various disciplines of composite materials, medical device design, bone reconstruction and dental prosthetics.

My forthcoming interests and aims are towards upgrading these technologies and prototypes for commercialization in partnership with industry towards attaining innovation goals related to industry 4.0.

Title: Health Behaviors of Adolescents Resulting from Preferred Lifestyles – A Report from Research Among Secondary School Youth in the Świętokrzyskie Region in Poland

Dr. Mariola Wojciechowska

Associate Professor

Jan Kochanowski University

Poland

Research Interest

pedagogy, clinical and health psychology, social work, research on continuity and change in value systems and lifestyles of representatives of different social and generational groups.

Abstract

We live in a time of transition from the post-industrial era to the fourth-generation digital revolution, in a so-called state of limbo [Giddens, 2007], of existential uncertainty and risk [Speck, 2005, Haidt, 2024]. The radical, deep and extensive cultural and social changes taking place at this time have their consequences in every area of our lives; they arouse tensions and many traumatic experiences. According to Lasch [2015], the contemporary post-modern world is dominated by consumerism, the cult of the „self” and the culture of achievement. Focusing on one's own needs, striving to fulfill one's own desires, which still remain unsatisfied. This also applies to young people. Many negative consequences for the health of children and adolescents, such as uniformity of lifestyles, isolation, loneliness, boredom, aggression, family neglect, etc., have been brought about by the COVID 19 pandemic, distance learning, lockdown and currently the war in Ukraine and inflation. The use of the lifestyle category in the aspect of pro-health behaviors is justified by the fact that this concept contains several layers of meaning which allows for the understanding of the axiological framework of choices made, values, personal patterns, knowledge, motives for behavior, awareness, and specific behaviors [Hejnicka-Bezwińska, 1991]. In many presentation, I will focus on specific examples of health behaviors of adolescents (e.g. physical activity, nutrition, Internet addiction) and discuss the determinants of these behaviors. The data were obtained from studies on lifestyles in their dimension of health behaviors with the participation of 3,200 secondary school students in the świętokrzyskie province. The research was carried out as part Science for Society II program, awarded by the Ministry of Science and Higher Education in Poland, entitled „Lifestyles of contemporary youth and their health implications”. I will also present the practical application of the obtained research results.

Biography

Ph.D. Mariola Wojciechowska is an associate professor of humanities at Jan Kochanowski University in Kielce. She is an educator, psychologist and EMDR therapist. Her areas of specialization include pedagogy, clinical and health psychology, and social work. In her research, she focuses on the axiological foundations of the functioning of representatives of various generational and social groups, and examines the dynamics of changes in the sphere of values. Over the past few years, her research has also included youth lifestyles in the context of pro-health and anti-health behaviors. She is the author of numerous scientific papers. She has presented her research results at many conferences in Europe, Asia and Australia. She has worked at Jan Kochanowski University in Kielce since graduation. She has held key management positions, including the position of Dean of the Faculty of Pedagogy and Psychology. She also supervised the education process in the following fields: pedagogy, psychology, special education, preschool and early school education, and social work. She currently serves as Vice-Rector for Education at Jan Kochanowski University. She is a member of significant bodies of pedagogues and psychologists in Poland, including the Section of Pedagogical Counselling of the Committee of Pedagogical Sciences of the Polish Academy of Sciences, the Ministry of Education, the EMDR Society. She actively cooperates with many institutions implementing new educational strategies. She is a member of the Coordination Team for the Implementation of the Integrated Skills Strategy in Poland. She cooperates with external partners to promote health-promoting behaviors in all its aspects.

Title: Effect of COVID-19 Pandemic on Health Behaviors of Students of Medical Specialties from the Aspect of Psychological Support Based on a Polish Example

Dr. Agnieszka Strzelecka

Associate Professor

Faculty of Health Sciences of Jan Kochanowski University in Kielce

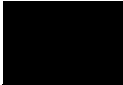
Poland

Abstract

The lack of access to open education, an uncertain academic future, concerns about the effect of COVID-19 on health and life, constituted a great barrier in eliminating anxiety and stress of young students (Prowse and al. 2021, Elmer and al.2020) Earlier studies confirmed that the evolving COVID-19 pandemic resulted in an increased threat of the occurrence of depression and suicidal thoughts in the group of students (Patsali and al. 2020, Zhu and al. 2021, Meshi and al. 2021). Health knowledge, which is especially important in the process of education of students of medical specialties, has a positive effect on the feeling of anxiety and enhancement of positive health behaviors. The aim of the study was an attempt to evaluate the effect of the COVID-19 pandemic on behaviors of students of medical specialties from the aspect of psychological support in Poland. The COVID-19 pandemic in Poland exerted a negative effect on the health behaviors of students of medical specialties, especially in the area of psychological health. The need for psychological support declared by the examined students of medical specialties was associated with the deterioration of health behaviors, especially with the respondents' negative mental attitude, and negative health practices. The degree of psychological support among the examined students of medical specialties differed according to gender, age, feeling of loneliness, and mental attitude. Students of medical specialties forming interpersonal teams of future patient care should particularly take care of their own psychological health, which translates into the quality of medical care.

Biography

Dr. Agnieszka Strzelecka is an assistant professor in the Department of Public Health at the Faculty of Health Sciences Collegium Medicum of the Jan Kochanowski University in Kielce, Poland. She holds a Ph.D. in health sciences. She completed her postgraduate studies in statistics at the Polish Academy of Sciences in Warsaw (Poland) and her postgraduate studies in biostatistics and clinical research at the Jagiellonian University in Krakow (Poland). Specializes in the use of e-Health tools to improve the quality of health care. Focuses his research around the health behavior of the population, in particular the need for psychological support as a result of the COVID-19 pandemic. Specialist in statistical analysis. Development of research methodology in e-Health– Observatory Network to Enhance ICT Structural Funds Absorption. Head of a research project on the use of e-Health tools in primary healthcare facilities in the Świętokrzyskie voivodeship (Poland). Member of the KEGA project team (KEGA 016KU-4/2023) Innovative Procedures, Recommendations and Strategies for the Prevention of Intravascular Catheter-Related Infections (Slovakia). Member of the international project Digital Lab for Education in Dietetics combining Experiential Learning and Community Service under the Erasmus+ Programme.. Member of the Board of the Polish Society for Telemedicine (until 2020), Member of the Polish Society of Public Health (continued). Faculty coordinator of the Erasmus+ Programme (2020-2024). Currently (from 2024) Deputy Director for Education - Institute of Health Sciences Faculty of Health Sciences, Collegium Medicum Jan Kochanowski University in Kielce, Poland.



WCE 04:

Higher Education Forum (II)

Chair

Prof. Dr. Jacqueline E. van Muijlwijk-Koezen, Chief Education Officer (Vice-Rector Education), Vrije University Amsterdam, the Netherlands

Co-chair

Dr. Sue Walker, Professor, Southern Cross University, Australia

Time: 13:30-17:10, November 12, 2025 (Wednesday)

Place: Yamato B, Fifth Floor

Title: Global Challenges, Local Lessons: Australian Pedagogical Innovation, the ADEPT Framework for Enabling Pedagogy, and Curriculum Development for Widening University Participation

Dr. Jennifer Stokes

Associate Professor

University of South Australia & Adelaide University
Australia

Research Interest

Pedagogy; Student Equity; Widening University Participation; Digital Literacy

Abstract

The higher education sector is facing significant global challenges, from the impact of artificial intelligence to growing misinformation, and increasing pressure to articulate meaningful contemporary outcomes. Calls for skilled graduates in emerging industries inform current Australian targets, wherein 80% of the working-age population will hold tertiary qualifications by 2050 (Department of Education, 2024). Widening participation is critical to meet this demand for knowledge workers, resulting in renewed focus on student equity at university. Accordingly, inclusive, future-focused learning underpins our curriculum development for the new Adelaide University. Research in Australian pathways programs informed development of the ADEPT framework for enabling pedagogy, which provides clear strategies to better support students from underrepresented backgrounds across all university levels (Stokes, 2023). Inclusive pedagogy alongside fit-for-purpose application of generative AI leads to significant success for students in digital literacy (Stokes, Pike & Folber, 2025). Course design which embeds scaffolded opportunities for relational learning acts to reduce academic integrity breaches. Combined, these approaches serve to value the diverse skills new students bring, as we collectively shape the academy and build positive futures together. Drawing upon 25 years' experience, this presentation will share hopeful insights from pedagogical innovation and curriculum development designed to address contextual challenges.

Biography

Associate Professor Jennifer Stokes is Associate Director of the Teaching Innovation Unit at the University of South Australia (UniSA). She leads colleagues in academic development and supports curriculum development for the new Adelaide University (opening 2026). She is an AdvanceHE Senior Fellow and an award-winning educator, who specialises in digital learning, educational innovation, and enabling pedagogy. Her national leadership was recognised via an Australian Award for University Teaching citation. She is passionate about the role universities can play in social inclusion and transformation. She developed the ADEPT framework for enabling pedagogy to assist educators and practitioners to support students from underrepresented backgrounds at university. Associate Professor Stokes is a member of the Higher Education and Research and Development Society of Australasia and presented a keynote at HERDSA '24 conference. She is on the *Widening Participation and Lifelong Learning journal* (The Open University, UK) Editorial Board, a member of the Centre for Change and Complexity in Learning, and Higher Education Research Network (UniSA). Her recent collaborative works examine authentic assessment and digital learning, learning analytics, and First Nations student pathways to university. She contributes to *The Conversation* on technology and society. Her publications are listed on Google Scholar or <https://people.unisa.edu.au/jennifer.stokes>

Title: Designing for Dialogue: How Digital Environments Shape Trust, Safety, and Quality in Peer Feedback in Higher Education

Prof. Dr. Jacqueline E. van Muijlwijk-Koezen

Professor and Group Leader Innovations in Human Health & Life Sciences (iH2LS)
Amsterdam Institute for Molecular and Life Sciences (AIMMS), Faculty of Science
Vrije Universiteit Amsterdam
The Netherlands

Abstract

Traditional higher education often relies on passive forms of instruction, where students absorb information but engage little beyond what is required to pass exams. This lecture challenges that model by exploring the potential and the complexities of *active learning*, particularly within STEM education. Grounded in constructivist theory, active learning positions students as active participants in knowledge construction, whether individually or collaboratively. While its benefits for deep learning, critical thinking, and student engagement are well established, its effectiveness depends on both cognitive and social factors, including motivation, trust, and psychological safety.

Drawing on mixed-methods studies, this lecture examines how active learning strategies—supported by technology and blended learning formats—can be effectively implemented in higher STEM education. Case studies and empirical research highlight the role of online pre-lab modules, peer feedback tools, and feedback dialogues in shaping not only learning outcomes but also students' intra- and interpersonal experiences. The findings reveal that while technology can provide structure and flexibility, the social dynamics of collaboration remain central to fostering meaningful learning.

By integrating theoretical insights with practical examples, the lecture provides a nuanced perspective on the promises and challenges of active learning. It underscores that effective implementation requires balancing cognitive demands with supportive interpersonal environments, both in physical classrooms and in digital learning spaces. Ultimately, it argues that active learning, when thoughtfully designed, can move students beyond rote memorization toward deeper understanding, collaboration, and critical inquiry—skills essential for the STEM professionals of tomorrow

Biography

Prof. Dr. Jacqueline van Muijlwijk is a full professor and group leader of Innovations in Human Health and Life Sciences at Vrije Universiteit (VU) Amsterdam. This Chair aims to apply the theory of science education within the context of STEM and especially the human health and life sciences. The research focuses on innovations and didactics in science education, with a special emphasis on Pharmaceutical sciences and drug discovery as embedded within the Amsterdam Institute of Molecular and Life Science (AIMMS). To identify optimal learning methods, iH2LS explores new teaching concepts and innovative learning approaches, concentrating on three main research areas: the Nature of Science, Teacher Development, and Educational Tools. In the context of Educational Tools, we emphasize active learning within the STEM fields and the incorporation of generative AI techniques in both learning and teaching. The practicality of teaching methods is taken into account while developing novel heuristics. Students' scientific curiosity is stimulated through the integration of educational and didactic research results into everyday teaching practice. The use of evidence driven teaching approaches also increases student involvement and learning gains. Since September 2023 Jacqueline has been appointed as Chief Education Officer at Vrije Universiteit Amsterdam.

Title: A New Academic Frontier: Responding to Paradigm Shifts in Global Higher Education

Dr. Anita Bledsoe-Gardner

Dean

College of Liberal Arts

Johnson C. Smith University

USA

Abstract

The broader societal shifts are clear reflections of the evolutionary changes seen in higher education. Higher education in recent years has transitioned from pedagogical teacher-centeredness to a learning centeredness perspective. Specifically, a greater emphasis is placed on student-learning outcomes and experiential engagement. Higher education has also witnessed instruction evolving from the traditional campus-based instruction to a massive growth and elevation in the use of learning management systems, asynchronous learning, and micro-credentialing opposed to traditional degree seeking efforts. Moreover, cost-cutting initiatives, particularly in the United States, have led to the development of varying faculty models. Specifically, the aforementioned faculty models have shifted from old paradigmatic practices of tenure-track positions that translate with job-security to contract-based teaching staff. The development of policy and practice in higher education has fundamentally transformed the sense of agency, reflecting the sector's adaptation to ongoing changes in the global educational landscape.

Biography

Dr. Anita Bledsoe-Gardner serves as Dean of the College of Liberal Arts and Professor of Criminology at Johnson C. Smith University (United States of America), where she also holds the prestigious title of Endowed Mott Professor. With an established record of scholarship and grantmanship, Dr. Bledsoe-Gardner is recognized for advancing academic excellence, fostering interdisciplinary research, and securing external funding to support innovative initiatives in higher education.

Title: Teaching about/to/for Diversity: Exploring a New Pedagogy of Teacher Education

Dr. Sue Walker

Professor
Southern Cross University
Australia

Research Interest

Early Childhood Education, Inclusive Education and the Transition to School

Abstract

Decades of research have consistently shown that the ways in which teachers, schools and educational systems respond to various forms of learner diversity has a direct impact upon educational pathways, experiences and outcomes. Teaching for diversity is an approach to teacher education in which preservice teachers are supported to engage with specialist literature and critical reflection for social justice as opposed to a focus on simply applying tips and tricks in the classroom. Teaching for diversity requires teacher educators to engage with specialist literature that focuses on critical consciousness underpinned by evaluativist ways of knowing. In this presentation, I argue that teaching for diversity is fundamentally reliant on epistemically reflexive teacher educators who seek to address sources of knowledge (critical specialist literature) and ways of knowing (critical reflection) that are evaluativistic in nature.

Biography

Dr. Sue Walker is a Professor of Early Childhood and Inclusive Education and the leader of the Early Years Research Lab at Southern Cross University. She has worked as an educator in Early Childhood Education and Care (ECEC) particularly in prior to school settings. Dr Walker has been conducting research in educational settings including ECEC, school and higher education for over 25 years. Her research foci include epistemic beliefs and teachers' practice; teaching to diversity in teacher education; early childhood social development; teacher-child relationships; child outcomes in relation to inclusive early childhood education programs; early intervention and the transition to school.

Title: Ethical Issues in Participatory Research and Co-design in Education

Dr. Jacqueline J. Schenk

Associate Professor
Erasmus University Rotterdam
The Netherlands

Research Interest

Ethics in Social Sciences Research and Clinical and Educational Interventions

Abstract

This presentation aims to explore the significance of participatory research and co-design methodologies within social science, highlighting their relevance to your own research practice or professional educational work. Key objectives include raising awareness of distinct ethical challenges encountered in such collaborative research approaches and facilitating expedited and valid ethical review and approval processes. The session will first cover a researcher's worldview and its impact on research questions and methods, different forms of collaboration and stakeholder involvement, and the advantages of participatory approaches, such as enhanced relevance, inclusivity, and improved research outcomes. Ethical considerations, such as including informed consent, monitoring participant wellbeing, the increased risk of power imbalances, and ultimate researcher responsibility, will be addressed alongside practical case studies, notably a participatory co-design project involving adolescents developing a mental health app. Challenges specific to participatory research and co-design, such as extended timelines, training needs, emotional burdens, and complex ethical review processes, will be discussed including solutions for these ethical issues. The presentation will conclude with practical recommendations for ethical reflection, clear participation levels, ongoing consent, and proactive engagement with ethical oversight bodies. To conclude, although participatory research and co-design increase inclusivity, and scientific validity and progress, heightened ethical awareness remains essential.

Biography

Dr. Jacqueline J. Schenk is a developmental psychologist, holding a PhD in Developmental Psychology and (Behaviour Analysis). In her position as an Associate Professor in Developmental Psychology and Orthopedagogical Sciences at ESSB at EUR, she designs and delivers courses and supervises research projects in Developmental as well as and in Clinical Child and Youth Psychology. In addition, Jacqueline is Chair of the Research Ethics Committee at ESSB and Vice Chair of NETHICS, the National Ethics Council for Social and Behavioural Sciences. Before working at EUR, she worked at the University of Kent, Canterbury (UK) in the field of learning disabilities, where she also did consultancy for the courts. Her academic and professional experiences have significantly informed the direction of her current research and administrative engagements relating to ethical practice in social scientific inquiry within clinical and educational contexts in the Netherlands, with a specific emphasis on participatory research and co-design. Her current research activities include:

- 1) Teacher reluctance to act in challenging or ambiguous situations with pupils, parents, and colleagues.
- 2) The use of hybrid consent with research with minors.
- 3) Fundamental research on the concept of deductive reasoning and creativity in preschoolers.
- 4) Removing barriers to inclusive education.

Title: Supporting Teachers to Personalise Education for Autistic Children in an Inclusive Setting

Dr. Stefanija Alisauskiene* and Dr. Julija Grigenaite

Professor

Vytautas Magnus University

Lithuania

Research Interest

Special Needs and Inclusive Education

Abstract

In implementing inclusive education, schools are becoming increasingly open to student diversity, and the number of autistic students is rapidly rising. Educating and supporting these students requires appropriate teacher preparation, which largely depends on knowledge of autism, teachers' psychological readiness to communicate with and understand autistic children, as well as their mindset—whether fixed or growth-oriented (Avramidis et al., 2019; Yeager & Dweck, 2020). For most teachers, working with autistic students is a new and challenging experience (Gómez-Marí et al., 2022). The relationship between inclusive education and personalized learning is one of the most important aspects of recognizing and supporting diversity in the classroom (Mincu, 2013). This presentation focuses on how teachers develop approaches to personalizing the education of autistic children and reports findings from a broader research project. We will share the process and specific steps of the action research carried out in school, where opportunities were created to enhance professional competences in real team situations. The research revealed teachers' openness to new knowledge, its practical application, and the identification of professional needs, critical reflection, and ongoing professional growth. Teachers strive to better recognize and understand autistic students, whose education has posed—and continues to pose—significant challenges. This presentation will highlight how relevant support opportunities can foster good practices, as well as the challenges that have emerged along the way.

Biography

Dr. Stefanija Alisauskiene is a professor at the Education Academy of Vytautas Magnus University, Lithuania. She received her doctorate in Early Childhood Intervention in 2002, completed a post-doctorate at Oxford University, UK in 2003, and was awarded full professorship in 2008. Her expertise lies in educational support specialist education and teacher education for inclusion. Her research interests include special needs and inclusive education, early childhood intervention, and personalised learning. From 2013 to 2016, she served as a visiting professor at Canterbury Christ Church University, UK. She has extensive experience in special needs and inclusive education, gained through national and international research projects, and has led and implemented projects on inclusive education in Uzbekistan, Kyrgyzstan, Armenia, and Ukraine. Since 2020, she has been a member of the Editorial Board of [European Journal of Special Needs Education | Taylor & Francis Online](#).

Dr. Julija Grigenaite received her doctorate in Inclusive Education in 2025, and is currently working as an assistant professor at the Education Academy of Vytautas Magnus University, Lithuania. Her expertise lies in educational support specialist and teacher education for the inclusion of autistic children as well as personalized education. Before joining the University, she worked as a speech and language therapist at the Child Developmental Centre, Vilnius University Clinics.

Title: The Trends of Training Model for Cultivating Talents in Art and Design in AI Era

Prof. Qing Wu* and Hui xia Guo

Professor

Wuhan University of Science and Technology

China

Research Interest

Digitize product design; Design Education

Abstract

In the AI era, AI technology is gradually integrated into the field of art and design, presenting significant opportunities and challenges to the current talent cultivation model for art and design. The existing model urgently needs improvement and refinement to meet the demands of the AI era. This paper introduces the measures taken by the School of Art and Design of Wuhan University of Science and Technology in talent cultivation. It explores the development trends of the talent cultivation model for art and design from aspects such as training objectives, educational methods, and talent evaluation standards.

Biography

Professor Qing Wu, with a postgraduate degree and a master's degree, mainly engaged in product development and design research.

Work Experience:

From 1986 to 1999, worked at the Technology Center of Dongfeng Motor Corporation, engaged in the research and development of engine components.

From 1999 to present, has been teaching at Wuhan University of Science and Technology.

From January 2014 to January 2015, was a visiting scholar at Kingston University in the UK.

Qing Wu has published over 40 papers in academic journals and obtained more than 10 patents. Has edited 3 textbooks.

Title: How to Make School Development Projects Sustainable. Insights from 15 Different Attempts to Improve Practices with and Without Results

Dr. Ulla Damber

Associate Professor
Mid Sweden University
Sweden

Abstract

Development work, primarily in preschools, will be described and analyzed. In all the projects that provided data to this presentation children's language and literacy development was targeted. The settings where the projects were conducted vary from country side to urban, multilingual and multicultural settings. Fieldnotes from coaching sessions, observations in targeted schools and preschools, written narratives from the principals and interviews with staff provides empirical material. Thematic analysis has been used to analyze participants' views of projects' different stages and outcomes. The development work at some preschools is still on-going years after the closure of the studied project, but a major part of the studied development projects did not lead to participants' perceptions of any outcomes. Success factors as well as factors obstructing development will be elaborated on during the presentation, after a short presentation of our view of projects as form for school development, as many projects leave very few long-lasting effects after the closure of a project. The concept "project" is paid attention as participants associate the concept with extra resources, extra time and tasks that mean doing something other than they usually do. When the project is over, only a new project can replace the those resources and the focus of development shifts. Among the themes that contribute to sustainability are how trustful cooperation with parents may be established and how children's literature in the children's mother tongues may be read at home. Another theme encompasses ways of enabling all children's participation, also children with special educational needs. An important theme concerns how leadership, organization and joint responsibility is built up and distributed, as involvement of all personnel, also personnel without a formal teacher education, is interpreted as a success factor for the sustainability of development work.

Biography

Dr. Ulla Damber, has more than 20 years of teacher experience in upper secondary school, including development projects and evaluations of practice. As a researcher, teachers and their practices have been in focus, within the areas of literacy, language development and teaching in multicultural school settings, studies published in a large amount of scientific articles, book chapters, books and debate regarding multilingual matters. Damber has been engaged as a writer on behalf of the Swedish National Board of Education. Recent research also includes issues related to school development projects. Damber has a long experience of different research projects, including qualitative methods, quantitative methods and mixed methods, narrative analysis and production of screening materials, mainly associated with literacy and emergent literacy. In later years Damber also has been engaged in action research projects, ranging from preschool settings, to schools, after-school programs, and municipal adult education. Teacher shortage has also been in focus in Damber's research. Damber has experience as editor, board member and leadership in research groups. Due to the extended experience of coach and researcher in projects in different practices Damber's interest in factors with impact on development processes in schools and preschools has grown and resulted in meta-analyses. In particular participants' perceptions of project work has been a research focus.

Title: Translation, Foreign Language Acquisition and Transculturality: The Japanese Experience of Italophone Writer Dacia Maraini

Dr. Dagmar Reichardt

Professor

Latvian Academy of Culture

Latvia / Europe

Research Interest

Transcultural Studies

Abstract

Every foreign language course begins with translation practices, whether consciously or unconsciously applied. From the very beginning of learning (A1), *full immersion* has been the prevailing maxim to date, but every learner inevitably resorts to translation techniques, even during longer stays abroad. This presentation focuses on the nature of educational techniques in Foreign Language Acquisition (FLA) combined with an “open” concept of translation (Eco 1962), while enhancing the correlations between translation-related text work and *transculturality* (Welsch 1992) as a didactical tool. In Italian Studies, the latest surveys on the global translation profile of Dacia Maraini’s (b. 1936) complete works offer representative points of reference (Pratt 1992, Casanova 2008, Haensler and al. 2022). The case study of Italy’s most renowned living female writer is particularly productive as Maraini was born in Italy but raised in Japan until the age of nine, learning first Kyoto dialect and English, and only later Italian language. In addition to the Maraini case, the memorable transcultural self-translation experiences of Italo-Indo-American writer Jhumpa Lahiri (b. 1967) illustrate specific translational problems transferrable to FLA. Methodologically, the presented comparative analyses will closely link the connection between translation and transculturality with global transmigration and social transformation processes (Nergaard 2021).

Biography

Professor Dagmar Reichardt holds an endowed chair for Transcultural Studies at the Latvian Academy of Culture, Riga and is author of over 400 publications in English, Italian, and German (including over 70 books edited with German publishers alone). Specializing in Contemporary Italian Studies, Sociocultural Studies as well as Comparative Literary and Cultural Studies, she is a proactive member of 15 international cultural and academic associations worldwide serving on 4 Scientific Boards based in Brussels, Bern, Vienna and Hamburg as Executive Board Member (AIPI, SGAVL/ASLGC, Austrian Canadian Society, and German Latvian Science Association). Until today, she has initiated, directed and co-organized over 30 international conferences and congress panels. Awards: Medal of Cicero (2005), International Award for Italian Studies Flaiano (2007), Prix Erica European Media, Culture and Science Award (2022), Antonello da Messina Award (2025). Various Visiting Professorships. Since 2009 she serves as director of the Science Section for the German-language digital cultural magazine *KulturPort.De*. Member of the German PEN (Exil PEN) since 2022, she has translated texts by Cesare Cases, Giuseppe Bonaviri, Pier Paolo Pasolini, Dacia Maraini, Igiaba Scego and Elvira Mujčić. Her edited volume about *The Many Translations of the Work of Dacia Maraini* is currently in print (Peter Lang).

Title: Modernizing STEM Education: Connecting STEM Challenges to Future Workforce Pathways

Dr. Julie Cwikla

CEO - STEM in Action

Distinguished Professor

University of Southern Mississippi

USA

Research Interest

STEAM Education Forum

Abstract

In the United States a new program, **STEM Futures** is being scaled across the country, from San Francisco to Savannah to engage high school students in activities that open pathways to STEM learning and careers. This program began in 2015 in Alabama and by 2025 has been replicated in 12 locations. Over the last four years, we have served over 3,00 students from 175 high schools via residential summer academies housed on university campuses providing lab and on-site STEM experiences in collaboration with our 83 industry partners nationwide.

STEM Futures a 6-day residential academy, seeks to increase students' awareness of their local high-paying, in-demand STEM career opportunities and understanding what it takes to secure these jobs. Local leadership selects from three curricula – Aviation, Maritime and Advanced Manufacturing providing STEM classroom challenges that are explicitly connected to regional industries. The engineering design challenges use robotics materials from VEX or Lego and students design, build, and test remote-controlled, multipurpose robots that complete several missions, each with increasing complexity.

In addition to the STEM content knowledge, students develop skills in teamwork, problem solving, communication, and leadership needed to be successful contributors and collaborators. Each year locations have the option to rotate among the three curricula and STEM design challenges.

Pre and post assessments (N=3,125), results indicate statistically significant gains in STEM content knowledge overall, with gains individually in mathematics, science, engineering and technology. In addition, students' awareness and interest in STEM career pathways in 2025 increased from 29% to 96% proficiency and their STEM confidence shows gains across all locations. Students also gained skills in teamwork, leadership, communication, and other 21st century workforce skills and experienced growth in social skills, courage, and personal responsibility. The STEM Futures scale up program is funded by the U.S. Department of Defense STEM initiative (Award Number HQ0034210009)



Biography

Dr. Cwikla, is the CEO of STEM in Action and a T.W. Bennett Distinguished Professor at the University of Southern Mississippi. She has led over \$30 million in STEM education research and programming, creating immersive opportunities for K-20 students, educators, and families across the nation. Her work spans research on JROTC cadet learning and STEM career pathways, professional development for mathematics faculty, out-of-school STEM initiatives, classroom technology integration, interdisciplinary STEM/STEAM curricula, and NASA-funded studies on algae cultivation for Mars. She is the author of over 50 publications, two books, book chapters, journal articles, and monographs and presented her research at conferences around the globe. She is also author of Good to Great Grant Writing: Secrets to Success.

 WCE 05:

STEAM Education Forum**Chair**

Dr. Richard Cangro, Professor and Director of Music Education, Western Illinois University, USA

Time: 08:30-11:45, November 13, 2025 (Thursday)

Place: Yamato B, Fifth Floor

Title: Revolutionizing Education: The Power of Drama-Based Pedagogy in Engaging 21st-Century Learners

Dr. William Yip

Board Member, Beijing Jheng Charitable Foundation

Director, Ximalaya Drama/Theatre & Education Innovation Institute

China

Research Interest

Drama-Based Pedagogy, Social-Emotional Learning (SEL), Educational Equity, Teacher Development

Abstract

As student disengagement continues to rise, traditional education—often centered on rote memorization and passive instruction—fails to foster curiosity, creativity, and deep learning. The absence of intrinsic motivation in classrooms prevents students from developing essential 21st-century skills, such as critical thinking, collaboration, adaptability, and resilience. Drama-based pedagogy, rooted in active learning and emotional engagement, offers a transformative educational approach that fosters not only academic success but also psychological well-being.

This presentation integrates insights from positive psychology theories, including Self-Determination Theory (Deci & Ryan, 1985) and Barbara Fredrickson's Broaden-and-Build Theory (1998, 2001), to illustrate how drama-in-education enhances motivation, engagement, and well-being. Self-Determination Theory underscores the importance of autonomy, competence, and relatedness in fostering intrinsic motivation—elements inherently embedded in drama-based learning. Fredrickson's Broaden-and-Build Theory explains how positive emotions broaden cognitive flexibility and build psychological resilience, both of which are activated in dynamic, play-based learning environments.

Drawing from my extensive work in urban and rural schools, I will present case studies from China's rural villages, demonstrating how drama-infused teaching strategies empower both teachers and students, close learning gaps, and support social-emotional development. By fostering creativity, agency, and an emotional connection to learning, drama-based methodologies help cultivate lifelong learners who are more engaged, confident, and resilient. Participants will gain insights into scalable methodologies for integrating drama and positive psychology principles into academic curricula, equipping educators and policymakers with evidence-based strategies to make learning more dynamic, inclusive, and impactful.

Biography

Dr. William Yip is a theatre director, drama educator, instructional leader, and teaching artist with over 25 years of experience. As the Director of the Ximalaya Drama/Theatre Education Innovation Institute, he leads initiatives that merge theatre, education, and well-being. He is also a Board Member and Deputy Secretary-General of the Beijing Jheng Charitable Foundation, a Research Fellow at Suzhou University, and an Academic Advisor at Trinity College London.

Recognized as a Forbes China Cultural Icon (2024) and China Charity Gala Person of the Year (2023), William has been at the forefront of advancing arts education and social impact. He is the Co-founder and Project Director of the Rural Schools Drama Education Community Initiative, a pioneering project dedicated to bringing drama-based learning to underserved schools across China.

His work integrates drama, education, and positive psychology, focusing on how drama-based learning fosters engagement, well-being, and social-emotional skills. William works extensively with educators to implement innovative teaching methodologies that promote intrinsic motivation, student engagement, and holistic learning. A dedicated member of the International Teaching Artist Collaborative (ITAC), he actively champions arts education, cross-cultural collaboration, and global advocacy.

Title: Communicating in, About, and Through Music: Language Arts and Music Education

Dr. Richard Cangro

Professor and Director
Western Illinois University
USA

Abstract

Good musicians can artistically express themselves not only through notes, but also through language. They can describe, express, reflect, and communicate performer and composer musical thoughts and intentions in multiple ways. Providing opportunities for speaking, listening, reading, and writing enables students to develop the necessary skills to be thoughtful musicians who can express and perform with purpose and meaningful expression. However, authentically including strategies to develop these language arts skills in a music class or rehearsal can many times be difficult for teachers and directors who have limited teaching time. This session will provide practical strategies for providing powerful language arts experiences for students. Learning activities will be demonstrated to help attendees enhance their classroom instruction and ensemble rehearsal as they develop students' ability to express music understanding through language and musical expression.

Biography

Richard Cangro, Ph.D., is a Professor and Director of Music Education at the Western Illinois University School of Music. A two-time US Fulbright grant recipient, Dr. Cangro is active as a presenter, curriculum consultant, adjudicator, and conductor. He has presented at numerous music educator events throughout the US and in over 15 countries. His articles on music learning and teaching have been published in journals including *UPDATE: Applications of Research in Music Education*, *Selected Papers from the 6th International Symposium on Assessment in Music Education*, *American Music Teacher*, and *Music Educators Journal*. Musically, Dr. Cangro has a wide range of performance experience as a trumpet player and conductor. He is currently the music director/conductor of the Monmouth Civic Orchestra at Monmouth College and the Quincy Area Youth Orchestra. At WIU, Dr. Cangro teaches graduate and undergraduate courses in music education and supervises student teachers. Dr. Cangro is the WIU 2024 Distinguished University Professor and the interim Director of Orchestras.

Title: Walk Between the Trees and Talk the Change: Trainers Insights on Climate Change Education in Forest Schools

Dr. Ofira Ayalon*, Moriya Netzer and Dafna Gan

Professor

School of Environmental Sciences, University of Haifa

Israel

Research Interest

Environmental policy, Environmental Education

Abstract

Forest schools (FS) offer a valuable platform for effective climate change education (CCE) through their direct engagement with climate change (CC) and their educational approach. Furthermore, FS can serve as nature-based solutions that support adaptation to CC.

However, CC topics are rarely incorporated into FS curricula. FS training programs play a crucial role in shaping educators' mindsets and guiding pedagogical methods, making the perspectives of FS trainers essential in addressing this gap.

This study examines how trainers from 14 countries integrate CC topics into FS training programs, considering cultural attitudes, local climate conditions, and educational policies. Through document analysis of training curricula and semi-structured interviews with 36 trainers, findings reveal that 55% of trainers are reluctant to include CC topics due to social, psychological, educational, and practical concerns. Meanwhile, 44% of proponents advocate for CC integration, emphasizing intergenerational responsibility and the unique learning opportunities FS provides.

Despite differing perspectives, both groups stress the importance of fostering sustainable behaviour and strengthening children's connection to nature. Based on trainers' experiences, this study proposes strategies for integrating CC education in FS, leveraging the benefits of outdoor learning and FS's distinctive pedagogy.

Biography

Full Professor - Dept. of Natural Resources and Environmental Management, University of Haifa,

Senior Researcher, Head of Environment Cluster Samuel Neaman Institute, Technion, Haifa.

Her research topics involve a wide range of activities related to environmental research and policy implications. The studies have served as a model for nationally recognized, updated energy and environmental activities for a variety of academic and public bodies that promote environmental policy in Israel. The resulting reports are submitted and jointly followed in cooperation with the Ministries of Finance, National Infrastructure and Environmental Protection, as well as other relevant government bodies. The research subjects include waste management and reduction of food loss, energy policy and management, agriculture and the environment, Business opportunities in environmental technologies (clean-tech), Reducing transportation-related air pollution and recent research topics include Mitigation of greenhouse gases as well as Adaptation to climate change. New studies are related to the role of nature in building personal resilience by increasing physical and emotional well-being. Prof. Ofira Ayalon has been awarded the 2018 Michael Landau Prize for Sciences and Research in the field of Sustainability.

Title: Project-Based Learning in a Brewing-Oriented Curriculum: A 3-Year Pedagogical Journey

Dr. Vannina LORENZI and Dr. Christine CHANCOGNE

Associate Professor and Faculty Lecturer
University of Corsica Institute of Technology
France

Abstract

This presentation introduces a project-based learning (PBL) approach implemented over the three years of a French BUT program, centered on beer production as a multidisciplinary and evolving project.

In the first year, students focus on the "produce" competency by designing a beer recipe based on a theme provided by the instructor. They select ingredients and develop a brewing process, gaining foundational knowledge in food science and formulation.

In the second year, they brew an initial version of their beer while applying hygiene and safety standards ("Produce" and "Quality management" competencies). A naive tasting panel provides feedback, which they use to improve the recipe during a second brewing session.

In the final year, students brew a final, optimized version of their beer ("Produce" and "Quality management"). They also conduct physico-chemical and microbiological analyses to assess product quality and safety, highlighting the "Analyze" and "Experiment" competencies. In parallel, they design a compliant label, visual identity, and packaging, and carry out a marketing study to define their target market and product positioning. The project culminates in a competition, where students present their final product to a jury of industry professionals who evaluate the beer on taste, innovation, branding, and market relevance.

Additionally, in years two and three, students are challenged to "Innovate" by creating a food product from spent grains (a brewing by-product), under constraints set by the instructor.

This long-term project fosters autonomy, creativity, teamwork, and critical thinking. It allows students to test, analyze, and refine their work while simulating real professional challenges. By combining technical, analytical, and entrepreneurial dimensions, this PBL approach offers an immersive and meaningful learning experience rooted in the agri-food sector.

Biography

Dr. Vannina LORENZI holds a Ph.D. in Biochemistry and is an associate professor specializing in microbiology, biochemistry, and food technology. Her research focuses on the use of natural products to combat multidrug-resistant bacteria, exploring alternatives to conventional antibiotics through the valorization of bioactive compounds. Passionate about bridging the gap between scientific innovation and practical application, she integrates her research findings into her teaching to inspire students and raise awareness of emerging challenges in public health and food safety. She is deeply involved in pedagogical innovation, particularly through project-based learning approaches that encourage autonomy, interdisciplinary thinking, and collaboration among students.

Alongside her is Christine CHANCOGNE, a faculty lecturer in biochemistry with expertise in microbiology, food quality, and food technology. With a strong background in applied science education, she is committed to delivering hands-on, skills-based training that prepares students for careers in the agri-food industry. Her teaching focuses on ensuring students master essential concepts in microbiological risk management, biochemical analysis, and quality control. She actively contributes to the design and implementation of immersive, long-term projects, such as the brewing project presented here, where students learn by doing, experimenting, and reflecting across three academic years.

Together, these two educators bring complementary perspectives and strengths to their teaching. Their collaboration combines scientific research and technical expertise to create engaging and meaningful learning experiences. They are committed to fostering student innovation, critical thinking, and problem-solving skills through real-world challenges rooted in food science and biotechnology. Their joint work exemplifies how interdisciplinary teaching teams can drive student success and educational transformation in technical higher education.

Title: From STEM to STEAM: The Importance of Arts in Technical Education

Dr. Peer Mohideen Sathikh

Associate Professor
School of Art, Design and Media
Nanyang Technological University
Singapore

Abstract

One of the most important periods in the history of Europe was the Renaissance which is from mid-15th century CE till mid-17th century CE. Renaissance fused art, architecture and science seamlessly and was fuelled by the humanism movement and supported by patrons. This period saw the emergence of geniuses such as Leonardo da Vinci, Michelangelo, Copernicus, Galileo, Descartes, Erasmus and Shakespeare. Many consider the art and architecture that flourished during Renaissance to have inspired not only the scientist and thinkers but launched the Age of Discovery with explorers such as Marco Polo, Magellan, Columbus and Vasco da Gama.

The world today is at a time where so much of the progress of science and technology is prevalent and easily available to a large cross section of the world. Yet, we are faced with concerns of a world seeing the result of depletion of nature and resources on climate. Engineering, which has the capacity to realise real-world applications of scientific principles and ensuing technologies has fractalised itself into many sub-specialisations. With the need to refocus on the 8.2 billion inhabitants of the Earth, the time is ripe for a réapparition of the ethos of Renaissance – the seamless fusion of art, science, technology guided by principles of humanity which begins to happen by including the ‘A’ in Arts in STEM to STEAM i.e., Science, Technology, Engineering, Arts and Mathematics.

A réapparition is important, this author feels, especially with present appearance of artificial intelligence in the education equation.

Biography

Dr. Peer Mohideen Sathikh is an Associate Professor and Coordinator Industry, Innovation and Entrepreneurship for at the School of Art, Design and Media (ADM) of Nanyang Technological University (NTU). Peer Sathikh is a Visiting Professor at VIT University, Vellore and at Anant National University, Ahmedabad. Former Visiting Professor at IDC School of Design at IIT Bombay, Peer Sathikh visits IIT Bombay very often. He is also an REP Fellow teaching in the prestigious Renaissance Engineering Programme of NTU.

Peer Sathikh has a PhD from the Nanyang Technological University, Master of Design (MDesRCA) in Industrial Design from the Royal College of Art, London and a Master of Design in Product Design from IIT Bombay, together with a Bachelor of Engineering (Hons) from the College of Engineering, Chennai, India. Fellow of the Royall society for Arts (FRSA), Peer Sathikh was awarded a Public Service Medal (PPA) during the National Day Celebrations in August 2022.

Besides teaching, Peer Sathikh’s present research interests are in immersive experience and designing for mobility and transportation. Creativity, innovation, and Culture and Design are topics of keynotes and lectures that Peer Sathikh is delivering around the world today.

Peer Sathikh will talk about two things:

- a) Creation of new culture in the Malaysian Peninsula
- b) Evolution of Design, Designers and Design Industry in a tiny island called Singapore

Title: Making Sustainable Development Practices Real for Students: An Interdisciplinary Project-based Approach

Dr. Santa Gregorj-Santini

Lecturer

University of Corsica Institute of Technology

France

Abstract

As sustainable development and corporate responsibility are becoming key subjects in the curriculums of our French University Institutes of Technology, it appears that students find it difficult to shift from theory to practice.

Business students in particular tend to consider those subjects as “just classes”. If they acknowledge the necessity for action, they do not feel concerned about the high stakes implied by sustainable development either in their lifestyles or in the business world they are preparing to enter.

This presentation focuses on the project-based approach that was developed first as part of the English class and then through an interdisciplinary challenge in order to enforce change.

I get the chance to teach English to a variety of non-specialist profiles such as business, management, commerce and ecology students. This pivotal position, allowing me to get in touch easily with teams of colleagues who otherwise do not get the opportunity to meet and exchange ideas on a regular basis, happens to be paramount in the process of bringing a synergy of competences and skills together to make that shift to sustainable development happen.

Consequently, a multidisciplinary project-based learning proposition also aims at helping students being more committed and focused. The project is implemented with second and third years of the business and management students in partnership with the ecology ones.

The following issues are to be tackled:

- a) The demotivation of students who do not project themselves in a more sustainable future;
- b) A professional approach that forgets the necessity of calling for and having different set of skills to collaborate;
- c) Raise awareness on the entrepreneurship opportunities created by sustainable development and the new emphasis on corporate responsibility.

Biography

University of Corsica Institute of Technology

Santa Gregorj-Santini is a lecturer of English as a Foreign language with an expertise in political science, law and business. She was trained at the Institut d'Études Politiques de Paris and at the Université Sorbonne Nouvelle Paris III.

She has been a language coordinator at the Université de Corse Faculty of law and responsible for the CEFR certifications of English. She also created CEFR certifications test papers used at European level.

She now focuses on English applied to business and sustainable development at the Université de Corse Institute of Technology with an emphasis on project-based learning and multidisciplinary collaboration as well as active, differentiated pedagogy and individualized student coaching.

She joined forces with DR Lorenzi and Chancogne to develop that approach within the agri-food and ecology departments as well as with future entrepreneurs and managers.

Santa Gregorj-Santini is also actively engaged in the Institute of Technology English Teachers National Association (APLIUT) which promotes innovative methods of learning.

Title: Women's Projects for Art and Design Education at University: Visual Artists and Graphic Designers – Two Case Studies

Dr. Jorge dos Reis

Associated Aggregated Professor
University of Lisbon
Portugal

Abstract

We have two women who use typographical words. In art and design education the use of the word is a fundamental initial project. The visual conception of the sentence and the message it carries are educational means in the hands of teachers, which allow students a robust learning of visual and textual communication. In this sense we will observe two women who can serve as study cases for the use of the typographical word in the classroom, forming a starting point to develop expression strategies where the content of the message and typography are operative means.

A strong parallel between Barbara Kruger and Jenny Holzer's work concerns a social deployment in urban advertising media. Holzer uses luminous electronic panels where typography slides dynamically taking into account its short phrases consisting of truisms. Kruger uses the worldly serigraphic media of urban and cosmopolitan life of the daily life of large cities.

Kruger's work presents as the main feature, simulating the typographical printing of the graphic arts and design industry. An interest in fonts that have an almost anonymous look and vernacular shows graphical neutrality and an emphasis on the ready-made character of typography.

Holzer brings to the museum and to the gallery the neon and the spectacular occupying the white space and the walls with facilities that allude to the urban outdoor space. By undermining this support with new content, especially conceptual, it takes away the commercial and advertising burden that impregnated them in the origin. Barbara Kruger and Jenny Holzer work on the agenda of feminism by finding a language that focuses on the authoritarian plan of the male order. This lesson is expanded in view of the fact that the work of the two women is based on this assumption to call into question all kinds of underground guidelines with which capitalist society surrounds individuals.

Biography

Dr. Jorge dos Reis is Master Philosophy from the Royal College of Art, in London, Master in Sociology of Communication from ISCTE-IUL, Instituto Universitário de Lisboa, and Doctor Philosophy from the University of Lisbon, in the field of Communication Design. Currently Associated Aggregated Professor at the Faculty of Fine Arts, University of Lisbon, since 1998, where he founded (2013) and directs the Master of Contemporary Typographic and Editorial Practices, celebrating ten years of existence in 2024; currently invited lecturer at Lumiar Academic Campus, ISEC Lisboa, Superior Institute of Education and Sciences.

Jorge dos Reis served as an apprentice of typographic composition with a chief typographer first officer from the Portuguese National Printing House at an old composing and printing letterpress movable type workshop in Cais do Sodré, Lisbon. He began his career by collaborating with the designer Robin Fior in Lisbon and with the typographer Alan Kitching in London. He started his own career in 1996. His work is extensive and diverse, having coherent interconnected activities as a Lecturer and international workshops entrepreneur; Researcher in the field of Communication design and typography; Graphic designer and typographer; Visual artist exhibiting drawing, painting, text art, making performance. He Attended the National Conservatory in António Wagner's singing class studying with the composers Jorge Peixinho and Paulo Brandão while graduating in Communication Design at Faculty of Fine Arts, University of Lisbon.

Jorge dos Reis has rich and diverse academic career; actually started lecturing in 1996 at Ar.Co – Center of Art and Visual Communication and in 1997 at the Polytechnic Institute of Tomar; In the year 2000 started as invited lecturer teaching at the Polytechnic Institute of Castelo Branco, till 2003; then, in 2012, also as invited lecturer started at ESTAL, Superior School of Technologies and Arts of Lisbon.

 WCE 06:

Humanities and Social Science Education Forum**Chair**

Dr. Jean-Paul Close, Founder, STIR Foundation Eindhoven, the Netherlands

Time: 08:30-10:15, November 13, 2025 (Thursday)

Place: Kamo, Fifth Floor

Title: Family Education and Democracy in Post-1945 Japan

Dr. Mutsuko Tendo

Professor Emeritus

Miyagi Gakuin Women's University

Japan

Research Interest

Sociology of Education and Gender Studies

Abstract

This study examines Japanese family strategies through discourse analysis of school textbooks from a sociological perspective. It traces the transformation of Japanese family structure and family education, focusing on changes after World War II.

Although Japan legally abolished the patriarchal family system in 1945 as part of democratic reforms, modern Japanese family consciousness still reflects deeply ingrained values related to the sexual division of labor. This study investigates official family, childcare, and education policies through discourse analysis, revealing governmental and parental strategies.

The research employs a two-pronged approach. First, it analyzes pedagogic discourses in school textbooks with particular reference to gender classification and framing in home economics. Second, it examines official gender policies, especially those post-1985, after the enactment of the Equal Employment Opportunity Act. The discourse analysis explores how family, democracy, peace, and gender roles are portrayed in texts and policies.

The findings shed light on child-rearing strategies in post-1945 and late modern Japan, showing how the pedagogic discourse of family and democracy is transmitted through textbooks and how gender regimes perpetuate traditional notions of motherhood in a neoliberal context emphasizing family responsibility. This study also examines the global impact of children's rights, women's empowerment movements after the 1970s, and the Sustainable Development Goals since 2015.

Biography

Dr. Mutsuko TENDO is a professor emeritus at Miyagi Gakuin Women's University, Ph.D. in education (Waseda University), MA in literature (Tokyo Woman's Christian University). She was a professor at Human Science Department of Meijo University (Nagoya) until 2015, before moving to Miyagi Gakuin Women's University (MGWU). She contributed academic research on 'Child Future and Community Building after the Great East Japan Earthquake' as a project leader of MGWU, supported by the Ministry of Education, Culture, Sports, Science and Technology (MEXT) for the fiscal years 2018 to 2020. She is a recognized expert in the sociology of education and served as a secretary general for The Japan Society of Educational Sociology (JSES) from 2018 to 2020. She is a member of International Society for Gender Studies (Japan) and was President of the International Society for Gender Studies from 2013 to 2015. Her research interests include Women's Studies, the Sociology of Education, and Family Sociology, with a particular interest in childcare, education, and women's empowerment. Her recent publications are *Women's Studies from Zero*, *Women's Empowerment and the Future of Education*, and co-edited book, *Creating Women's Studies for Disaster Science*.

Title: A New Era, Also for Education

Dr. Jean-Paul Close

Founder

STIR foundation

Founder Sustainocracy, sustainable human development in a real time democracy

The Netherlands

Research interest

Anthropology, sociology, sustainable development, society, education

Abstract

When referring to “sustainability” we cannot take the human species for granted. In 2009 the STIR foundation in the Netherlands started to refer to sustainability from an existential natural human perspective. The foundation introduced five essential human values for the sustainable development of humankind as a natural species. It positioned these existential values as a shared responsibility of local citizens and institutions together. The foundation took the initiative to invite the main pillars of society to the table of regional co-creation: local government, citizens, science, education and business. One of the priorities was “regional health and air quality”, which was translated into the “healthy city and region cooperative”.

It was not easy, since the approach challenged the entire functioning of society and its players. Educational institutions refused to participate at first. STIR offered a partnership program in which the foundation would challenge the students with existential mindfulness and creativity, applied to the study direction of the students. The approach, offered through guest lectures, minors or practicals, was very well received by the students, motivating them to put extra effort in their learning. As a consequence however the institutions faced the need to change their attitude towards learning. Students became critical, creative, societal innovators. Teachers needed to develop coaching skills while the institution had to facilitate the open space of creation. It took a long time for management layers to accept a new position for education in the new societal format. Not just as a service with a political financial dependence, yet a challenging learning environment that prepares and engages our upcoming generations in a mindful way for the existential challenges at hand.

Biography

Dr. Jean-Paul Close quit an executive career in large global telecom and computer network multinationals. This was existentially, ethically motivated, redefining his focus to research and personal development in the field of essential human values. With his academic background in Mathematics, Computer science and International Business, he at first defined the entrepreneurship of the 21st century. This resulted in various publications, a business coaching network and guest lecturing at universities. The entrepreneurial approach was human and environmental values driven, with money as a means, not just as a goal. This format of business development required a contextual, deregulated and supportive environment where it could flourish. When the financial crisis hit the world in 2008 he set up the STIR foundation in order to experiment with a human values driven societal approach. This was coined a Sustainocracy. It became the basis of values driven cooperatives in which the foundation functions as context driven linking pin for all local operational silos. He has received a diversity of awards, including a “lifetime merit award” from the Visioneers community in Canada. His experiences have been documented and published in peer reviewed journals, academic publications, books and through presented at conferences.

Title: Land and Orature: Learning that Rises Above and Beyond Colonialism and Awakens a Lifelong Journey of Healing and Well-being

Dr. Davina Rousell and Language Keeper Doreen Frencheater

Research Associate
University of Alberta,
Canada

Research Interest

Revitalization and preservation of Ancestral Languages and Indigenous research

Abstract

Recognizing the critical state of Ancestral languages around the globe, the United Nations General Assembly declared 2022 to 2032 the International Decade of Indigenous Languages. As such, efforts to reawaken Ancestral languages is of utmost importance. As Elder Dr. Ayisikew Elmer Ghostkeeper stated “This is of great importance because Indigenous verb-based languages gift Indigenous Sovereignty to Indigenous peoples” (personal communication, April 26, 2024). It is commonly understood amongst Indigenous Elders that knowing and speaking one's Ancestral language is interwoven with one's wellbeing. In response, the University of Alberta's Supporting Indigenous Language Revitalization (SILR) Research team conducted a systematic literature review to identify and understand what current literature can tell us about the ways in which knowing and speaking one's Ancestral language can foster individual and communal wellbeing (body, mind, spirit and emotion). This presentation provides an overview of the main findings that Ancestral languages emerge from the land and are foundational to Indigenous peoples individual and community health, wellbeing and a process of healing and discusses how healing is a lifelong journey that is interconnected to and opens-up paths to learn about and experience balance and wellbeing (a good life).

Biography

Language Keeper, Doreen Frencheater was born and raised near Rocky mountain House, Alberta, on Sunchild First Nation, 280kms southwest of Edmonton, Alberta. As a child grew up learning two languages, Cree and Anisnabe. Ancestors, great- grandparents, who were medicine men and women, and held ceremonial lodges and taught me an abundance of traditional knowledge and protocols and they originate from a sacred place called 'Manitou Lake', near Marsden, Saskatchewan. I also have family ties to North Battleford, Saskatchewan region. As a young mother in 1984, I decided to return to school to acquire a GED, which I completed in one year. I began my University journey in 1990. From there, in 1992 I graduated with a Health Development Administration University certificate which included management classes and professional development classes. I decided to go and work for my community and as the Health Director. In 2002, went back to University and graduated with a B.A, through Athabasca University, went back to work. In 2013 I decided to pursue a Masters Degree in Indigenous Languages and graduated in 2016. The journey of my Masters included a 'Tour Study' in New Zealand of the Maori people and their reclamation to Revitalizing their Indigenous languages. During my tour of New Zealand I had the opportunity to visit eight schools to see first-hand their work with Language Revitalization. Today you can find me as a sessional language Instructor at the Yellowhead Tribal College in Edmonton. My goal is to help First Nations revitalize the diminishing Indigenous languages in a good way.

Dr. Davina Rousell grew up in Treaty 8 Territory and moved to Treaty 6 Territory as a young adult. She has called amiskwacîwâskahikan (Beaver Hills House) home since 1999 when she began her learning journey of understanding that we are all Treaty people and how to be an ally in a good way. As the research lead for SILR's Research Team, she seeks to work in ways that honour her Treaties responsibilities by working alongside Indigenous peoples to collectively rise above colonial worldviews, practices and systems. Part of this journey was being invited in 2022 to work with a talented team of Indigenous graduate research assistants and one ally graduate research assistant and co-author that collaboratively conducted this systematic literature. Her expertise includes mitigating and preventing racist beliefs and praxis, teaching and learning processes, allyship, leadership, health and well-being. She is honoured to be part of an interdisciplinary research team seeking a deeper understanding of the connections between Ancestral languages and well-being.

Title: *Kahani* Literacy Project: Culturally Efficacious Story Writing

Dr. Kalpana Mukunda Iyengar,

Assistant Professor of Practice
College of Education and Human Development
The University of Texas at San Antonio
USA

Research Interest

Literacy, Multicultural Education, Indic-centric Performing Arts

Abstract

This presentation describes a literacy approach for Teaching Cultural Rhetorical Knowledge (TCRK). A review of traditional curricula for literacy and the Language Arts indicates a paucity of focus and opportunities for diasporic Asian Indian American children (AIA) (or any minoritized youth) to learn about their heritage culture to an appreciable degree. The author conceptualized and designed the Kahani Literacy Project model (i.e., a multimodal, multilingual literacy experience centered on the Indic cultures), to enable young writers to create within a habitus that privileged and honored the epistemologies and perspectives of India. Thematic analysis of the Kahani narratives demonstrated the students' appreciation and deepened understanding of heritage culture and practices. It was posited that the opportunity for students to engage with ideas from home, in a pedagogic space without fear of disparagement, would foster respect. As the Funds of Knowledge are recognized and incorporated into literacy instruction, the adolescent writer acquires TCRK. This culturally grounded literacy instruction fosters heightened creativity and contributes to the development of a healthy ethnic identity. As students engage in dialogic conferencing, reading and writing experiences that accept, value, and or venerate the cultural practices of India, they acquire a perspective of their heritage that enables them to resist the debilitating effects of assimilation and anomie.

Biography

Dr. Kalpana Mukunda Iyengar earned her Ph.D. in literacy at the University of Texas - San Antonio. She was later awarded a postdoctoral fellowship in the Bicultural Bilingual Studies Department. She holds a master's in Linguistics and Commonwealth Literature from Bangalore University and a second masters from Kutztown University, Pennsylvania. Dr. Iyengar received a B.Sc. from Arakalagudu Varadarajulu Kanthamma College for Women, Hassan. Dr. Iyengar's research foci include cultural preservation, literacy, teacher preparation, Indic cultures, and multicultural education. She co-edited a volume with Cognella Publishers, book chapters in IGI Publications, and articles in peer-reviewed journals including *Educational Studies*, *South Asian Review*, *Devsanskriti Interdisciplinary (DSVV) Journal*, and *English in Texas*. Dr. Iyengar was selected as a San Antonio Writing Project Summer (SAWP) Institute Fellow, 2007. She subsequently became a teacher-consultant and co-director for the SAWP. Continuing her research interest, she co-founded/co-directed the DSVV *Haridwar* Writing Project in India. In recognition of her literacy work, she was awarded the National Council of Teachers of English Distinguished Early College Educator of Color Award. Dr. Iyengar's co-edited volume (with Dr. Smith), *Diversity in Society and Schools*, was published by Cognella Press, 2021. Her current project, a co-edited volume on biliteracy development, will be published by Kendall Hunt, 2022. A co-edited book on *Teaching English Writing in the Diaspora: Scaffolding Educators and Students* has a publication date of 2023. Dr. Iyengar offers teacher preparation and literacy courses at UTSA. She was lead faculty for the *Family Literacy Project* sponsored by the Center for Inquiry of Transformative Literacies. Dr. Iyengar was a Scholar-in-Residence at DSVV and she is a visiting professor in the English department. Drs. Iyengar and Smith, as guest faculty, offered a three-week graduate course on Qualitative Methods at Presidency College, Bengaluru, India.

Partial List of Publications

- Iyengar, K. M. (2022). Kahani Literacy Project: “Culturalized” Writing. In *Handbook of Research on Promoting Global Citizenship Education* (pp. 209-227). IGI Global.
- Iyengar, K. M., and Smith, H.L. (2021). Kahani Literacy Project: Culturally Sustaining Story Writing. In Anastassiou Fatoni (Ed.), *Biliteracy and Multiliteracies: Building Paths to the Future* (pp. 145-165).
- Iyengar, K. M., & Smith, H. L. (2020). Growing Up in the Diaspora: South-Asian Children. *South Asian Review*, 41(1), i-iii.
- Iyengar, K. M., & Smith, H. L. (2020). The Sacred Bharatanatyam Dance: Transcendental Aesthetics. *South Asian Review*, 41(1), 69-86.
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- Iyengar, K. M., & Smith, H. L. Kahani Literacy Project: Culturally Efficacious Story Writing. Innovation in Language Learning Conference. Italy, 2022.
- Iyengar, K.M., & SMITH, H. L. (2024). Multicultural children’s books about women: Pedagogy to disrupt hegemony. In Tiffany Flowers (Ed.), *The Urban Education Sourcebook on Instruction and Supervision*, pp. 84-103. Cambridge Scholars Publishing.

Title: Intercultural Dialogue as Main Strategy to Tackle Misinformation: The Creation of the Brazilian Media and Information Literacy Olympiad

Dr. Claudia Wanderley

Permanent Researcher

State University of Campinas (UNICAMP)

Brazil

Research Interest

Multilingualism, Interculturality, Non-Standard Epistemologies, Media and Information Literacy, Science for Collective Well Being

Abstract

The Brazilian Media and Information Literacy Olympiad (Olimpíada Brasileira de Educação Midiática - **obem**) is an activity of two months length to be developed in secondary schools in Brazil to present competencies and abilities to tackle misinformation to students and teachers. A team work of three coordinators, eighteen scholarships and nearly one hundred partner professors created three reference courses and thematic handouts in 2024 and 2025. The projection for the participation is of 400.000 students and 100.000 teachers on the first edition of **obem** in 2026. The activity is a partnership among the Observatory of Disinformation, the Secretary of Communication of the Presidency of the Republic, the Ministry of Science Technology and Innovation and the Ministry of Education of Brazil. Being Brazil a very rich country in terms of different cultural backgrounds, and bearing around 280 living original languages, the debate on tackling misinformation is highly related to the inclusiveness of non standard epistemologies, in the case of this project, based on theory of complexity. This research work considers intercultural dialogue as a paramount notion to work outside the limits of academic walls, and open systems and self organization as the main notions to have agency in this process.

Biography

Dr. Claudia Wanderley works as Permanent Researcher at the Centre for Logic, Epistemology and the History of Science at the State University of Campinas, Brazil, with Master and Doctorate Degree in Linguistics, Post-Doctorate in Computational Linguistics. She works with multilingualism and multiculturalism in the digital world considering the revitalization of local languages, cultures and knowledge/epistemologies of traditional communities in Brazil. She is part of the Unitwin UNESCO Higher Education Program on Media and Information Literacy (2019 -). She created and coordinated the E-Lab for Multiculturalism in Digital World in UNESCO UNITWIN Complex System Digital Campus from 2015-2021. She was the founder and Chairholder of the UNESCO Chair Multilingualism in Digital World at Unicamp University from 2007-2009. She invests intellectual efforts towards a philosophical approach of difference that enriches communitarian experience and scientific advances. Nowadays she is dedicated to work with non-standard epistemologies, intercultural dialogue to develop an approach to science for mutual well-being. The actual project is a complete package of research, learning and extension activities to create a massive interaction with secondary schools in cooperation with teachers and students respecting their traditional and cultural agenda promoting intercultural dialogue and Media and Information Literacy abilities and competencies.

WCE 07:

Video Forum

Videos could be viewed by <https://www.bitcongress.com/galatechvideo1/index.php>

Title: The Role of Artificial Intelligence in Shaping the Future of Education

Dr. Marja-Liisa Tenhunen

Rector

Dimitrie Cantemir Christian University

Romania

Abstract

Artificial Intelligence (AI) is redefining the landscape of education across the globe, introducing new paradigms for teaching, learning, and educational administration. This paper examines the multifaceted role of AI in shaping the future of education, with a particular focus on its pedagogical, ethical, and socio-economic dimensions. Drawing on both global case studies and Nordic experiences, especially from Finland's progressive education system, this study explores how AI technologies such as machine learning, natural language processing (NLP), and adaptive learning platforms are being integrated into curricula and educational practices. The research addresses key opportunities AI brings, including personalized learning, automated assessment, and enhanced accessibility for diverse learner populations. Simultaneously, it critically evaluates the challenges associated with AI adoption, such as data privacy, algorithmic bias, teacher displacement, and the digital divide. The paper advocates for a balanced approach that combines technological innovation with human-centric values, ensuring that AI complements rather than replaces the essential role of educators. Methodologically, the study synthesizes qualitative and quantitative data from recent AI implementations in Finnish schools and higher education institutions. These findings are then contextualized within broader international trends, providing comparative insights relevant to both developed and emerging education systems. In light of the Japanese conference context, the paper also includes reflections on how AI strategies in Finland might inform or align with Japan's own educational innovations. The study concludes with recommendations for policy, curriculum development, and international cooperation aimed at fostering ethical and effective AI integration in education.

Keywords: Artificial Intelligence, Education Technology, Personalized Learning, Educational Policy

Biography

Dr. Marja-Liisa Tenhunen, Ph.D. (Econ.), Finland is a distinguished academic leader, international consultant, and former university president with more than 40 years of experience in higher education, strategic management, and global academic collaboration. Since 2021, she has served as Rector of Dimitrie Cantemir Christian University in Bucharest, Romania, where she leads internationalization and research development efforts. Dr. Tenhunen was the founding President and Managing Director of Centria University of Applied Sciences in Kokkola, Finland, from 1995 to 2012. Under her leadership, Centria gained national recognition for innovation and built strong international networks, particularly in China. She also served two terms as Vice President of the Finnish Rectors' Conference of Universities of Applied Sciences. A globally engaged academic, Dr. Tenhunen has held visiting professorships at top institutions in China, Mexico, Romania, and the USA. She is a long-term Visiting Professor at Shanghai University, where she supported multiple AMBA accreditation cycles and organized major business forums in cooperation with the Finnish Consulate. She also holds the PIMSA Distinguished Visiting Chair in International Strategy at CETYS Universidad in Mexico. Her research interests include digital learning, AI in education, entrepreneurship, and international business strategy. She has led multi-country research projects and consults regularly for Finland's Ministry of Education and Culture. Dr. Tenhunen holds a Ph.D. and M.Sc. in Economics from the University of Jyväskylä, Finland. She is a Certified Auditor and Accountant and has served on national boards including the Finnish Council for Chartered Accountants and the Prime Minister's Research and Innovation Council. Dr. Tenhunen has received several medals of honor from several organizations like as Finland's National Entrepreneurs' Organization, Association of Finnish Accounting Firms and Finland's Cultural Foundation. The most notable highly respected Medal of Honour is given by President of Finland's Republic in 2002. The newest Medal of honour Dr. Tenhunen has received at Dimitrie Cantemir University in Bucharest Romania

Title: Content and Language Integrated Learning (CLIL) Approach to Teaching Multilingualism: Theory and Practice

Dr. Oksana Ivanova

Associate Professor
Pyatigorsk State University
Russia

Research Interest

Linguodidactics and Multilingualism

Abstract

More and more often lately, scientists, who are major in Linguodidactics, have shown a significant interest concerning the problem of developing multilingual communicative competence. The connection between multilingual teaching and the CLIL is based on a number of key factors that make this approach particularly important for developing multilingual communicative competence. They are learning and teaching languages through content, cognitive development and practical orientation. By dint of CLIL approach, students master new knowledge through various subjects in several foreign languages. Instead of the traditional model of separate language learning and individual subjects, both aspects are integrated, accelerating the acquisition of different components. For example, in Pyatigorsk State University, the course "Literature of the Countries of Studied Languages" is taught in English, German, French, and Spanish. Simultaneous acquisition of different types of information (subject matter and language) activates thinking and memory. Learning process becomes more intense as the brain is forced to process more types of information at once. This develops the ability to switch between different activities and languages, quickly adapt to new situations and improve overall intellectual potential. Mastering several languages opens up opportunities for professional growth and personal development. Using CLIL approach prepares students for situations where they will have to apply their knowledge in their future professional life.

Biography

Dr. Oksana Ivanova graduated with honors from Pyatigorsk State University in 2010 with a degree in "Theory and Methods of Teaching Foreign Languages and Cultures". Also in 2010, she entered postgraduate study Institute by specialty "Theory and Methods of Teaching and Education." In 2014, she completed her postgraduate program, successfully defending her thesis on "Teaching Foreign Language Semantic Competence on base of affixal models: Spanish, Basic School." Oksana Ivanova began her career at Pyatigorsk State University in 2010.

From 2011 to 2012, she worked as an assistant in the Department of English Language and Professional Communication. From 2012 to the present, she has been working in the Department of Intercultural Communication, Linguodidactics, and Pedagogical Technologies of Teaching and Education. In addition to her main position as an associate professor, Oksana Ivanova also leads the Department of Multilingualism at the Institute of Translation Studies, Russian Studies, and Multilingualism. The Department of Multilingualism is unique in Russia at preparing specialists in cross-cultural communication during 4 years (Bachelor degree) who are able to speak 4 foreign languages (English, German, French and Spanish). Currently, O. Ivanova is conducting researches in the field of Didactics of multilingualism. She supervises the final theses of students studying in Bachelor's and Master's degree graduate programs.

Title: AI Literacy and Distributed Creativity

Dr. Lorenzo Manera

Researcher

University of Modena and Reggio Emilia

Italy

Research Interest

Media aesthetic, aesthetic education

Abstract

This contribution examines the evolving relationship between generative AI and authorship, focusing on the intersection of technology, creativity, and aesthetic theory. It introduces the concept of "semantic attractors" within AI systems, particularly in text-to-image models, where specific words or phrases exert a gravitational influence on the output, shaping both visual and semantic outcomes. These attractors are explored through the lens of art theory, including Goodman's divide between autographic and allographic arts and the concept of distributed agency in art-making, which sees creativity as a collective process involving both human and non-human elements. By investigating how these systems use prompts to generate images, it argues that the creative act in AI is a result of negotiation between the user and the machine, rather than a solitary artistic endeavor. Furthermore, the paper links this discussion to the cultural phenomenon of deepfakes, exploring how such images, despite their technical sophistication, function more as symbolic currency than as literal representations of truth.

By analyzing some deepfakes, we argue that they operate as image-ideograms—modular signs that communicate emotions or stances, rather than factual accuracy. This shift marks a broader move in visual culture from realism to symbolic communication, where the circulation of images as affective cues takes precedence over their referential truth-value. The contribution claims that generative AI and deepfake technologies redefine authorship as a distributed, collaborative process shaped by both human input and computational systems, and offers an example of an AI literacy experience involving youngsters in the Italian educational context.

Biography

He is a researcher in Aesthetics at the Department of Education and Human Sciences at the University of Modena and Reggio Emilia, where he teaches "The Approach of the Municipal Infant Schools of Reggio Emilia," "Theory of the Arts," and "Theory and Didactics of Digital Media." He co-directs, together with Annamaria Contini, the series "Aesthetics of Education" for Edizioni Junior, and is the secretary of the journal *Estetica. Studi e ricerche* (Il Mulino). He is a member of the doctoral program committees in Reggio Childhood Studies and Human Sciences, a board member of the Italian Society of Aesthetics, the International Network for Cooperation and Research in Aesthetic Education, the Research Center for Children and Early Childhood Educators – Federal University of São Carlos, and the Interdisciplinary Centre for Research in Curriculum as a Social Practice at Western University – Faculty of Education (Ontario, Canada).

Title: The Impact of AI on Education and Lifelong Learning

Mr. David John Wortley FRSA

Non-Executive Director

World Lifestyle Medicine Education Services (WLMES)

UK

Research Interest

AI and Creative Technologies

Abstract

Artificial Intelligence (AI) is transforming education and lifelong learning, offering both significant opportunities and complex challenges. In formal education, AI enhances personalised learning, optimises curriculum design, and improves access to resources. However, challenges arise around data privacy, bias in algorithms, and the potential reduction in critical thinking among young people, who may become overly dependent on AI-driven platforms. There are growing concerns that, without careful guidance, AI could narrow rather than broaden young learners' intellectual horizons, reinforcing existing inequalities.

Conversely, AI offers powerful tools to harness the lived experiences of older adults, promoting inclusive lifelong learning ecosystems. AI-driven storytelling platforms, knowledge transfer systems, and mentorship networks can valorise the wisdom of elderly populations, creating intergenerational learning opportunities. Natural language processing and adaptive interfaces enable older adults to share complex life experiences, making them accessible and educational for younger generations. Furthermore, AI's ability to personalise engagement based on cognitive, emotional, and physical needs can empower older learners to continue growing, contributing, and feeling connected.

The future of education and lifelong learning must involve responsible AI integration that safeguards the developmental needs of youth while embracing the vast, often untapped, resource of elderly lived experience. Achieving this balance requires ethical AI governance, human-centred design, and a commitment to diversity and inclusivity across all stages of life.

Biography

Mr. David Wortley is CEO & Founder of 360in360 Immersive Experiences, Non-Executive Director of the World Lifestyle Medicine Education Services (WLMES) and a VP of the International Society of Digital Medicine (ISDM). He is a Fellow of the Royal Society of Arts and Commerce and a global thought leader and innovator on enabling technologies for health, education and the environment. He is on the editorial board of the Digital Medicine Journal. He is an Associate Member of the Royal Society of Medicine and a Visiting Fellow at the Faculty of Health and Social Sciences at Bournemouth University.

As the Founding Director of the Serious Games Institute (SGI) at Coventry University, his team established an International Centre of Excellence for Applied Research and Innovation in the field of serious games and immersive technologies for a wide range of applications. His areas of special interest are technologies for preventative healthcare, collaboration, virtual reality and interactive rich media knowledge sharing. He is a professional virtual event facilitator, webinar host and publisher.

Title: Analyzing the Relationship Between Sense of Belonging with Perception of Academic - Confidence, Stress, and Exclusion for College Students with Different Demographics

Dr. Mahtash Esfandiari

Director

Department of Statistics and Data Science at UCLA
USA

Research Interest

Statistics Education and Statistical Consulting

Abstract

This study examined the relationship between academic self-confidence and students' perceptions of belonging, stress, and exclusion within the campus climate, across demographic and academic variables including ethnicity, gender, major, first-generation status, and residency. Data were collected via an anonymous online survey from 1,120 undergraduates at a U.S. public university. Multivariate and logistic regression analyses were used to address the research questions. Results from multivariate regression consistently showed that a stronger sense of belonging was associated with higher academic self-confidence and lower perceived stress and exclusion across all subgroups. Logistic regression assessed the likelihood of reporting academic self-confidence in the top 50th percentile, with predictors including sense of belonging, stress, exclusion, gender, first-generation status, residency, and major. Students with higher academic self-confidence reported significantly greater belonging and significantly less stress and exclusion. Males were more likely, and STEM majors less likely, to report academic self-confidence in the top 50th percentile. These findings suggest that enhancing students' sense of belonging and reducing stress and exclusion can foster greater academic confidence, thereby promoting personal development, academic engagement, and institutional retention.

Biography

Dr. Mahtash Esfandiari is a full-time faculty member and Director of the Statistical Consulting Center in the Department of Statistics and Data Science at UCLA. She holds a B.S. in Chemistry from the American University of Beirut and a Ph.D. in Cognitive Science and Applied Statistics from the University of Illinois at Urbana-Champaign. Dr. Esfandiari is highly recognized for her contributions to the design and evaluation of interventions, as well as for her innovative application of cognitive learning theory to statistics education, diversity, and consulting. Her extensive consulting work spans the fields of medicine, education, entrepreneurship, industry, and public health. She has authored and presented more than 50 papers in peer-reviewed journals and at national and international conferences, with a focus on promoting advanced statistical thinking and enhancing statistical literacy through active learning, team-based collaboration, real-client consulting, and effective communication of statistical results to non-technical audiences. Her recent research interests center on teaching and studying diversity through the lens of data science and exploring ethical considerations and biases in the application of artificial intelligence and machine learning in educational and medical data analysis. Dr. Esfandiari has also made significant contributions to the medical community through her leadership in consulting and teaching workshops, seminars, and webinars on experimental design, statistical power, and sample size estimation. She has served on the editorial boards of several national and international journals in the fields of statistics education, intercultural studies, and education. Among her many accolades, Dr. Esfandiari is the recipient of the UCLA Inaugural Physical Sciences Centennial Excellence in Education Award, in recognition of her pioneering role in establishing the first diversity-focused course in the division, and for her lasting impact on inclusive pedagogy and academic excellence at UCLA.

Title: Critical Aspirations and Agency Amid Global Uncertainty

Dr. Aliya Khalid

Course Director
Lady Margaret Hall
UK

Abstract

We are living in a period of profound uncertainty shaped by climate crises, pandemics, political unrest, and deepening inequalities. These conditions restrict material opportunities while also threatening the very capacity to imagine flourishing. For people living with disadvantage, the challenge lies not only in surviving the present but also in navigating physical and psychological spaces to move toward an imagined future. Understanding how this happens is vital, and it carries important implications for both academic and policy communities. It calls on us to learn from the field as knowledge producers and to value what some describe as theorising from the margins.

My central argument is that aspirations in such contexts are not simply individual goals but critical and situated practices. They are deeply social, political, and ethical orientations that reveal resilience, resistance, and creativity. Aspirations show how agency can take shape under conditions of systemic neglect, and they force us to reconsider how hope functions in precarious times.

In this talk, I will discuss two areas of analytical and methodological innovation that help to foreground this argument. The first is the idea of *negative capability*, which allows us to engage with uncertainty, contradiction, and unfinishedness rather than seeking premature closure. The second is an approach to *silences* as data, treating silence not as absence but as presence, carrying meaning in what is left unsaid or withheld.

Both of these approaches are framed in relation to epistemic justice, raising questions about whose voices are heard, whose knowledge counts, and how we might be more attentive as researchers. Taken together, they support my argument that hope is central to understanding agency as a grounded, context-sensitive response to global uncertainty.

Biography

Dr. Aliya Khalid is the Course Director for the MSc in Comparative and International Education and a Junior Research Fellow at Lady Margaret Hall. Her research is guided by the principles of epistemic justice and engages reflexively with critical questions: whose knowledge is recognised and valued, and what do silences signify, both when imposed upon individuals and when maintained by those navigating life at the margins? Central to her work is the exploration of how educational systems can be reimagined to centre the perspectives of knowledge communities.

Her research examines how intersecting forms of marginalisation, including gender, class, ethnicity, migration, and displacement, shape educational aspirations, experiences of exclusion, and expressions of agency. Her work spans post-crisis education in Pakistan and educational recovery following COVID-19 in the UK. Collaborating with young people, families, teacher-educators, and community members in both countries, she aims to contribute to more inclusive and responsive educational practices by learning directly from lived experiences.

Aliya Khalid also works closely with colleague-scholars through the development of the Crisis, Education and Epistemic Justice network (CEEJ-Link: <https://ceejnetwork.com/>)

Title: Social Anxiety and Learning Disorders - The Case of Learning Difficulties and Social Distance Anxiety

Dr. Ephraim S. Grossman

Senior Lecturer
Ariel University
Israel

Research Interest

Social and emotional aspects of Learning Disabilities / ADHD

Abstract

Learning disabilities impact the lives of people beyond the learning domain. Emotional and social problems are common and accompany individuals into adulthood. Anxiety and social anxiety prevail among this population. Our aim was to see if learning difficulties are related to anxiety during social interaction. Adult participants, 323 women, 16 men, responded to invitations posted by education students at Ariel University. The average age was 26.85 (9.14). About 24% and 14% of the participants self-identified as having or perhaps having a learning disability (respectively). The study began with running the stop-distance paradigm (Hayduk, 1983) three times. Twice, the participant approached the confederate, and once the confederate approached the participant. After this task, participants received a link to the questionnaire beginning with the state anxiety inventory relating to feelings while conducting the stop-distance paradigm, followed by the rest of the study variables. Results indicate that experiencing difficulty in learning is positively correlated with social anxiety and with anxiety experienced during the interpersonal space task. Linear regression confirmed that both social anxiety and learning based difficulties significantly contribute to interpersonal space task anxiety. The results confirm the impact that learning difficulties have on the emotional and social life of these people.

Biography

Dr. Ephraim S. Grossman is the head of the Department of Education and the Teachers Training Program at Ariel University in Israel. After obtaining his Ph.D. from Bar-Ilan University, Dr. Grossman started his research career in studies concerning the relations of sleep with functioning and with emotion. While being a researcher and at the same time working as a school psychologist, Dr. Grossman became intrigued by the similarity in effects caused by sleep problems, neurological developmental states, such as ADHD and learning disabilities, and affective challenges, such as trauma and stress. Dr. Grossman has recently published papers about stress symptoms experienced by adults with learning disabilities. In this line of studies, Dr. Grossman puts together the experience he gained while working with children as a school psychologist and his research in the field of trauma.

Title: Recognition Accreditation Supporting Teachers

Prof. Ricardo León-Bórquez

President

World Federation for Medical Education (WFME)

UK

Research Interest

Creating a Culture of Improvement through the Empowerment of Teachers

Abstract

The **World Federation for Medical Education (WFME)** was established in **1972** by the **World Medical Association (WMA)** and the **World Health Organization (WHO)** to **enhance the quality of medical education worldwide** in support of **healthcare for all**.

WFME is committed to ensuring that medical education for the estimated **13.7 million physician workforce**—and for all future students—is of the **highest standard**. This reflects a duty to the physician workforce, and funding institutions, but also to the patients they serve.

Key Activities and Priorities

- WFME publishes the best international practice *Global Standards for Quality Improvement of Medical Education*, covering Basic Medical Education (BME), Postgraduate Medical Education (PGME), Continuing Professional Development (CPD), and Distributed and Distance Learning.
- The WFME Recognition of Accreditation Programmes (BME, PGME and CPD) evaluate agencies against rigorous Recognition Criteria. Recognition Status affirms that the quality of medical education in an agency's accredited schools and programmes meets appropriate international standards.
- The World Directory of Medical Schools is a freely accessible global resource listing undergraduate (basic) medical education programmes. It contains information for over 4,300 schools, both current and historical, including curriculum and enrolment details.

In May 2025, WFME launched the **Declaration on Institutions' Responsibility to Support Medical Students, Physicians in Postgraduate Education, and Physicians in Practice** at its World Conference in Bangkok.

The Declaration's central message is clear: **safeguarding the wellbeing of medical students and physicians is essential, not optional**. This commitment is vital for strengthening health systems and improving population health. **Institutions are called upon to lead systemic change** by fostering supportive, inclusive, and nurturing environments.

Biography

Professor Ricardo León-Bórquez has been involved with WFME since 2014, initially as the regional representative for the Americas while serving as President of the Pan-American Federation of Associations of Medical Schools (PAFAMS). He became WFME President-Elect in April 2022 and assumed the presidency on 1 January 2023.

He is a professor of medicine and former Dean of Medicine and Vice-President of Health Sciences at the Universidad Autónoma de Guadalajara, México. He also served as President of the Mexican Association of Medical Schools and Faculties (AMFEM).

Professor León-Bórquez has lectured extensively on medical education across North America, the Caribbean, Latin America, Europe, and Asia.

Title: Moral Competences of 20th Century Teachers (Analyses and Reflections)

Dr. hab. Mirosław Kowalski* and Paulina Kobylecka - Bitner

Assistant Professor
University of Zielona Góra
Poland

Research Interest

Pedagogy, Moral competences, Teachers

Abstract

Contemporary social reality harbors many complexities that are difficult to resolve through clear-cut solutions. The multitude of ethical orientations, the relativization of values, and the pluralism of worldviews—a significant part of the referent of the concept of "social change"—complicate attempts to illustrate the emerging contradictions in the form of a simple "good-evil" dichotomy. At the same time—and this is undoubtedly true—ethical messages should avoid ambiguity, striving to strongly advocate for a specific resolution of a moral dilemma, to instruct, and to brook no opposition. So what is the image of this crystallizing tension in the field of education?—this difficult question is worth attempting to answer from the perspective of teachers' moral competence. It is the teacher who is assigned the mission of shaping students' sociomoral attitudes, including ethical orientation. It seems that the understanding of the above concept, as well as the desired quality of the competencies mentioned, depends on the axionormative system adopted by the teacher. It is within this framework that the content of the answers we are interested in can be found.

Biography

Assistant Professor Mirosław Kowalski is the director of the Institute of Pedagogy at the University of Zielona Góra. Since 2011 a member of the Committee of Pedagogical Sciences of the Polish Academy of Sciences in Warsaw currently secretary of this body and chairman of the Health Pedagogy Section of the Polish Academy of Sciences). Reviewer of over 500 scientific articles. Supervisor of 300 master's theses, 250 bachelor's theses, 110 diploma theses - postgraduate studies. Author, co-author, editor or co-editor of over 220 scientific articles and books. Author of opinions for the Fulbright Scholar Program as part of applications for scientific internships in the USA. Member of scientific and editorial boards, reviewer of many foreign and domestic scientific journals, including: Review of European Studies (Canada).

Information on education, academic degrees/titles

2004 – Faculty of Pedagogy and Psychology, Bydgoszcz Academy. Kazimierz Wielki (defense of doctoral thesis on: Conditioning of a healthy lifestyle of young people studying – candidates for the teaching profession; specialization according to the Ministry of National Education: field – humanities, discipline – pedagogy, specialization – social pedagogy); 2016 – HABILITATION: THE VALUE OF EDUCATION AND HEALTH CULTURE IN DIFFERENT EDUCATIONAL ENVIRONMENTS - MARIA CURIE-SKŁODOWSKA UNIVERSITY IN LUBLIN, FACULTY OF PEDAGOGY AND PSYCHOLOGY.

Title: The Importance of Father-son Communication in the Educational Process

Dr Anita Famula-Jurczak

Professor

University of Zielona Góra

Poland

Research Interest

My research interests focus on language and communication development, the role of family interactions and narratives in shaping children's competences, and the application of educational coaching and speech therapy in learning processes.

Abstract

This paper examines the significance of father-son communication in the context of education and child development. Although maternal influence has been widely studied, the role of fathers remains less visible in both research and practice. Communication between fathers and sons creates a specific relational dynamic that supports not only the transmission of knowledge and values but also the development of emotional security, motivation, and social skills. Everyday conversations, narratives, and shared experiences contribute to the child's ability to regulate emotions, build self-confidence, and engage in learning processes more effectively. The presentation highlights theoretical perspectives and selected empirical findings illustrating how father-son dialogue can enhance school achievement and foster resilience. It also emphasizes preventive aspects of communication, showing its potential in reducing educational difficulties and strengthening cooperation between family and school. Recognizing father-son communication as a vital element of the educational process broadens our understanding of parental involvement and offers practical implications for educators, counselors, and policymakers. Promoting the father's active role in dialogue with the child not only enriches family life but also supports the creation of a more inclusive and balanced educational environment.

Biography

Dr. Anita Famula-Jurczak is a speech therapist, educational therapist, coach, and academic teacher at the Institute of Pedagogy, University of Zielona Góra, where she serves as the Head of the Speech Therapy Laboratory. Her research focuses on language and communication development, the role of family interactions in shaping children's competences, and environmental factors influencing communication. She has authored and co-authored numerous scientific publications in the fields of speech therapy, education, and coaching. In teaching, she prepares students for professional practice as speech therapists and special educators. She co-develops the Speech Therapy with Neurodidactics program, contributing to its curriculum design, promotion, and organization of pedagogical internships. She actively collaborates with educational institutions to implement innovative educational and therapeutic solutions. Her research also explores the use of educational coaching and music therapy in speech-language pathology. By combining scientific work with practical experience, she develops approaches that support children, parents, teachers, and students in learning, communication, and personal development. Dr. Famula-Jurczak's work emphasizes the integration of research and practice to enhance educational and therapeutic outcomes, highlighting the importance of family, school, and community collaboration in supporting child development.

Title: Educating the Next Generation of Scientists: From Early Childhood to Undergraduate Education

Dr. Roseanne L. Flores,

Professor

Department of Psychology

Hunter College of the City University of New York

USA

Abstract

In an age where scientific literacy is vital for addressing global challenges, the importance of comprehensive STEM education cannot be overlooked. This presentation explores the continuum of STEM education from early childhood through the undergraduate years, emphasizing the transformative role of early childhood education in integrating scientific concepts that spark curiosity and build foundational knowledge. As students' progress into middle and high school, the focus shifts towards more rigorous STEM training, encouraging hands-on learning and critical thinking. Programs designed for college students are also highlighted, illustrating successful initiatives that bolster engagement and innovation. By examining these educational pathways, this presentation aims to underscore strategies for cultivating a new generation of scientists prepared to advance knowledge and address complex issues facing our society. Through active participation and innovative teaching methods, we can inspire the next wave of scientific thinkers.

Biography

Dr. Roseanne L. Flores is a Professor in the Department of Psychology at Hunter College and the Graduate Center of the City University of New York. She received her Ph.D. from the Graduate Center of the City University of New York and, more recently, an Advanced Certificate in Public Administration and Public Policy and a Certificate in Health Care Policy and Administration, both from the CUNY School of Professional Studies. She is also a Faculty Associate of the Roosevelt House Public Policy Institute at Hunter College and a member of the Public Policy and Human Rights faculty. Roseanne also currently serves as the Ombudsperson for Hunter College.

Roseanne is a Developmental Psychologist by training and was a National Head Start Fellow in the Office of Head Start in Washington, DC, from 2009-2010. She was the 2022- 2023 President of the Eastern Psychological Association. She served as the 2013 chair of the Committee on Children, Youth, and Families at the American Psychological Association and the past chair of the APA Coalition for Psychology in Schools and Education. Roseanne also served as an APA Representative to the United Nations and on the Exploratory Committee on Applied Psychology. She was also a member of the APA Board of Educational Affairs Task Force on Educational Disparities. Most recently she was elected to serve as member of the APA Board of Education Affairs.

Roseanne's current research focuses on the intersection between education, health equity, and human rights. She is the co-editor of the award-winning *Cambridge Handbook of Psychology and Human Rights*. She served as a American Association for the Advancement of Science, Science, Technology and Policy Fellow at the National Institute of Justice where she supported the work of staff scientists on firearms and violence, juvenile justice, and graduate internship programs.

The 13th Annual World Congress of Ocean (WCO-2025)

WCO 01:

Ocean Economy and Maritime Law

Chair

Dr. Hermann Held, Professor, Chair Sustainability & Global Change, University of Hamburg, Germany

Time: 13:30-17:35, November 11, 2025 (Tuesday)

Place: Yoshino, Fifth Floor

Title: Evaluation Modelling Green Shipping Technologies: A Techno-Economic-Energy-Environment Complex Systems Approach

Dr. Feier Chen

Vice Chief, Research Institute of Coastal & Shipping Management,
School of Ocean and Civil Engineering
Shanghai Jiao Tong University
China

Abstract

As global carbon emissions from the shipping industry rise, hydrogen and ammonia emerge as key zero-carbon fuels for achieving carbon neutrality. This study combines Techno-Economic Analysis (TEA) and System Dynamics (SD) to develop a comprehensive evaluation model that incorporates four subsystems: cost, revenue, environment, and policy. The model integrates the IMO's MEPC 83 Life Cycle Assessment (LCA) standards, assessing the full Well-to-Wake carbon footprint of alternative fuels. Using a 57,000 DWT bulk carrier case study, we calculate the Net Present Value (NPV) of hydrogen and ammonia-fueled ships over their life cycle as a measure of economic feasibility. Results show that, in the stage of immature technology and incomplete green supply chains, hydrogen vessels are more viable on short-haul routes (e.g., Ningbo to Malaysia). As technology improves, fuel prices drop, and policies such as GHG levy mechanisms and green fuel standards are implemented, both fuel types show substantial market potential. Sensitivity analysis reveals that factors such as freight rates, fuel prices, carbon prices, and green certification costs significantly influence the economic performance of alternative-fuel ships. This study offers strategic insights for the green transformation of the shipping industry and provides policymakers with a basis for decisions on carbon reduction, fuel standards, and market mechanisms.

Biography

Dr. Feier Chen serves as the Principal Investigator for multiple scientific research projects in the complex system of energy and shipping, supported by the National Social Science Fund, the Shanghai Natural Science Fund, etc. Additionally, she has been involved in special high-tech ship research projects overseen by the Ministry of Industry and Information Technology, specifically in the domains of Green Shipping and the Digital Transformation of Ship Assembly.

She has over 40 academic papers published in renowned journals such as "Nonlinear Dynamics" and "Physica A: Statistical Mechanics and its Applications", and serves as an editorial board member for "PLOS ONE". In 2018, she was recognized as the Outstanding Reviewer of the journal "Transportation Research Part E", and further as one of the Top Ten Outstanding Women in China's Shipping Industry in 2023.

She holds a Doctoral Degree in Naval Architecture and Ocean Engineering, along with dual bachelor's degrees in Economics and Transportation from Shanghai Jiao Tong University. Moreover, she has had the experience of being a one-year visiting scholar at the University of Tokyo in Japan.

Title: Probabilistic Time to Collapse as a Risk Communication Tool

Dr. Hermann Held

Professor, Chair Sustainability & Global Change
University of Hamburg
Germany

Abstract

Fisheries always has to deal with the possibility of the collapse of the fish stock. Harvest control rules aim at avoiding such collapse while ensuring viable economic gains at the same time. This dual goal function approach cannot be said to have always been successful. In Blanz, Courmier, Swain, Held (ICES, 2024) we point out that ‘globally, many fisheries have experienced collapse even though most of these fisheries had management plans with harvest control rules and were supported by scientific modelling that explicitly accounted for uncertainty. Recognizing that an informed decision on risks of a stock collapse versus harvest is only possible when the outcomes of the technical measures are described explicitly. We propose that the cumulative probability of stock collapse over a range of harvest levels would provide a perspective of the future consequences of harvesting decisions. Adding to the harvest level negotiations the consideration of how long a fishery should sustain the livelihoods of fishers may provide managers, fishers, and other stakeholders with a more tangible understanding of the risks within the context of precautionary principles in decision-making. We use a time series from the Canadian Cod fishery of the Southern Gulf of St. Lawrence, from which we construct and calibrate a simplified model as an emulator of more comprehensive models to demonstrate the approach. The implications of adding an analysis of the probabilities of stock collapse for a range of harvest levels and using a risk matrix to inform decision-making are discussed for four selected years 1974, 1986, 1993, and 2017.’

Biography

Dr. Hermann Held is a physicist who since 1999 has been dealing with climate statistics and climate economics. Since 2013, he also pursues research on sustainable development of fisheries in the presence of socio-ecological tipping points. Since 2010 he is Chair of Sustainability and Global Change at the University of Hamburg. 2010-2022 he acted first as Lead Author, then Review Editor for IPCC WGIII. 2013-2019 he co-led the project NOAH (North Sea Observation and Assessment of Habitats) and 2018-2023 SeaUseTip (Spatio-temporal analysis of tipping points in the socio-ecological system of the North Sea), both funded by the former German Federal Ministry of Education and Research (BMBF).

Title: The Just Allocation of Captured Forage Fish - Human Food or Fish Food?

Dr. Moshe Agami* and Dr. Amir Neori

Ecologist,
Tel-Aviv University
Israel

Abstract

Forage fish, a crucial source of nutrition in developing countries, are, unfortunately, primarily used for fishmeal and aquafeed production for aquaculture, which mainly serves consumers in developed countries. Industrial fish use leaves a meager portion of the catch available for direct human consumption in these fish-producing countries, leading to inflated fish prices locally. Overfishing forage fish due to the needs of the reduction fishery industry disrupts the ecosystem, diminishes the catch of larger fish, such as mackerel, and marginalizes local artisanal fishermen. This research briefly appraises the financial and nutritional impacts of elevated fish prices on low-income consumers in forage-fish-producing countries, drawing attention to the ethical implications of this situation. By reducing the supply to the industry, a hypothetical 10% boost in the annual supply of fresh forage fish to the current global supply of 5 million Mt (metric tons), markets could save consumers annually millions of US dollars. In summary, the current use of captured forage fish in reduction industries and aquaculture warrants further scrutiny, as it inadvertently burdens disadvantaged societies financially and nutritionally. This research proposes using alternative protein sources and cultivating non-carnivorous fish, among several optional measures, to ensure the equitable distribution of forage fish resources.

Keywords: overfishing; poor families; fisherfolk; artisanal fishermen; fishmeal; natural food chain; anchovy; sardines; social justice; supply and price; fish market

Biography

Dr. Moshe Agami is a botanist ecologist from Tel Aviv University, Israel with a passion for exploring the world's most diverse and remote ecosystems. His extensive expertise spans over five decades, encompassing academic research, field expeditions and a deep understanding of various environments. He has published books and many research articles in international journals of botany and ecology. He held the position of Director of the Botanical Gardens in Tel Aviv University for 13 years. He has been directing students and graduating them to academic degrees in botany and ecology for many years, teaching courses in phytogeography, ecology and adaptations of plants to different environmental conditions, climatology and vegetation life zones on earth etc. His work has focused on the following areas: ecology and ecophysiology of aquatic plants, role of aquatic plants in wastewater treatment, conservation of wild relatives of cultivated plants, impact of climate change on aquatic ecosystems, distribution and germination of aquatic plants seeds by fish and ducks.

Title: Defining and Constructing Islandness

Ms. Qingliu Ren

Faculty of Geographical Science, Beijing Normal University
China

Abstract

Islandness is a key concept for understanding the unique characteristics and development of islands. However, there remains debate on its definition, and a unified conceptual framework has not been established, particularly in the Chinese context. This paper reviews domestic and international research on islandness and explores its localized construction from the dual perspectives of people and islands. From the human perspective, islandness arises from the dynamic interaction between everyday island life and island imagination. Everyday life on islands is shaped by the production and livelihood practices of residents, forming localized experiences centered on place identity. In contrast, island imagination is influenced by external narratives and media, transforming the island into a space imbued with symbolic meanings and idealized projections. From the island's perspective, islandness emphasizes the distinct characteristics that differentiate islands from the mainland, including isolation and connectivity, vulnerability and resilience, localization and politicization. These attributes are continually reshaped through globalization, regional development, and ecological changes. The dual influence of individual experiences and island-specific attributes shapes islandness, enabling it to reflect local societal logic while being embedded within broader spatial networks.

Biography

Ms. Qingliu Ren is a Ph.D. candidate in Human Geography at the Faculty of Geographical Science, Beijing Normal University, with research interests in island spatial production, island tourism, and the relationship between humans and islands. Her research covers multiple fields, including cultural geography, tourism geography, island economy, and island production. She has participated in various projects, such as the second comprehensive scientific expedition of the Qinghai-Tibet Plateau, the protection and development of World Natural Heritage sites, tourism development and planning, and field research on the Green and Beautiful Guangdong ecological construction in Zhuhai.

Title: The Ship Financing Portal of The European Union

Dr. Salvatore Vitale

Professor of International Law of Economics at UNIDAV University
Senior Partner of Vitale & Partners, International Law Firm
Italy

Abstract

The International Maritime Organization in April 2025 approved a new set of regulatory measures aimed at reducing greenhouse gas emissions from the international maritime transport sector. Having in mind the need of European fleets to finance the purchase of new ships to improve the environmental health of the sea waters and avoid gas emission-related financial sanctions, the European Commission has activated the Ship Financing Portal, an on-line platform dedicated to provide information on the financial instruments available to promote the green transition of the maritime sector, which Portal has the purpose of improving access to finance for the renewal and modernization of fleets and to improve efficiency and reduce the environmental impact of ships, inclusive of an up-to-date information on grants, loans and other financial products administered by the EU, its Member States, and private financial institutions. The purpose is to help the greening of the maritime industry, as said Portal addresses the lack of available information on financing opportunities. In my presentation, I will describe how such Portal works and mention some financial products which are currently available and shown therein.

Biography

Dr. Salvatore Vitale is a lawyer – admitted to plead before the Italian Supreme Court and the European Court of Justice - with more than 40 years of international experience, having worked at multinational (Texas Instruments, as European Counsel) and Italian (Telecom Italia, as Head of Legal Affairs for Europe; Alitalia-Italian Airlines, as Head of Contracts) companies, and also at some prestigious U.S. (Baker & Mc Kenzie), English (Eversheds) and Italian (Chiomenti) law firms. He also acted as Board member of Malev-Hungarian Airlines (Hungary), STET International Netherlands, as well as Contract Manager of Bombardier Transportation Italy for the High Speed ETR 1000 Train Project, and, more recently, as Contract Manager-Remedy of Alstom Transportation for the sale of the former Bombardier's High-Speed Trains production and supply business to Hitachi Rail, in pursuance of the EU Commission's request.

Salvatore Vitale is the founder of Vitale & Partners, an international law firm. Besides practicing as a lawyer, he has been teaching for more than 20 years International Law of Economics at LUISS University (Rome, Italy), Siena University-Law School (Italy) and UNIDAV-Leonardo da Vinci University Law School (Italy).

Salvatore Vitale specializes in the negotiation and drafting of contracts for the construction, supply, maintenance, financing and leasing of ships, trains and aircraft, as well as the relevant aspects of maritime and aviation laws and regulations. He is the author of a handbook on legal aspects of international securitization transactions, and of several published articles on international financial transactions.

Title: Legal Liability in Maritime Incidents Involving AI-Oriented or Non-Human Operational Advanced Technology

Mr. Nobuto Yamaguchi
Managing Partner
Tokyo Sanno Law Office
Japan

Abstract

This speech explores the legal liability issues arising from maritime incidents caused, wholly or partially, by AI-oriented or non-human operational advanced technology. As the maritime industry increasingly integrates innovations such as autonomous ships (Maritime Autonomous Surface Ships), AI-driven logistics, and advanced navigation tools, existing legal frameworks will be put to the test. While these advancements enhance efficiency and safety, they also introduce complex legal challenges, particularly when accidents occur.

The speech provides an overview of how current maritime laws address these emerging technologies and identifies gaps in their applicability. By examining proposed legal frameworks for similar issues in land transportation and ongoing discussions within the IMO committees, the speech highlights key developments and potential regulatory responses. It also considers how legal standards may need to evolve to address accountability, responsibility, and compensation in an era of autonomous and remotely controlled ships.

Beyond analyzing current challenges, the speech offers forward-looking recommendations for policymakers, legal experts, and industry stakeholders. The objective is to ensure that as maritime technology continues to evolve, legal systems remain capable of balancing safety, operational efficiency, and fairness in resolving liability disputes.

Biography

Nobuto Yamaguchi is a legal professional based in Tokyo, Japan. A member of the Daiichi Tokyo Bar Association, he has developed a profound expertise across a range of legal specialties, especially shipping transaction. He holds an LL.B from Waseda University and an LL.M from the University of Washington School of Law, U.S.A.. He further enriched his academic credentials as a Visiting Scholar at Harvard Law School. In 1997, he founded Yamaguchi & Nagahama Law Firm, later renamed Tokyo Sanno Law Office in 2011. His professional path includes a significant tenure as a partner at Braun, Moriya, Hoashi & Kubota Law Office. His expertise extends to serving as an arbitrator at the Tokyo Summary Court and for the Tokyo Maritime Arbitration Commission (TOMAC) of the Japan Shipping Exchange Inc. His practice areas span litigation and arbitration, international transactions, law of advance technology, finance, and more. He is proficient in Japanese and English, which allows him to effectively handle a range of domestic and international legal matters. His professional approach combines diligence and a commitment to legal excellence, making him a valued member of the legal community in Tokyo.

Title: Specifics of Vessel Operation in Ice Conditions and Northern Sea Route Area

Mr. George Ossipov

Naval Architect, Surveyor, Director of Marinex ITS Ltd.
Vice-President of National Association of Insurance Adjusters
Russia

Abstract

Navigation in Arctic waters is an exception to coverage in most if not all of the traditional insurance conditions. The presentation will address some of basic requirements for ice classes of vessels as well as insurance applications for vessels navigating the Northern Sea Route.

Biography

George Ossipov graduated from St. Petersburg Marine Technical University (former Leningrad Shipbuilding Institute). In 1993 he started working for Marinex ITS Ltd., the first independent survey organization on the territory of former USSR. During 1994-2003 the company was the Lloyd's Agency for the North Western part of Russian Federation. In 2003 following the reorganization the company became private and continued working in marine claims and casualty management field. It is known as the leading marine claims survey organization on the territory of former USSR.

George Ossipov is certified Surveyor, highly skilled at performing a wide range of accurate marine and non-marine surveys driving productivity throughout entire line of expertise in the field of Marine losses, Cargoes of any kind and Property losses, Hull and Machinery surveys and Loss adjustments. In 2011 he was appointed as Vice-President of National Association of Insurance Adjusters in Russian Federation.

Title: One Ocean, One Law: Unification of Maritime Law and its Importance for the Effective Protection of the Ocean

Ms. Ramat Jalloh

Lecturer

IMO International Maritime Law Institute

Malta

Abstract

The use of ocean space is widely international by its very nature. During a single voyage, a ship may be subject to various national maritime laws governed by different national laws, while the crew, disputes, cargo and environmental impact transcend national boundaries. In this regard, national law loses its enforcement powers over events which are no longer national in nature. It has been posited that the need for international unification has not been felt more in any other area of law than in maritime law.

It has also been suggested that the history of maritime law is the history of internationally accepted practices. Therefore, ensuring uniformity in practice and enforcement of maritime law in ocean activities calls for what could be referred to as a *uniform law*. The international community has employed various methods for the unification of same and these are also not devoid of complexities. The presentation will evaluate the effectiveness of the unification strategies and highlight the challenges confronted in interpretation, enforcement and compliance.

The presentation will discuss the landmark evolution approaches in unifying maritime law and the emergence of national legislation with their consequent impact on the application of maritime law. This would be followed by a deliberation of the methods and entities responsible for unification.

Since there is no jurisdiction that can boast of a supranational scope, in a globalised context, the limits of national enforcement become evident, particularly in addressing shared concerns such as safety, labour rights or environmental protection. This presentation aims to demonstrate that a harmonized maritime regime is essential for international uniformity.

Biography

Ramat Jalloh is a Lecturer in International Maritime Law at the IMO International Maritime Law Institute (IMLI), where she lectures post graduate students on Private Law, International Law, Shipping Law, Law of the Sea, particularly Nationality, Registration and Ownership of Ships, International Maritime Labour Law, Marine Environmental Law and Maritime Legislation Drafting. In addition to lecturing, Ms. Jalloh is the Institute's coordinator of the IMLI Specialized Course on the Law of Treaties and the Course on Seafarers Rights'. She also assists and supports academic initiatives, participates in IMLI's research projects and co-ordination of IMLI's academic publications.

Ramat is a Ph.D. Candidate in the Ph.D. Program DO*MAR at the University of Vigo in Spain. She has a Master of Laws (LL.M.) awarded with Distinction in International Maritime Law from the IMO International Maritime Law Institute in Malta, Bachelor of Laws (LL.B) awarded with Honours and a Bachelor of Arts (B.A) from Fourah Bay College, University of Sierra Leone. Ramat is also a Barrister-at law and Solicitor (BL) by profession.

Title: Legal Aspects of Ship Recycling

Mr. Hari Narayan Veettath Brelviv

Partner

United Maritime Law Chambers

India

Abstract

The impending entry into force of the Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships on 26 June 2025 marks a milestone in global efforts to ensure that end-of-life vessels are dismantled without harm to human health or the environment. Adopted by the International Maritime Organization in May 2009, the HKC requires ships to maintain an Inventory of Hazardous Materials (IHM), develop a Ship Recycling Plan (SRP), and obtain an International Ready for Recycling Certificate (IRRC) before recycling at certified yards. These measures join a framework of international instruments, including the Basel Convention on transboundary movements of hazardous wastes (effective May 1992) and the EU's Ship Recycling Regulation (No. 1257/2013), to prevent toxic pollution and regulate cross-border disposal of ship-generated waste.

End of life vessels have to undergo stringent recycling protocols to avoid the leaks of asbestos, heavy metals, and ozone-depleting substances that have historically plagued developing-country shipbreaking sites. In regions lacking robust oversight, dismantling operations have led to soil and water contamination and exposed workers to life-threatening hazards, underscoring the necessity of binding global standards.

The legal procedure to purchase a decommissioned ship is complicated. Foreign buyers have to go through environmental permits, registration of ships, and compliance with international and national laws. The speech will cover the legal and regulatory aspect of Ship Recycling with reference to the HK Convention and national laws of countries engaged in ship breaking.

Biography

HARI NARAYAN is at Partner of United Maritime Law Chambers, a boutique admiralty law firm dealing with contentious and noncontentious shipping matters. After his graduation in Law, he did his LL.M in Maritime Law from the University of Southampton. He has more than 25 years of experience as a lawyer and regularly appears in several High Courts and Supreme Court in India. His area of expertise includes charter party, bill of lading and marine insurance disputes. He has advised several multinational Companies on shipping related issues including the Republic of Estonia through its Ambassador in India on a ship detention dispute. His clients include ship owners, Charterers, P & I Clubs, Freight Forwarders, Terminals, Ship Yards and Commodity traders.

He has served as a faculty for training Judges from the Federal Capital Territory High Court of Nigeria on the topic, "Commercial Arbitration", held at Dubai during 2008. He is a visiting faculty at Indian Maritime University, and Gujrat Maritime University and has delivered lectures at various forums in India and abroad on maritime-related topics. He is the sole faculty for Master class on Marine Insurance and Cargo claims organized at Dubai, Singapore, and Kuala Lumpur. He has conducted a 5-day course on Cabotage law at Dubai for Nigeria Maritime Administration. He has published articles and case reviews in leading law journals. Hari is a supporting member of the London Maritime Arbitrators Association (LMAA) and has conducted several arbitrations in London. He is also nominated as Arbitrator in LMAA arbitrations. He is also a member of Singapore Chamber of Maritime Arbitrations (SCMA) and the governing council member of Maritime Law Association of India (MLAI). He is a member of International Bar Association.

WCO 02:

Ocean Engineering, Science and Technologies

Chair

Mr. Earl J. Dodd, Co-Founder & CTO, MMersive Technology, Inc., USA

Time: 08:30-12:30, November 12, 2025 (Wednesday)

Place: Yoshino, Fifth Floor

Title: Applications of Underwater Digital Holography for Ocean Exploration

Dr. Victor Dyomin*, Dr. Igor Polovtsev, and Dr. Alexandra Davydova

First Vice-Rector

National Research Tomsk State University,

Russia

Abstract

Currently, the monitoring of ocean properties and parameters via various sensors (marine sensorics) is widely used. Traditionally, the sensors form a global information network that analyzes and forecasts the state of the ocean through the big data analysis. The purpose of such networks may vary from the protection of water area perimeter to weather and environmental forecast. Information measuring systems based on underwater digital holography are one of such measuring tools of marine sensorics that allow determining the concentration, location, measuring the geometrical parameters, recognizing and analyzing the dynamics of marine particles, such as plankton, marine snow, solid particles of inorganic suspension, gas bubbles, oil droplets, etc.

This paper presents a DHC technology for underwater recording of digital holograms of a medium volume with particles, subsequent numerical layer-by-layer reconstruction of a holographic image of this volume, and the analysis of particles that were in the volume at the time of hologram recording. The paper describes several design alternatives of a submersible DHC (Digital Holographic Camera) and hydrobiological probes constructed on its basis. The results of field studies using the DHC may include the following:

- construction of spatial and temporal distributions of plankton *in situ* in a continuous data flow mode;
- oceanological studies in the continuous data flow mode during a stationary moorage;
- *in situ* classification of plankton according to taxonomic features;
- *in situ* analysis of plankton particles behavior for the early biotesting near hazardous facilities.

The paper presents several DHC operating modes, including background monitoring and paired photostimulation of plankton. It considers the underwater observatory for the monitoring and early prediction of the ecological situation in the water area, as well as a few options to present and interpret the measurement results, including spectral representation of monitoring time series.

Biography

Dr. Victor Dyomin is the First Vice-Rector at National Research Tomsk State University (TSU), Associate Professor at the Department of Optoelectronic Systems, and Head of the Laboratory of Radiophysical and Optical Methods of Environmental Research. Research interests include optics, holography, digital holography, underwater holography of plankton, ecology, and methodology of education in optics.

He authored 80+ journal papers, 45+ papers in Proceedings (SPIE, IEEE, OSA, etc.), 14 patents and 2 text books and made many invited presentations at national and international conferences, the whole list of works includes more than 250 items. During the last 10 years, Professor Dyomin has been a PI and co-PI of more than fifteen successful grants projects. He is the Laureate of the 2020 Government Prize of the Russian Federation in the field of education. He is awarded the Medal of the Order "For Merit to the Fatherland" II degree (2022), the Medal of Yu.N. Denisyuk of the Optical Society named after D.S. Rozhdestvensky (2022). Professor Dyomin is a Senior Member of the Optica (former Optical Society of America), Member of IEEE, and SPIE.

Title: Technical Reference (Tr) Books on Competence Standards and Performance Criteria for Liquefied Natural Gas (Lng) Floating Storage Unit (Fsu)

Ts. Dr. Captain. Manivannan Subramaniam

Chief Executive
Akademi Laut Malaysia
Malaysia

Abstract

This paper introduces an innovative initiative by Akademi Laut Malaysia (ALAM), in collaboration with Lloyd's Register (LR) and supported by the Malaysia Marine Department (MMD) and MISC Berhad. Together, five Technical Reference (TR) books been developed focusing on Competence Standards (CS) and Performance Criteria (PC) for officers working on Liquefied Natural Gas (LNG) Floating Storage Units (FSUs). The aim of these books is to create a structured framework that ensures the continual improvement of FSU officers' competence, extending beyond the minimum requirements of the STCW Convention. The key goals include addressing competence gaps through Training Needs Analysis (TNA), promoting the identification of qualified officers, and enhancing training materials for LNG FSU operations. The TR books comply with essential regulations such as the STCW Code, IGC Code, and ISO standards, serving as valuable resources for ship owners, managers, training academies, and officers. Additionally, the initiative promotes the adoption of a Continual Competence Management System (CCMS) to ensure ongoing development and operational excellence in LNG FSU operations. The paper underscores the significance of these TR books in strengthening Competence Management Systems amidst rapid advancements in maritime technologies and regulations, and encourages the International Maritime Organization (IMO) members to consider these references for global maritime competence development.

Biography

Ts. Dr. Capt. Manivannan Subramaniam is an accomplished maritime professional whose career began as a Deck Cadet with MISC Berhad's pioneering LNG fleet. After gaining significant sea experience and earning his Master Mariner - Class 1 (Unlimited) Certificate of Competency, he transitioned to education as an instructor and lecturer at Akademi Laut Malaysia (ALAM), where he has been instrumental in training future maritime professionals. While at ALAM, he pursued advanced studies, obtaining a MSc. in Emergency Response and Planning from University Putra Malaysia and a PhD in Mechanical Engineering from Universiti Teknologi Malaysia. His academic background complements his practical maritime expertise. He has successfully delivered several world-first LNG projects, including an LNG e-Learning platform, an LNG Simulator Course for the IMO, and contributions to PETRONAS PFLNG. Over his career, he has led more than 100 applied research projects related to the maritime industry.

Recognized internationally for his contributions to maritime education, he was appointed Adjunct Professor by American Digital University (ADU) in 2021, solidifying his status as a leader in the field. He has also co-authored six technical books on LNG, five of which are world firsts focusing on LNG FSU Technical Competencies. Currently, Ts. Dr. Capt. Manivannan is the Chief Executive of Akademi Laut Malaysia, where he shapes the institution's educational strategies and academic programs, ensuring its relevance and sustainability. His combination of practical experience and academic leadership has established him as a pivotal figure in advancing Maritime Education and Training (MET) both in Malaysia and globally.

Title: MMersive: STEAM Powered Immersive EdTech for Ocean Science and Conservation

Mr. Earl J. Dodd

Co-Founder & CTO

MMersive Technology, Inc.

USA

Abstract

Our oceans, teeming with life and covering 71% of Earth, forming a critical element of the planet's life force, still need to be explored and represented in education, serious gaming and overall public consciousness. MMersive, an AI-powered EdTech platform, seeks to transform this using mixed-reality (MR) experiences that immerse users—gamers, students, researchers, and policymakers—in the dynamic currents of marine ecosystems, conservation challenges, and technological innovations. In the rapidly expanding \$254 billion global edtech market, MMersive fuses gamification with real-world ecological science to inspire all generations of ocean advocates with vital knowledge.

This session invites a paradigm shift in exploring ocean sciences, moving from passive learning to active, solution-focused exploration. Users dive into engaging missions, from simulating coral reef restoration and battling invasive species to addressing pollution with AI-driven data modeling. These experiences present education as an interactive convergence of discovery, innovation, and stewardship, identifying and introducing environmental challenges as compelling solution gameplay.

For researchers and policymakers, MMersive is more than an educational tool or serious gaming platform; it's a bridge to public engagement and action. The platform enhances research outreach and fosters comprehensive marine policy and conservation collaboration by championing digital simulations and interactive learning. The question is not whether ocean science can be effectively taught digitally but how soon we can scale these immersive experiences to drive real-world change. As the EdTech sector gains momentum, platforms like MMersive promise to reshape ocean literacy and sustainable practices, setting a new benchmark for how technology can deepen understanding of our most vital ecosystems.

This session will outline MMersive's use of Immersive EdTech to revolutionize ocean education through serious gaming, highlighting its urgent role in fostering global environmental awareness and action.

Biography

Earl J. Dodd (♂), as an Accelerated Computing (AI) and Supercomputing Strategist, leads and mentors high performance computing (HPC) and high performance data analytics (HPDA) organizations and applies his specialized genius when clients encounter extreme computing and data needs. Mr. Dodd's mission is to leverage these needs to create a safer, cleaner, and healthier world through servant leadership and appropriate technology. Because of this passion to serve, Mr. Dodd co-founded MMersive Technology and leads as its CTO to pioneer an edtech platform combining AI-powered learning, virtual reality, and gamification to immerse users—students, researchers, and gamers—in ocean conservation and STEAM education.

Mr. Dodd holds degrees in Mining Engineering and an MBA. He actively engages with the U.S. Council on Competitiveness, White House Office of Science & Technology Policy, Society of HPC Professionals, Compute Canada, Ontario Ministry of Research & Innovation, and other professional organizations and national governments. Mr. Dodd holds positions on various technology companies and boards. He resides in Whitehall, Montana, USA and travels the world for business and pleasure.

Title: Predicting Marine Ecosystem Responses: Lessons from Young Fossil Records

Dr. Yael Edelman-Furstenberg

Head

Marine Geology Division, Geological Survey of Israel

Israel

Abstract

Understanding of the ongoing changes shaping benthic communities on seafloors today, including humans impacts, is crucial to understanding how marine ecosystems are transforming, at what rate, and how to predict future change. Identifying the drivers nonetheless remains challenging because most scientific studies began after the onset of local human stresses and because we lack data on key benthic components from periods before human influence.

Skeletal death assemblages offer a unique solution. They are typically time-averaged, filtering out short-term fluctuations while preserving records of populations from now-vanished environments. This makes them invaluable baselines for understanding the current ecological status of marine ecosystems.

I will demonstrate how young fossil records capture long-term ecological change and differentiate between natural and anthropogenic stressors. Specifically, I will examine high-resolution, dated sediment cores and use molluscan death assemblages to evaluate environmental influences across the eastern Mediterranean shelf over the past centuries. Mollusks are sensitive recorders of seafloor conditions, naturally preserving historic environmental conditions. Major perturbations including the Suez Canal opening, Nile damming, and coastal development have strongly affected eastern Mediterranean biota. Molluscan assemblages show feeding mode changes over time, with deposit feeders disappearing following Nile damming and subsequent nutrient depletion. Variations in relative abundance and community structure captured these undergoing long-term changes. Identifying these patterns is crucial for correctly understanding the present ecological state and changed Mediterranean monitoring program results.

Biography

Dr. Yael Edelman-Furstenberg received her Ph.D. from the Department of Geophysical Science at the University of Chicago in 2003 and currently serves as a senior researcher and Head of Marine Geology research at the Geological Survey of Israel, where she leads the Macrofaunal Invertebrate Laboratory. She also curates the Survey's fossil collections and initiated their digitization.

Yael's research focuses on using fossil concentrations and shelly remains to understand marine environmental evolution across geological timescales through the present day. By combining paleontological outcrop studies with conservation biology fieldwork at sea, she addresses key questions about environmental change, ecosystem responses, and biodiversity patterns. Her research interests span marine upwelling ecology and taphonomy, applying death assemblages as ecological baselines, and reconstructing seafloor conditions throughout the eastern Mediterranean, Red Sea, and Middle East.

Title: Methodology for Precise Monitoring of River Bottom Changes Using Geodetic and Hydroacoustic Techniques

Dr. Dariusz Popielarczyk* and Tomasz Templin

Dean of Faculty of Geoengineering
University of Warmia and Mazury
Poland

Abstract

During the operation of water power plants, there is often an engineering problem in the form of pothole formation on the river bed. This is usually caused by increased fluvial erosion due to a reduced water level behind the power station, along with frequent changes in the water flow rates and water levels caused by varying technological and economic operation of the power plant. The research presents precise geodetic and hydroacoustic monitoring of alluvial Vistula river bottom changes behind the power station in Wloclawek, the largest in Poland. The original plan was to build eight water power plants north of Warsaw on the biggest Polish river, the Vistula, which would optimize the hydraulic conditions of the river in relation to the ongoing erosion and sedimentation processes. Unfortunately, only one water power plant was built in 1970, the Wloclawek water power plant. As a consequence, the formation of potholes endangers the concrete structures of the water power plants and the threshold, which serves for partial water flow stabilization. The bathymetric measurements were performed using a GNSS satellite positioning system and a Single Beam Echosounder System (SBES) hydroacoustic system. The critical problem during practical surveys was the height of the water surface and water flow speed during depth measurements (rough and choppy water, quick water level changes caused by the time depended on work of power station work). Four years of mobile bathymetric mapping of the riverbed showed a lowering of the bottom surface by an average of 5-7 cm per year. This enables the analysis of changes in the shape of bed erosion, sedimentation movements and the identification of potentially dangerous changes in the river bed.

Biography

Dariusz Popielarczyk - Associate Professor with the Department of Geodesy. He is currently a Dean of the Faculty of Geoengineering, University of Warmia and Mazury, Poland. His research interest includes hydrography, Unmanned Aerial Vehicles, geodesy and cartography, satellite geodesy and satellite navigation. He is mainly involved in inland bathymetric surveys. He has conducted first integrated satellite/hydroacoustic measurements of two famous polish lakes: the biggest – Lake Śniardwy and the deepest in the central part of European Depression – Lake Hańcza. Recently he deals with single and multi-beam hydrographic measurements of water bodies with difficult hydrological conditions: hydroelectric and pumped-storage power plants and mine sludge reservoirs. He is a member of Association of Polish Surveyors, Polish Navigational Forum and Polish Hydrographic Society (Hydrographic Surveyor, Certificate Category B).

Tomasz Templin - Researcher and Consultant specializing in Geomatics and GIS systems. He has 20 years of professional experience in diversified service industries (satellite geodesy, surveying, geoinformatics, water sciences, transportation, environment protection). In 2010 he received his Ph.D. in Satellite Geodesy. He has served in the Department of Geodesy in Olsztyn teaching programming, databases, GIS and mobile technology courses. His research and teaching focused on Distributed and Mobile Geographic Information Systems, spatio-temporal analysis, Virtual and Augmented Reality, and laser scanning. In several years, he was involved in many R&D projects funded by private companies, public institutions, national and international agencies.

Title: Remote Sensing of Coastal Environments – The Concept of Land To-Sea (L2S) Mapping Using Earth Observation Data

Dr. Natascha Oppelt

Professor
Kiel University
Germany

Abstract

Coastal regions are dynamic interfaces where land and ocean processes intersect, impacting ecosystems, economies, and societies. Effective management and sustainable development in these areas require holistic monitoring solutions capable of bridging terrestrial and marine domains. This speech introduces the concept of land-to-sea (L2S) mapping, emphasizing the powerful role of remote sensing technologies in capturing, analyzing, and integrating environmental data across the entire land-sea continuum.

Remote sensing enables the seamless acquisition of high-resolution spatial and temporal information from satellites, drones, and marine sensors, supporting the harmonized monitoring of key parameters such as land cover changes, shoreline dynamics, sediment transport, water quality, and habitat connectivity. By combining different approaches, the concept aims at overcoming system boundaries and create integrated datasets that improve predictive models and inform evidence-based coastal management strategies.

The speech highlights interdisciplinary workflows that leverage artificial intelligence and FAIR data principles to fuse terrestrial and marine measurements, fostering collaboration among natural, engineering, and economic sciences. The speech will showcase case studies on how land-to-sea protocols and mapping support adaptive management under rising sea levels, climate impacts, and competing land and ocean uses. The presentation aims to inspire cross-sectoral dialogue and demonstrate how remote sensing-based L2S mapping delivers new insights for policy, conservation, and resilience in coastal regions – advancing both scientific understanding and societal co-design for sustainable coastal futures.

Biography

Natascha Oppelt graduated in Physical Geography/Remote Sensing at Ludwig-Maximilians-Universität (LMU) Munich in the field of airborne imaging spectroscopy. During her habilitation at LMU, she specialized in multi-angular remote sensing and the integration of remote sensing data in physical based model approaches. Since 2008, she is professor at Kiel University and head of the “Remote Sensing and Environmental Modelling” group.

At Kiel University her main research interests are in the development of methods for process-oriented and spatially differentiated environmental observation remote sensing technology, GIS and modelling approaches. Natascha Oppelt offers strong expertise in land use/land cover monitoring and analysis including natural and agricultural land use systems in Europe, Latin America, Southeast-Asia and Arctic regions on trans-regional, regional and local scales. Her research projects show a strong focus on fusion of different, active and passive sensors and multi-temporal analysis of image data for environmental analysis of agricultural systems, land surface processes, landscape development, ecology, ecosystem services, and aquatic ecosystems.

She is also involved in a number of projects focusing on the processing and analysis of remote sensing data to support a sustainable land and coastal zone management. In this context, she is developing remote sensing applications for optically complex, coastal and inland waters. An important aspect is in combining remote sensing data and modelling using different model approaches and ensembles including bio-optical modelling of aquatic environments for monitoring water quality and, in shallow waters, bathymetry and benthic vegetation of inland and coastal waters.

Title: Estimation of Chlorophyll-a Concentration in Hiroshima Bay Using Landsat-8/9 Data

Mr. Yoshinari Oguro

Professor

Hiroshima Institute of Technology

Japan

Abstract

Hiroshima Bay in Hiroshima Prefecture is a very famous place for oyster farming. In oyster farming, it is very important to correctly grasp marine information such as chlorophyll-a concentration and seawater temperature. Accurate measurement at fixed points of chlorophyll-a concentration and seawater temperature are also very important, but the use of satellite data such as Landsat-8/9 data is effective in obtaining a wide area of information. Previously, we examined a method for estimating chlorophyll-a concentrations using the linear combination index (LCI) of Robert Frouin et al. using Landsat-8 data observed in the Uwa Sea in Uwajima City of Ehime Prefecture. In addition, Landsat 9 was launched on September 27, 2021, and now the observations can be made every 8 days using Landsat-8 data and Landsat-9 data. Therefore, we applied the previously developed method for estimating chlorophyll-a concentrations to Landsat-8/9 data observed in Hiroshima Bay. As a result of examining the relationship between the estimated chlorophyll-a concentration by Landsat-8 data and the actual measurement by the Japan Coast Guard, the absolute values were slightly different, but the characteristics of the changes in chlorophyll concentration due to different locations were consistent. In addition, the coefficients and indices of the estimation equation were almost equal to the coefficients and indices of the estimation equation obtained from simulated spectral reflectance of the Bio-optical model by Morel et al.

Biography

Yoshinari Oguro has been involved in education and research related to satellite remote sensing, digital signal processing and programming etc. at university for over 30 years. The general research theme is to understand earth surface conditions using satellite data observed on land and marine. In recent years, I have been engaged in research on marine environmental information using satellite data. Also, he served as the vice president of the Japanese Society of Remote Sensing from 2020 to 2021. As a publication, there is a textbook for university students on electromagnetism.

Title: Machine Learning Methods Comparison for Maritime Wireless Signal Strength Prediction

Dr. Kun Yang, Lisha Peng, Jianming Wu, Chengyuan Wen, Tong Peng, and Xin Li*

Professor
Zhejiang Ocean University,
China

Abstract

The prediction of 5G signal strength in maritime environments using artificial intelligence (AI) offers advantages such as ease of implementation and high accuracy. However, the optimal machine learning model for maritime applications remains unclear. This study evaluates twelve predictive models, including eight machine learning and four linear regression approaches, for estimating reference signal receiving power (RSRP) and received signal strength indicator (RSSI) in land-to-ship (L2S) scenarios. The models are trained on a dataset collected with custom-designed equipment and refined through feature selection to maximize accuracy. Results demonstrate that machine learning models generally outperform linear regression models in fitting and predicting RSRP and RSSI. Notably, rule-based models like decision tree regression (DTR) effectively capture the impact of both large-scale and small-scale fading while maintaining strong interpretability. This work provides valuable insights for future machine learning-based channel modeling and evaluation in maritime environments.

Biography

Prof. Kun Yang, a leading expert in maritime communications, heads Zhejiang Ocean University's Ocean Connectivity Lab and the Zhejiang Oceanographic Big Data Mining & Application Key Lab. With a Ph.D. from NTNU (Norway) and postdoctoral experience at IFSTTAR (France), he pioneered the world's first maritime 5G project, securing NOK 13.6M funding. His innovations in massive MIMO and maritime propagation have been featured on top 5G blog and media (Bloomberg, Nasdaq, People's Daily). He has published 70+ SCI/EI papers and spoken at 5G World Summit, APMC, and other global forums. Since 2021, he serves as a full professor at ZJOU, focusing on maritime wireless communications and channel modeling.

Title: An Analysis of the Spatio-Temporal Distribution of Recreational Boating Tourism Traffic on Inland and Coastal Waters

Dr. Tomasz Templin^{}, Dariusz Popielarczyk, and Marcin Gryzsko*

Researcher and Consultant

Faculty of Geoengineering, University of Warmia and Mazury

Poland

Abstract

The safety of navigation on inland and coastal water bodies significantly impacts the development of modern nautical tourism. Up-to-date, reliable information is crucial for determining safe, tourist-attractive routes, which, in turn, affects the attractiveness of places, the number of tourists, and the region's economy.

Modern GIS systems help manage water traffic. Using bathymetric data, existing GIS databases, weather parameters, and POI databases, Operators can designate safe sailing routes and influence the development of coastal infrastructure. The right location of ports and marinas helps stimulate the development of sustainable tourism and, consequently, a region's economy.

Our article reveals the potential of historical data in analyzing recreational boating tourism traffic on inland waters. We propose an innovative methodology that leverages raw spatio-temporal data to analyze user behavior, considering time, weather, POIs, events in the area, and tourist attraction locations. This approach utilizes trajectory datasets and GIS algorithms to extract patterns and rules, optimizing the algorithm for determining new routes.

Biography

Tomasz Templin - researcher and consultant specializing in Geomatics and GIS systems. He has 20 years of professional experience in diversified service industries (satellite geodesy, surveying, geoinformatics, water sciences, transportation, environment protection). In 2010 he received his Ph.D. in Satellite Geodesy. He has served in the Department of Geodesy in Olsztyn teaching programming, databases, GIS and mobile technology courses. His research and teaching focused on Distributed and Mobile Geographic Information Systems, spatio-temporal analysis, Virtual and Augmented Reality, and laser scanning. In several years, he was involved in many R&D projects funded by private companies, public institutions, national and international agencies.

Dariusz Popielarczyk - Associate Professor with the Department of Geodesy. He is currently a Dean of the Faculty of Geoengineering, University of Warmia and Mazury, Poland. His research interest includes hydrography, Unmanned Aerial Vehicles, geodesy and cartography, satellite geodesy and satellite navigation. He is mainly involved in inland bathymetric surveys. He has conducted first integrated satellite/hydroacoustic measurements of two famous polish lakes: the biggest – Lake Śniardwy and the deepest in the central part of European Depression – Lake Hańcza. Recently he deals with single and multi-beam hydrographic measurements of water bodies with difficult hydrological conditions: hydroelectric and pumped-storage power plants and mine sludge reservoirs. He is a member of Association of Polish Surveyors, Polish Navigational Forum and Polish Hydrographic Society (Hydrographic Surveyor, Certificate Category B).

Marcin Gryzsko - owner of the company Infeo and a Chief Executive Officer in Wake App. from the IT sector, developing web and mobile applications for over 15 years. He is responsible for product management, directing the developer's team, and mobile applications programming. The Infeo company is developing several start-ups and is liable for the biggest web service for tutors in Poland called e-korepetycje.net. In the last four years, Marcin Gryzsko has been developing a mobile application Żegluj aimed at sailors and other inland water waterways participants. He advantages of his education in satellite navigation and geoinformatics, software development.

Title: Antibacterial Properties of Marine Bacteria Isolated from the New Caledonia Coast Against Methicillin-Resistant *Staphylococcus aureus*

Céphas Xuma^{*1}, Alexandre Bourles², Eleftherios Chalkiadakis³, Simon Gensous³, Frédéric J. Veyrier⁴, Julien Colot^{2, 5}, Linda Guentas⁶, Mariko Matsui¹

1 Bioactivities of Natural Substances and Derivatives, Institute Pasteur of New Caledonia

2 Medical and Environmental Bacteriology, Institute Pasteur of New Caledonia

3 BIOTECAL, New Caledonia

4 Armand-Frappier Center, National Institute of Scientific Research (INRS), Canada

5 Territorial Hospital Center of New Caledonia

6 Institute of Exact and Applied Sciences, University of New Caledonia

Abstract

Antimicrobial resistance poses a major threat to global public health, requiring the urgent discovery of new effective antibacterial agents. Among resistant pathogens, methicillin-resistant *Staphylococcus aureus* (MRSA) is classified by the WHO as a high priority for the discovery of novel antibiotics. As conventional antibiotics lose efficacy, exploring new natural sources is crucial. Marine ecosystems, with their rich microbial biodiversity, produce diverse bioactive secondary metabolites with notable antibacterial activities. This study evaluates the antibacterial potential of marine bacteria isolated from New Caledonia; a region known for exceptional marine biodiversity.

Twenty-one bacterial strains isolated from marine samples collected along the coasts of New Caledonia were screened for antibacterial activity using agar diffusion assays. The test panel included clinically relevant pathogens, notably members of the ESKAPE group, such as both susceptible and resistant strains of *S. aureus* and *Pseudomonas aeruginosa*, as well as *Enterococcus faecalis*, and other high-priority pathogens including susceptible and resistant *Escherichia coli*. Whole genome sequencing (WGS) was subsequently performed on selected isolates to confirm taxonomic identity and to investigate the presence of biosynthetic gene clusters (BGCs) potentially responsible for antimicrobial compound production, using the antiSMASH tool.

Three *Salinivibrio* spp. and one *Micrococcus* spp. isolates exhibited notable antibacterial activity against MRSA. WGS of the *Salinivibrio* strains revealed multiple BGCs, including those encoding ribosomally synthesized and post-translationally modified peptides (RiPPs) and β -lactones, which are likely contributors to the observed activity. Active bacterial cultures (both pellet and supernatant compartments) will undergo solvent partitioning to generate fractions, each of which will be tested for antibacterial activity. In parallel, fractions will be analyzed using LC-MS to identify the bioactive compounds. This integrative approach, combining microbiological screening, genomics, and chemical profiling, highlights marine bacteria from New Caledonia as promising sources of new antibacterial agents targeting multidrug-resistant pathogens.

Biography

Céphas XUMA is a third-year Ph.D. Candidate at the Pasteur Institute of New Caledonia, focusing on the discovery of novel antimicrobial compounds derived from marine bacteria, based on isolates collected between 2015 and 2017 by BIOTECAL, a New Caledonian start-up specialized in developing biologically active products from marine microorganisms for industrial and commercial applications. After earning a Master's degree in environmental management and environmental sciences from the University of New Caledonia, Céphas completed his master's internship at the Institute of Exact and Applied Sciences (ISEA), where he investigated microbial communities associated with a nickel-hyperaccumulating endemic plant, which strengthened his interest in microbiology and marine natural products. Drawn to the theme of marine bacteria and the challenge of antibiotic resistance, he chose to pursue this doctoral research, integrating classical microbiology, bioassays, chemical analyses, and genomic approaches to identify and characterize antibacterial secondary metabolites. His work is conducted within a multidisciplinary collaboration involving microbiologists, chemists, and genomics specialists, aiming to explore the potential of local marine biodiversity and contribute to the development of innovative therapeutic solutions addressing the growing threat of antibiotic resistance.

Title: Aequor's Products Mimic Nature's Remedy for Micro and MacroFouling

Dr. Marilyn Bruno
Co-Founder and CEO
Aequor Inc.
USA

Abstract

Aequor's has harnessed Nature's unique mechanism to inhibit unwanted bacteria and fungi from forming biofilm – the glue that allows them to attach to inert, nano and organic surfaces and root cause of microfouling (slime, corrosion, scale, contamination, infection) and macrofouling (attachment of barnacles, mussels and algae to surfaces in contact with water).

This presentation will describe the discoveries of Marine and Medical Microbiologist Cynthia Burzell, Ph.D. who found a new genus and several new species of marine microbes in the coral reef that produce novel chemicals that inhibit biofilm formation for days and remove pre-formed biofilm in minutes, completely eliminating fouling.

Dr. Burzell co-Founded Aequor to synthesize and develop 70 analogs of one of the natural chemicals; 25 are EPA/TSCA-approved and used in Aequor's suite of cleaners and water treatments. NASA, DOD, USDA, DOE and several multinationals validated that these chemicals outperform everything on the market to eliminate biofilm and fouling and save up to 50% energy in existing water systems and processes using water.

Biography

Marilyn Bruno (B.A. Mount Holyoke College; MA, Ph.D. New York University; J.D. New York Law School) had a 20-year career in international business and law and 16 years as a U.S. Foreign Service Officer prior to joining Aequor in 2009. She supports Dr. Burzell's breakthrough discoveries, raises funding, applies for grants, liaises with business and scientific advisory boards to bring in expertise for each new use case and execute on large government and commercial contracts.

Marilyn is involved in policy development for renewable energy, clean water, and the replacement of thousands of tons of toxic biocides that trigger further antimicrobial resistance (AMR), thicker fouling and up to 50% more carbon emissions. When the UN declared AMR the greatest threat to mankind's survival, she was invited to speak about biofilm, One Health and access at the UN General Assembly High Level Meetings on AMR. Since Aequor's "gold mine" of novel chemicals was discovered in the coral reef, she is also committed to protecting our oceans and their vast untapped resources.

WCO 03:

Ocean Energy Development and Utilization

Chair

Mr. Andy Billcliff, CEO, Menter Mon Morlais Ltd., UK

Time: 13:30-15:15, November 12, 2025 (Wednesday)

Place: Yoshino, Fifth Floor

Title: Ocean Thermal Energy Can be Economical Today

Mr. James H Anderson

President
Sea Solar Power
USA

Abstract

Ocean thermal energy conversion (OTEC) has been recognized since the late 1800's, as a very large, practically infinite source of solar energy, captured and stored in the ocean and capable of being tapped. Many studies prove this possibility, and numerous small experimental models and plants have been built since the 1930's which certainly prove that this source of heat can physically be harnessed. OTEC is potentially the best and only "green" source of energy which is truly base load or continuous. That means no storage system, batteries and converters are needed.

Today, almost universally, engineers agree on OTEC science but have differing approaches to design and engineering for practical plants. Pure and solely OTEC thermal efficiency is not the overall key to a successful plant model. The best use of pumped water, warm and cold, to maximize the kilowatts per quantity of water pumped together with the minimization, cost of materials, manufacture, and installation methods used in constructing and installing the plant will ultimately lead to the best solutions for making an OTEC plant competitive with fossil fuels.

This paper describes how an OTEC plant can be constructed in an economical way providing design features and costs. The result is a floating OTEC plant that will provide lower levelized cost of electricity than can be obtained using diesel oil delivered through tankers for diesel generators. The 25,000 KW net commercial plant described in this paper can be built today with present technology and provide massive savings for the countries who will install it first. It is the only economical "green" base load electric producer available to man today.

Biography

James Anderson is a graduate of the Massachusetts Institute of Technology with Bachelor of Science degrees in Mechanical and Electrical Engineering. As his BS thesis in 1963 in Mechanical Engineering, he wrote a proposal for an ocean thermal power plant in the Gulf Stream off the coast of Miami.

After graduation in 1963, he served at sea in the US Navy in engineering duties where he experienced the rigors of open ocean storms. From 1962 on, Anderson, with his father, J. Hilbert, began serious independent study on ocean thermal energy. After Jim Jr. thesis, they wrote their first technical papers published in Power Magazine, 1965 and later in Mechanical Engineering, 1966. After college and the Navy, Anderson went to work as a junior engineer for the consulting engineering company, Jackson and Moreland, a division of United Engineers in Boston, Massachusetts. It was here where he started working on cycle optimization and a bottoming cycle for a new nuclear power plant.

In 1968 Anderson, his father J. Hilbert and George Miller started Coupling Corporation of America to make high speed flexible non-lubricated shaft couplings. In 1972 the Andersons incorporated Sea Solar Power and later J. Hilbert Anderson Inc. During the period 1969-1980, the 3 companies designed and built the first commercial 11 MW hot water geothermal power plant in the world for Magma Energy of California.

Anderson's father, J. Hilbert died in 2004, but Anderson continued as president of Sea Solar Power, Coupling Corporation, and J. Hilbert Anderson, Inc. and James Anderson III came into the business. These companies have grown into a multimillion-dollar combination, engaged in research, development, and manufacture of proprietary product lines. They operate out of their two manufacturing plants of about 7000 sq. m. in Jacobus, PA and Hanover, PA, USA.

Title: Progress and Challenges of Key Technologies in Deepwater Drilling Engineering

Dr. Yanbin Wang

Professor

China University of Petroleum, Beijing

China

Abstract

Deepwater drilling, conducted beyond 500m water depth, represents a critical frontier in offshore oil and gas exploration, characterized by significant technological advances and persistent challenges. Key innovations include dynamic positioning systems, subsea BOP stacks, jetting-in conductor techniques, and advanced well control technologies that enhance operational safety in harsh environments. However, deepwater operations face narrow pressure windows, shallow geohazards, extreme metocean conditions, and gas hydrate risks. High costs and potential environmental consequences further underscore the complexity of these projects. Future development relies on digitalization, smart drilling systems, and advanced materials to improve efficiency and risk management, supporting sustainable deepwater resource extraction for global energy supply.

Biography

Dr. Wang Yanbin has long been engaged in scientific research and engineering practice related to drilling string mechanics and design control technologies. He has achieved systematic and innovative research results, particularly in the areas of riser mechanical behavior analysis and control, as well as subsea wellhead stability and wellbore integrity design and control. He has established novel methodologies for the safe and efficient control of deepwater drilling strings under complex conditions, providing a scientific basis and new technical support for the design and control of deepwater oil and gas drilling engineering projects. Dr. Wang has published over 80 high-quality academic papers, co-authored one English monograph, and obtained 24 authorized invention patents.

Title: Morlais Tidal Energy, the Long Voyage, Latest Position

Mr. Andy Billcliff

CEO

Menter Mon Morlais Ltd.

UK

Abstract

We at Morlais believe the Morlais scheme to be the largest consented Tidal Stream Energy site in the world. This is the story of a small community-based organization embarking on the almost impossible task of delivering a large scale 'plug and play' consented and grid connected tidal energy generation scheme in a beautiful and heavily regulated part of North-West Wales in the UK. I will introduce you to the parent company Menter Mon, its origins and make up, give a brief overview of the Morlais scheme's history and some of the problems encountered along the way. I will introduce the developers already contracted to deploy turbines in the zone including an overview of the technology to be used. I will then describe the environmental monitoring and mitigation plan (EMMP) and the Marine Characterisation Research Project (MCRP), both developed to enable more rapid scientific and evidence-based deployment of underwater turbines up to the 240MW capacity of the zone.

Biography

Andy has over 40 years' experience in power plant development construction and operation. After building nuclear submarines, Andy joined the Merchant Navy as a marine engineer. Then in the Central Electricity Generating Board and successor companies he gained experience in nuclear, coal, oil, hydro, and wind generation. Running RWE's UK wind fleet including North Hoyle, the first commercial offshore wind farm, before becoming director of their UK Hydropower business. Building and operating over 20 embedded hydropower schemes predominantly in Scotland. Andy is currently CEO of Menter Mon Morlais Limited, and a board member of the parent company, Menter Mon, with responsibility for Energy. He is also a board member of North Wales Tidal Energy and Coastal Protection, a tidal lagoon project in North Wales, and a governor of Grwp Llandrillo Menai, one of the largest further education establishments in Wales and recently worked with Scottish Power Energy Networks on their customer engagement group for the RIIO ED2 regulated business plan, and in late 2023 retired as a long standing director of the British Hydropower Association.

Title: Spatiotemporal Characteristics of Offshore Wind and Wind Energy Potential in Sri Lanka

Dr. Jinglong Yao

Deputy Director

China-Sri Lanka Joint Center for Education and Research, CAS

China

Abstract

The climate of Sri Lanka is significantly influenced by the Southwest Monsoon and is frequently affected by tropical storms. Sri Lanka has abundant offshore wind energy resources. Exploring the spatial distribution and development potential of its offshore wind energy is of strategic importance for reducing dependence on fossil fuels, and promoting regional sustainable development. This study focuses on the analysis of offshore wind characteristics and the assessment of wind energy potential around Sri Lanka. Based on multi-source datasets—including ERA5 and CCMP reanalysis products validated against *in-situ* observational data, along with CMIP6 climate model simulations, this study systematically investigates the spatiotemporal variation characteristics of the wind field, the distribution of wind energy resources, and the changing trends of wind energy under future climate change scenarios in this region.

Biography

Dr. Jinglong Yao has engaged in Indian Ocean environment dynamics and oceanography research for years with Sri Lankan scientists. He operates the programs researching on the offshore wind energy potential, water and vapor transport by monsoon, coral reef environment, etc. More than 40 research papers have been published. He worked as the deputy director of China-Sri Lanka Joint Center for Education and Research, CAS from September 2016, and was elected as Executive Council Member of CASE (China Association for Scientific Expedition) in April 2025.

Title: Kelp Grown in the Open Ocean as Abundant Feedstock for Renewable Fuels

Mrs. Cindy Wilcox
President
Marine BioEnergy, Inc.
USA

Abstract

To address climate change, fossil fuels and chemicals need to be replaced. Solar, wind and batteries are not viable solutions for every application. In particular, long-haul vehicles (trucks, planes and ships) need liquid fuels. And the electrical grid needs renewable methane to run the spinning generators during extended periods of low wind and low sun. To make carbon-neutral liquid fuels and green methane, the world needs an abundant, affordable feedstock that does not compete for land and fresh water. Marine BioEnergy is working to grow kelp feedstock on farms towed in the open ocean by drone submarines. The kelp does not need land, fresh water or artificial fertilizer or pesticides. The coastal regions are too congested for an adequate number of kelp farms. Once we move away from the coast, the top layer of the ocean has no nutrients. However, there are abundant nutrients down at the thermocline and all the way to the bottom. The drone submarines will surface the farms during the day absorb sunlight and submerge the farms at night to absorb nutrients. The drones will also submerge the farms to avoid passing ships and storms. The kelp will be harvested 3 - 4 times a year and used to make carbon-neutral fuels. Once 0.5% of the oceans are under cultivation, we can replace all fossil fuels used in long-haul vehicles worldwide.

Biography

Cindy Wilcox has been working on assembling a group, fund-raising and conducting tests. Working with the group, Wilcox raised \$3 million from the US Dept of Energy, Advanced Research Projects Agency – Energy (ARPA-E) to first test the depth-cycling concept with Giant Kelp. The test was successful and resulted in a peer-reviewed journal article led by the marine biology research group at University of Southern California. The government funds were also used to design the drone submarine, led by Co-Founder and Robotic Engineer, Brian Wilcox, working with naval architects, engineers, and a dynamic modeling team. The drone will fit in a shipping container – an ocean farm system organized to be licensed to other companies and regions. Prior to Marine BioEnergy, Wilcox served two terms, 8 years, as an elected member of a school board in a highly competitive California school district. During that period, the district improved test scores, improved enrollment, and maintained solvency during the Great Recession.

WCO 04:

Smart Port, Green Shipping

Chair

Mr. Guangrong Zou, Senior Scientist, Senior Project Manager, VTT Technical Research Centre of Finland, Finland

Time: 15:30-17:35, November 12, 2025 (Wednesday)

Place: Yoshino, Fifth Floor

Title: From Data Silos to Shared Intelligence: The Role of the Maritime Single Window in Smart & Green Ports and Shipping

Mr. Olli Soininen

Head of Programs

Fintraffic VTS

Finland

Abstract

The maritime industry stands at a critical juncture, driven by the dual imperatives of environmental sustainability and operational excellence. Yet fragmented information flows and legacy systems still hinder progress. This presentation explores how Maritime Single Window (MSW) systems, coupled with emerging data exchange technologies, can fundamentally transform port calls, shipping logistics, and maritime traffic management. The Maritime Single Window (MSW) has been established under the International Maritime Organization (IMO) framework as a mechanism to standardize and streamline data exchange between ships, ports, and authorities.

Leveraging insights from Finland's national MSW program (NEMO) and the broader development of a real-time, standardized Maritime Data Space, the session demonstrates how structured data exchange empowers Just-In-Time (JIT) operations, Virtual Port Arrivals (VPA), and port community services. Evidence from real-world deployments shows tangible outcomes: vessel waiting times reduced by up to 30%, bunker fuel consumption lowered by 18–20%, CO₂ emissions cut by 20%, and enhanced predictability across the supply chain.

The analysis emphasizes that beyond compliance with IMO and EU regulations, systematic data sharing fosters smarter decision-making, optimizes resource use, and enhances resilience in increasingly complex port ecosystems. Furthermore, the integration of decentralized, trusted data-sharing environments opens new avenues for cross-sector collaboration and innovation, supporting future-proof digital maritime infrastructures.

The presentation also reflects on lessons learned from national implementations and collaborative initiatives like the GRAVITY project, offering a practical blueprint for global maritime stakeholders seeking to drive value creation, achieve environmental targets, and unlock new business models through digital transformation.

Biography

Olli Soininen is the Head of Programs at Fintraffic Vessel Traffic Services (VTS), where he leads the strategic development, innovation, and long-term transformation of Finland's vessel traffic management. His work sits at the intersection of business leadership, maritime digitalization, and investment planning—translating future visions into tangible, value-driven results for the maritime sector. With over 20 years of experience in systems and process development, Olli brings extensive expertise in VTS systems and operations, digital maritime logistics, and regulatory frameworks such as the Maritime Single Window (MSW). He oversees a broad portfolio of national and international initiatives, including the advancement of Just-in-Time (JIT) operations, e-Navigation (S-100), and data-sharing platforms that align with evolving IMO and EU regulations.

Before joining Fintraffic, Olli served in the Finnish Navy, culminating in his role as Chief of Systems Development. There, he led the design and modernization of surveillance and command-and-control systems, as well as Finland's participation in different interoperability programs. His career is marked by a deep commitment to innovation, future studies, and international collaboration, ensuring that maritime operations are safer, smarter, and more sustainable.

Title: Digitalization and Decarbonization for Business and Environmentally Sustainable Ports - A Finnish Case

Mr. Guangrong Zou

Senior Scientist, Senior Project Manager
VTT Technical Research Centre of Finland
Finland

Abstract

Ports, as crucial hubs bridging between waterborne and road transport, are the critical nodes of global logistics and supply chain and play an essential role in global social and economic prosperity. The need to improve energy efficiency and reduce emissions has been well understood by the industries. On the other hand, digitalization and decarbonization have already been shaping the port future, which however is still scientifically and technically challenging due to inherited complexities and uncertainties existing in port operational environments.

BESPORT is a Finland-China joint innovation action striving to address industry's major challenges and need for electrification, digitalization and operational optimization towards smart and green ports. Specifically, the project brings together 11 partners from Finland (7) and China (4) to work collaboratively for joint innovations and, for Finnish partners, employs a holistic approach to next-generation electric vehicles in ports, port vehicle fleet and charging infrastructure integration, AI-driven port business and technical operations optimization, collaborative intelligence in future ports. A list of sustainability-driven innovations, tools, services and platforms are being developed and further validated in a number of case studies, pilots and demonstrations to show their potential and practical capability for port renewal and operation optimization. Executed successfully, BESPORT will not only generate significant scientific and technological knowledge and global competitive advantages, but more importantly strengthen Finland's position in port digitalization and decarbonization. Eventually, we can make global ports more productive, cost-effective and business and environmentally sustainable.

Biography

Mr. Guangrong Zou is a Senior Scientist and Senior Project Manager at VTT Technical Research Centre of Finland. He has been promoting and dedicating himself to shipping decarbonization, digitalization and automation for over 10 years, with special focus on simulation- and data-driven decision makings on the holistic design and operation of ships and shipping. He has coordinated and managed a number of national and EU projects, and is currently the coordinator of a Business Finland funded co-innovation project BESPORT, aiming for the digitalization and decarbonization of port and wider logistics chains for better environmental and business sustainability of future ports.

Title: Naval Repair Sector: New Drydock and Shipbuilding Capabilities at the Port of Santa Cruz De Tenerife

Mr. Airam Díaz

Deputy Director
Ports of Tenerife
Spain

Title: The Lines of Cold Ironing and Port Electrification

Mr. Stathis Anagnostou,

Executive Director

Strategy, Business Development & Transformation

Hellenic Electricity Distribution Network Operator S.A.

Greece

Title: Digitalization of Ports' Organization & Operations

Captain Yoss Leclerc

President and CEO

Logistro Consulting International Inc.

Canada

Abstract

As autonomous vessels continue to emerge as a transformative force within the maritime industry, the importance of strong port governance has become increasingly evident. The integration of autonomous ships into commercial shipping requires ports to adapt their operations and organizational structures to accommodate these advanced technologies. A robust governance framework is essential to ensure that the port infrastructure, regulatory systems, and operational protocols can support the seamless interaction between autonomous vessels and traditional maritime practices.

Effective port governance in the era of autonomous shipping hinges on the need for digitalization. Ports must embrace digital technologies to enhance operational efficiency, safety, and security, as well as to manage the complex data flows generated by autonomous vessels. This includes the adoption of digital platforms for vessel tracking, automated cargo handling, predictive maintenance, and real-time communication systems between ships and port facilities.

Digitalization is not merely a tool but a fundamental shift that enables ports to maintain competitiveness in an increasingly automated maritime landscape. By integrating smart technologies, ports can enhance decision-making, optimize resource allocation, and improve overall service delivery. Moreover, digital systems can facilitate better regulatory compliance and risk management, ensuring that the introduction of autonomous vessels is done safely and in accordance with international standards.

In conclusion, the emergence of autonomous vessels presents both a challenge and an opportunity for ports worldwide. Strong governance, supported by digital transformation, will be crucial for ports to remain resilient and effective in managing the complexities of this new maritime era.

Biography

Captain Yoss Leclerc is a seasoned maritime professional with over 35 years of experience in the global shipping and port sectors. His career spans both operational and leadership roles, where he has significantly contributed to enhancing port governance, safety, and sustainability. Captain Leclerc has been at the forefront of discussions on integrating emerging technologies, such as autonomous vessels, and the role of digital transformation in modern port operations.

Captain Leclerc's expertise is built on years of practical experience at sea and in port management. He served as Harbour Master at the Port of Vancouver, where he improved port safety, regulatory compliance, and operational efficiency. His focus was on fostering a robust governance framework to ensure seamless operations within the increasingly complex maritime environment. Captain Leclerc's leadership extended internationally during his tenure as President of the International Harbour Masters Association (IHMA), where he collaborated with organizations like the International Maritime Organization (IMO), the International Labour Organization (ILO), and other global maritime bodies to address critical issues related to port operations and the rise of autonomous vessels.

As President and CEO of Logistro Consulting International Inc., Captain Leclerc continues to champion the importance of digital transformation in port operations. With the rise of autonomous vessels, ports must adapt their infrastructure and governance frameworks to accommodate these technologies. This requires a strong governance structure to manage the complexities of integrating autonomous ships into commercial shipping. Captain Leclerc emphasizes that ports must embrace digital technologies to remain competitive, improve operational efficiency, and ensure safety and security. Digital platforms for vessel tracking, automated cargo handling, predictive maintenance, and real-time communication systems are crucial for supporting autonomous vessel integration.

Title: Safe Navigation in a World of GPS/GNSS Jamming and Spoofing

Mr. Dana A. Goward

President

Resilient Navigation and Timing Foundation

USA

Abstract

The positioning, navigation, and timing services provided by the Global Positioning System (GPS) and other Global Navigation Satellite Systems (GNSS) support numerous aspects of safe, secure, and efficient maritime operations. A steady rise over the last decade of GNSS signal denial (jamming) and manipulation (spoofing) has imperiled safety of life at sea and resulted in at least one collision. Even if the current levels of jamming and spoofing abate, the ease with which it can be resumed by a range of malicious actors from individuals to nation-states means it will continue to be a significant threat. This presentation will discuss the threat and measures that can be taken in the short and long terms to mitigate both threat and potential consequences.

Biography

Mr. Dana A. Goward is President of the Resilient Navigation and Timing Foundation, a scientific and educational charity advocating for policies and systems to protect GPS/GNSS satellites, signals, and users. He is a retired U.S. Coast Guard Captain and served in the federal Senior Executive Service as the maritime navigation authority for the United States. He has also served as a navigator at sea and for 20 years as an award-winning Coast Guard helicopter pilot. He currently serves on the U.S. President's National Space-based Positioning, Navigation, and Timing Advisory Board.

WCO 05:

Aquaculture and Fisheries

Chair

Dr. Bosiljka Mustać, Professor, University of Zadar, Croatia

Time: 08:30-10:15, November 13, 2025 (Thursday)

Place: Yoshino, Fifth Floor

Title: The Role of Certifications in Promoting Sustainable Exploitation of Ocean Resources

Mr. Paolo Bray

Founder and Director

Friend of the Earth and Friend of the Sea

Italy

Abstract

Anthropogenic pressures on marine ecosystems are multifaceted and intensifying. This presentation will provide a systematic overview of these cumulative impacts, from extractive activities like fishing, aquaculture, and drilling to pollution from land-based agriculture, industrial emissions, and marine shipping. We will present synthesized scientific data and global maps quantifying the severity and distribution of these threats.

In response, market-driven certifications have emerged as critical tools to incentivize sustainable practices. This talk will analyze the evolution of these certifications on a timeline, categorizing them by sector, market focus (B2B vs. B2C), and credibility markers such as third-party verification and accreditation body recognition. We will objectively assess the strengths and challenges of key programs, including the Friend of the Sea standards for seafood, shipping, and tourism.

The core argument is that for certifications to effectively combat greenwashing and drive tangible change, they must be underpinned by robust, science-based criteria and independent, accredited verification. We will conclude by evaluating the demonstrable impacts of credible certifications on ocean stewardship and discuss future strategies to enhance their rigor, transparency, and global adoption for a healthier ocean.

Biography

Paolo Bray is a pioneering economist and conservationist, renowned for developing some of the world's most influential market-driven certification programs for sustainability. He is the Founder and Director of the World Sustainability Organization & Foundation and its projects, Friend of the Sea and Friend of the Earth, which promote sustainable practices in fisheries, aquaculture, and agriculture on a global scale.

With a career dedicated to marine conservation spanning over three decades, Paolo serves as the Director of International Programs for the Earth Island Institute's Dolphin-Safe tuna project since 1991. He was instrumental in the project's global expansion, helping to drastically reduce dolphin mortality associated with tuna fishing and initiating the sustainable seafood movement.

Driven by the success of the Dolphin-Safe model, he founded Friend of the Sea in 2008. Under his leadership, it has become a major international certification for sustainable seafood, omega-3 oils, and other marine products, now recognized as one of the largest sources of certified wild-catch seafood by volume. Paolo's work is characterized by a unique, pragmatic approach that blends economic principles with conservation goals, effectively incentivizing industries to adopt more sustainable and socially accountable practices.

Title: Conversion of Coastal Wetland to Mariculture on Greenhouse Gas Footprint

Mr. Weixin Ding

Professor

The Institute of Soil Science, Chinese Academy of Sciences
China

Abstract

Coastal wetlands offer large carbon sequestration benefits, however ever-expanding mariculture could lead to substantial losses of “blue carbon” in coastal wetland ecosystems. Here we show that the conversion of *Spartina alterniflora* coastal wetland to mariculture ponds generated a greenhouse gas footprint of 20.3 Mg CO₂eq ha⁻¹ year⁻¹. Approximately two-thirds of the footprint was attributed to foregone wetland greenhouse gas mitigation capacity, whereas direct greenhouse gas emissions in mariculture ponds accounted for only 10%, with the remaining 20% arising from feed, fertilizer and energy consumption. Mariculture could offer comparatively lower greenhouse gas footprint than other animal protein sources on a kg CO₂eq per kg protein basis, however this assumption may not be accurate when considering landscape-scale changes in greenhouse gas footprint, particularly in relation to the expansion of mariculture within blue carbon ecosystems.

Biography

Dr. Weixin Ding is a core Distinguished Professor in the Institute of Soil Science, focusing on soil carbon and nitrogen transformation processes, greenhouse gas emission, and improvement of soil fertility in wetland and cropland ecosystems. His Ph.D. Dissertation was awarded with the National Top-Hundred Best Dissertation by the Ministry of Education of China. As a research fellow of the Japan Society for the Promotion of Science, he carried out studies in the National Institute for Agro-Environmental Sciences, Japan. He has run the national natural science fund for distinguished young scholars, key fund, and regional joint fund from the National Natural Science Foundation of China, and National key R&D project from Ministry of Science and Technology of China. He is a recipient of Second-class prize of National Natural Science Award for greenhouse gas emissions from wetland ecosystem in China. He is also a recipient of excellent mentor award of Chinese Academy of Sciences. He publishes about 200 papers in journals such as Nature Climate Change, Nature Food, Nature Communications, Global Change Biology, Global Biogeochemical Cycles, Water Research.

Title: Intelligent Processing for a Changing Ocean: Technological Pathways for Sustainable Fish Supply

Mr. Marcel Franz

CEO

BAADER ASIA PTE. LTD.

Singapore

Abstract

Since the beginning of humankind, we have used the ocean as a source of food. During the 16th century fishing vessels have been able to cross oceans and since the 19th century larger fishing vessels started the pursuit of fish with onboard processing facilities. The industry has seen many changes during the last 100 years, and fishing has become increasingly efficient and technologically advanced. Today we are at a pathway for the future, how can technology and intelligent processing help us to open the pathway for sustainable fish supply in the future and how processing can help to achieve this goal.

Biography

Marcel Franz is working for over seventeen years with BAADER, a leading manufacturer for Food Processing Machinery in Germany, dealing with a wide range of Processing Solutions for the Fish and Seafood Industry. Among other things, he worked in Technical Sales and Project Management for the Establishment of complete Processing Facilities in Europe and Asia.

In January 2018, Marcel moved from Europe to Singapore to develop the Asian Market for BAADER specially on Fish and Poultry Processing. Since August 2021 he took over as the Managing Director of BAADER ASIA Group in Singapore, with manufacturing in Malaysia and several Sales offices throughout Asia.

Title: The Occurrence of Wild Fish in the Vicinity of Aquaculture Cages: A Case Study of Bogue (*Boops boops*) from the Adriatic Sea (Croatia)

Dr. Bosiljka Mustać

Professor
University of Zadar
Croatia

Abstract

Aquaculture is a fast-growing and strategic sector in the Republic of Croatia, one of the European pioneers in fish farming. Today, European sea bass (*Dicentrarchus labrax*) and gilthead seabream (*Sparus aurata*) are the most numerous farmed fish species in Croatia, as well as in other Mediterranean countries. However, recently meagre (*Argyrosomus regius*), Atlantic bluefin tuna (*Thunnus thynnus*) greater amberjack (*Seriola dumerili*) and common dentex (*Dentex dentex*) production has increased and entered the global market. Growing aquaculture, besides being very important economically and sociologically, reveals various ecological challenges. Farming installations may attract wild fish populations, because they ensure a source of food such as residues and organic material, while also providing shelter and protection from predators. The occurrence and wild fish species aggregation in the vicinity of sea farms in the Mediterranean area is high, due to its biodiversity. During the cage farming of marine fish, it is possible for wild fish to enter the cage, and depending on their adaptive abilities and biological characteristics, certain species may remain living in cohabitation with farmed fish. Bogue (*Boops boops*) is a wild fish species that often occurs in the vicinity of cages, especially in the Mediterranean Sea and Eastern Atlantic. Its abundance and distribution in these regions indicate the importance of this fish in natural communities, fisheries but also as a connection between aquaculture and marine environment. Hence, the study on bogue aggregating around cages reveals altering of wild fish biology and ecology (e.g., physiology, feeding behavior), but also enhance the awareness of possible disease transmission among farmed and wild fish, which is of great importance for aquaculture management.

Biography

Bosiljka Mustać obtained her Ph.D. in biotechnical sciences (fisheries) at the University of Zagreb in Croatia. She has been working at the Department of Ecology, Agronomy and Aquaculture at the University of Zadar in Croatia since 2014 to present, where she was the head of the Department from 2015 to 2022. She was elected to the scientific teaching position of full professor in 2022 and her scientific interest is in sustainable fisheries, small pelagic fish, marine pollution, and recently aquaculture and environment. She is a member of the Scientific Council for Maritime Affairs of HAZU (Croatian Academy of Sciences and Art). Besides in publications (<https://www.researchgate.net/profile/Bosiljka-Mustac>) she actively participates in various international projects and conferences regarding marine science, fisheries and sustainability.

Title: The High Seas Treaty and Sustainable Fisheries

Mrs. Ana Olivert

Independent Legal Consultant and Researcher
Suva
Fiji

Abstract

The overall objective of this presentation is to contribute to the discussions on the implementation of the High Seas Treaty showcasing specific examples of how it could be used in practice in a fisheries context filling legal gaps in the current legal system and harmonizing existing fragmented measures.

The High Seas Treaty aims to tackle marine biological diversity loss and ecosystem degradation in areas beyond national jurisdiction from the impacts of climate change, pollution and unsustainable use. The implementation of the Treaty is to be supported by the application of relevant provisions of UNCLOS, general principles of law and approaches, and strong international cooperation and coordination. Whilst the Parties to the Agreement are bound to promote the objectives therein when participating in decision-making under other relevant legal instruments or sectorial bodies, the COP has to ensure that decisions and recommendations taken under the Agreement do not undermine existing legal instruments and the competences of sectorial bodies.

In this presentation, the author will explore how the High Seas Treaty can contribute to sustainable exploitation of fisheries and ecosystem conservation by offering a model on ABMT-MPA to harmonize practice within RFMOs reducing existing fragmentation. Overfished fishing grounds in non-regulated areas of the high seas could be closed to fishing and even be subject to emergency measures. Even flag States parties to the Agreement could be called to conducting EIA prior to authorizing vessels to fish for non-regulated species or in non-regulated areas of the high seas, or when using certain fishing techniques. All these proposals for fisheries management and ecosystem conservation and their implementation would require close collaboration with FAO and RFMOs. All these aspects are explored and explained with the view to further contributing to the continuous development of international fisheries law.

Biography

Mrs. Ana Olivert worked as a fisheries official for the European Union for a decade. In her role as legal officer for the European Commission she drafted and negotiated legislation particularly in relation to fisheries management and conservation, such as multiannual fisheries plans for Bluefin tuna and swordfish in the Mediterranean, the regulation of fishing gears in the Atlantic and North Sea, the discard policy on cod in the North Sea and Baltic Sea. She also has experience with international ocean governance, drafting and negotiating legislation for the management of EU fishing fleets on the high seas and the waters of third states, implementing measures agreed by RFMOs into EU law, drafting fisheries protocols of bilateral fisheries agreements with third countries, to mention some examples. She was also the adviser to the Chair of the Fisheries Committee at the European Parliament during the 7th legislature where reform of the EU common fisheries policy and the common markets organisation were negotiated.

In 2022, Mrs Ana Olivert joined the international fisheries legal experts' team of FAO providing capacity building assistance to national fisheries administrations in Africa and Southeast Asia to strengthening the legal capacity for the adoption and effective implementation of the provisions of the FAO Port State Measures Agreement and complementary international instruments to combat illegal, unreported, and unregulated fishing.

She is currently undertaking some research on the nexus between climate change and fisheries at the University of the South Pacific (Fiji).

WCO 06:

Ocean Management and Environment Protection

Chair

Mr. Nigel Bowen-Morris, Partner, Stephenson Harwood, UK

Time: 10:30-12:15, November 13, 2025 (Thursday)

Place: Yoshino, Fifth Floor

Title: Countermeasures on Plastic Pollution in Southeast Asian Countries

Mr. Michikazu Kojima

Chief Senior Researcher

Institute of Developing Economies, Japan External Trade Organization
Japan

Abstract

According to some research on estimating marine plastic pollution, Southeast Asian countries are major sources of marine plastic debris. According to Jambek et al.(2015) the leakage of plastics to the ocean from Indonesia, Malaysia, Philippines, Thailand and Vietnam were estimated to 27.9% of world plastic leakages. Meijer et al.(2021) also estimated the leakage from these 5 countries are 52.8%. In fact, plastics were found from intestine of whale, dugon and others.

These countries developed action plan and/or roadmap to reduce plastic pollution, including various countermeasures. In addition, Indonesia, Philippines and Vietnam have applied Extended Producer Responsibility.

The presentation reviews the countermeasures against plastic pollution in these 5 ASEAN countries, and propose some prioritized measures in these countries.

Biography

Michikazu Kojima has studied environmental issued in Southeast Asian countries from 1990s in Institute of Developing Economies. He has studied recycling, international trade of recyclable wastes and plastic pollution. His Japanese book on *Recycling and World Economy* published in 2018 got Masayoshi Ohira Memorial Award in 2019. He had been seconded from IDE-JETRO to Economic Research Institute for ASEAN and East Asia (ERIA) from 2018 to 2020, which is located in Jakarta, Indonesia. With support of Ministry of Environment, Japan, Regional Knowledge Center for Marine Plastics was established in ERIA. He published some papers, such as (1) Kojima, Michikazu and Fusanori Iwasaki, 2019, “Sea Change: Japanese leads on marine plastic litter”, *East Asia Forum Quarterly*, Vol.11, No.3, pp.24-25, (2) Kojima, Michikazu, 2022, “Toward a Regional Circular Economy Policy for East Asia and the Association of Southeast Asian Nations”, Linda Arthur, Reetta Kohonen, Maria Hughes(ed), *Prospects for Transitioning from a Linear to Circular Economy in Developing Asia*, Asian Development Bank Institute.

Title: Carbon Reduction and Marine Ecological Development in High-Energy-Consuming Cities along the Eastern Coast of China-Taking Fujian Province as an Example

Dr. Xin Liu

Professor, Associate Dean
School of Economics and Business Administration
Chongqing University
China

Abstract

High-energy-consuming cities along the eastern coast of China face the dual constraints of "industrial emission reduction pressure" and "ecological resource endowment". Marine ecological development provides a new pathway to resolve the contradiction between carbon reduction and economic growth. As a typical region with the spatial coupling of high-energy-consuming industries and blue carbon resources, the correlative effects of Fujian Province's carbon reduction practices on marine ecological development have not been fully explored, and there is a lack of systematic analysis on how carbon reduction measures promote marine ecological restoration, blue carbon development, and ecological value transformation. Based on the carbon emission accounting and carbon reduction potential analysis of the six major high-energy-consuming industries, and in combination with Fujian's policy framework of "a holistic conservation and governance pattern from mountaintops to oceans", I will discuss the impact of industrial carbon reduction on marine ecological development. It will clarify the driving role of carbon reduction in marine ecological development, so as to provide theoretical support for eastern coastal cities in China to formulate synergistic policies of "emission reduction and marine protection".

Biography

Professor Liu Xin currently serves as Vice Dean of the School of Economics and Business Administration, Chongqing University, and Ph.D. Supervisor. He has long been deeply engaged in the field of Energy Economics, with solid theoretical and empirical foundations in research on carbon reduction in high-energy-consuming industries, environmental governance, and ecological coordinated development. He has led key projects such as Analysis of Carbon Reduction Potential in High-Energy-Consuming Industries of Chongqing Municipality, mastering precise methods for measuring emission reduction pathways and potential in high-energy-consuming industries. He has also published papers on low-carbon policy effects and carbon emission mechanisms in international authoritative journals including Energy Policy and Journal of Environmental Management, and released the monograph Study on the Interactive Mechanism and Response Strategies between Income Distribution and Air Pollution Prevention—providing scientific methodological support for the correlation analysis of carbon reduction and ecological development in high-energy-consuming cities.

Additionally, he once worked as a visiting research assistant at Waseda University in Japan, possessing an international perspective and cross-cultural exchange experience. His research has long focused on issues of regional development and ecological protection in China, giving him a profound understanding of the linkage mechanisms between the transformation of high-energy-consuming industries and ecological restoration in coastal areas.

Title: A Case Study on the Application of Nagasaki Restoration Coral Reef Technologies in Ecotourism

Ms. Chika Sato

Biotechnology Engineer
M.M. Bridge Co., Ltd.
Japan

Abstract

Two elemental processes have been found effective for coral restoration; one is electrochemically ion-coated surfacing which provides good substrates for coral larvae settlement, and another is weak impressing of electric density which is effective for coral implantation through the growth promotion at juvenile stage. Based on these findings, we have designed and set coral growth facilities in the field coast. This paper reports on a case study for ecotourism activity utilizing of the coral growth promotion device.

(Ecotourism is the special tourism which provides guests marine leisure experiences combined with environmental education.)

On Takashima Island, a small island in Nagasaki Prefecture, Japan, the coral growth promotion device (GMC device) was settled in 2018 at the inner bay in front of Takashima Artificial Beach.

This coral propagation facility is aiming to promote marine leisure activities and revitalize the local area through the coral rehabilitation.

The MM Bridge co.,ltd provided the facility with managing know-how, while the local NGO organization (Yattaro de Takashima) runs the ecotourism programs. Supports from local universities and local governments also help the activities.

From 2018 to the present, over 10 events have been held, including environmental education programs for elementary schools. These events typically consist of snorkeling experience and classroom session. Survey by questionnaire shows high satisfaction levels.

Visitor numbers have increased annually since 2018, frequently drawing coverage from local media, including television, newspapers, and online articles. A recent challenge is increasing the capacity of accommodation, as a significant number of repeat visitors is a key feature.

Biography

Ms. Chika Sato(sato.chika@mm-bridge.co.jp) is currently engaged in coral reef recovery study from whitening, feeding damages of starfish and/or typhoon erosion. at MM Bridge co.,ltd.(<https://www.mm-bridge.com/>) MM Bridge is a bridge construction company, and have built several floating piers on Ishigaki Island, Okinawa. In 2003, MM Bridge initially found fresh corals rapidly growing on the side of the floating piers with the help of the electric corrosion protection system. This finding led to the understanding on the promotion effect of the weak electric current on the juvenile corals.

Her academic background is in phytochemistry, with a particular focus on the analysis of bioactive compounds derived from plant extracts. Her interest is recently turned toward marine science, specifically coral reef ecosystems. She wishes to have wider scope for her research integrates biological, ecological, and engineering approaches to understand coral growth, resilience, and response to diverse environmental stressors, including global warming. She also wishes to contribute the restoration of coral reefs by combining biology and civil engineering knowledge and to expand her activities to increase the number of people who are familiar with the sea through environmental education and marine leisure with local community.

Title: Maritime Legislation and the Environment

Mr. Nigel Bowen-Morris

Partner

Stephenson Harwood

UK

Abstract

Maritime legislation involves the intersection of national laws and international conventions, and the development of this framework is critical to ensuring the safe passage of ships, and the protection of the environment. The applicable national law may be the law of the country where the ship operates or the law of the flag state where the ship is registered. There is a general legal requirement that ships which are over a certain size must be registered in the ownership of a ship owner and under a recognized flag and be classed with a recognized class society. This requirement is common to most maritime states. Modern maritime legislation aims to create a stable legal framework that can ensure the development of international trade and transport while ensuring that the environment is protected. The environment has become an increasingly important aspect of the regulation of marine activities, and I will review some of the background and the current state of development of legislation that aims to protect the environment.

Biography

Nigel Bowen-Morris is a solicitor and partner in an international law firm specializing in shipping finance and advises leading international banks, financial institutions, and top-tier shipping companies on complex asset-backed transactions. He has extensive experience in structuring and documenting secured loan facilities across the shipping sector. His work includes advising on multi-jurisdictional syndicated loan facilities and the sale and purchase of ships. He is highly regarded in the market for his expertise in high-stakes financial transactions and is recognized in Chambers Europe and Chambers Global with a Band 1 ranking in Shipping (Greece), he is praised for his technical skill, client service, and market insight.

Title: Framing Analysis of Japan and China's Response to Fukushima's Nuclear-Contaminated Water Discharge: Technical Rationality vs Local Experience

Mr. Chenxi Sun*

Ph.D. Candidate

School of National Security and Emergency Management, Beijing Normal University, Zhuhai
China

Dr. Yuejing Ge

Professor

Faculty of Geographical Science, Beijing Normal University, Beijing
China

Abstract

This study examines the framing competition between China and Japan over the discharge of Fukushima's nuclear-contaminated water, focusing on how each nation constructs domestic and international legitimacy. Utilizing a functional framing model and credibility dimensions (centrality, actor credibility, experiential commensurability, macro-cultural resonance, and empirical fit), the analysis reveals divergent strategies: Japan's "Scientific Safety" frame emphasizes technical legitimacy, backed by international authorities like the IAEA, while China's "Environmental Justice" frame prioritizes historical accountability and ecological values, resonating culturally within East Asia. The findings highlight tensions between technical rationality and localized experience, as well as the evolution of international legitimacy contests—from unilateral technical assertions to multi-scalar confrontations and partial institutional reconciliation. This research advances theoretical insights into bridging technical and cultural paradigms in global environmental risk governance, offering practical implications for transnational policymaking and cooperation.

Biography

Chenxi Sun graduated from the Xinjiang Institute of Ecology and Geography, Chinese Academy of Sciences, with a specialization in Human Geography. He is currently a Ph.D. candidate at the School of National Security and Emergency Management, Beijing Normal University, under the supervision of Prof. Yuejing Ge, focusing on social security. He has participated in multiple research projects, including the second comprehensive scientific expedition to the Qinghai-Tibet Plateau, the study of implementation paths for Beautiful Villages in Xinjiang, and a borderland field study in Yunnan collaborated with Canadian Professor Victor Konrad. His current research interests include maritime policy, risk governance, and the framing analysis of global risks.

Yuejing Ge is a Professor of human geography at Faculty of Geographical Science, with a specialization in World Geography, Globalization and Geopolitics. She studied multi-scale regional analysis and geo-relations.

The 11th World Energy Congress (WEC-2025)

WEC 01:

Latest Research and Development on Energy and Its Application

Chair

Dr. Pascal Briois, Associate Professor, University of Technology of Belfort-Montbéliard (UTBM), France

Time: 13:30-16:45, November 11, 2025 (Tuesday)

Place: Kamo, Fifth Floor

**Title: Geothermal Energy and Its Application to Integrated Energy Systems
and Low Carbon Fuel Production**

Mr. David Robert Cavanagh
Managing Director
Integrated Energy Pty Ltd.
Australia

Title: Modified CANDU Reactor MCR as an Early-deployable Nuclear Workhorse

Dr. Juergen Knorr* and Albert Kerber

Professor Emeritus
Technical University Dresden
Germany

Research Interest

Ceramics in nuclear sector

Abstract

Keep it safe, simple and soon deployable - that are the imperatives for each SMR concept today. Only this SMR has the potential to become a nuclear workhorse in the fight against energy hunger and climate change, if it is available soon, in large numbers and deployable worldwide. Special attention must be paid for an operation in so-called development corridors. Therefore the assessment of the usefulness of an SMR concept must not only relate to the reactor itself. Only a holistic view of the entire nuclear fuel cycle can lead to viable decisions. The International Atomic Energy Agency (IAEA) has been systematically recording more than 100 SMRs for many years. The Catalogue 2024 represents already a certain selection and contains 71 SMR concepts, divided into six categories. Despite of this background, we have strong arguments to propose the Modified CANDU Reactor (MCR) as an additional SMR design. Intended for the generation of heat and electricity in areas with extreme climate (deserts, arctic), in politically unstable regions or close to the consumer (district heating or desalination for big cities), safety has to be the top priority for the entire MCR fuel cycle including normal reactor operation and hypothetical accidents. The fuel cycle is described as a sequence of Stationary Phases and Transport Phases, each of which is scrutinized on the basis of five safety objectives, taking into account the usual safety principles (redundancy, diversity, fail-safe): a) ISOLATION b) CONTROL c) HEAT REMOVAL d) SHIELDING e) PROTECTION. Compared to the well-known and globally proven CANDU reactor design, the MCR got several modifications: a) underground construction using Herrenknecht VSM-shaft-tunnel drilling technology b) spherical fuel elements (pebbles) with ceramic cladding c) vertical arrangement of the pressure tubes d) waste container with ceramic Initial Barrier for (extended) interim storage and long-term safe final disposal. The MCR is a promising concept which combines innovative solutions (materials: boron-free silicon carbide SSiC for in-core applications SICANA, technologies: fuel element manufacturing with 3D printing DEXPRINT, Rapid Sinter Bonding RSB of ceramic reactor components) with proven and internationally established technical and administrative networks. At WEC-2025 the authors hope for a fruitful discussion and are looking for future cooperation with potential partners.

Biography

Professor Knorr has been Professor of Nuclear Technology at the Technical University of Dresden (Emeritus since 2006). He received his doctorate in physics/nuclear technologies. From 1975 to 1992, Professor Knorr was responsible for the planning, construction and operation of the AKR training reactor in Dresden. Starting with ceramics in nuclear sector in the early 199ties together with Professor Kurt Kugeler, the cooperation with SiCeram GmbH on the nuclear application of high-tech ceramics began in 2003. From 1993 to 2000, Professor Knorr was President of the German Nuclear Society and also a Board Member of European Nuclear Society and German Atomic Industrial Forum. Professor Knorr is an Honorary Member of the German and Slovak Nuclear Societies. The Russian Academy of Sciences awarded him the Kapitsa Medal.

Title: Application of PVD Technology for SOFC to Increasing Lifetime

Dr. Pascal Briois

Associate Professor

University of Technology of Belfort-Montbéliard (UTBM)

France

Research Interest

Fuel Cell, Electrolysers, Reactive Magnetron Sputtering

Abstract

Nowadays, it is well known that Solid Oxide Fuel Cells (SOFC) lifetime improvement and cost reduction can be controlled by decreasing their operating temperature. In the SOFC technology, the delivered power is obtained after an oxy-reduction reaction governed by the Nernst and the Arrhenius laws. In order to obtain the same electric power while reducing the operating temperature, two methods are possible. The first one consists in developing a new material with better properties in terms of conductivity, catalytic efficiency and so on while the second one is to reduce the thickness of each part of the fuel cell.

In this work, we present some recent results on anode and metal supported cells. Each element of the unit cell (anode, electrolyte and cathode) was deposited by thin technologies. After a short description of the experimental configuration, the structural, microstructural and morphological features of the cell were determined by XRD and SEM. The electrical properties were evaluated by using Electrochemical Impedance Spectroscopy (EIS) technique as a function of the temperature. Finally, the I-V-P curves of the complete cell were conducted at different temperatures;

Biography

Pascal Briois received the Ph.D. degree in science and material engineering from Nancy, France, in 2005. He is currently an Associate Professor at University of Technology of Belfort-Montbéliard (UTBM). His main research areas include characterization and elaboration of SOFC/PCFC, sensors and catalysts by thin technology in particular reactive magnetron sputtering. He also have activities for the development of specific layers for industrial partners in the field of mechanics, optics, etc... Since 2002, he is member of the French research group on fuel cell and in 2018 he is the head of the SURFACE platform from UTBM. SURFACE is specialized in dry surface treatment (PVD) and the characterization of thin films. Since 2023, he is co-head of the "MSH2 specialized master's degree in hydrogen" at UTBM. Since 2025, he is director of Micro-Nano Science and Surfaces (MN2S) department of FEMTO-ST institute. He is co-author of more than 70 scientific articles, 3 book chapters, a patent as well as 4 plenary conferences, more than 30 invited conferences, more than 100 oral communications, 90 communications by poster; he co-supervised 10 PhD theses, he currently has 6 theses in progress and he supervised several master's internships

Title: Advancing Metal Halide Perovskites: Stability Strategies and Multifunctional Applications

Dr. Jun Pan

Professor

Zhejiang University of Technology

China

Abstract

Metal halide perovskites show great promise in optoelectronics—from solar cells to LEDs and photocatalysis—thanks to their exceptional defect tolerance and high carrier mobility. However, their inherent ionic nature and the dynamic binding of long-chain surface ligands make them less stable than traditional bulk semiconductors. Moreover, these commonly used insulating ligands severely impede charge transport, limiting device performance. Addressing these challenges requires innovative strategies to enhance stability and conductivity through optimized synthesis and defect passivation. This presentation will share effective approaches for defect control in perovskites, exploring how surface engineering, composition tuning, and matrix encapsulation can be leveraged to build highly efficient and stable optoelectronic devices.

Biography

Prof. Jun Pan is a Professor of Materials Science and Academic Vice Dean of the College of Integration of Education in Energy and Carbon Neutrality at Zhejiang University of Technology. He earned his B.Sc. in Bioengineering, M.Sc. in Fermentation Engineering, and Ph.D. in Inorganic Chemistry (2010) from the University of Science and Technology of China. Following his doctoral studies, he served as a Postdoctoral Researcher and then a Research Scientist at King Abdullah University of Science and Technology (KAUST) before joining Zhejiang University of Technology in 2019. He was awarded for the Recruitment Program of Global Experts, Zhejiang Province (Innovative Experts, Long-term Program) and the National Overseas Talents (Young) Program. His research focuses on the precise synthesis of energy materials and their applications in optoelectronic devices. He has authored over 90 publications in leading journals such as *Advanced Materials*, *Journal of the American Chemical Society*, and *Angewandte Chemie International Edition*.

Title: Investigation on Coupling Oscillation of the Water-diversion Hydropower System and Further Engineering Application

Dr. Jianxu Zhou*, Wenchao Cheng, and Yutong Mao

Professor
Hohai University
China

Research Interest

Hydraulic Simulation and Safety Control of Water Conservancy and Hydropower Engineering

Abstract

With great development of water energy utilization, more hydropower stations have experienced hydraulic vibration which basically appears as a typical coupling oscillation and evidently effects system's safety operation, but less is concerned about this complex, periodical and random transient process. Base on theoretical analysis and further engineering application, the hydraulic vibration theory is greatly improved to accurately reveal the coupling oscillation characteristics of different hydropower systems, and to evaluate their possible coupling resonance. The results indicate that, with unit's improved hydraulic impedance formula, the effect and further dynamic response of unit's rotational speed is clarified, and by derivation of hydraulic impedance for complex free-surface-pressurized flow, the dynamic properties of multi-flow patterns in the hydropower system is successfully included in the coupling oscillation analysis; With clarification of the invalid surge tank, the decoupled 1-order ordinary differential equations for hydraulic vibration and stability analysis, the interaction of multi dimensional dynamic characteristics among hydraulic and other systems can be revealed. In particular, the self-excited vibration related with local S-shaped regions of pump-turbines is confirmed by analytical analysis. Furthermore, the validity of different hydraulic elements on vibration reduction and necessary stochastic analysis of hydraulic vibration is discussed by comparative analysis.

Biography

Professor Jianxu Zhou has been engaged in the College of Water Conservancy and Hydropower Engineering, Hohai University since 1996, and is currently the Director of Institute of Water Conservancy and Hydropower Engineering. As a Visiting Professor, he went to the Department of Civil Engineering, University of Toronto for a one-year exchange program. He is a Member of the International Association of Hydraulic and Environmental Engineering (IAHR), a Member of the Chinese Society of Hydropower Engineering, a Director of the Jiangsu Society of Hydropower Engineering, and a Director of the Jiangsu Society of Industrial and Applied Mathematics. His research interests include: Hydraulics and structure of hydropower station and pump station, Transient process and safety control of hydraulic unit, and Technique of pumped-storage project and renewable energy. He finished several National Natural Science Foundations of China, many science and technology projects on hydraulic transients analysis and experimental research for the water supply systems, the hydropower systems and pumped-storage power systems etc. He published an Academical Monograph on hydropower systems, a Design Handbook for hydraulic structure and more than 100 articles. He has won several Provincial-Ministerial science and technology progress awards for his innovative achievements on water conservancy and hydropower engineering.

Title: Characteristics of Concentration Distribution Through the Exposure Route from Emission Sources in Small Multi-purpose Industrial

Dr. Kilyong Choi

Associate Professor
Anyang University
South Korea

Abstract

Background: Air pollution (NO₂, SO₂, PM_{2.5}) emissions by pollutant source (point, line, surface) and substance (NO_x, SO_x, PM_{2.5}, NH₃, VOC) for data on emissions and emissions from small businesses in Korea. , O₃, NH₃), we would like to analyze the contribution of the impact on the surrounding area. Objectives: Development of algorithm technology optimized for decision-making based on evaluation of environmental pollutants. Methods: Establishment of emission source inventory through air pollution emission survey, and subsequent emission source measurement data through emission status survey and establishment of VOC and PM profile using EPA and Speciate, etc., application of questionnaire and comparative analysis (measurement analysis) according to the emission characteristics of the business site. result). Results: As a result of building an inventory of air pollutant emission sources centered on 190 workplaces, the characteristics of emission sources through the final 104 workplaces were confirmed, and the results of the air pollutant emission status showed the national air pollutant emissions by substance (CO, NO_x, SO_x, TSP, PM₁₀, PM_{2.5}, VOC, NH₃) were confirmed. This is data applied to the results of VOC and PM profile construction using EPA and Speciate5.1, and consistent characteristics of pollution concentration were confirmed around five business sites and four representative spaces in the surrounding area. Conclusions: It is recommended that the questionnaire be used as basic data to identify the concentration level of pollutants (chemical species) by emission source according to the source profile of domestic environmental pollutants.

Biography

In the past 5 years, while working as a researcher and performing business activities, I have been heavily involved in and conducted research on carbon neutrality and climate change-related projects in the future. As the damage from environmental diseases caused by various environmental hazards due to the past Seoul City air policy and carbon neutrality and inventory construction has continued to increase, I conducted research to derive results from the follow-up observation of cancer and chronic diseases according to how various pollutants, in addition to fine dust, heavy metals, and VOCs, spread and are exposed to individuals in the region. The projects conducted in the past 3 years are: Long-term follow-up cohort of pediatric respiratory and allergic diseases, Korea Centers for Disease Control and Prevention. Project name: Monitoring study on air pollution and health effects in the upstream of Andong Dam, Ministry of Environment. Project name: Study on health risks and countermeasures for residents around Ansan City Industrial Complex, Ministry of Environment Green Environment Support Center. Project name: Comprehensive environmental health assessment of areas surrounding general industrial complexes, National Institute of Environmental Research. The project name is Environmental Health Assessment of Areas Surrounding Coal-Fired Power Plants (I) Yeongheung Thermal Power Plant, Ministry of Environment National Institute of Environmental Research. The project name is Environmental Health Assessment of Residents of Ondong Village, Ministry of Environment National Institute of Environmental Research, etc., and many projects have been carried out. While carrying out industrial activities in Korea and contributing to the country, the following activities have been carried out. As a member of the Gimpo-si Regional Noise Countermeasure Deliberation Committee of Gyeonggi-do, I will carry out activities until 2025. As a member of the Seocheon-gun Chemical Substance Safety Management Committee, I will carry out activities until 2027. As a member of the Haeundae-gu Office Architectural Committee of Busan, I will carry out activities until 2026. As a member of the Gyeonggi Free Economic Zone Authority Architectural Committee, I will carry out activities until 2026. As a member of the Pyeongtaek Port Authority Technical Advisory Committee of Gyeonggi-do, I will carry out activities until 2026. As a member of the Korea Air Cleaning Association Technical Expert Committee, I will carry out activities until 2026. Lastly, I am currently working as an academic director at the Korean Society for Environmental Health and Toxicology, and as an executive director of the Korean Society for Indoor Environment and a full member of the Korean Society for Environmental Toxicology and Toxicology and the Korean Society for Occupational Asthma and Lung Disease in 2025.

Title: Numerical Simulation of Deflagration Appearance in Hydrogen-Air Mixtures Turbulent Viscous Flows

Dr. Sergey Martyushov

Professor

Moscow Aviation Institute-National Research University

Russia

Research Interest

Numerical Simulation of Deflagration Initiation in Hydrogen-Air Mixtures .

Abstract

In the paper numerically investigated flows of hydrogen-air gas mixes in channels with obstacles with purpose to define conditions of deflagration initiation. Preference of hydrogen as a fuel is detonation fuel cycle which is more energetic preferable in comparing with ordinary fuel cycle. In laboratory experiments deflagration initiation appears as result of energy and temperature grows by successive triggering of electric discharges or near obstacles in channels. Numerical simulation was provided on the basis of k-epsilon model of turbulent viscous flows. In these cases it seems to be preferable for mathematical modelling to use full system of reactions for all components and radicals. In the paper full system of kinetic equation was used for numerical simulation of deflagration in mixture flow. Using of full system of kinetic equation allows one to determine moment of deflagration initiation and transition it to detonation

Biography

Professor Sergey Martyushov works at The Department of Theory of Probability and Mathematical Modelling of Institute of Computer science and Applied Mathematics of Moscow Aviation Institute-National Research University. He publish more than 50 papers on the subject of Numerical Simulation of shock waves propagation and deflagration initiation and its transition to Detonation in reactive gas mixtures. After obtaining an Honors Degree in Mathematics from the Ural State University in 1976, he started work at Mathematics and Mechanics Institute of Ural Branch of Russian Academy of Science. In this Institute he developed mathematical algorithms for numerical simulation of unsteady supersonic three dimensional flows. He developed algorithms for three dimensional grid construction. For those results he got his Ph.D. in 1984. In 2008 he began work as assistant professor and later professor in Moscow Aviation Institute. At the same time he was Leading Adviser of Energy Committee of State Duma of Russian Federation and Vice-President of National Association of Hydrogen Energetics. In 2012 he got Doctor Degree in mathematics. He is author of monography devoted to detonation process of Hydrogen as fuel, Handbook for numerical methods in fields of chemical physics and numerical methods and some chapters in monographies in this field.

WEC 02:

Global Energy Policies, Market and Future Trends

Chair

Dr. Izabela Barbara Sztangret, Professor, University of Economics in Katowice, Poland

Time: 10:30-12:15, November 13, 2025 (Thursday)

Place: Kamo, Fifth Floor

Title: Prospects for Alkaline Exchange Membrane (AEM) Electrolysis

Dr. Ervin Tal-Gutelmacher

CEO

Hydrolite Ltd.

Israel

Research Interest

Hydrogen Production

Abstract

Alkaline exchange membrane electrolysis (AEMEL) has emerged as a promising novel route toward potential cost reductions of hydrogen production. The AEMEL technology allows to preserve simultaneously the advantages of a membrane water electrolyzer and the low-cost materials, both electrodes' catalysts, and structural materials derived from the alkaline environment. Given the promise and potential, however, there is a strong need to mature the technology readiness level of AEMEL. Its technological challenges are mainly embedded in developing innovative low-cost alkaline Membrane-Electrode Assemblies (MEAs), Stacks, and Modules, capable of delivering overall device performance and durability that allow direct competition with current competitor electrolyzer technologies. In this talk, an overview on HydroLite's recent advancements in harnessing nanotechnology to enhance the performance of alkaline exchange membrane (AEM) electrolyzers for green hydrogen generation will be outlined, with specific emphasis on the design-to-cost, innovation, and development of nano-structured components for improved and enhanced performance of Alkaline Membrane-Electrode Assemblies.

Biography

Dr. Ervin Tal-Gutelmacher is the C.E.O of HYDROLITE Ltd., an Elbit Systems Subsidiary, focusing on leading-edge development of advanced hydrogen technologies. With 20 years of experience in hydrogen and energy-related innovation, project management, team leadership, steering committees, consortiums, and bilateral projects with industrial and academic partners, Dr. Tal-Gutelmacher leads and paves the company's current and future direction toward the development and deployment of advanced alkaline exchange membrane fuel cells and electrolysis technologies and devices. She is a noted Hydrogen Expert of the European Commission, holds numerous patents, several prestigious national and international awards, and hundreds of scientific contributions to journal and conference publications.

LinkedIn: <https://www.linkedin.com/in/ervin-tal-gutelmacher-78342318/>

Title: From Compliance to Commitment: The Impact of the CSDD Directive on Corporate ESG Awareness and Practices

Dr. Izabela Barbara Sztangret

Professor

University of Economics in Katowice

Poland

Abstract

On May 24, 2024, the Council of the EU adopted the Corporate Sustainability Due Diligence Directive (CSDD), marking the culmination of a four-year legislative process initiated by Justice Commissioner Didier Reynders in April 2020. The directive, proposed to enhance corporate responsibility in sustainability practices, was first introduced by the European Commission on February 23, 2022, following the European Parliament's legislative initiative of March 10, 2021. Subsequent negotiations and compromises, including trilogues between the European Parliament, the Council, and the European Commission, resulted in a final framework text. This was officially adopted after a series of political agreements, concluding with the European Parliament's plenary vote on April 24, 2024. The directive applies to companies within the EU and non-EU companies operating in its market.

The CSDD directive highlights a broader trend of regulatory frameworks driving Environmental, Social, and Governance (ESG) initiatives. For the first time, legal requirements were cited as the primary motivator for companies to engage in ESG. Organizational image and stakeholder pressure remain significant motivators, particularly for SMEs (Small and Medium Enterprises) in Europe. Larger companies demonstrate greater ESG maturity, with half of them having established ESG strategies and the same maintaining dedicated sustainability departments. In contrast, only few of SMEs have ESG strategies, and most lack dedicated budgets, relying instead on ad hoc financing. Environmental goals, particularly greenhouse gas emission reduction, are a priority for a lot of large companies, aiming for climate neutrality between 2041 and 2050, in Europe. Additionally, a growing number of companies require ESG data from suppliers. However, only large companies consistently measure the financial benefits of ESG initiatives, while SMEs struggle with problem in it.

In summary, the CSDD directive reflects the increasing role of regulatory frameworks in shaping corporate ESG practices. It underscores a growing commitment to sustainability, driven by compliance, stakeholder expectations, and competitive advantages, while also highlighting disparities between large firms and SMEs in terms of strategy, resources, and measurable outcomes. This topic will be presented and discussed widely.

Biography

Izabela Barbara Sztangret, has **Diploma of Ph.D. in economic sciences in the field of management sciences**, awarded by the resolution of Board of Wydział Zarządzania Akademii Ekonomicznej im. Karola Adamieckiego [Faculty of Management, Karol Adamiecki University of Economics] in Katowice of 30th December 2003 on the basis of presented Ph.D. thesis entitled: *Strategie promocji produktów komputerowych na rynku polskim (na tle rozwoju strategii marketingowych producentów krajowych) [Promotion strategies of computer products on Polish market (against the background of marketing strategies of domestic producers)]*, prepared under scientific supervision of Professor L. Żabiński, Ph.D. ; **Diploma of professor of the University**, awarded by the resolution of Board of Wydział Zarządzania Akademii Ekonomicznej im. Karola Adamieckiego [Faculty of Management, Karol Adamiecki University of Economics] in Katowice 23rd March 2017 on the basis of **accomplishments in Scientific and Research Work and presented thesis entitled: Zarządzanie wiedzą marketingową w strukturach sieciowych sektora produktów informatycznych [Marketing knowledge management in network structures of IT product sector]**; **Special activities of author:** Member of the **Energy Council in the Business Council**, The Warsaw HUB in Warsaw, since 2022; Member of **Chapter Zero Poland**, an initiative raising competences in the field of combating climate change, coordinated by the Responsible Business Forum, since 26.05.2024; Member of the **Working Group on Due Diligence** at the Ministry of Funds and Regional Policy in Warsaw, since March 2024; Juror of the **"Sustainable Development Reports"** Competition, an initiative of the Responsible Business Forum; Certificate of Completion **The Essentials of**



OECD Due Diligence for Responsible Business Conduct on the OECD e-learning Academy on Responsible Business Conduct on 12/08/2024; Specialist in **NCBR** (National Centre for Research and Development). Currently Izabela Sztangret's research focus on the circular economy, balanced development, ESG in management, strategies of ESG, especially in SMEs. She has got research awards: **Young Service Researcher Award**, 8th International Research Symposium in Service Management (IRSSM-8), 1-5 August, 2017 , School of Business at Yonsei University, Seoul, South Korea; **ISCOIM 2018 award, for the most innovative paper on innovative marketing**, 2nd International Scientific Conference on Innovative Marketing "communication and digital marketing management" , Durres University Albania 2018; diploma "for the report: *Intelligent Knowledge Management in the Sector of Waste Disposal Enterprises*", Scientific and Technical Union of Mechanical Engineering Bulgaria 2018; diploma for: *Re-value of municipal waste. Strategic approach*; 4th International Conference on Marketing, Business and Trade (ICMBT 2019) Waseda University of Tokio, Faculty of Science and Engineering, Japan January 2019.



Title: Out of the Blue: Can Blue Coal Redefine the Polish Fuel Market?

Dr. Kornelia Przedworska

Assistant Professor

University of Economics in Katowice

Poland

Abstract

The growing demand for sustainable energy solutions has sparked significant interest in alternative fuels, with blue coal emerging as a potential game-changer in the Polish fuel market. This article explores the viability of blue coal as a substitute for traditional hard coal, focusing on its adoption by fuel distributors. Through a survey of coal suppliers, the study examines factors influencing the decision to sell blue coal, including environmental concerns, regulatory pressures, and economic incentives. In particular, the research highlights the role of customer demand for eco-friendly fuels and the impact of government support schemes on the adoption of blue coal. The study also investigates the elasticity of blue coal prices and the potential barriers, including cost competitiveness and market acceptance. The findings suggest that while blue coal holds promise as a sustainable alternative, its widespread adoption is hindered by price sensitivity and a lack of awareness among consumers. The article concludes by discussing the future prospects of blue coal in Poland's energy transition, considering its potential to replace traditional coal as a key energy source in the context of environmental sustainability.

Biography

Kornelia Przedworska is an assistant professor at the Department of Entrepreneurship at the University of Economics in Katowice, specializing in strategic management, strategic marketing, sustainable development, energy transition, and entrepreneurship. She holds a doctoral degree, with her dissertation focusing on the effectiveness of distribution strategies in the declining market, specifically studying the hard coal market.

She is the author and co-author of numerous scientific publications and actively participates in research projects and scientific conferences. She has been involved in initiatives such as "Ecology or Economics – Determinants and the Willingness of Poles to Transition to Renewable Energy" and has contributed to conferences focused on the future of mining and sustainable development. Her research interests include energy transition, renewable energy sources, and the role of sustainable development in shaping business strategies.

Kornelia is a lecturer in subjects related to sustainable development and entrepreneurship. She has completed various professional development courses in sustainable development and ESG reporting, and regularly participates in programs related to these topics, furthering her commitment to advancing sustainability in business practices.

Title: Empowering the Future Grid: Model Predictive Control for Intelligent Hybrid Microgrid Automation

Dr. Somayeh Mohammady

Lecturer

Technological University Dublin

Ireland

Abstract

As the global energy sector advances toward a cleaner, more decentralized, and digitally connected future, the development of intelligent control mechanisms for managing dynamic, distributed power systems has become a strategic priority. Building on my research expertise in advanced communication and control systems, this keynote introduces the application of Model Predictive Control (MPC) as an enabling technology for the automation and real-time optimization of hybrid microgrid architectures, integrating renewable sources such as wind and solar with battery energy storage systems.

The study leverages MATLAB/Simulink-based modeling and simulation to evaluate the performance of MPC in regulating power flow, stabilizing voltage and frequency, and optimizing the state of charge of energy storage units under variable operational conditions. Comparative analyses against conventional control methods demonstrate MPC's superior efficiency, responsiveness, and robustness, highlighting its potential to enhance both energy reliability and system sustainability.

This work is situated within the broader context of Ireland's leadership in smart energy innovation, aligning with national decarbonization targets, research-driven pilot projects, and collaborative initiatives that position Ireland at the forefront of decentralized renewable energy integration. By bridging advanced control theory, communication technologies, and practical deployment strategies, this keynote presents a forward-looking vision for how predictive intelligence can strengthen the resilience and adaptability of future energy systems, both in Ireland and globally.

Biography

Dr. Somayeh Mohammady is a Lecturer in Electronic and Electrical Engineering at Technological University Dublin, with over 15 years of academic and research experience in advanced communication systems, control engineering, and intelligent energy technologies. She holds a PhD in Electronic Engineering and has an extensive record of publications and patents in the fields of 5G/6G networks, Internet of Things (IoT), RF/microwave systems, and digital signal processing.

Dr. Mohammady's current research focuses on the convergence of control, communication, and computational intelligence for sustainable and resilient energy systems.

She has also served as a conference presenter, session chair, and STEAM education advocate, promoting women's participation in engineering and sustainable technologies.



Title: The Share of Hydropower Energy in Energy Demand of Turkey and Its Sustainability

Dr. İbrahim Gurer

Professor
Engineering Faculty
Department of Civil Engineering
Baskent University
Turkey

Research Interest

Water Resources and Hydraulics

Abstract

Turkey has a surface area of 780 580 km² and a population of about 85 million and electric energy is essential for the everyday life. The energy demand in Turkey increases not only with population increase but also by improving the living standards of people and industrial development. Being a non-oil-producing country at present, Turkey tries to minimize the import fossil fuels (like natural gas, coal and fuel oil) and so to minimize the air pollution. The consumption of imported energy sources had to be reduced for the environmental, economic, and diplomatic reasons. As the electricity need of the country is increasing continuously, more energy from the national renewables as market priority. The share of renewables in Turkey's installed power reached to 54% at the end of 2022. The next step will be the Akkuyu nuclear power plant in its energy mix, to decrease negative environmental effects of energy production, and to meet its energy demand increase. And decrease the energy from imported sources.

Hydropower plants (HPPs) provide clean, fast, flexible electricity. The amount of energy that a HPP can produce basically depends on the available flow rate (Q) and the head (H). The first hydropower station of Turkey had been opened at Tarsus town located at south in 1929. The number of HPPs and total installed capacity have increased especially after the 1960s. According to energy consumption figures from December 2023 through November 2024, the energy mix is 53 % from coal and gas, 42% from renewables and the rest 5% is from geothermal sources and biofuel. Hydropower leads among the low-carbon sources with more than one fifth of the total electricity, followed by wind and solar. Due to continuing climate change, all the available local energy sources should be developed and put in service as quickly and efficiently as possible.

For a sustainable energy run, the ecological impacts of both reservoirs and run-on-river type small size energy production structures should be minimized. The habitat diversity may be substantially reduced. Flow and sediment regimes are basically affected. Although the seasonal flow variability is reduced, the daily discharges can be highly variable. The natural temperature regime may drastically change due to limnological properties, etc releases. Dewatering can cause high mortality of aquatic organisms through stranding. The lack of flooding allows vegetation to encroach upon the channel and the riparian zone then becomes less diverse. The altered hydrologic, sediment, and temperature regimes do not provide adequate environmental conditions for most native species. The most important issue is the constant minimum in-stream flow in the dewatered reach between the dam and the powerhouse tailrace. The environmental flow value is usually chosen to be 10 % of the mean annual flow of the last 10 years, at the site.

In this paper, the current level of hydropower production and energy saving, and power consumption by different sectors, and the sustainable energy policy are presented..

Key Words: Turkey, Renewable Energy Sources, Hydropower, Energy Demand, Saving and environmental concern

Biography

Born in 1945, at Bursa, Turkey. He completed B.Sc and M.Sc (Water Resources) studies in Civil Engineering Department of Middle East Tech. Uni. Ankara in 1969. He received his Engineering Doctorate from Helsinki



Technical University in 1975, Finland, became Associate professor in Hydrology at Hacettepe University, Ankara in 1983, and Professor in Water Resources and Hydrology at Gazi University, Ankara in 1993. He was Chair person in Civil Engineering Dept. during the period of 1993-1999. He has been the Dean of Engineering and Architectural Faculty of Gazi University during the period September 2007- January 2010. He has been “Visiting Professor” at the Department of Civil and Environmental Engineering of University of Utah, USA during 1999-2000 Academic year. He has worked as Program committee member of “World Water Forum 5” to be held in İstanbul in March, 2009. He was a member of University governing council, and also the Head of the Center of “Scientific and Technological Research Strategies” of Gazi University during 2008-2012. On the 1st of September 2012, he retired from the Civil Engineering Department of Engineering Faculty of Gazi University. During 2014-2017, He taught as full-time academic at Civil Engineering Department of Engineering Faculty of Near East University at Northern Cyprus. Now he teaches water related courses at Civil Engineering Department of Engineering Faculty of Baskent University, Ankara, Turkey. He is co-author of two Professional books and about 205 papers printed both in National and/or International professional journals, proceedings and technical magazines.



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The 12th Annual World Congress of Food and Nutrition (WCFN-2025)



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WCFN 01:

Research and Development for Food and Nutrition Science

Chair

Dr. Satoshi Matsuda, Associate Professor, Shizuoka University, Japan

Time: 13:30-16:45, November 12, 2025 (Wednesday);

Place: Kamo, Fifth Floor

Title: Oral Intake of Degalactosylated Whey Protein Increases Peripheral Blood Telomere Length in Young and Aged Mice

Dr. Toshio Inui

CEO

Saisei Mirai Clinic Group

Japan

Abstract

The effects of oral intake of degalactosylated whey protein (D-WP) on peripheral blood telomere length and telomerase were examined in young and aged mice. In young mice, peripheral blood telomere length was significantly elongated following oral intake of D-WP for 4 weeks. The mRNA expression of both telomerase reverse transcriptase (TERT) and telomerase RNA component (TERC) was also significantly increased in the peripheral blood following oral intake of D-WP for 4 weeks. In aged mice, peripheral blood telomere length was significantly decreased as compared with that of young mice, and significantly restored to the level of young mice drinking water by the oral intake of D-WP for 4 weeks. The mRNA expression of peripheral blood TERT and TERC mRNA in aged mice significantly decreased as compared with the level in young mice drinking water, and was significantly restored to the level of expression of young mice drinking water by oral intake of D-WP for 4 weeks. This study demonstrated that D-WP, but not intact whey protein, potentially increases peripheral blood telomere length accompanied by increased mRNA expression of TERT and TERC in both young and aged mice, suggesting that D-WP may enhance chromosome-end integrity and chromosomal stability.

Biography

Dr. Toshio Inui is the CEO of the Saisei Mirai Clinics Group and a distinguished Medical Doctor with a PhD. He graduated from Kyoto Prefectural University of Medicine in 1978. Following his graduation, he gained experience as a physician in the internal medicine department of a general hospital. At the age of 33, he founded Inui Clinic, specializing in the treatment of internal diseases.

A pivotal moment in his career came after the loss of his father to cancer, which led Dr. Inui to reevaluate the limitations of traditional cancer therapies, including surgery, chemotherapy, and radiation. This personal experience drove him to focus on immunotherapy as an alternative approach to cancer treatment. As a result, he renamed his clinic to Inui Cancer Immunotherapy Clinic and dedicated himself to advancing immunotherapy research and cancer treatment.

Today, his clinic is engaged in collaborative efforts with universities and medical institutions both within Japan and internationally, pioneering research and development in immunotherapies such as GcMAF, autologous cancer vaccines, hyper T/NK cell therapy, Sonodynamic therapy (SDT), and P53 and PTEN gene therapy.

Key Career Highlights:

- 1978: Graduated from Kyoto Prefectural University of Medicine
- 1987: Founded Inui Cancer Immunotherapy Clinic in Osaka
- 2009: Established Saisei Mirai Medical Corporation
- 2010: Opened Saisei Mirai Clinics in Osaka, Kobe, and Tokyo
- 2013: Appointed as a Visiting Professor at Kyoto Prefectural University of Medicine, Ritsumeikan University (2018) and Kagoshima University (2020)
- 2016: Completed PhD in Engineering from Tokushima University.
- 2023: Opened Saisei Serbia Clinic; Saisei Lithuania Company

Title: Engineering of Composting Plants for the Treatment and Recycle of Waste Foods

Dr. Satoshi Matsuda

Associate Professor
Shizuoka University
Japan

Abstract

The treatment and recycle of waste foods is an important issue for our society. Although there are many options for the treatment of food wastes, each option has its own weak point. Among the possible methods, a microbial decomposition type of garbage treatment system, i.e. composting, is considered to be one of the most environmentally-friendly options. But the design and operation of composting plants has been carried out mainly based on empirically obtained data in many cases, which caused various troubles such as generation of bad smells and low performance in decomposing organic wastes. The essential reason of this situation would be that composting system is a kind of “complex system”, in which many factors, temperature, moisture content, aeration, microbial activity, and so on, interact in diverse ways.

And also, although many research articles have been published on the composting processes throughout the world, most of them employ batch processes and not continuous processes. Conversely, most real-world practical composting plants adopt a continuous operation system in which fresh feed is usually input once a day with continuous aeration and intermittent mixing. Since composting plants are one of the biochemical reaction processes, the design and operation of them should be accomplished on the basis of chemical engineering aspects such as material and heat (enthalpy) balance, kinetic analysis of reaction and/or mass transfer rate, and various equilibrium relations. Thus, the purpose of this study is to establish a methodology of the large-scale composting plants with continuous operation. The major operating factors considered here are as follows: the rate of aeration, the control of temperature and moisture content in the reactor, pH, ORP, mixing conditions, organic loading to the reactor, and others. And also, the research on the analysis of the bacterial community in the composting process is introduced, which will make this process from “black box” to “clear box”.

Biography

Satoshi MATSUDA, Associate Professor of Faculty of Engineering, SHIZUOKA University, grew up in Japan and received his Bachelor's degree from Kyoto University in 1978, and Dr. of Chemical Environmental Engineering from Tokyo Institute of Technology, and was installed the post of Res. Assoc. of Tokyo Institute of Technology in 1983.

And then he worked at SHIZUOKA University as an Assoc. Prof. from 1992 to 2020.

Major Research Area: Waste Treatment Technologies using Microorganisms; e.g. composting of kitchen waste (aerobic process), methane fermentation (anaerobic one). Technology Assessment (mainly renewable energies). Life Cycle Analysis (mainly technologies for recycling of wastes).



Title: The Mechanisms and Nutritional Treatments for Sarcopenia

Dr. Kento Hamada* and Kunihiro Sakuma

Doctoral Student
Institute of Science Tokyo
Japan

Abstract

Sarcopenia is a disease defined as age-related loss of muscle mass and function that reduces mobility and increases the risk of falls in the elderly. Two major degradative systems, the ubiquitin-proteasome system and the autophagy-lysosome system, are involved in skeletal muscle mass loss. Acute muscle atrophy, such as denervation and hindlimb suspension, activates the former, whereas slow progressive muscle atrophy, such as sarcopenia, is primarily due to the dysfunction of the latter. We have shown that the expression of two substances, Rubicon (Run domain Beclin-1 interacting and cysteine-rich domain containing Beclin-1 interacting protein) and TRB3 (Tribbles homolog 3), is increased in aging skeletal muscle, demonstrating that the expression of these two substances is increased and contributes to autophagy dysfunction. Exercise may alter the expression of these substances and contribute to the prevention or improvement of sarcopenia. Amino acid intake has been proposed as a nutritional approach, but its single intake is not sufficient to increase muscle mass and strength, and must be combined with resistance exercise. Tea catechins, soy isoflavones, and ursolic acid have been mentioned as candidates to improve sarcopenia, but human clinical trials have not provided sufficient results. In this presentation, the molecular mechanisms of sarcopenia and nutritional approaches will be presented.

Biography

Dr. Hamada is a physical therapist and has been working on skeletal muscle research in a doctoral program at Institute of Science Tokyo (formerly Tokyo Institute of Technology) since 2020. He is interested in molecular mechanisms of muscle diseases and muscle pathology, including age-related changes.

Title: Oral Calcium Butyrate Attenuates Colonic and Cerebral Inflammation and Tissue Pathology Across Aging in Rats

Dr. Sevim Kandis Sever, Dr. Rabia Ilgın, Prof. Dr. M. Ibrahim Tuglu, and Prof. Dr. Nazan Uysal Harzadin*

Assistant Professor

Dokuz Eylul University

Turkey

Abstract

The microbiota–gut–brain axis has emerged as a key focus due to its critical role in health and disease. Short-chain fatty acids are essential microbial metabolites produced through anaerobic fermentation, with butyrate serving as the primary energy source for colonocytes and exerting anti-inflammatory, antioxidant, and anti-apoptotic effects. Aging alters microbiota composition, immune responses, and epithelial barrier integrity, leading to reduced microbial diversity, increased intestinal permeability, and inflammation. In this study, calcium butyrate (300 mg/kg daily for 21 days) was administered to young adult (12–14 weeks) and aged (12–14 months) Wistar rats to investigate age-related changes in inflammation and intestinal barrier function. Intestinal tight junction proteins (OCLN, ZO-1), neuroinflammatory markers (GFAP, Iba-1, NeuN), and inflammatory cytokines (TNF- α , IL-10, IL-1 β , IL-6) were analyzed. Calcium butyrate increased IL-10 and decreased TNF- α in hippocampal and colonic tissues, indicating anti-inflammatory effects predominantly in the hippocampus of young rats and the colon of aged rats. NeuN expression was significantly elevated in calcium butyrate groups compared to controls, whereas GFAP and Iba-1 expression were markedly reduced. Colonic ZO-1 and OCLN expression were also significantly upregulated, with more pronounced effects observed in aged rats. Collectively, these findings demonstrate that 21 days of oral calcium butyrate supplementation enhances intestinal tight junction protein expression and mitigates neuroinflammatory and systemic inflammatory parameters in both young adult and aged rats.

Keywords: calcium butyrate, neuroinflammation, inflammatory cytokines, tight-junction proteins

Biography

She graduated from Ankara University, Faculty of Veterinary Medicine, where she also completed her first PhD. She obtained her master's degree and a second PhD at Dokuz Eylul University, Faculty of Medicine. Between 2022 and 2023, she held a post-doctoral research position at Madrid Autónoma University with a competitive scholarship. Currently, she is working as an Assistant Professor in the Department of Physiology at Dokuz Eylul University, Faculty of Medicine. Her academic background reflects strong interdisciplinary expertise bridging veterinary and medical sciences, with research interests focusing on neuroinflammation, gut–brain axis, and functional nutrition.



Title: Microencapsulation of Bacillus Megaterium in Humic Acid-Supplied Alginate Beads Enhances Tomato Growth and Suppresses the Root-Knot Nematode Meloidogyne Javanica Under Greenhouse Conditions

Dr. Hanaa Ahmed Abokoura

Professor

Soil Microbiology Research Department

Soils, Water, and Environment Research Institute (SWERI)

Agriculture Research Center

Egypt

Title: Chrononutrition for Infants: Better Sleep Through Chrononutrition with Melatonin-Rich Night Milk from Non-Pooled Cow's Milk

Dr. Ekkehart Paditz

Professor

Center for Applied Prevention

Germany

Abstract

Objectives: Sleep problems are reported in 10% to 35% of infants. Infant colic is significantly associated with infant sleep disorders and lower breastfeeding. Goal: Better infant sleep with fewer sleep disorders and less infant colic. Improvement in the quality of life and satisfaction of parents.

Methods: Systematic reviews and development of an international patent specification [1-3].

Results: In the first 6 to 12 months of life, infants show a 'physiological' melatonin deficiency because the pineal gland cannot start the circadian pulsatile synthesis and secretion of melatonin. This is associated with sleep disorders and infant colic. To date, more than 30 randomised placebo-controlled studies are available on the effective influence of non-organic sleep disorders in childhood and adolescence through the evening administration of melatonin [3]. However, external nutritional supplements are not necessary for infants, as cow's milk, like breast milk, has high melatonin concentrations at night (melatonin-rich night milk); milk contains hardly any melatonin during the day [1, 4, 5].

Conclusion: We propose to use non-pooled day milk with physiologically low melatonin and night milk with physiologically high melatonin concentrations for the production of infant formula from cow's milk [1].

Video: https://www.youtube.com/watch?v=R6EL_oVVu2U,

Patent: https://patentscope.wipo.int/search/en/detail.jsf?docId=US453097015&_fid=WO2023135228 .

There is a high market potential [6] with a high return on investment (ROI).

Biography

Degree in human medicine from Humboldt University Berlin, specialist training in paediatrics at the Medical Faculty of the Technical University of Dresden. Additional scientific training at the Institute for Clinical Pharmacology, Medical Faculty, TU Dresden. Internships at the Institute for Toxicology at the German Cancer Research Centre in Heidelberg and in the Division of Applied Physiology at the Ruhr University in Bochum. Scientific and clinical experience in the field of paediatric sleep medicine, including several years as a member of the board of the German Sleep Society (DGSM). His publications have been cited 859 times:

https://scholar.google.com/citations?hl=de&user=9G8IZkcAAAAJ&view_op=list_works&sortby=pubdate

[1] Paditz E: Postnatal Development of the Circadian Rhythmicity of Human Pineal Melatonin Synthesis and Secretion (Systematic Review). *Children* 2024;11:1197.

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[4] Andrani M, et al.: Bioactive Peptides in Dairy Milk: Highlighting the Role of Melatonin. *Biomolecules* 2024;14:934.

[5] Eriksson L, et al.: Diurnal rhythm of melatonin in bovine milk. *Acta vet Scand* 1998;39:301-310.

[6] Baker P, et al.: Data on the market a of the transnational baby food industry. *Globalization and health* 2021;17:58.

Title: The Role of Vegetable and Fruit Learning Modules in Early Childhood Education: Insights from Preschool Educators

Dr. Nur Suhaidah Sukor

Senior Lecturer

Faculty of Education and Sport Studies

University Malaysia Sabah

Malaysia

Abstract

This study examines preschool teachers' perceptions of the need for vegetable and fruit learning modules for children aged 5–6 years, focusing on their efficacy in enhancing knowledge and developmental skills. A quantitative survey was administered to 30 preschool teachers, assessing four key module components: (1) graphics and illustrations, (2) text, (3) usability, and (4) activity roles (encompassing self-confidence, emotional, social, physical, cognitive, and language skills). Findings revealed strong agreement on the modules' effectiveness, particularly in using appropriate colors (Item S3: $M = 4.63$, $SD = 0.56$) and fostering children's identification of vegetable and fruit. In term of text component, the teachers strongly agree that the modules produced are clear and the instructions are understood to make it easier for children to perform the tasks given (Item S7: $M = 4.40$, $SD = 0.72$). Teachers strongly agreed that the modules' text was clear and instructions were comprehensible (Item S7: $M = 4.40$, $SD = 0.72$), with activity guides being particularly user-friendly (Item S9: $M = 4.50$, $SD = 0.63$). Regarding developmental outcomes, teachers consistently affirmed the modules' positive impact across all measured skills ($M = 4.33$ – 4.57). These findings highlight teachers' emphasis on both engagement and holistic development, suggesting that systematically designed modules can effectively support early childhood nutrition education while fostering comprehensive skill development. The study underscores the value of purpose-built educational resources in early science learning contexts.

Keywords: preschool, vegetable and fruit, modules,

Biography

Dr. Nur Suhaidah Sukor is a Senior Lecturer at Universiti Malaysia Sabah (UMS), specializing in Science Education and early childhood STEM learning. A Ph.D. graduate from UMS, her research focuses on innovative pedagogical approaches, earning her multiple awards at the Malaysian Technology Expo (MTE) for STEM-based educational modules. Beyond research, she contributes to consultancy projects in science education and quantitative methodologies. Passionate about early literacy, she has authored seven children's books published by UMS Publisher. As an active peer reviewer, she serves Scopus-indexed journals including Journal of Educational Research and Journal of Research in Childhood Education, alongside MyCite-indexed publications. Her academic commitments reflect her dedication to advancing science education and improving learning outcomes.



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The 6th International Congress of Environment (ICE-2025)



ICE 01:

Hot Topics in Environment Field

Chair

Dr. Arminda do Paço, Professor, University of Beira Interior, Portugal

Co-Chair

Dr. Margarida Catalão-Lopes, Associate Professor, Lisbon University, Portugal

Time: 13:30-18:10, November 12, 2025 (Wednesday)

Place: Katsura, Fifth Floor

Title: The Degrading Capacity of Bacteria Species to the Maximum Threshold Concentration of Pesticides in Vitro and in Vivo Conditions

Dr. Tinatin Doolotkeldieva*, Saykal Bobusheva, and Mahabat Konurbaeva

Professor,
Kyrgyz National Agrarian University, named K.I.Skryabin,
Kyrgyzstan

Abstract

One of the adverse problems of modern times is global chemical pollution of the biosphere, which raises reasonable concern about the potential disruption of the ecological balance in individual ecosystems. One of the key aspects of pesticide biodegradation is understanding the availability and susceptibility of appropriate microbes.

The aim was to identify the maximum threshold concentration of pesticides that would inhibit the degrading capacity of bacteria species in vitro and in vivo conditions. Three bacterial strains, *Stenotrophomonas sp. Ps-B*, *Lysinibacillus fusiformis SA-4*, and *Enterobacter cloacae SB-2* were chosen for trials with varying concentrations of pesticide and herbicide. Two types of pesticides were used for the trials: Imidacloprid is an insecticide from the neonicotinoid group, and Glyphosate is an organophosphorus compound used as a herbicide. The threshold inhibitory concentration of Imidacloprid for all three tested strains is 20000 mg/l. The threshold inhibitory concentration of Glyphosate for the *Lysinibacillus fusiformis SA-4* strain was 10000 mg/l, for *Stenotrophomonas sp.* - 5000 mg/l, and *Enterobacter cloacae SB-2* 10 000 mg/L. To determine the threshold essential when planning bioremediation in soils with a high content of pesticides. Analysed bacterial species' ability to withstand high concentrations of pesticides demonstrates their potential as bioremediation agents.

Keywords: chemical pollution, pesticide biodegradation, the degrading capacity of bacteria; the threshold inhibitory concentration of pesticides.

Biography

Dr. Tinatin Doolotkeldieva is currently a Professor of Plant Science and Plant Protection.

Department, Head of Plant Protection Centre at Kyrgyz National Agrarian University named K. I. Skryabin. She has expertise in plant pathology, soil microbiology, biocontrol, bioremediation, plant-microbe interactions using molecular tools, and plant health management using biocontrol agents. She has published over 260 papers in reputed journals and has been an editorial board member. She is a member of the American Association for Microbiology, the Molecular Plant-Microbe Interaction Society, the British Plant Pathology Society, the Society for Invertebrate Pathology, the Asian Plant Pathology Society, TIPI Asia, 'Global Avalon network "on organic agriculture and a member of the Society of Environmental Toxicology and Chemistry (SETAC). Prof. Tinatin Doolotkeldieva was awarded the Gold Medal and the Certification of the World Intellectual Property Organization for creating several biological products (April 25, 2014). For her scientific achievements and invaluable contribution to the development of microbiology and biotechnology, she was awarded the State Award with the honorary title "Honored Worker of Science of Kyrgyz Republic" (August 27, 2019). May,5, 2024. « SETAC Europe Noack Laboratorien Outstanding Science Career Award » for significant contributions to the field of environmental toxicology and chemistry on a global scale.

Title: ABC-process for Carbon-neutral and Energy-independent Wastewater Treatment

Dr. Jungyu Park*, Sangyeol Jo, Rahul Kadam, Heewon Jang, Dongyun Seo, Sunjin Rho, and Hyolin Lee

Associate Professor,
Chosun University,
South Korea

Research Interest

Current research interest is the development of carbon- and energy-neutral wastewater treatment processes. For that, Dr. Park's research group mainly focuses on chemically enhanced primary treatment technologies, bio-electrochemical nitrogen oxidation system, and enhanced anaerobic co-digestion processes.

Abstract

Increasing human population along with rapid urbanization and industrial advancement have seriously threatened current energy resources and environmental health, while heightening issues such as the availability and purity of natural water bodies. Because approximately 80% of generated wastewater is directly discharged into the environment, damaging human health and aquatic life, it is certain that more than 40% of the global population will be forced to live with water uncertainty and stressful conditions if wastewater is left unmanaged. Therefore, these global water environment crises have driven the need to develop and implement wastewater treatment measures. Wastewater treatment has become the only substitute for securing the future freshwater supply. Despite a quick shift of global goals toward carbon-neutral infrastructure, activated sludge-based conventional systems inhibit the Green New Deal. Here, a municipal wastewater treatment plant (MWWTP) for carbon neutrality and energy sustainability is suggested and discussed based on realizable technical aspects. Organics have been recovered using various enhanced primary treatment techniques, thereby reducing oxygen demand for the oxidation of organics and maximizing biogas production in biological processes. Meanwhile, ammonium in organic-separated wastewater is bio-electrochemically oxidized to N₂ and reduced to H₂ under completely anaerobic conditions, resulting in the minimization of energy requirements and waste sludge production, which are the main problems in activated sludge-based conventional processes. The anaerobic digestion process converts concentrated primary sludge to biomethane, and H₂ gas recovered from nitrogen upgrades the biomethane quality by reducing carbon dioxide in biogas. Based on these results, MWWTPs can be simplified and improved with high process and energy efficiencies.

Biography

Dr. Jungyu Park is an Associate Professor of the Advanced Energy Engineering Department, Chosun University, grew up in Republic of Korea and received his Bachelor's degree from Chungbuk National University in 2009. After he obtained his Ph.D. degree from Chungbuk National University in 2019, he joined Professor Daqian Jiang's research group at the University of Montana in 2020. Dr. Park was appointed to Chosun University as Assistant Professor in 2021 and was promoted to Associate Professor in 2025. He has received various awards, with the most representative being the 2022 Baek-ak Best Research Award, 2023 KSEE Best Presentation Award, 2024 KWMS Best Research Award, and 2025 ICRES Best Presentation Award.

Title: Integrated Sustainability Assessment of Biomass Power Plants Using Tree Pruning Residues in Greece

Dr. Styliani Sofianopoulou*, Dr. Vassilis Dedoussis, Stavros Gennitsaris, and Angeliki Sagani

Professor

University of Piraeus

Greece

Abstract

Despite the increasing penetration of renewable energy sources into the electricity generation mix, fossil fuels still constitute a significant share of global energy production, contributing significantly to air pollution and climate change.

Thus, the deployment of sustainable energy technologies is essential to align with the long-term decarbonization targets established by the European Union. Among several available technologies, those that utilize secondary biomass residues, such as tree pruning, could offer a promising solution for electricity generation. Tree pruning residues represent a widely available yet unexploited biomass resource with substantial energy potential. However, the prevailing practice of the open-field burning of pruning residues results in adverse environmental impacts, including Greenhouse Gas (GHG) and dioxin emissions and the waste of recoverable thermal energy. This study evaluates the life cycle environmental and techno-economic performance of biomass-fired power plants across multiple regions in Greece, jointly applying Life Cycle Assessment (LCA), Techno-Economic analysis, and Multi-Criteria Decision Analysis (MCDA). The proposed methodology incorporates environmental, economic, and technical criteria to enable a holistic comparison of sustainability outcomes and identify the critical stages that mostly deserve optimization from a circular economy perspective. The obtained results are expected to offer valuable insights into the environmental and economic benefits of tree pruning biomass exploitation, serving as a decision-support tool for stakeholders and policymakers to guide more informed planning and strategy development for sustainable bioenergy deployment. The proposed approach is adaptable and transferable, providing a valuable framework for optimizing bioresource management across diverse regions and sectors.

Acknowledgement: This work has been partly supported by the University of Piraeus Research Center, Greece.

Biography

Stavros Gennitsaris received Dipl. Ing. degree in Production Engineering and Management from the Technical University of Crete in 2018, ranking first in his class, followed by an M.Sc. degree in Industrial Management and Technology, with a specialization in Energy and Environmental Management, from the University of Piraeus in 2022. Currently, he is a Ph.D. candidate in the Department of Industrial Management and Technology at the University of Piraeus and works as an associate research engineer at the Centre for Research and Technology Hellas (CERTH), where he contributes to multiple EU-funded projects. He also serves as a reviewer for several peer-reviewed scientific journals, and his research work has been published in high-impact journals, as well as presented at international academic conferences. His research focuses on the economic and environmental performance evaluation of energy systems, renewable energy technologies, conversion processes, and biochemicals from a life cycle perspective, alongside the theoretical conceptualization of sustainability and its application in assessing enterprises, processes, and energy systems.

Angeliki Sagani is a Mechanical Engineer with a MSc in Energy and Environmental Management. She is a Senior Research Engineer at CERTH and a PhD candidate at the University of Piraeus. She is involved in European industry-oriented projects with a focus on the development of life cycle thinking models integrated into decision-making tools with application in the field of advanced energy systems, biofuels & biochemicals.

Vassilis Dedoussis, is Professor Emeritus in Industrial Systems Techniques of the Department of Industrial Management & Technology, University of Piraeus, Greece. He has received the Dipl. Ing. degree from the National Technical University of Athens (Mechanical Engineering, 1981), and the M.Sc. (with distinction) and



Ph.D. degrees in computational aerodynamics from Imperial College, London (Aeronautics 1983, 1988). Has published more than 90 papers in refereed journals and conference proceedings. His published work focuses on CAE of aircraft, industrial and power installations as well as commercial product components. His current research interests include CAD and Additive Manufacturing/3D Printing applications for product design and development, medicine and healthcare, as well as computational tools for optimizing industrial processes and energy systems. Styliani Sofianopoulou is Professor of Operations Research at the Department of Industrial Management & Technology, University of Piraeus, Greece. She received her B.Sc. degree in Economics from the University of Piraeus, Greece, ranking first in her class, and the MSc and PhD degrees in Operational Research at the Dept. of Mathematics and Statistics of the London School of Economics and Political Science. She has published more than 70 papers in refereed journals and conference proceedings with more than 950 citations. Her published work focuses on the solution of combinatorial optimization problems in the fields of telecommunications, design and analysis of production systems, inventory routing and scheduling etc. Current research interests also include the development of (meta-) heuristic algorithms and the application of performance measuring techniques to industrial problems, energy systems and sustainable development and its goals. Is a reviewer to several leading journals and conferences.

Title: Sustainability Assessment of End-of-Life Wind Turbine Management Using LCA and TOPSIS

Dr. Vassilis Dedoussis, Styliani Sofianopoulou, Angeliki Sagani, and Stavros Gennitsaris*

Professor Emeritus
University of Piraeus
Greece

Abstract

The accelerating expansion of wind energy capacity has become a core strategy in the European Union's efforts to decarbonize the electricity sector, in compliance with the European Green Deal and the 'Fit for 55' legislative package. However, this rapid deployment is accompanied by an increasing volume of difficult-to-recycle wind turbine components, including blades and composite materials, thereby intensifying end-of-life management challenges and highlighting the need for sustainable treatment solutions. The present study addresses these issues by performing an integrated sustainability performance evaluation of alternative waste management scenarios for onshore wind turbines. A comprehensive Life Cycle Assessment (LCA) is carried out to quantify the environmental impacts associated with landfill disposal, mechanical recycling, and advanced thermal recycling technologies. The analysis considers multiple impact categories, including climate change, land occupation and depletion of energy resources. To enhance the assessment beyond the conventional environmental or technical focus of most published studies, a Multi-Criteria Decision-Making (MCDM) approach, specifically the Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS), is developed and applied. This methodological framework, implemented via a representative case study using real-world data, evaluates and ranks the end-of-life treatment scenarios by integrating technological, environmental, economic, and social criteria to assess their overall efficiency. The results highlight the respective advantages and limitations of the evaluated end-of-life strategies, offering a holistic and robust basis for informed decision-making that facilitates the transition toward more sustainable and circular waste management practices in the wind energy sector.

Acknowledgement: This work was partially supported by the University of Piraeus Research Center.

Biography

Angeliki Sagani is a Mechanical Engineer with an MSc in Energy and Environmental Management. She is a Senior Research Engineer at CERTH and a PhD candidate at the University of Piraeus. She is involved in European industry-oriented projects with a focus on the development of life cycle thinking models integrated into decision-making tools with application in the field of advanced energy systems, biofuels & biochemicals.

Stavros Gennitsaris received Dipl. Ing. degree in Production Engineering and Management from the Technical University of Crete in 2018, ranking first in his class, followed by an M.Sc. degree in Industrial Management and Technology, with a specialization in Energy and Environmental Management, from the University of Piraeus in 2022. Currently, he is a Ph.D. candidate in the Department of Industrial Management and Technology at the University of Piraeus and works as an associate research engineer at the Centre for Research and Technology Hellas (CERTH), where he contributes to multiple EU-funded projects. He also serves as a reviewer for several peer-reviewed scientific journals, and his research work has been published in high-impact journals, as well as presented at international academic conferences. His research focuses on the economic and environmental performance evaluation of energy systems, renewable energy technologies, conversion processes, and biochemicals from a life cycle perspective, alongside the theoretical conceptualization of sustainability and its application in assessing enterprises, processes, and energy systems.

Styliani Sofianopoulou is Professor of Operations Research at the Department of Industrial Management & Technology, University of Piraeus, Greece. She received her B.Sc. degree in Economics from the University of Piraeus, Greece, ranking first in her class, and the MSc and PhD degrees in Operational Research at the Dept. of Mathematics and Statistics of the London School of Economics and Political Science. She has published more than 70 papers in refereed journals and conference proceedings with more than 950 citations. Her published work focuses on the solution of combinatorial optimization problems in the fields of telecommunications, design and



analysis of production systems, inventory routing and scheduling etc. Current research interests also include the development of (meta-) heuristic algorithms and the application of performance measuring techniques to industrial problems, energy systems and sustainable development and its goals. Is a reviewer to several leading journals and conferences.

Vassilis Dedoussis is Professor Emeritus in Industrial Systems Techniques of the Department of Industrial Management & Technology, University of Piraeus, Greece. He has received the Dipl. Ing. degree from the National Technical University of Athens (Mechanical Engineering, 1981), and the M.Sc. (with distinction) and Ph.D. degrees in computational aerodynamics from Imperial College, London (Aeronautics 1983, 1988). Has published more than 90 papers in refereed journals and conference proceedings. His published work focuses on CAE of aircraft, industrial and power installations as well as commercial product components. His current research interests include CAD and Additive Manufacturing/3D Printing applications for product design and development, medicine and healthcare, as well as computational tools for optimizing industrial processes and energy systems.

Title: How Sustainable and Circular Can the Health Industry Be?

Prof. Arminda do Paco

Full Professor

University of Beira Interior

Portugal

Abstract

The importance of sustainability in healthcare and related businesses is widely recognised due to its significant environmental and economic impacts. Imbalances in this sector contribute to serious management challenges and the existence of unsustainable national healthcare systems in many countries. Adopting Circular Economy (CE) practices in the health-related businesses can significantly reduce waste and emissions, foster innovation, enhance supply chain security, and create new jobs. Circular business models can be integrated across various stages of the healthcare value chain, even within its complex systems. CE principles advocate for designing products and materials to be reused, repaired, or recycled rather than discarded. While implementing these practices in the healthcare sector poses unique challenges, transitioning to eco-friendlier processes and reducing dependency on certain materials offer viable solutions. This shift requires healthcare professionals to embrace a sustainability-focused mindset. This way it is necessary to explore how could be the transition from linear to circular business models, which of the key CE principles can be adopted by this sensitive industry are, and to know the barriers, best practices, emerging trends, and innovations. This knowledge will help to understand the potential of CE to transform the health tech sector toward a more sustainable future. This approach was specifically developed to be discussed in the scope of the Health2Innovation project that brings together higher education institutions, incubators, vocational education training organisations, SMEs and tech experts from Sweden, Germany, Portugal, Spain, France, Ireland, Greece, Cyprus, Lithuania, Poland and Romania to exchange knowledge and best practices, co-design and deliver a training course targeting students and/or graduates in Life Sciences, Medicine, Business, Engineering or ICT-related studies. This project involves the creation of a digital learning hub and a mobile app, and it will also bring to life a Health Innovation Bootcamp and an Apprenticeship programme in innovative health clusters.

Biography

Arminda do Paco (PhD. In Management) is Full Professor at University of Beira Interior, Portugal. She is currently the Dean of Faculty of Human and Social Sciences and researcher of NECE – Research Unit of Business Sciences. Her areas of interest are sustainability and environmental marketing. She has published several articles in international journals and has edited books in the field of sustainability. Additionally, she has participating in national research projects, as well as in international projects being the coordinator of some of them (Health2Innovation, RESTLESS, Start Circular, Re-Start, PAM4WELLNESS, ICT Entrepreneur, SCIENT, ARTISAN, SPRING).

Acknowledges

FCT - Fundação para a Ciência e Tecnologia, I.P. by project reference UIDB/04630/2020 and DOI identifier 10.54499/UIDP/04630/2020 and Health2Innovation Erasmus+ project.

Title: Challenges in Energy Access, Energy Transition and Inequality

Dr. Margarida Catalão-Lopes

Associate Professor with Habilitation
Economics CEGIST, Instituto Superior
Técnico, Lisbon University
Portugal

Abstract

Access to modern energy is essential for economic development and equity. However, the relationship between energy access and income inequality is complex, unclear, and seems to vary across countries. This fact calls for tailored policies that consider each country's unique socio-economic and energy context to pursue a just energy transition. While in some countries improved electricity access reduces income inequality, a sort of "energy access curse" exists in others. Reducing income inequality may, in turn, contribute to enhanced energy access; however, this relationship is neither uniform nor universally observed and rather reflects a broader "inequality conundrum". Concrete examples of these different situations will be provided. Inequality and energy access issues will also be addressed in the context of the adoption of electric vehicles (EVs). Although it has intensified, EV adoption remains constrained by critical mass thresholds and indirect network effects, wherein the availability of charging infrastructure significantly influences market expansion. Strategic public policies (such as targeted subsidies and infrastructure investments) are essential to facilitate widespread adoption; however, persistent challenges continue to impede progress. The growing electricity demand associated with EVs may contribute to rising energy prices, potentially imposing a disproportionate economic burden on low-income households. Furthermore, substantial upfront costs and the uneven geographic distribution of the charging infrastructure present additional barriers to electric vehicle adoption, disproportionately benefiting higher-income individuals. As fuel tax revenues diminish, governments may introduce road usage charges or electricity taxes, which would place additional financial strain on socioeconomically disadvantaged groups. At the same time, digitalization facilitates AI-enhanced battery management and intelligent mobility solutions, but digital inequalities limit access to smart charging infrastructure and online incentive programs, thereby exacerbating existing social disparities. These topics call for an integrated view and will be explored in the talk.

Biography

Margarida Catalão-Lopes holds a Ph.D. and Habilitation in Economics. She is an Associate Professor at Universidade de Lisboa and a member of CEGIST, the Centre for Management Studies of Instituto Superior Técnico (IST). Her research interests include energy access, inequality, and the interconnection between competition policy and sustainability, under game theory and econometrics lenses. She has presented her work at dozens of specialized international conferences and published in several peer-reviewed international journals, covering different areas of Economics, Strategy, and Management, including M&A, corporate social responsibility, and energy transition. She has been a team member and principal investigator in competitive research projects. She is Vice-President of the Engineering and Management Department of IST, where she teaches at the Undergraduate, Master and PhD levels.



Title: Financial Development, Environmental regulation, and Firms' Pollution Emission: Evidence from China

Dr. Ruili Zhao

Associate Professor

Shanghai University of International Business and Economics,
China

Abstract

This paper examines how banking sector reforms in China between 1998 and 2007 affected firms' pollution emissions by easing credit constraints. Exploiting variation in local bank competition and sectoral financial dependence, we find that banking deregulation significantly reduces air pollution emissions (SO₂ and waste gas), while having limited effects on water pollutants (COD and wastewater). We document three mechanisms: (i) financial deregulation lowers firms' borrowing costs, easing financing constraints; (ii) firms invest in both abatement equipment and energy-efficient technologies that improve air-pollution performance; and (iii) firms shift their asset mix away from collateral-intensive tangible assets without expanding output. The results highlight that financial liberalization facilitates selective technology adoption that reduces pollution, especially for air pollutants subject to stronger regulatory pressure, but does not automatically extend to water pollution. Our findings underscore the importance of financial sector reforms as a complement to environmental policy in emerging economies.

Keywords: China, Pollution emissions, Financial constraints, financial intermediation, Financial development
JEL Codes: G2, G32, L25, L6, Q53

Biography

Dr. Ruili Zhao is an associate professor of International Trade in the Department of School of International Business at Shanghai University of International Business and Economics. She holds a Ph.D. in economic from the University of FuDan, China. Her areas of expertise include the heterogeneous trade theory, energy economics and urban economics. In the last few years, she has published several papers related to energy economics in international journal such as Journal of Economic Behavior and Organization (JEBO), Journal of Economic Surveys, China Economic Review. Besides, she serves as referee for several journals with high citation index such as World Economy, China&World Economy et.al.

Title: Statistical Contributions to the Study of Contamination in Abandoned Mining Areas. The Case Study of the Vale das Gatas Mine-Portugal

Dr. Joaquim Góis*, Dr. António Fiúza, Isabel Fagundes, and MSc. Bárbara Fonseca

Assistant Professor

Porto University

Portugal

Abstract

The objective of this work is to apply a selected set of geomathematical models that analyze the relationships between different Potentially Toxic Elements (PTEs) and spatial dispersion in the areas surrounding former abandoned mines. The use of multivariate statistical techniques within the framework of Factorial Methods (Principal Component Analysis and Correspondence Analysis), combined with geostatistical models characterizing the spatial behavior of PTEs, allows not only an environmental diagnosis of the site but also sanctions the evaluation of the potential economic feasibility of the site rehabilitation (through remining or remediation). The Vale das Gatas mine was one of the main centers of tungsten extraction in Portugal, heavily exploited during both World War II and Korean War, given its high economic and strategic value (Ávila, 2003). With the closure of mining operations and the abandonment of mining facilities, the area was neglected, with climatic factors being the main agents of weathering, allowing the continued degradation of exposed materials on the slopes, the waste rocks disposals, and consequent mobilization of potentially toxic elements (PTE) present. As documented by several authors (Almeida et al., 2023; Antunes et al., 2016; Cardenes et al., 2013; Durães et al., 2021; Favas et al., 2017, 2024; Fonseca et al., 2020), contamination in abandoned mining areas represents a significant environmental risk factor, impacting various environmental compartments such as soil, surface and groundwater, atmosphere, sediments and surrounding ecosystems.

Keywords: Multivariate Statistics; Geostatistics; Potentially Toxic Elements.

Biography

Dr. Joaquim Góis is an assistant Professor at the University of Porto, Faculty of Engineering in the Department of Civil and Georesources Engineering. He holds a M.Sc. in Mine Planning and Ph.D. in Engineering Sciences. His areas of expertise include geostatistics and multivariate statistical analysis of geological and mining data. He is the author of articles and conference presentations related to these topics. President of Geological and Mining Engineering at Ordem dos Engenheiros of Portugal (2017-2024). Participation in 12 National and European institutional projects. Supervision more than 50 approved Ph.D. thesis and Master dissertations. Member of the International Committee on Mine Safety Science and Engineering. Visiting Professor at the following universities: Kasetsart University (Thailand); Agostinho Neto University (Angola); Eduardo Mondlane and Pedagogical University (Mozambique); McGill University (Canada); Vigo University (Spain); San Carlos University (Guatemala) and Cabo Verde University (Cabo Verde).

Title: Life Cycle Assessment of Ore Extraction from a Lithium Mine

Dr. António Fiúza* and Dr. Joaquim Góis

Emeritus Professor

Porto University

Portugal

Research Interest

Current research interest is Environmental Risk Analysis

Abstract

Within the scope of a research project, it was intended to adapt the generic methodology of the Life Cycle Assessment (LCA) to the initial phases of the value chain inherent to the production of lithium compounds for electric vehicle batteries. Two main objectives were established: i) measure, characterize and evaluate the potential environmental impacts resulting from the production cycle of lithium carbonate: ii) include in the modelling all stages of the production cycle ranging from the extraction of the ore from the deposit, to the production of lithium carbonate or hydroxide, including the use of the remaining associated minerals aiming at the absence of tailings. In this document, we refer to the mining component that embraces the following unit operations: drilling, blasting, loading, ore and waste haulages, and ancillary operations (e.g., pumping, maintenance, transport of fuel, lubricants and explosives). From the intrinsic characteristics of the mineral deposit (geo-mechanical properties, ore reserves, stripping ratio, mining planning) and also considering some preliminary project decisions (life time, locations of the waste rock disposal and ore processing plant) each one of the main unit operations could be designed, allowing for the selection and number of the required equipment. Next, the corresponding consumption of utilities and emissions could be estimated.

The following environmental impact categories were selected: Climate Change, Ozone Layer Depletion, Terrestrial Acidification, Eutrophication of Fresh Water, Human Toxicity, Inhalable Particle Formation, Water Depletion and Depletion of Abiotic Resources. In the methodology used, the potential environmental load for each one of the unit operations that make up the process was evaluated, thus allowing the identification of the hot spots of the production process.

Biography

Professor Emeritus, Faculty of Engineering, University of Porto. Served as Full Professor, Director of the Masters and Doctoral Programs in Environmental Engineering and also for Mining Engineering. Created the Geo-Resources Environment Research Center (CIGAR). It was also coordinator at national level of the raw materials area of the research center Cerena. Former senior technician at the extinct Nuclear Energy Board and head of the Planning and Project Division of the National Uranium Company. Former research fellow of the U.S. Academy of Sciences and of the International Atomic Energy Agency. Visiting professor at the Technical University of Helsinki (now Alvar Aalto) and taught at universities in Spain, Slovakia, and Peru. He was responsible for large industrial projects, notably the Nisa project (uranium extraction and hydrometallurgy). Coordinated more than two dozen research projects with national, European Community, and transcontinental funding. In the area of hydrometallurgy, developed research on the hydrometallurgy of gold, scheelite and lithium ores. Executed projects for several large institutions and private companies concerning soil and groundwater contamination. Was consultant in the hydrometallurgical area for an Australian mining company. Reviewed scientific articles for many international journals and conferences. Participation in the scientific committees of several international conferences. Evaluator of research projects for the Portuguese Innovation Agency. Evaluation of the career of international researchers in Argentina and Greece. It has more than a hundred articles published in national and international journals and scientific books.



Title: ADAPT! Building Prototype for Climate-Adapted Urban Housing

Mr. Craig Applegath,

Partner,
DIALOG,
Canada

Abstract

As climate change accelerates, urban housing must not only mitigate carbon emissions but also adapt to escalating environmental stresses. The ADAPT! Building Prototype proposes an innovative mid-rise, multi-unit, low-carbon residential design that directly addresses the urgent need for climate resilience in urban communities. Developed by a multidisciplinary team at DIALOG, the prototype integrates architectural, structural, mechanical, and urban design strategies to anticipate and withstand severe heat waves, intense storm events, deluge flooding, and wildfire smoke conditions.

The project explores key questions fundamental to resilient housing: What building envelope and structural systems best resist wind, water, and heat stress? How can passive design, natural ventilation, and distributed PV generation enhance occupant safety and comfort during extended outages? What role can modular construction, local materials, and circular practices play in reducing vulnerability to disrupted supply chains? How can adaptation measures be achieved while maintaining cost feasibility and urban liveability?

By uniting mitigation and adaptation in one demonstrative prototype, this initiative seeks to establish a scalable model for the “missing middle” of urban residential design. The ADAPT! Building Prototype aims to advance both practice and discourse, positioning housing as a frontline response to the climate crisis.

Biography

Craig Applegath is an architect, urban designer, and biologist specializing in sustainable and climate-adapted design at the intersection of built environments and natural ecosystems. Craig focuses on zero-carbon, climate-adapted buildings, campuses, and communities, integrating mass timber in higher education, healthcare, and affordable housing projects. As Chair of the Mass Timber Institute Craig champions innovative low-carbon wood construction. The Founding Partner of DIALOG's Toronto studio, Craig holds degrees from the University of Toronto, Dalhousie University, and Harvard's GSD. Craig has taught climate change adaptation at the Daniels Faculty of Architecture at the University of Toronto, hosts of the Twenty First Century Imperative podcast, and speaks internationally, driven by his passion for addressing environmental challenges through design.



Title: Building Resilience in a Dual-Risk Cities: Climate Change Problematic and Earthquake Challenges in Istanbul

Dr. Hülya Coskun

Assistant Professor

Department of Architecture in (English Language)

Rumeli University

Turkey

Abstract

Climate change has emerged as one of the most urgent global challenges since the late twentieth century, profoundly impacting ecosystems, urban environments, and socioeconomic systems. International Earth-Summits started in the 1990s, in Brazil have increasingly emphasized the need for preventative and adaptive measures. Today, key global concerns include rising temperatures, ecological degradation, extreme weather events, sea level rise, and biodiversity loss. In this context, climatic awareness in the city, which began with the 1996 Istanbul Earth Summit, has become a critical case study due to the rapid urbanization, population growth exceeding 15 million, and vulnerability to both natural and anthropogenic pressures. Seismic risks and geographical constraints, such as city's location which allows to expand only to the tectonically stable north and its border the Sea of Marmara in south, further increase the risk of exposure to climate-related hazards. Rising average temperatures and warming in neighboring Mediterranean Sea are exacerbating ecological stress, exemplified by the migration of invasive marine species and the emerging mucilage crisis in the Sea of Marmara near İstanbul. Furthermore, recurring heat-related wildfires in areas close to the city threaten it's limited green infrastructure, weakening urban resilience. Despite the implementation of policy measures such as green infrastructure projects, sustainable mobility initiatives, and climate-resilient financing mechanisms, significant research gaps remain regarding the long-term adaptability of Istanbul's infrastructure, governance capacity, and community-based resilience strategies. This study positions Istanbul within broader global climate dynamics, highlighting both common and contextual challenges. It is anticipated that the city's proposed solutions to the climate crisis will serve as an example for other cities. The findings highlight the urgent need for localized, integrated, and governance-focused strategies aligned with global climate action to enhance urban resilience in rapidly urbanizing and climate-vulnerable cities.

Keywords: Climate-Change, Global Warming, Green Design, Housing, Istanbul, Sustainability

Biography

Hülya Coskun, BArch., (MSGSU), MSci., (MSGSU), Phd., (ENSA-PB Paris, France & MSGSU, Istanbul, Turkey). (Dual Degree on Phd. Architecture& Urbanism)

Received her B.Arch. and M.Sci. Degrees in Architecture from Faculty of Architecture, MSGSU, (Mimar Sinan Fine Arts University), Istanbul, Türkiye, and educated Urban Planning at ENSA-PB, École Nationale Supérieure d'Architecture de Paris-Belleville, Paris, France during her doctoral studies. She earned her Ph.D. degree in Architecture from MSGSU, Faculty of Architecture, İstanbul, Türkiye with the Doctoral Thesis of "The Housing Problem in the First Half of the 20th Century in Europe and Henri Prost Example".

She is currently working as an Ass. Prof. Dr., Department of Architecture in (English Language), Rumeli University, Istanbul, Türkiye.

Title: Anoxic Polyhydroxyalkanoates Production by Mixed Microbial Cultures

Dr. Xiaowu Huang*, Wenqiong Zhang, Tianyu Zou, and Xueyi Ruan

Associate Professor,
Guangdong Technion-Israel Institute of Technology,
China

Research Interest

Current research interest is biological wastewater treatment, anammox, and microbial PHA biosynthesis.

Abstract

Conventional anaerobically/aerobically alternating operated mixed microbial cultures (MMC) for polyhydroxyalkanoate (PHA) production requests high energy for aeration, restricting its technological scale-up and industrialization. MMC-based PHA production under completely anoxic conditions was developed with sequencing batch reactor (SBR) and continuous stirred-tank reactor (CSTR) configurations. The PHA production rate, property of sludge-derived PHA products, nutrient removal, and microbiome were systematically explored. First, MMC-based anoxic PHA production was developed and compared with conventional anaerobic/oxic (A/O) MMC-based scenario. Anoxic MMCs attained stable PHA production, i.e., PHA content of 26.0% and PHA yield of 0.20 g COD_{PHA}/g COD_{VFA} for An-SBR; PHA content of 38.0% and PHA yield of 0.23 g COD_{PHA}/g COD_{VFA} for An-CSTR, which are comparable to that of A/O SBR (i.e., PHA content of 35.0% and PHA yield of 0.23 g COD_{PHA}/g COD_{VFA}). Rich PHA producers proliferated and occupied >50.0% of the microbiome of the three reactors. *Brachymonas* and *Thauera* dominated and responded to PHA synthesis in An-SBR and An-CSTR. *Alsobacter*, *Acinetobacter*, and *Pseudomonas* were functional PHA producers in A/O-SBR. Secondly, anoxic PHA production was further validated with long-term operated SBR and CSTR. Both processes achieved >35% of PHA content and >0.40 g COD_{PHA}/g COD_{VFA}. Diverse and rich PHA producing populations, i.e., *Brachymonas*, *Thauera*, *Xanthobacter*, and *Paracoccus*, jointly performed PHA biosynthesis stably. Thirdly, the microbiome was explored with metagenomic sequencing, and 148 high-quality MAGs were recovered and annotated as the PHA producing microorganisms. Lastly, the properties of PHA products including monomer composition, crystallinity, and thermostability were analyzed, and results indicated that the quality of sludge-derived PHA products is competitive with the commercialized PHA standard. In this lecture, the process setup and optimization, metabolic synergy, and regulation strategies and mechanisms towards production of PHV-rich PHA products will be presented in details.

Biography

Dr. Xiaowu Huang is an Associate Professor at Guangdong Technion-Israel Institute of Technology. He received his PhD degree in Environmental Engineering from Kumamoto University (CSC, 2016) and was working at the University of Hawaii at Hilo and Swiss Federal Institute of Aquatic Science and Technology (EAWAG) as a visiting scholar (2015). Dr. Huang completed his postdoctoral training at The Hong Kong Polytechnic University (2016-2018) and The University of Hong Kong (2019-2021). He has served as the PI of four vertical projects and two industrial projects and has published over 35 peer-review papers on leading journals including ISME, ES&T and WR. He won the Second Prize of Guangdong Science and Technology Progress Award (2019), Second Prize of Guangdong Environmental Protection Science and Technology Award (2019), and Technology Innovation Award of China Innovation and Entrepreneurship Fair (2023). He currently serves as the associate editor for *Water Research*, editor for *Journal of Environmental Management*, and executive editor for *Current Research in Biotechnology*. His research mainly focuses on biological wastewater treatment, anammox, and microbial PHA biosynthesis.

Title: Recycling Biodegradable Waste to Combat Poor Solid Waste Management in Lubumbashi, Democratic Republic of the Congo

Dr. Elie Fereche Itoba-Tombo*, Dr. Marondji Bukoko Pacy, Dr. Itoba-Tombo Elie, and Prof. Useni Sikuzani Yannick

Cape Peninsula University of Technology
South Africa

Abstract

Waste management is social, economic and environmental problem faced by many countries worldwide and african countries are not exempt from this reality (Ijasz 2018; Aluko and al. 2022; Debrah and al. 2022). Poor waste management (PWM) contributes to environmental pollution, climate change and negatively affects human health (Godfrey and al. 2019; Debrah and al. 2022 Chandrasekaran, 2022). This study sought to explore the potential of managing solid waste through composting in Lubumbashi, DRC. Thus, a mixed-method research design that included field observations, qualitative and quantitative research methods was adopted. Field observations, interviews, and solid waste weighing were used for data collection. Households were grouped into two categories depending on where they were located, whether it was a formal settlement (colonial) or informal settlement. The unit of analysis was household. Data analysis was done using the IBM Statistical Package for Social Sciences (IBM SPSS) and Microsoft Excel 2022, Version 16.

Results revealed a need for attention and urgent action to address PWM. This phenomenon (PWM) is due to a lack of the community's awareness, education on solid waste management and recycling/ composting as well as dysfunctional municipal waste management services. Thus, the management of solid waste in the city, is non-existent. The common mode of waste management in the city is incineration and disposal of waste in open dumps. It was found that the average household in Lubumbashi generates 6.797333333kg (0.006797333 ton) of compostable materials per week, which represents 141 840.55 tons of compostable waste into open dumps annually from 434 731.00 households in Lubumbashi. This represents 9 219,6 tons of methane gas released into the atmosphere from disposing compostable waste in open dumps in Lubumbashi, DRC annually. This could have a huge negative impact on human health and the environment if not managed sustainably.

Biography

Dr. Elie Fereche Itoba-Tombo is a Lecturer and researcher in the department of Environmental and Occupational Studies- Faculty of Applied Sciences at Cape Peninsula University of Technology (CPUT). He obtained a Diploma in Geography, a bachelor's degree in physical Geography and Certificate C2 of master's degree in climatology from the University Marien Ngouabi of Brazzaville- Congo; Bachelor of Natural Science Honours degree in Earth and Environmental Sciences from the University of the Western Cape (UWC), a Master of Technology (M.Tech) degree in Environmental Management (in 2010) and a PhD in Environmental Health (in 2018) both from the Cape Peninsula University of Technology, Cape Town, South Africa. As a researcher, he is the author of several peer reviewed scientific publications ranging from book chapters, international conference proceedings and articles which are cited by his peers locally and internationally. Since 2007 he joined (CPUT) as a part-time lecturer and still teaching at both (undergraduate and postgraduate) levels in the department of Environmental Occupational Studies- Faculty of Applied Sciences at the Cape Peninsula University of Technology. Additionally, he is a member of the Cape Peninsula University of Technology Research Ethics Senate, faculty of applied sciences research ethics committee member since (March 2018 to date), deputy chairperson of the faculty's research ethics committee (August 2023- December 2024) and the chairperson of the same committee since January 2025 to date. The Environmental Management program's ECP (extended curriculum program) coordinator. His research interest areas are Environmental management/sustainability, EIA, solid waste management, soil and water pollution and remediation, soil ecology/biodiversity, and microbial extraction/identification and bioprocessing systems (extracellular metabolite production). He is a member of the following professional societies: South African Council for Natural Scientific Professions (SACNASP).



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Osaka, Japan

Title: Linfluence of Materials from Natural Sources on the Environment and Sustainable Development

Dr. Abderrahim Benmoussat,

Professor,
Tlemcen University,
Algeria

Title: Smart Ecologization of Cities based on Optimal Investment Strategies for Energy Modernization of Buildings

Dr. Andrii Polyvianchuk* and Dr. Olga Arsenyeva

Professor

Vinnitsia National Technical University (VNTU)

Ukraine

Research Interest

Energy, environmental, and economic efficiency of building heat supply systems

Abstract

The study is devoted to solving the urgent problem of eliminating ecological-economic losses from the inefficient use of fuel and energy resources in the field of urban heat supply due to the operation of buildings with low levels of energy efficiency. The technology of strategic planning of optimal energy-efficient modernization of buildings (OEEMB) is presented, which allows determining the most effective investment strategies for implementation of energy-saving measures in technical complexes "building-heat supply system" with minimal expenditure of financial resources and terms of payback. The basic principles of the technology are: phased, rational and optimality of the modernization process of research objects. The created technology was verified on the basis of buildings for various purposes: educational institution, residential building, private house, group of typical buildings and group of buildings of various types. The results of the research prove the high economic efficiency of the OEEMB technology, the application of which allows to significantly reduce the amount of investment resources required for energy modernization of buildings by 10.1-22.8% with an insignificant increase in their payback period by 0.2-0.5 years. The research proves the unprofitability of continuing to use the studied facilities in the current energy and economic state, which is accompanied by excessive financial costs, which annually exceed the economic effect of the implemented OEEMB strategies by twice as much. The versatility of the proposed technology is noted, which allows to determine the optimal strategies for implementing the existing economic potential of inefficient technical systems.

Biography

Dr. Andrii Polyvianchuk (born in 1969, Luhansk, Ukraine) is a specialist in the fields of energy and environmental safety of cities and transport ecology. Doctor of Technical Sciences (2013), Professor (2016). Graduated from the Baltic State Technical University (St. Petersburg, 1994) in the specialty "Spacecraft and boosters". In 1995-2014, he worked at the Volodymyr Dahl East Ukrainian National University (Luhansk) in positions: from engineer to professor of the Department of Ecology, Deputy Director of the Research Institute of Applied Ecology (2000-2003), Dean of the Faculty of Natural Sciences (2013-2014). He is the developer of the first measuring complexes in Ukraine for controlling normalized mass emissions of diesel particulate matter – mini-tunnel (2000), microtunnel (2004). Since 2014 - Professor of the Department of Internal Combustion Engines of the National Technical University "Kharkiv Polytechnic Institute". Developer of automated measuring complex for environmental diagnostics of transport diesel engines (2015). Since 2016 - Professor of the Department of Engineering Ecology of Cities of the O.M. Beketov National University of Urban Economy in Kharkiv. Developer of innovative scientific laboratories: ecological monitoring (2017) and energy-efficient building heating systems (2018). Since 2022 - Professor of the Department of Ecology, Chemistry and Environmental Protection Technologies of VNTU. Scientific supervisor of a series of national scientific and applied projects in the field of energy ecology.



**The 9th Annual World Congress of Smart
Materials (WCSM-2025)
&
The 3rd Smart Manufacturing Forum
(SMF-2025)**



WCSM 01:

Smart Materials Structures, Engineering and Manufacturing

Chair

Mr. David Wortley, Vice President, International Society of Digital Medicine, UK

Co-Chair

Dr. Stuart Wiesner, Head of R&D, Aluminium Rheinfelden Alloys GmbH, Germany

Time: 13:30-17:35, November 11, 2025 (Tuesday)

Place: Tatsuta, Fifth Floor

Title: Leveraging AI for Smart Circular Manufacturing: Challenges and Opportunities

Dr. Iryna Bashynska

Professor

AGH University of Krakow

Poland

Abstract

Artificial Intelligence is increasingly recognized as a transformative enabler for the development of smart circular manufacturing systems. While conventional manufacturing approaches are limited in achieving closed-loop resource cycles and high levels of efficiency, AI-driven methods provide opportunities for predictive control, process optimization, and integration of industrial symbiosis. We report on the main challenges and opportunities associated with leveraging AI for smart circular manufacturing. The theoretical background of circular economy principles is briefly introduced, particularly in comparison with traditional linear production models. Technological frameworks and implementation pathways are explained in detail, with emphasis on data-driven optimization, interoperability, and sustainability assessment. Furthermore, numerical models and scenario-based analyses are used to study the influence of AI-enabled decision-making on material flows and energy efficiency. Case-based insights and experimental evidence demonstrate the potential of AI-supported solutions to enhance resilience, scalability, and environmental performance in manufacturing ecosystems.

Biography

Dr. hab Iryna Bashynska is a habilitated doctor, professor at AGH University of Krakow. Corresponding Member of the Academy of Economic Sciences of Ukraine; Member of Tax Consultants Union of Ukraine. Has led 3 significant research projects and was Leading researcher/Researcher/Contributor in 9 scientific projects, including the Horizon Europe project. She has over 220 publications, including one patent for industrial design, 15 monographs, and over 100 articles, 35 of which are indexed in Scopus. She has successfully supervised three PhD candidates and mentored students who have won prizes at student olympiads and competitions. Her work has also led to the successful commercialization of scientific projects in business. She has been recognized with several awards, including the 2 Rector's Award, 1st degree, for scientific achievements in 2023 and 2024 from AGH University of Krakow.

She conducts research on issues related to: Smart Circular Solutions, Sustainable Future, AI-Based Decision Support, Application of smart technologies AI in risk management and decision support systems; Energy efficiency, renewable energy integration, and reducing energy consumption; Sustainable development, including circular economy practices and sustainable leadership in innovative activities; Smartization and digital transformation of industrial enterprises; Human-AI Collaboration in the Workplace.



Title: Comparison between Structural Components in Recently Developed Aluminum HP-DC Alloys with Magnesium and Steel Constructions

Dr. Stuart Wiesner* and Kunal Wandrekar

Head of R&D

Aluminium Rheinfelden Alloys GmbH

Germany

Abstract

This presentation provides a comparative analysis of structural components made from newly developed aluminum high-pressure die casting (HPDC) alloys, magnesium alloys, and steels, with a focus on automotive body-in-white (BIW) applications. Following a brief introduction to Aluminium Rheinfelden Alloys and an overview of current BIW material strategies – including mild and high-strength steel, cast aluminum and magnesium components – the study examines case studies of a shock tower, an A-pillar node, and a B-pillar.

Recent developments at Rheinfelden have resulted in advanced HPDC aluminum alloys specifically designed for structural automotive use. These alloys combine high elongation in thin-walled sections with excellent strength, corrosion resistance, and tolerance to recycled content. Up to 50% secondary material can be used without loss of performance, and up to 90% if requirements are met. Their optimized microstructure and balanced composition deliver a lightweight, sustainable, and structurally robust solution, positioning them as strong alternatives to high-strength steel.

Each component is analyzed in terms of mechanical performance, weight reduction, and manufacturing feasibility. Particular attention is given to secondary materials, including the use of various scrap types, and their impact on mechanical properties and corrosion resistance. The results underline the growing potential of aluminum HPDC alloys as sustainable, performance-competitive alternatives to steel and magnesium in BIW structures.

Biography

Dr.-Ing. Stuart Wiesner is Head of Research and Development at Aluminium Rheinfelden Alloys GmbH in Germany, where he has been leading alloy development efforts for high-pressure die casting applications for over 10 years. He earned his doctorate from the Technical University of Braunschweig, focusing on the economic production of weldable aluminum high-pressure die castings. His research investigated hydrogen behavior in the casting process and its impact on weldability, including an in-depth analysis of hydrogen sources during production.

Prior to joining Rheinfelden, Dr. Wiesner gained extensive experience in the die casting industry. He worked for Buhler as an application engineer, defining processes for structural components, and later became head of the laboratory at the foundry DGS. He then served as team leader for the materials group in the central laboratory of Georg Fischer. His career combines deep metallurgical expertise with practical process knowledge, especially in structural casting and alloy development.

Title: Density Functional Study of Silver/Reduced Graphene Oxide Nanohybrid

Dr. Víctor Eduardo Comparán-Padilla, Odilia Pérez-Camacho, José de Jesús Kú-Herrera, Felipe Robles-González, Arely Monserrat López-Martínez, and Maricela García-Zamora*

Researcher

Center for Research in Applied chemistry

Mexico

Abstract

Silver/reduced graphene oxide (Ag/rGO) nanohybrids are innovative composite materials that combine organic and inorganic components, resulting in unique characteristics ideal for a wide range of applications. This combination creates synergy between the components, leading to materials with enhanced physical, chemical, and mechanical properties. In this work, we conduct Density Functional Theory (DFT) calculations to study the interactions among Ag/rGO with the aim to predict parameters that could improve electrical conductivity of the rGO. Optimized nanohybrid structures are studied in order to probe this material as a nanofiller for the fabrication of polymeric nanocomposites. This study contributed to support explanations about the interaction's nature between Ag and rGO, which are difficult to obtain through practical experimentation. Adsorption energy, optimized structural configuration, electronic charge density map and isosurfaces were obtained to study these interactions. To improve the calculations and achieve the convergence the adsorption of silver cluster on rGO surface in the nanohybrid was represented separately by three configurations: epoxy functional group, pristine graphene sheet and graphene sheet with vacancies. The adsorption energy and distance between graphene oxide and silver cluster show a strong interaction. Meanwhile, the adsorption of silver on epoxy functional group promote the formation of silver oxide. However, no covalent chemical bonds are observed on pristine graphene sheet when silver cluster is adsorbed which could mean that ionic bonds or electrostatic interactions could be expected considering the presence of a metal such as silver. Finally, covalent bonds were observed with silver on vacancies of graphene sheet.

Biography

Dr. Víctor Eduardo Comparán-Padilla received his Ph.D. (science and technology of materials) from the Universidad Autónoma de Coahuila in 2017. Since 2008 works in the Department of Macromolecular Chemistry and Nanomaterials at the Centro de Investigación en Química Aplicada (Center for Research in Applied chemistry). His research interest is related to synthesis of metallocene catalyst and polyolefins, synthesis of metallic and carbon nanoparticles and polymeric nanocompounds, as well as, simulation of nanomaterials through ab initio methods.

Title: Semiconductor Scaling Challenges: Bottom-Up Area Selective Deposition for Next-Generation Devices

Dr. Younseon Wang*, Jeong-Min Lee, Seo-Hyun Lee, Jieun Oh, Woohyuk Kim, Junghun Kwak, Jinhee Lee, and Woo-Hee Kim

Staff Engineer
Samsung Electronics
South Korea

Abstract

The semiconductor industry is facing unprecedented scaling challenges as device dimensions approach the sub-3 nm node. The continuous demand for higher performance, lower power consumption, and advanced integration — particularly for applications such as AI acceleration and high-bandwidth memory (HBM) — has driven device architectures toward extreme aspect ratios and complex multilayer structures. These trends have significantly increased the difficulty of patterning, etching, and material integration in conventional top-down fabrication.

To address these challenges, bottom-up approaches are gaining attention as a promising alternative to traditional patterning methods. Among emerging techniques, Area-Selective Deposition (ASD) exemplifies how controlling surface chemistry and material-specific properties can simplify integration and improve structural fidelity with atomic-level precision. Recently, we demonstrated a highly selective SiO₂ film growth on oxide surfaces using catalyzed atomic layer deposition (ALD) combined with vapor-dosed phosphoric acid inhibitors to suppress deposition on adjacent TiN regions. The proposed approach broadens the applicability of AS-ALD of SiO₂ thin films by ensuring the efficient incorporation of inhibitors during subsequent ALD processes. While still at an early stage, these new paradigms suggest a potential shift in how future semiconductor devices will be designed and manufactured, enabling scalable 3D architectures for the next generation.

Biography

Dr. Younseon Wang is currently a staff engineer at Samsung Electronics, where she develops etching processes for memory devices and surface treatments for components in semiconductor processing equipment. Specializing in surface functionalization, self-healing materials, and adhesive material design, her research focuses on material-independent coatings, hydrophilicity engineering, area-selective coatings, and plasma -resistant coatings. Dr. Wang holds a B.S. in chemistry from Yonsei university and a integrated M.S./Ph.D. in chemistry from KAIST, where her dissertation under Prof. Haeshin Lee explored nature-inspired surface modifications. During a visiting student researcher at HongKong Polytechnic university, she investigated conductive coatings with surface modifications for wearable electronics. As a postdoctoral researcher at KIST, Dr. Wang developed air-curable gallol-based cellulose 3D printing and researched the anti- retardant mechanism. At Samsung Electronics, she continues to innovate in surface engineering, focusing on solutions for components in semiconductor processing equipment and nano-patterning in next generation memory devices.

Title: Construction and Application of Circularly Polarized Luminescent Materials Based on Achiral Polymers

Dr. Gong Zhang*, Zhiwei Zhao, and Wei Zhang

Associate Professor

Henan University of Technology

China

Abstract

The transfer, amplification, and memory of chirality are ubiquitous in nature. Inspired by this chirality, numerous polymer chiral materials have been reported, but the construction of novel circularly polarized luminescence (CPL) materials based on achiral building blocks remains a challenge. This report first utilizes achiral polyfluorene as a supramolecular assembly host, utilizing a multi-step chirality transfer and continuous fluorescence resonance energy transfer multipathway strategy to fabricate memorable full-color CPL films with high asymmetry factor ($\sim 10^{-2}$). Furthermore, a series of donor-acceptor achiral conjugated polyfluorene derivatives were designed and synthesized. Under the chirality-induced effect of the chiral solvent limonene, the three polymers co-assembled in a quantitative ratio, yielding CPL films with precise color control across the entire color range. Furthermore, the dynamic chiral encryption system was constructed. In addition, we further utilized a molecular imprinting strategy to fabricate CPL polymer films with high quality factor through interfacial supramolecular assembly. This work proposed a strategy for constructing highly stable and high-performance CPL materials based on achiral polymer systems, laying the foundation for the practical application of CPL materials.

Biography

Dr. Gong Zhang received his Bachelor's degree from China University of Petroleum (East China), China and completed his Master's and Ph.D. degrees (2021) at Tianjin University, China. Then he finished his postdoctoral research in Soochow University with Prof. Wei Zhang. During 2023-2024, he worked as a visiting postdoctoral in Universidade de Santiago de Compostela (Spain) with Prof. Félix Freire. His current research interests cover the synthesis and chiral self-assembly of polymers, and fabrication of CPL-active materials based on luminescent polymers. He is the author of more than 23 scientific publications including *Chem. Soc. Rev.*, *J. Am. Chem. Soc.*, *Angew. Chem. Int. Ed.*, *ACS Nano*, and *Adv. Sci.* et al. Now he works as a lecture in Henan University of Technology.

Title: Shape-Memory Effects of Polymer Blends and Composites Enabled by the Control of Phase Morphology and Particle Distribution

Dr. Yu Zheng*, Jiabin Shen, and Shaoyun Guo

Associate Professor
Sichuan University
China

Abstract

Shape-memory polymeric materials (SMPs) have been the rising star in the field of smart materials due to their special ability to fix temporary deformation and then recover to their original shape upon external stimulus. Among various strategies developed to fabricate SMPs, melt compounding recently drawn much attention because of its easy processability. Herein, a novel layer-multiplying coextrusion technology was introduced to fabricate alternating multilayered SMPs. Benefiting from the characteristics of the multilayer architecture involving regular layer distribution, continuous layer space and enriched layer interfaces, shape-memory blends possessing dual- and multiple-shape memory effects were successfully obtained. Additionally, the layer confined distribution of conductive particles endowed the multilayered SMPs with excellent electrical conductivity without affecting the shape-memory performance, providing a strategy to fabricate shape-memory composites with tunable electro-responsive properties.

Biography

Dr. Yu Zheng obtained his Ph.D. degree in Materials Science from Sichuan University under the supervision of Prof. Shaoyun Guo in 2018. Now, he is an associate professor at the Polymer Research Institute of Sichuan University (China). His current research interests are focused on shape-memory polymer blends/composites, electrically conductive polymer composites, biaxially oriented multilayer films. Dr. Jiabin Shen received his Ph.D. degree in Materials Science from Sichuan University under the supervision of Prof. Shaoyun Guo in 2011. Now, he is a Professor at the Polymer Research Institute of Sichuan University (China). His main research interests include novel polymer processing technologies, high-performance polymer materials, and fluorinated polymer materials. And Dr. Shaoyun Guo received his B.S. degree in 1984 from Shandong Institute of Chemical Technology (now Qingdao University of Science and Technology) and his master's and Ph.D. degrees in Materials Science from Sichuan University in 1987 and 1992 in China. After that, he joined the Polymer Research Institute of Sichuan University (China) and has been a full professor since 1995. His current research focuses on the high performance and functionalization of polymer materials, as well as new principles, technologies, and equipment for polymer material processing.

Title: Role of New Materials in Large Scale Fukushima Radioactive Waste Water Treatment: Current Scenario

Dr. Anil Kumar Pabby

Ex-Senior Scientist

Bhabha Atomic Research Centre

India

Abstract

The Fukushima Daiichi plant (constructed after the nuclear accident) has been processing nuclear waste effluents since 2011, and this process will continue for a very long time. The extremely high radioactive concentration of the molten fuel makes decommissioning of damaged reactors a very difficult task that must be completed with cooling. Reverse osmosis and ion exchange media are used to remove radionuclides from cooling water before it is recirculated back to reactors to prevent the formation of excessive radioactivity levels. The many mechanisms built at the Fukushima Daiichi facility for this goal are presented in this invited talk. The various system's performance and efficiency in separating radionuclides are explained. The novel materials for separating radionuclides from various waste water sources are given particular consideration. By taking into account developments in membrane manufacturing, such as membrane materials and membrane processes, the new directions are demonstrated. The reverse osmosis unit and its function in eliminating salt and certain radionuclides, as well as the function of the membrane used in the RO, are also presented in this direction. It was determined how well the extremely selective inorganic ion exchangers CsTreat and SrTreat, which were employed to remove radioactive strontium and cesium, performed. The most popular smart material for this procedure is nanoporous silicate, like zeolites, but in addition to serving as selective ion exchange media, they also need to be physically deployable in the right form for flow columns. Thus, zeolite ion exchange powders, which are known to be effective for treating radioactive wastes, were formed into monoliths using digital light processing (DLP) three-dimensional (3D) printing. Furthermore, a step-by-step flowsheet outlines the materials and methods required to remove all radionuclides from the treated wastewater before it is released into the ocean. Since tritium could not be eliminated from treated effluent, the wastewater was diluted and discharged into the ocean (with a tritium content below the discharge limit). Since, 2011 to 2021, or up until the month of April, the entire 2.0 Million M³ of cooling water was treated, with the removal of its primary radioactive component, ¹³⁷Cs.

1. Anil K Pabby et.al., Industrial experience with Fukushima Daiichi Accident wastewater treatment: Part I & II, *Membrane Technology*, August/September 2021.

PTO (next page)

2. A.K. Pabby et al. *Handbook of Membrane Separations: Chemical, Pharmaceutical, Food, and Biotechnological Applications*, 2008, 2nd; CRC Press: Boca Raton, FL, USA, 2015; 3rd edition: CRC Press: Boca Raton, FL, USA, 2023.

Biography

Dr. Anil Kumar Pabby was serving Bhabha Atomic Research Centre (BARC), Tarapur, Mumbai, Maharashtra, as Senior Scientist (Scientific Officer, G). He is retired on superannuation in July 2021. Dr. Pabby has more than 210 publications to his credit including 20 chapters and two patents on non-dispersive membrane technology. Dr. Pabby has taken a leading role in publishing "Handbook of membrane separation: Chemical, pharmaceutical, food and biotechnological applications" in July 2008 and second edition published in April 2015 and 3rd edition recently in Dec. 2023. Also, he has been awarded with prestigious Tarun Datta Memorial award (instituted by Indian Association Nuclear Chemist and Allied Scientist) in 2005 for his excellent contribution in Nuclear and Radiochemistry. Very recently, Dr. Pabby has received Lifetime Achievement Award in August 2024 by international research awards instituted by Scientific Laurels. He is serving as Editor/editorial/advisory board member of some international peer reviewed journals (Separation and Purification Reviews, Desalination (2010-2014), Desalination and Water Treatment, Membrane Technology, Applied Membrane Science and Technology, Journal of Radioanalytical & Nuclear Chemistry (Editor, 2001-2005)



Title: The Role of Smart Digital Twins

Mr. David Wortley,

Vice President

International Society of Digital Medicine,

UK

Biography

Mr. David Wortley is CEO & Founder of 360in360 Immersive Experiences, Non-Executive Director of the World Lifestyle Medicine Education Services (WLMES) and a VP of the International Society of Digital Medicine (ISDM). He is a Fellow of the Royal Society of Arts and Commerce and a global thought leader and innovator on enabling technologies for health, education and the environment. He is on the editorial board of the Digital Medicine Journal. He is an Associate Member of the Royal Society of Medicine and a Visiting Fellow at the Faculty of Health and Social Sciences at Bournemouth University.

As the Founding Director of the Serious Games Institute (SGI) at Coventry University, his team established an International Centre of Excellence for Applied Research and Innovation in the field of serious games and immersive technologies for a wide range of applications. His areas of special interest are technologies for preventative healthcare, collaboration, virtual reality and interactive rich media knowledge sharing. He a professional virtual event facilitator, webinar host and publisher.



Title: Carbon-Efficient Pavement Solutions: Geopolymer Concrete with Recycled Asphalt Pavement Aggregates

Dr. G. D. Ransinchung R. N* and Ayana Ghosh

Professor

Indian Institute of Technology Roorkee

India

Abstract

The accelerating expansion of highway infrastructure has amplified global concerns over resource depletion and environmental degradation associated with conventional cement concrete. Cement production alone contributes significantly to greenhouse gas emissions, while the extraction of natural aggregates further intensifies ecological imbalance. In response, sustainable and circular alternatives are being actively explored to decarbonize pavement construction.

Geopolymer concrete (GPC), synthesized from industrial by-products activated through alkaline solutions, presents a cement-free pathway toward low-carbon infrastructure. Equally, the recycling of Reclaimed Asphalt Pavement (RAP) offers an avenue to minimize waste and preserve natural aggregates. Integrating these two sustainable materials—RAP and GPC—unlocks immense potential for green pavement engineering.

Through systematic evaluation of mechanical and durability performance, RAP-GPC blends have demonstrated that carefully optimized combinations can deliver Pavement Quality Concrete (PQC) grade strength while achieving substantial carbon and energy savings. In particular, coarse RAP fractions have emerged as the most effective substitute, offering superior flexural strength and wear resistance under ambient curing—conditions most suitable for field application.

Beyond technical merit, this innovation embodies the principles of a circular economy by repurposing asphalt waste, reducing landfill burden, and eliminating cement dependency. The resulting material not only advances sustainability goals but also aligns with global efforts toward climate neutrality and resilient infrastructure.

The integration of RAP with geopolymer technology thus marks a decisive step toward next-generation pavement materials—an approach that harmonizes performance, economy, and environmental stewardship.

Biography

Prof. G. D. Ransinchung R. N. is a distinguished researcher and visionary academic in the realm of sustainable pavement engineering, widely recognized for his impactful contributions to the development of low-carbon, high-durability, and resource-efficient materials for transportation infrastructure. His research epitomizes the synergy between sustainability, material science, and structural innovation, focusing on the valorization of industrial byproducts and reclaimed aggregates to foster environmental resilience and long-term performance.

His scholarly oeuvre encompasses geopolymer and recycled binders, advanced stabilization and self-healing systems, and circular-economy-driven pavement technologies, translating laboratory ingenuity into scalable field applications. With more than 3,400 citations and an h-index of 35, his body of work commands international recognition for its intellectual depth and practical significance in shaping the discourse on sustainable pavements and climate-neutral infrastructure.

Prof. Ransinchung concurrently holds several prestigious appointments, including Standing Committee Member (AKC50) of TRB, U.S.A., Coordinator, STA (PMGSY, NRIDA), and National Advisory Committee Member on Self-Healing Roads (TIFAC, DST). Closely associated with the Indian Roads Congress, he serves as a B-8 Committee Member and formerly on H-3 and H-6, contributing profoundly to the evolution of sustainable pavement materials and policy frameworks in India.



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Osaka, Japan

WCSM 02:

Smart Optical, Electronic and Magnetic Materials

Chair

Dr. Cecil Bruce-Boye, Professor, automlTe GmbH., Germany

Time: 08:30-11:45, November 12, 2025 (Wednesday)

Place: Tatsuta, Fifth Floor



Title: Real-Time Capable IoT Based Middleware Architecture

Dr. Cecil Bruce-Boye

Professor

automITe GmbH, Germany

Abstract

The next generation of Information and Communication Technology (ICT) demands enhanced networking, real-time processing, and robust security to ensure seamless, safe and secure data exchange across heterogeneous distributed environment under time and payload traffic constraints. From customer and developer perspective, ICT must facilitate secure, transparent, and cyber attack resistant communication from sensors to applications, forming the backbone of the Internet of Things (IoT), spanning and connecting a great variety of sectors of industry. To meet these requirements, an infrastructure capable of deterministic real-time response, comprehensive cybersecurity, and transparent data processing is essential. We propose an architectural concept of a middleware addressing the challenge with the goal of smooth integration of different layers from sensor-level data acquisition to secure network transmission up to large-scale cloud processing. By binding these layers, the middleware should enhance flexibility, scalability, and sustainability in IoT architectures while reducing development and maintenance costs. We believe that the proposed middleware-oriented approach would secure the resilience and adaptability required for the next generation of ICT ecosystem.



Title: Functionalization of Liquid Crystal Loaded Metasurface

Dr. Seiji Fukushima

Professor

Kagoshima University

Japan

Abstract

Recently interest in metamaterial and metasurface has been stimulated by the possibility of new functional devices in electronics, optics, and acoustics. Metasurface devices have been developed based on passive periodic array structures of metal, semiconductor, or dielectric materials. This simple structure enables enormous progress of research and development although it has limited application fields. Our research group has loaded liquid crystal into the metasurface since some optical parameters are easily variable with applied voltage. We have achieved successful numeric demonstrations of a light beam steering device and a variable focal length lens. Even in a flat metasurface, it can deflect light beam when we set refractive index distribution for linear increment. We have shown that a steering angle variability can be enhanced by using the thicker metasurface or a chevron-structure waveguide in each unit cell. Our new trial is a variable focal length lens. The metasurface functions as the lens when refractive index distribution is parabolic just as the lens curvature. Of course, dynamic control of the focal length is achieved when voltages are applied to the cells. Furthermore, we noticed that employment of a Fresnel structure enables a two-focal-length lens, which consist of an inner lens and an outer. Our techniques can be extended to a lot of application fields for both electromagnetics and acoustics. This research has been funded by the Cooperative Research Program of Network Joint Research Center for Materials and Devices; Grant numbers 20241367 and 20251372.

Biography

Dr. Seiji Fukushima was born in Kumamoto, Japan in 1962. He received the B.S., M.S., and Ph.D. degrees in electric engineering from Kyushu University in 1984, 1986, and 1993, respectively. Between 1986 and 2009, he was engaged in research and development of optical devices such as ferroelectric liquid crystal spatial light modulator, a vertical cavity surface emitting laser diode, and a uni-travelling-carrier photodiode and optical modules and transceivers such as a BiDi, a functional receiver module, and a wavelength-tunable 300-pin transceiver at NTT Laboratories. He worked on the research project of tunable millimeter synthesis at University College London from 2000 to 2001. In 2009, he moved to Ehime University as a visiting professor to found and manage its new graduate course 'ICT Specialists Training Course'. He has been a professor at Kagoshima University since 2011. His current research interests include a radio-on-fiber system, a cube satellite, and an optical device. In addition, he served as a director at Kagoshima University Innovation Center between 2011 and 2015. Dr. Fukushima is a senior member of OPTICA and a member of Institute of Electrical and Electronics Engineers/Photonics Society, Institute of Electronics, Information and Communication Engineers, Japanese Society of Applied Physics, and Japanese Liquid Crystal Society.



Title: On-chip Rolled-up Nanomembrane Passive Electronic Components

Dr. Wen Huang

Professor

Hefei University of Technology

China

Abstract

On the RF/microwave and power chips, the number of transistors is relatively small, while basic passive electronic components (e.g., inductors and capacitors) not only dominate in quantity but also occupy the majority of the chip area, becoming a bottleneck for miniaturization. The fundamental reason for this lies in the fact that passive electronic components developed using conventional planar semiconductor processes are limited to 2D or 2.5D structures, resulting in weak electromagnetic field confinement and thus low achievable energy density. To address this challenge, it is necessary to fundamentally break the existing 2D/2.5D framework for monolithic passive electronic components by implementing true 3D structures on-chip, based on conventional planar semiconductor processes. In recent years, high-integration 3D rolled-up structures on-chip have been realized by leveraging planar film stress, offering a transformative solution. In this talk, I will present the following achievements over the past years using rolled-up thin-film nanotechnology: fabrication of complex 3D rolled structures on-chip, design and manufacturing of high-performance miniaturized passive components, along with their applications in RF/microwave chips, power chips, biotechnology, and other fields.

Biography

Professor Wen Huang holds the prestigious position of Huangshan Scholar Professor at Hefei University of Technology. He serves as the Chief Scientist for the Key Project under the National Key Research and Development Program of China, and the Leading Talent Distinguished Professor of Anhui Province. He is a senior member of the IEEE. Professor Huang graduated with a bachelor's degree from the University of Electronic Science and Technology of China. He completed his Ph.D. in Electrical and Computer Engineering at the University of Illinois at Urbana-Champaign in 2017. Following his doctoral studies, he conducted postdoctoral research at the Holonyak Micro and Nanotechnology Lab at the same university. His notable academic contributions involve pioneering and systematic research on rolled-up membrane technology and its applications in high-integration microwave and power electronics. His works, published in renowned journals such as Science, Nature Electronics, Nature Communications, Science Advances, and Nature Materials etc., include cover articles and have received significant attention. With over 100 academic papers to his name, more than 30 of which are published in top-tier journals indexed in the Journal Citation Reports (JCR), he has accumulated over 2400 citations (exclude self-citation) with H-index of 18.



Title: Intelligent Object Differentiation via Contour Extraction for Real-Time Video Streaming

Dr. Tsang-Ling Sheu

Director & Professor

Wireless Broadband Communications Research Center and National Sun-Yat-Sen University

Taiwan

Abstract

In real-time video streaming, identification often involves outlining features before comparing them to a database. However, existing monitoring software's faces limitations in capturing complete figure contours and suffers from lengthy processing times evaluated from database comparisons. To address these challenges, we propose the Fast Contour Extraction (FCE) algorithm. The FCE algorithm segments a frame into several Macro Blocks (MBs). It assumes that the MB located in the bottom left corner does not contain the figure. If the total difference between a given MB and the average of the three-color components exceeds a predefined threshold, it indicates the presence of the figure outline. Similarly, if the total root-mean-square deviation of the three-color components in all pixels of the figure-included MB exceeds a predefined threshold, then the corresponding MBs are included in the outline of the figure. The given pixel is one of the figure-included pixels if the total difference of root-mean-square deviation of the three-color components between the pixel on the bottom left corner and any pixel from the figure-included MB exceeds the threshold. Then, if any of the eight pixels surrounding a figure-included pixel does not contain the figure, it is considered as part of the figure contour. Furthermore, the FCE algorithm classifies the captured pixels, including the contour, based on the MB number of contours, total pixels, motion velocity, contour length, and width. We modified the contour capture function from OpenCV on the video identification server and added a contour classification function to implement the FCE algorithm. We evaluated the time required for capturing figure contours, contour classification, and the accuracy of contour classification. These measurements were then compared to those obtained using YOLO. Our results demonstrate that the FCE algorithm outperforms YOLO in contour capturing speed and figure classification accuracy.

Keywords: real-time video streaming, macro block, pixels, contour capture, contour classification

Biography

Dr. Tsang-Ling Sheu received the Ph.D. degree in Computer Engineering from the Department of Electrical and Computer Engineering, Penn State University, University Park, Pennsylvania, USA, in 1989. From September 1989 to July 1995, he worked with IBM Corporation at Research Triangle Park, North Carolina, USA. In Aug. 1995, he became an Associate Professor, and was promoted to Professor in January 2006 at the Department of Electrical Engineering, National Sun-Yat-Sen University, Kaohsiung, Taiwan. His research interests include generative AI, mobile wireless networks and communications..



Title: LaFeSi-based Magnetocaloric Materials Analysis: Thermal performance and Endurance Results

Dr. Sergiu Lionte

R&D Manager
Magnoric SAS
France

Abstract

Like any previous disruptive technology, magnetic cooling still faces several challenges before it can be widely adopted as a large-scale cooling solution. One of the main limitations lies in the reliance on benchmark magnetocaloric materials based on rare-earth elements such as gadolinium, erbium or terbium. In this work, we present a set of experimental results obtained with rare-earth-free magnetocaloric materials exhibiting different Curie temperatures, integrated into a rotating R&D prototype. The prototype was tested under various operating conditions, and the corresponding performance results are reported. In addition, two types of endurance tests were conducted on these materials using a dedicated experimental test bench. The results are promising and form the basis for a potential replacement of Gd-based alloys with first-order LaFeSi-based alloys in practical magnetic refrigeration systems. LaFeSi-based materials show the potential to enhance cooling power while significantly reducing raw material costs, a critical factor for enabling large-scale production and broader accessibility of magnetic cooling technology.

Biography

Dr. Sergiu Lionte is the R&D Manager of Magnoric SAS, a leading start-up in the field of magnetic cooling and the waste heat conversion to clean electricity. He holds a Ph.D. in Energetics, Heat Transfer and Fluid Flow applied to magnetic cooling from the University of Strasbourg in France, where the magnetocaloric effect has been first observed in 1881. His work is mainly focused on improving the magnetic cooling units to face the technical challenges from the cooling industry. Lately, he is also involved in the waste heat conversion to clean electricity using the magnetocaloric effect in FOMT (First Order Magnetocaloric Materials) and in SOMT (Second Order Magnetocaloric Materials).

Title: Laser Sails for Photon Pressure Propulsion to Relativistic Speeds

Dr. Claude R Phipps

Photonic Associates

LLC Santa Fe NM

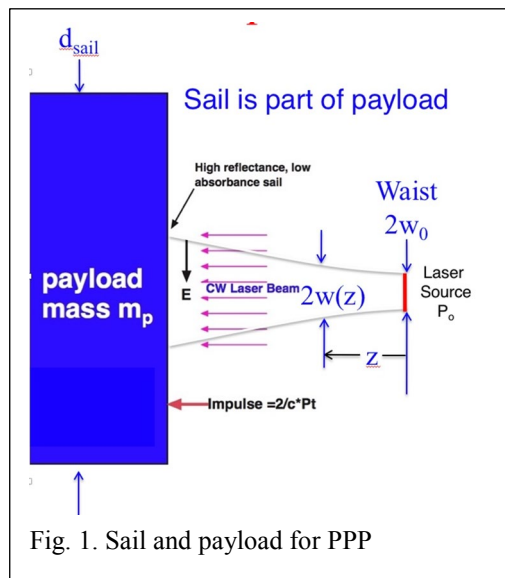
USA

Abstract

This materials topic is a hidden challenge for Photon Pressure Propulsion (PPP). PPP requires a minimum of 100GW of CW laser power to achieve 670N of thrust on a totally reflective sail. The sail, also being accelerated, drags a payload and the two can achieve relativistic speeds providing that the Rayleigh Range z_R of the beam is sufficiently small (Figure 1). z_R is the distance in which the beam intensity decreases by a factor of two due to diffraction. It is related to the other variables by the expression

$$z_R = \pi w_o^2 / \lambda \quad 1)$$

$$\text{The beam diameter as a function of } z \text{ is given by } w^2(z) = w_o^2 [1 + (z / z_R)^2]. \quad 2)$$



Sail area and mass are proportional w^2 , and the sail as well as the payload must be accelerated together. Because z_R varies inversely as wavelength, it is obvious that short wavelengths have a strong advantage, because the cost of accelerating mass can be very high.

Sails must be highly reflective, very thin (100nm) with very low absorptance (of order 10^{-9}) and very strong. They must also be able to tolerate temperatures up to 625K in order to reradiate absorbed intensity and light flux up to 3.9W/m^2 , corresponding to light pressure of 26Pa. For an 18km diameter sail, the only problem is that if the spherical radius of the sail is 9km, and thickness 100nm, film tension amounts to $2.4\text{E}12\text{ N/m}^2$, or 370 million psi, beyond the capabilities of most materials. Sails must be small. Any material that satisfies these requirements can be

used. New ideas for sail materials are very welcome. Sail materials which have been considered include silicon nitride¹.

1. Chapter 2, C. Phipps, ed., *Laser Propulsion in Space*, Fundamentals, Technology and Future Missions, June 10, 2024, Elsevier, ISBN 9780443159039



Title: Influence of Homoepitaxial Layer Thickness on Flatness and Chemical Mechanical Planarization Induced Scratches of 4H-Silicon Carbide Epi-Wafers

Mr. Chi-Hsiang Hsieh*, Chiao-Yang Cheng, Yi-Kai Hsiao, Zi-Hao Wang, Chang-Ching Tu, Chao-Chang A. Chen, Po-Tsung Lee, and Hao-Chung Kuo

Ph.D. Candidate

National Yang Ming Chiao Tung University

Taiwan

Abstract

The integration of thick homoepitaxial layers on silicon carbide (SiC) substrates is critical for enabling high-voltage power devices, yet remains challenged by substrate surface quality and wafer geometry evolution. This study investigates the relationship between substrate preparation—particularly chemical mechanical planarization (CMP)—and the impact on wafer bow, total thickness variation (TTV), local thickness variation (LTV), and defect propagation during epitaxial growth. Seven 150 mm, 4° off-axis, prime-grade 4H-SiC substrates from a single ingot were processed under high-volume manufacturing (HVM) conditions and grown with epitaxial layers ranging from 12 μm to 100 μm . Metrology revealed a strong correlation between increasing epitaxial thickness and geometric deformation, especially beyond 31 μm . Despite initial surface scratches from CMP, hydrogen etching and buffer layer deposition significantly mitigated scratch propagation, as confirmed through defect mapping and SEM/FIB analysis. These findings provide a deeper understanding of the substrate-to-epitaxy integration process and offer pathways to improve manufacturability and yield in thick-epilayer SiC device fabrication.

Biography

Mr. Chi-Hsiang Hsieh is a Ph.D. candidate in the Department of Photonics at National Yang Ming Chiao Tung University, Taiwan. His research centers on advanced semiconductor materials, with emphasis on silicon carbide (SiC) chemical mechanical polishing (CMP) technologies, post-CMP cleaning processes, and homoepitaxial growth of SiC films for high-performance and energy-efficient devices. With more than 14 years of professional experience in the semiconductor industry, he has built expertise that bridges material science and industrial applications.

At Entegris/CMC Materials, he managed global projects in Si and SiC CMP slurry and pad development, supporting customers across Taiwan, China, and Singapore. Previously at GlobalWafers, he led R&D teams in wafer slicing, lapping, grinding, polishing, oxidation and diffusion technology for both silicon and wide-bandgap materials, achieving significant advances in yield, defect reduction, and production efficiency. His contributions include establishing new wafering production lines, driving integration of innovative CMP solutions, and securing customer qualifications for next-generation products.

Mr. Hsieh holds multiple invention and utility patents and combines technical innovation with training in ESG reporting and quality systems. His work continues to focus on advancing smart materials that enable the next era of semiconductor devices.



WCSM 03:

Future Trends and Applications of Smart Materials

Chair

Mr. Manoj Dalaya, Co-President, KGD Architecture, USA

Co-chair

Dr. Bogdan Varga, Professor, Technical University of Cluj-Napoca, Romania

Time: 08:30-11:45, November 13, 2025 (Thursday)

Place: Tatsuta, Fifth Floor



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International Exchange of Professionals -Thematic Event in Sustainable Development
Osaka, Japan

Title: Multifunctional Composite Materials – From Development to Deployment

Dr. Raj Das

Professor and Deputy Head of Department,
RMIT University
Australia

Title: Challenges to develop thin lithium metal electrode for the next-generation of solid-state batteries

Dr. Didier Devaux, Thomas Boulmier, Clara Aimar, Khawla Zrikem, Benoît L. Campeon, Nour Daher, Adeline Lafort, and Cristina Iojoiu*

Research Scientist

CNRS

France

Abstract

In the context of the energy transition toward massive electrification, lithium (Li) metal stands out as the most promising negative electrode material for battery applications due to its high capacity, low gravimetric density and electrochemical potential, and resulting high energy density. However, to maximize device energy density and mitigate the over-consumption of Li, a critical raw material as classified by the European Union, it is essential to minimize its overall quantity in the battery device, specifically by reducing its thickness. Currently, the primary method for producing Li metal foil involves extrusion followed by lamination step, which typically yields to foils of at least several dozen micrometers thick, typically above 50 μm . To produce thinner films, a vacuum evaporation process, enabling precise thickness control at the scale of a few hundred nanometers is an interesting strategy. Through systematic testing, key deposition parameters, such as substrate type and evaporation temperature, significantly influence the final microstructure of the Li thin films and thus their electrochemical reactivity (e.g. Coulombic efficiency) and interfacial properties. Herein, the resulting Li microstructure and thickness are benchmarked using Li symmetric cells comprising a solid polymer electrolyte and assessed via electrochemical methodologies and impedance spectroscopy. Additionally, in-situ X-ray tomography and post-mortem SEM analyses of electrodeposits provided further insights into microstructure.

Biography

Since 2016, Didier Devaux is a CNRS research scientist at LEPMI lab. (Univ. Grenoble Alpes, Univ. Savoie Mont Blanc, CNRS, Grenoble INP) on electrochemical energy storage devices. He graduated in 2012 with a PhD in materials science on electrochemical and physico-chemical characterizations of polymer electrolytes for Li metal battery. He co-authored 30 peer-review publications in international journals, one book chapter, and 3 patents. He is focusing on the analysis of the functioning and failure modes of electrochemical energy storage devices by coupling techniques (in-situ and operando methodologies), notably using X-ray and Neutron techniques with electrochemistry and impedance. His research interest is mainly related to get new understanding of the bulk and interface phenomena in the next generation of electrochemical storage devices such as Li metal and post-Li-ion based batteries. In this context, he is working on the characterization of ionic transport in the volume in liquid, solid, and hybrid electrolytes, and at the organic/inorganic interfaces. He is also looking at the link between the mechanical properties of materials and systems in correlation with their impact on ionic transport. The objective being to tackle the phenomena at stake at the different relevant length scales typically from the local (nm) to the cell (cm) scale in devices comprising liquid, solid, and hybrid electrolytes.

Title: Modification of Microstructure, Crystal Structure, Phase Composition and Electrical Properties of Selected ABO₃-Type Materials for Electrochemical Energy Conversion

Dr. Paweł Pasierb, Sherly Novia Sari, Dariusz Zientara, Paweł Nieroda, and Radosław Lach*

Professor

AGH University of Science and Technology

Poland

Abstract

The increasing global demand for sustainable energy technologies has accelerated the development of efficient electrochemical devices, including protonic ceramic fuel cells (PCFCs). Among the materials investigated for use as electrolytes in PCFCs, barium cerate (BaCeO₃)-based perovskites stand out due to their high protonic conductivity in the intermediate temperature range (400–700 °C). However, their practical application is often limited by chemical instability and challenges in processing. To address these limitations, compositional and microstructural modifications are necessary.

In this work, we investigate the effect of formation of solid solutions with BaZrO₃, Y and Gd co-doping and the influence of different sintering methods on the structural, microstructural, and electrical properties of BaCeO₃-based proton-conducting ceramics. Additionally, composite materials were prepared by introducing secondary glass–crystalline phases based on the Ba–Ce–Y–Si–P–O system into a BaCe_{0.9}Y_{0.1}O₃ matrix. These modifiers were incorporated via mechanical homogenization or solution-based impregnation techniques.

The ceramic powders were sintered using three methods: conventional free sintering, Spark Plasma Sintering (SPS), and Hot Pressing (HP), allowing us to compare the impact of densification technique on the properties of obtained materials. Phase composition and crystal structure were characterized by X-ray diffraction (XRD), while the microstructure was examined using scanning electron microscopy (SEM). Electrochemical Impedance Spectroscopy (EIS) was used to evaluate total electrical conductivity in various gas environments (dry air, wet air, and 5 vol% H₂ in Ar) over the temperature range of 200–740 °C.

The study demonstrates that both chemical composition and processing route significantly influence the final properties of the materials. The development of next-generation BaCeO₃-based proton conductors for energy conversion applications can be achieved by combining the proper selection of chemical composition and optimized processing. Improved sinterability, enhanced grain connectivity, and modified grain boundary behavior were observed depending on the sintering technique and type of dopant or additive used. The selected systems exhibited increased total conductivity and potential chemical stability enhancements due to co-doping or composite formation.

ACKNOWLEDGMENTS

The financial support of the program “Excellence Initiative – Research University” for the AGH University of Krakow, grant No. 501.696.7996, grant ID: 10646 is gratefully acknowledged.



Title: Sequestering Carbon in Concrete: Enhancing Sustainability in Construction

Mr. Manoj Dalaya
Co-President
KGD Architecture
USA

Abstract

The environmental impact of traditional concrete production is significant, primarily due to its high carbon footprint. This research introduces a novel approach to mitigate these impacts by utilizing waste carbon dioxide (CO₂) as an additive in concrete, transforming it into a smart material for sustainable construction. The waste CO₂ is sourced from industrial processes that would otherwise be released into the atmosphere. By injecting recycled CO₂ into the concrete mix, the gas chemically converts to a mineral, sequestering carbon and reducing the concrete's overall carbon footprint. This process is known as carbonation. The carbonation reaction can occur quickly compared to the traditional hydration process of cement, leading to certain effects on the curing times and the overall properties of the concrete. This injection of CO₂ into concrete not only contributes to greenhouse gas reduction but also improves the concrete's strength and durability. The implementation of this technology in an 8-story, 400,000 GSF building project demonstrated its feasibility, allowing the project to achieve environmental goals without compromising performance or quality. This method promises significant benefits for the construction industry, offering a scalable solution to reduce emissions and enhance material properties, aligning with global sustainability objectives.

Biography

Mr. Manoj Dalaya, FAIA, co-president of KGD Architecture, brings over three decades of expertise in architecture and urban design, focusing on integrating sustainability and community connectivity. His leadership in secure and high-performance spaces has earned numerous awards and recognitions. A prominent speaker on sustainable design, Mr. Dalaya's contributions to the field are shaping the future of environmentally responsible construction practices.



Title: Materials-Driven Optimization of CAV Platforms with Hydrogen Fuel Cell Propulsion

Dr. Tudor Oarga, Dr. Bogdan Varga, Dr. Dan Moldovanu, and Dr. Nicolae Cordoș,
Technical University of Cluj-Napoca
Romania



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International Exchange of Professionals -Thematic Event in Sustainable Development
Osaka, Japan

Title: Fuel Cell Hydrogen Mobility

Dr. Bogdan Varga

Professor

Technical University of Cluj-Napoca

Romania



Title: Comparative Analysis of Implementation and Operational Costs Between BEBs and FCEBs

Dr. Horatiu Carausan, Dr. Bogdan Varga, Dr. Gabriel Prunean, and Dr. Nicolae Vlad

Technical University of Cluj-Napoca
Romania



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International Exchange of Professionals -Thematic Event in Sustainable Development
Osaka, Japan

The 3rd World Congress of AI Industry (WCAI-2025)



WCAI 01:

AI Industry

Chair

Dr. Michael Short, Professor & Associate Dean (Research & Innovation), Teesside University, UK

Co-Chair

Dr. Henry Hexmoor, Professor, Southern Illinois University, USA

Time: 13:30-17:10, November 12, 2025 (Wednesday)

Place: Tatsuta, Fifth Floor

Title: Strategic Electrode Development: Bridging Material Design and Battery Performance

Dr. Hsing-Yu Tuan

Professor

National Tsing Hua University

Taiwan

Abstract

To meet the urgent demand for advanced energy storage systems, this study proposes an integrated strategy for next-generation potassium-ion batteries (PIBs), focusing on the design of high-performance electrode materials. The approach involves two major thrusts: optimizing anode materials through nanostructuring, interface engineering, multi-element alloying, and catalytic enhancement to improve electrochemical performance and cycle life; and developing high volumetric energy density systems by employing high-mass-loading electrodes and high-entropy cathodes to address practical application needs. The optimization of electrode materials is guided by several key principles. Heterostructured electrodes are designed to enhance ion and electron transport while modulating electronic structures such as Fermi level, bandgap, and charge separation through interface engineering. Control over spatial configuration and synthesis methods further strengthens interfacial interactions and overall electrochemical performance. High-entropy electrodes, composed of multiple metal components, exploit entropy stabilization and lattice distortion to suppress volume fluctuations during cycling, thereby improving capacity retention and reducing reliance on specific elements. In parallel, tunable solid-solution electrodes leverage the synergistic interaction between bimetallic components to increase active sites, while the substitution of sulfur with selenium or tellurium improves conductivity and ion diffusion due to favorable atomic properties. Electrodes that undergo electrochemical reconstruction utilize conversion, alloying, or intercalation reactions to dynamically evolve in structure during cycling, enabling adaptive performance optimization. Finally, single-atom catalytic electrodes, with atomically dispersed metal centers in low-coordination environments, offer accelerated redox kinetics and enhanced rate capabilities through strong bonding with conductive supports, leading to improved charge transfer and reaction efficiency. Collectively, these synergistic strategies aim to unlock the full potential of potassium-ion storage by enabling high energy density, long cycle life, and sustainable electrode design.

Biography

Prof. Tuan is a distinguished Professor in the Department of Chemical Engineering at National Tsing Hua University. His research interest includes nanomaterials synthesis and energy applications have pioneered this area towards practical applications. He has published 130 papers in prestigious international journals, including *Energy and Environmental Science*, *JACS*, *Advanced Science*, *ACS Nano*, *Chemical Engineering Journal*, *Energy Storage Materials*, *Nano Energy*, and *Journal of Materials Chemistry A*, etc. 100 papers have an impact factor over 6 and the average paper impact factor of published articles is around 10.6. Over 80% of his articles were published in the top 15% journals of the assigned area. His articles have been cited over 12000 times. Seven of his articles have ever been listed as high-cited papers by ISI. He also holds 10 patents. His research provides groundbreaking impact on the multiple perspectives communities. Since 2008, 51 projects have been implemented, of which I served as the principal investigator of 35 projects, and a total of 836,600,000 TWD has been applied.

Prof. Tuan has been honored with several prestigious international recognitions, including the Outstanding Asian Researcher and Engineer Award from the Society of Chemical Engineers, Japan (SCEJ), and Fellows of the Royal Society of Chemistry (RSC), the Institute of Materials, Minerals and Mining (IOM3), the Institute of Physics (IOP), the International Association of Advanced Materials (IAAM), the Australian Institute of Energy (AIE), and the Vebleo International Scientific Organization, in recognition of my contributions to battery materials and technology. I have also received the Ministry of Science and Technology's Outstanding Research Award twice (in 2020 and 2023), the Professor Tsai-Tzer Lai Award from the Chemical Engineering Society, the IAAM Medal, and the IIP International Lifetime Achievement Award for Distinguished Inventors.



Title: Innovations in AI and Robotics: Towards a Full-Scale EV Battery Recycling Industry in the UK

Dr. Michael Short

Professor & Associate Dean (Research & Innovation)
Teesside University
UK

Abstract

The recycling of End-of-Life (EoL) Electric Vehicle (EV) batteries has become a critical focus due to the growing volume of EVs in production, coupled with increasing numbers of discarded batteries and environmental concerns. This talk provides an overview of current methodologies, challenges, innovations, and future perspectives for EoL EV batteries recycling. Challenges such as battery design variations, critical raw material supply, and sustainable recycling strategies are explored, along with recent advancements in sorting, deep discharge, disassembly, and regeneration technologies developed in the context of a recent Innovate UK funded collaborative project with industry partner Altilium Clean Technologies Ltd. The integration of Artificial Intelligence (AI) and Advanced Robotics (AR) technologies into recycling processes and hence their role in supporting circular economy principles in EoL EV battery management are also examined. Future perspectives and proposals emphasize the need for industry engagement and ecosystem co-ordination, standardized cloud-based tracking/analytics to provide vendor-independent upstream battery health assessment and recycling decision support, deployment of energy-efficient advanced disassembly and discharge technologies, coupled with collaborative efforts to enhance the environmental sustainability and competitiveness of downstream EoL EV batteries recycling operations. The talk also reports on successful prototype testing in these areas carried out at Teesside University and plans for scale-up towards the construction of the UK's largest recycling facility in Tees Valley, UK.

Biography

Dr. Michael Short is Professor of Control Engineering and Systems Informatics and Associate Dean for Research, Innovation and Knowledge Exchange within the School of Computing, Engineering and Digital Technologies at Teesside University in the UK. He is also a visiting Professor at VIT Chennai in India and External Examiner at RGU Aberdeen in the UK. He holds a BEng degree in electronic and electrical engineering (1999, Sunderland) and a Ph.D. degree in real-time robot control (2003, Sunderland). Michael's research interests encompass aspects of applied control engineering and systems informatics applied to smart energy systems and robotics. He is PI or co-I on eighteen either completed or ongoing funded research and innovation projects, has authored over 200 reviewed publications in international conferences and journals with over 2200 citations. He has supervised eleven Ph.D. completions, has won six best paper awards and a full member of the IET and IEEE, and is a fellow of the HEA.



Title: Quo Vadis, Logistics? The Role of AI and Robotics Navigating the Rise of Automation

Dr. Tino Krueger-Basjmeleh

Senior Robotics Expert
Autonomous Solutions
KION Group
Germany

Abstract

Intralogistics processes can be found in nearly all businesses around the world, while nearly all intralogistics processes lack qualified employees and are under enormous economic pressure due to the financial loss incurred by each manipulation of a good. This automatically implies the need for these processes to be automated, which requires additional qualified employees, not only in the field of intralogistics, but also in automation. Implementing automation in practice requires specialists to integrate automation technologies into continuously changing intralogistics processes. One way to provide an affordable solution is to design smart machines in the form of mobile robots. These robots must be smart enough to adapt to the aforementioned continuously changing intralogistics processes and must be easy for employees who are unable to program machines to commission, using the processes they perform daily. At KION Group, we have been developing smart mobile robots that can interact with their surroundings for over a decade. This interaction is based on vision-based sensors for perception and decision-making systems that enables them to adjust their behavior depending on environmental situations and the fit into the intralogistics process. Additionally, we have created a learning mechanism based on a one-shot imitation learning approach, enabling the mobile robot to learn new intralogistics processes from a single demonstration. This approach is driven by observing the daily activities of intralogistics workers the manually driven mobile robot. I will also share insights into current problems and potential solutions.

Biography

Dr. Tino Krüger-Basjmeleh (Ph.D. in Engineering) now leads a team of mobile robotics specialists developing advanced mobile robotics applications for intralogistics. He is also a lecturer at the Technical University of Hamburg. He obtained his German Dipl.-Ing. degree in Automotive Engineering from the HTW Berlin in collaboration with Robert Bosch GmbH. While working at Robert Bosch GmbH, he designed a real-time simulation model for an electro-hydraulic braking system. He obtained his MSc in Mechatronics at Otto von Guericke University Magdeburg in close collaboration with the Fraunhofer Institute for Factory Operation and Automation, where he designed an adaptive position control system for a boat-like inspection robot used to examine sewer pipes. He obtained his Ph.D. at the Institute of Aircraft Production Technology at the Technical University Hamburg in 2023 and worked in parallel at KION Group, where he designed an adapted one-shot imitation learning approach to enable autonomous mobile robots to transport pallets in warehouses and production areas. In 2014, Dr. Tino Krüger-Basjmeleh and his team won the Volkswagen Logistic Challenge with an automated collaboration of mobile robots in an intralogistics scenario, earning the IFOY award for the best autonomous cobot product for semi-automated order picking. He has also written 48 patents in the intralogistics area.

Title: Challenges in the Development of Dependable Autonomous Systems

Dr. Elena Troubitsyna

Professor

KTH – Royal Institute of Technology

Sweden

Abstract

Autonomous systems are able to operate for long periods of time without human intervention and control. There is a great demand for their trustworthy operation in various domains: automotive, space, agriculture, maritime etc. Autonomous systems rely on Artificial Intelligence and Machine Learning for implementing a large variety of functions including safety-critical ones. Achieving dependability, i.e., trustworthiness in developing such systems is an open research challenge. It requires novel techniques for modelling, design and verification of safety and reliability in presence of uncertainty and open evolving operating environments. We discuss several novel research areas emerging to address challenges in the development of dependable autonomous systems.

Biography

Dr. Elena Troubitsyna is a full professor in Computer Science at KTH – Royal Institute of Technology, Sweden, School of Electrical Engineering and Computer. Elena Troubitsyna defended her Ph.D. in 2000 on formal methods for developing dependable systems at Åbo Akademi University, Finland. Elena is carrying an active research on formal and model-driven engineering of autonomous systems from different domains. She has supervised several doctoral students on the topics of modelling autonomous systems, formal modelling of safety-critical systems and fault tolerant systems, architectures and algorithms for safe navigation of a fleet of robots and multi-agent coordination. Elena Troubitsyna has been serving in numerous program committees of conferences in the area of dependability and formal engineering methods. She was a program chair of International Symposium of Software Reliability Engineering – ISSRE 2016, general chair of International Conference on Computer Safety, Reliability and Security –SAFECOMP 2019, program chair of European Dependability Computing Conference – EDCC 2020, program chair of International Conference on Integrated Formal Methods -- iFM 2020.

Title: Generating Near Anomalies

Dr. Martin Klimo* and Lubomír Králik

Professor Emeritus
Žilina University
Slovakia

Abstract

Distinguishing between normal and anomalous data may appear to be a simple binary classification task. However, the fundamental difficulty lies in the vague and open-ended nature of what constitutes an anomaly. While normal data can often be characterized by clear patterns, anomalous data is typically defined only in contrast—as everything that deviates from normality. This complement is broad, diverse, and difficult to model directly.

We adopt a generative modelling approach inspired by the idea that anomalies are data points that differ so significantly from normal data that they suggest a different underlying generative process. Using a generative neural network trained exclusively on normal data, we model the process that gives rise to normal observations. By intentionally perturbing the generative mechanism, we produce samples that deviate slightly from normality—these are referred to as near anomalies.

We propose training a binary classifier to distinguish between normal data and these synthetic near anomalies. Although the classifier is never exposed to real anomalous data, we hypothesize that the local boundary learned between normal and near-anomalous data generalizes to detect distant anomalies as well.

We test this hypothesis on the MNIST dataset. A generative model is trained on all digits, and near anomalies are produced through small latent-space perturbations. A classifier trained on these synthetic examples achieves high accuracy not only in distinguishing normal data from near anomalies but also in identifying truly anomalous data, including samples from different distributions.

This approach offers a scalable and unsupervised strategy for anomaly detection without requiring labelled outliers. The concept of near anomalies provides a meaningful training signal, and generative models offer an interpretable framework for modelling normality and its deviations.

Funded by the EU NextGenerationEU through the Recovery and Resilience Plan for Slovakia under the project No. 09I05-03-V02-00029.

Biography

Dr. Martin Klimo received his diploma in telecommunication engineering from the University of Transport and Communication Zilina in 1973. Since 1990, he worked as an Associate Professor, and in 2003, he was appointed a full professor of Applied Informatics.

His research interests include communication theory, queuing theory, machine learning and fuzzy logic implementation by nanotechnology. He focused on these disciplines mainly from a speech point of view: packet network performance for voice transmission (VOIP quality), text-to-speech systems, and speech recognition. His interest is memristor-based fuzzy computing, anomaly detection and explainable artificial intelligence applied mainly in image recognition and IP networks.

He participated in the projects: COPERNICUS #62, COST 242, COST257, EURESCOM P1112, COST 279 COST 290, VEGA 1-2039-5, and he was a reviewer of the EURESCOM projects P603, P806-GI, P 906-GI, APVV-14-0560 “Resistive switching structures for pattern recognition” and ICT COST Action IC1401 Memristors - Devices, Models, Circuits, Systems and Applications (MemoCiS). He participated in the ETSI Speech Transmission Quality group and was the national delegate in ICT Committee FP7 and H2020.

Ref. https://www.researchgate.net/profile/Martin_Klimo

Web of Science Researcher ID I-2973-2012

ORCID 0000-0002-2463-7538



Title: The Gap between Artificial General Intelligence and Generative Artificial General Intelligence

Dr. Henry Hexmoor

Professor

Southern Illinois University

USA

Abstract

I outline the foundations and promises of Generative AI, contrasted with Artificial General Artificial Intelligence. I argue about the growing need for evolving change in the roles of mixed teams of humans and machines. Mixed initiation is a prominent focus, as is the responsibility and accountability of initiators and participants. I remark on the emergence of synthetic consciousness, projections, and implications for future developments, as well as collective clarion calls for action.

Biography

Dr. Henry Hexmoor received an M.S. degree from Georgia Tech, Atlanta, and a Ph.D. degree in computer science from the State University of New York, Buffalo, in 1996. He taught at the University of North Dakota before a stint at the University of Arkansas. Currently, he is a tenured Professor with the School of Computing, Southern Illinois University, Carbondale, IL. He has published widely in artificial intelligence and multiagent systems. His long-term and sponsored research includes federal and state agencies and prime contractors. He is an IEEE senior member. His current interests include Cyber-physical systems, Wireless networks, Complex Networks, Multiagent Systems, cognitive science, Robotics, Digital forensics, Blockchain, and Artificial Intelligence.

Title: Application of AI for *in situ* Monitoring of Artemia Salina Population Using a Submersible Digital Holographic Camera

Dr. Victor Dyomin*, Mikhail Kurkov, Igor Polovtsev, and Alexandra Davydova

First Vice-Rector, National Research Tomsk State University, Russia;

Head, Laboratory of Radiophysical and Optical Methods for Environmental Research, Russia

Abstract

Modern optical-electronic methods, in particular the methods of digital holography used in modern oceanography, make it possible to study plankton without the lethal consequences for animals, their sampling and laboratory analysis. This study presents a DHC technology that includes the underwater recording of digital holograms of a medium volume with particles, subsequent numerical layer-by-layer reconstruction of a holographic image of that volume, and the analysis of particles that were in the volume at the time of hologram recording. The paper describes several design alternatives of a submersible DHC (Digital Holographic Camera) and hydrobiological probes constructed on its basis. For the classification of plankton particles, the DHC applies either a morphological analysis of their holographic images or a neural network. The application of the neural network in field conditions is illustrated in the study of *Artemia salina* population. The YOLOv8 neural network was pre-trained on a dataset of ~10,000 holographic images of marked individuals representing seven different life stages of *Artemia salina*, from cysts to adults. After *in situ* full training, YOLOv8 demonstrated the F1 metric at the level of 85%, which is average for all classes and allows accurate identification and classification of different age stages. A field experiment using the DHC equipped with real-time AI-assisted classification capabilities provided insights into circadian rhythms and ecological status of the population.

Biography

Dr. Victor Dyomin is the First Vice-Rector at National Research Tomsk State University, Associate Professor at the Department of Optoelectronic Systems, and Head of the Laboratory of Radiophysical and Optical Methods of Environmental Research. Research interests include optics, holography, digital holography, underwater holography of plankton, ecology, and methodology of education in optics. He authored 80+ journal papers, 45+ papers in Proceedings (SPIE, IEEE, OSA, etc.), 14 patents and 2 text books and made many invited presentations at national and international conferences, the whole list of works includes more than 250 items. During the last 10 years, Professor Dyomin has been a PI and co-PI of more than fifteen successful grants projects. Professor Dyomin is a Senior Member of the Optica (former Optical Society of America), Member of IEEE, and SPIE.

Title: Contemporary Research about the Digital Transformation of Manufacturing Companies

Dr. Lucia Knapcikova*, Annamaria Behunova, and Marcel Behun

Associate Professor

Technical University of Kosice

Slovakia

Abstract

Recent years show that modern technologies like digital twins, IIoT, XR, and AI bring significant added value to manufacturing – especially in terms of flexibility, efficiency and adaptability. However, the obstacles are often non-technical: data readiness, organisational changes and the availability of a competent workforce. The combination of proven frameworks, strategic IIoT architectures, and a focus on the human factor is the key to the success of the digital transformation of manufacturing companies. Digital transformation in manufacturing is a strategic and technological process in which manufacturing companies integrate digital technologies into all areas of their operations. It is a profound change in the way companies produce products, manage processes, collaborate with customers and suppliers, and respond to market changes. The goal of transformation is not only automation, but also increased flexibility, efficiency, competitiveness, and innovation in a changing digital environment. The research is focused on an overview of current digital technologies that can provide real-time recommendations to operators to optimise the production process based on data from sensors and AI. Manufacturing is moving towards smart factories – fully connected, flexible and autonomous systems where people collaborate with machines and algorithms. The future will belong to companies that can not only implement digital technologies but also integrate them into their strategy and culture.

Biography

Assoc. Prof. Dr. Lucia Knapcikova is Vice-Dean for International Relations and Mobility at the Faculty of Manufacturing Technologies (FMT) of the Technical University of Košice. In 2017 she completed her Habilitation for Associate Professor at the FMT in the field "Manufacturing Technologies". In 2011 she completed her PhD study at the above-mentioned Faculty. Assoc. Prof. Knapčíková, Ph.D., is the author more than 260 scientific papers in Slovakia and abroad and she is the owner of 6 utility models. She participated in several international research projects, mainly in Germany. A most important project is H2020 Less Than Wagon Load (Project duration 2017-2020) in collaboration with Belgium, Germany, Netherland, Italy and Slovakia, where she's position is the Faculty project coordinator. The project has the objective to develop a SMART specialised logistics cluster for the chemical industry in the Port of Antwerp in order to shift transport volumes from road to rail freight. Actually, she participated in project EUROSTARS (BRIDGE2ERA Program) with the collaboration of Technical University of Applied Sciences in Wildau (TH Wildau), Germany. Aim of the project is Industry 4.0 strategic orientation between universities and SME. She lectured at the universities in Germany (TH Wildau), Czech Republic (TU Liberec) and Croatia (J.J. Strossmayer University of Osijek, Mechanical Engineering Faculty in Slavonski Brod). Her area of interest includes SMART technologies, SMART materials, applications possibilities directly in the industry. In the year 2018, she was awarded in the category "Personality of Science and Technology under 35 years". The Ministry of Education, Science, Research and Sport of the Slovak Republic, in support of the development of science and technology and the recognition of the exceptional achievements in this field, awarded the Science and Technology Awards – the highest award in science and technology, for the year 2018. She is member of European Alliance for Innovation, Belgium (www.eai.eu), TEAM Society in Croatia and an active member of the Editorial Board of Acta Technologica Journal (Slovakia), SAR Journal (Serbia). She works as Guest Editor in the indexed journal (CC Journal) Wireless Networks-WINET. She is a responsible person for organizing of International conferences under EAI organization- MMS 2023, MMS 2022, MMS 2021, MMS 2020 and previously MMS2019, MMS2018, MMS2017, MMS2016 and EAI FABULOUS 2023, 2022, 2021.

Assoc. Prof. Dr. Annamaria Behunova is associated professor in the field of Industrial Engineering, she works at the Institute of Earth Resources, Faculty of Mining, Ecology, Process Control and Geotechnologies and Department of Industrial Engineering and Informatics at the Faculty of Manufacturing Technologies with a seat in Prešov. Her research is focused on exploring the impact of modern information technologies on changing the strategy of manufacturing enterprises. The introduction of mass customization and therefore the focus on the



final customer represents a wide range of consumer needs and requirements that ultimately result not only in the productivity of the production enterprise but also in the associated production costs. She has a wealth of practical experience on the position of the financial manager and lecturer leader.

Assoc. Prof. Dr. Marcel Behun

Marcel Behun is the bursar of Technical University of Kosice. As a part of his pedagogical and scientific research activities, he works at the Faculty of Mining, Ecology, Process Control and Geotechnologies. He deals with process management, economics and controlling in his pedagogical practice. His scientific and research activity is also focused on the field of mineral and building materials, the efficiency of production and non-production processes, the management of innovations in the manufacturing sector, the controlling of objects management, the quantification of economic and environmental impacts on the environment through the use of secondary raw materials, logistics processes in the manufacturing sector. He is the author of more than 50 scientific publications.



Title: Artificial Intelligence: An Untapped Opportunity for Equity and Access in STEM Education

Dr. Tiffanie Zaugg

Post Doc.

University of Central Florida

USA

Abstract

Artificial intelligence (AI) technologies have garnered increased attention in STEM education over the past decade. While adoption remains uneven, the ability of AI tools to personalize instruction and provide adaptive feedback presents new opportunities to improve learning outcomes. AI can improve equity and access for marginalized students, including those with disabilities, multilingual learners, and economically disadvantaged backgrounds. Examining the integration of AI-driven tools within K-12 STEM environments to support inclusive instructional practices. Focus is placed on applications such as intelligent tutoring systems, automated assessment engines, and adaptive learning platforms that align with principles of Universal Design for Learning (UDL). Specific instructional scenarios and emerging research findings are presented to demonstrate how AI contributes to narrowing opportunity gaps in STEM education. Implementation considerations including algorithmic bias, data privacy, and educator readiness are discussed. The implications for ethical deployment and the role of AI in addressing systemic barriers to participation in STEM fields are considered.

Biography

Dr. Tiffanie Zaugg has been engaged in the field of exceptional education and inclusive instructional design for two decades. Despite the challenges of educating students with significant disabilities, evidence-based practices and data-driven personalization drive innovation in this field. Moreover, the integration of Universal Design for Learning (UDL) principles and assistive technology frameworks into teacher preparation programs remains a cornerstone of her work. Dr. Zaugg's scholarship and practice focus on the development and implementation of scalable solutions that enhance access, engagement, and outcomes for all learners. Her recent efforts report on the creation and application of AI-enhanced educational tools designed to support both novice and veteran educators. The theoretical foundation of these tools is grounded in inclusive pedagogical models and cognitive accessibility principles, particularly when compared to more rigid traditional instructional technologies. Curricular alignment, implementation structures, and professional learning support are discussed in detail. Additionally, data from field studies and pilot evaluations are utilized to analyze the impact of these innovations. Findings from these applications continue to inform her of work at the intersection of technology, equity, and teacher support systems.



Title: GCA²Net: Global-Consolidation and Angle-Adaptive Network for Oriented Object Detection in Aerial Imagery

Dr. Shenbo Zhou

Researcher

National Key Laboratory of Optical Field Manipulation Science and Technology

Chinese Academy of Sciences

China



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Posters & Papers

Title: Circadian Rhythmicity of Serum and Milk Melatonin Concentrations in Cows: Systematic Review

Dr. Ekkehart Paditz

Professor

Center for Applied Prevention

Germany

Abstract

Objectives: Cow's milk is the leading raw material in the production of infant formula. The composition of human breast milk is the gold standard to which the continuous improvement of the quality of industrially produced infant formula should be orientated. Adapting the production of infant formula to natural day-night rhythms anchored in evolution would enable a completely new form of infant formula in the sense of 'chrononutrition for infants' [1]. We were interested in whether cow's milk has a circadian day-night rhythm comparable to that of breast milk and which influencing factors could be used in a targeted manner.

Methods: Systematic review on the topic of 'night milk' in cows (PubMed, MEDLINE, ProQuest, Cochrane syst rev).

Results: We found 105 articles. Accordingly, it has been known since 1976 that the melatonin concentration in serum increases considerably at night, in humans [2] in the same way as in cows [3, 4]. Eriksson et al. have also shown that the level and duration of the nocturnal increase in concentration in cow's milk can be seasonally influenced by the duration of the night [5]. Andrani et al. and Paditz showed in 2024 that the use of this data has considerable market potential [1, 6, 7].

Biography

Degree in human medicine from Humboldt University Berlin, specialist training in paediatrics at the Medical Faculty of the Technical University of Dresden. Additional scientific training at the Institute for Clinical Pharmacology, Medical Faculty, TU Dresden. Internships at the Institute for Toxicology at the German Cancer Research Centre in Heidelberg and in the Division of Applied Physiology at the Ruhr University in Bochum. Scientific and clinical experience in the field of paediatric sleep medicine, including several years as a member of the board of the German Sleep Society (DGSM). His publications have been cited 859 times:

https://scholar.google.com/citations?hl=de&user=9G8IZkcAAAAJ&view_op=list_works&sortby=pubdate

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Title: European Fisheries Enhancement through 'Omic' Characterization and Seafood Production from Underutilized Fish Species

Prof. Tiziana Pepe^{1*}, Prof. Gerardo Manfreda², Prof. Adriana Ianieri³, Prof. Aniello Anastasio⁴

1. Full Professor, Department of Veterinary Medicine and Animal Production, University of Naples "Federico II", Naples, Italy

2. Full Professor, Dipartimento di Scienze e Tecnologie Agro-Alimentari, Università di Bologna, Italy

3. Full Professor, Dipartimento di Scienze degli Alimenti e del Farmaco, Università di Parma, Italy

4. Full Professor, Department of Veterinary Medicine and Animal Production, University of Naples "Federico II", Naples, Italy

Abstract

The sustainable management of marine biological resources is a key objective of the European Union's Common Fisheries Policy (CFP). Despite the abundance of native fish species in the Mediterranean Sea, European seafood consumption remains highly selective, favoring a limited range of species. This consumer preference leads to the underutilization of many locally available species, resulting in both resource wastage and the overexploitation of a few targeted stocks. This study aimed to enhance the market potential of underutilized Mediterranean fish species through a multidisciplinary approach. Three species—Atlantic Horse Mackerel (*Trachurus trachurus*), Bogue (*Boops boops*), and Common Dolphinfin (*Coryphaena hippurus*)—were analyzed to assess their nutritional, physicochemical, and rheological properties. Parameters such as moisture content, fat, protein, ash, total volatile basic nitrogen (TVB-N), histamine levels, pH, color, texture, and viscosity were measured in both fillets and processing by-products. Additionally, mitochondrial DNA (*mtDNA*) was extracted and sequenced using the Illumina NGS platform to ensure accurate species identification and phylogenetic analysis.

The results classified all fillets as lean or semi-fat, with a lipid content below 3%, while by-products exhibited a higher fat concentration (2.7–5%). Protein content was consistent across species, with fillets containing 22–23% protein and by-products showing slightly lower values (18–19%). Rheological analyses revealed increased viscosity in saline solutions, highlighting their potential for industrial applications. Furthermore, high-quality *mtDNA* sequences were successfully obtained and annotated, contributing valuable genetic data to international databases for species authentication and traceability.

These findings underscore the potential of underutilized Mediterranean fish species for both human consumption and feed production. Promoting their market presence can reduce overfishing pressures on heavily exploited stocks, enhance local fisheries' sustainability, and support regional economies. This study aligns with the CFP's objectives by advocating for the optimal use of marine resources while safeguarding biodiversity and advancing sustainable seafood consumption.

Biography

Dr. Tiziana Pepe is Full Professor at Department of Veterinary Medicine and Animal Production, University "Federico II", Naples, Italy. She obtained the degree in Veterinary Medicine at the Faculty Veterinary Medicine of Naples "Federico II" Italy with 110/110 cum laude. Ph. D. in Food Inspection. She is Director of the School of Specialization in "Food Inspection of Animal Origin", Department of Veterinary Medicine and Animal Production, University "Federico II", Naples, Italy.

Topics of the research are: species identification in sea-food products using DNA analysis, study of the fragments sequence of mitochondrial cytochrome b in prepared and processed fish products, use of end-point PCR (conventional, nested, multiplex) and real-time for the identification of fish species and microbial pathogenic species: *Campylobacter jejuni* (analysis of sequences of *flaA* SVR fragment); *Escherichia coli* 0157:H7; *Salmonella* spp.; *Listeria* spp.; *Vibrio* spp and Norovirus, application of two-dimensional electrophoresis and mass spectrometry techniques for the identification of fish species in fresh and prepared products, proteomic analysis of Tuna species, implementation of Real Time PCR for detection of bovine species in samples of sausage mixture. Species identification through analysis of sequences of mitochondrial cytochrome b fragment in milk. Her research activity is summarized in more than 150 Scientific publications, whose results have been communicated in National and International.

Title: Phytocoenotic and Soil Signs of Current Global Warming on the Boreal Ecotone of the East-European Plain

Dr. Erland G. Kolomyts

Professor

Institute of Basic Biological Problems, Russia

Abstract

The current global warming, which has been going on since the mid-70s of the last century, has been confirmed by numerous factual observations. A decrease in edaphic moisture should inevitably cause the replacement of forest-steppe vegetation by northern steppe vegetation, and the latter by dry steppe vegetation. At the same time, dark-gray forest soils and ordinary chernozems still remain in the position of northern relics during this short period. However, due to the increased humification of organic matter, the predominant type of humus changes from humate-fulvate to fulvate-humate. The successional trend in boreal phytocoenoses includes the replacement of oak and/or pine by spruce, with a decrease in forest density, as well as the nemoralization of the ground cover. On the Main Landscape Boundary of the Russian Plain, a three-dimensional local phytocoenotic ecotone is developing to a certain extent, with the strengthening of the boreal vegetation type in the tree layer and sub-boreal types in the undergrowth and ground cover. The increase in the range of inter-annual fluctuations in temperatures and precipitation over the last century indicates a clear increase in climate extremes. The frequency of extreme weather increases - abnormally cold and abnormally warm, as well as excessively humid and extremely dry. All this contributes to the development of steppe ecosystems and has an extremely unfavorable effect on the state of oak groves, causing waves of their mass drying out even at the northern borders of their habitats. In general, on the territory of the Eastern European sub-continent, the "savannization" of mesophilic broad-leaved forests should begin, with their merging with a mosaic complex of sparse forests, meadows and steppes of the typical forest-steppe.

Biography

KOLOMYTS Erland Georgievich, b. 23 January 1936, Bashkirskaya ASSR, Russia, Professor of Geography and Ecology

Education: Geographical faculty of Moscow State University, 1960; Post-graduate, Institute of geography of Russian Academy of Science, Moscow, 1962-1964;

Career to date: Scientists in Institute of Geography of Siberia and Far East, Russian Academy of Science, Irkutsk, 1960-1972; Scientists in Pacific Institute of Geography, Russian Academy of Science, Vladivostok, 1972-1977; Head of Laboratory of geo-ecology of High mountain geophysical institute, Nalychik, 1977-1986; Head of (sub-)faculty of Physical geography in Nizhniy Novgorod pedagogical University, 1986-1990; Head of Laboratory of landscape ecology in Institute of ecology of the Volga River Basin of Russian Academy of Science, Togliatti, 1990. Since December 2022, he has moved to work at the Institute for Fundamental Problems of Biology of the Pushchino Scientific Center of the Russian Academy of Sciences as a leading researcher.

Honours and/or awards: Doctor of geographical sciences, 1976; Professor, 1986; Meritorious Science Worker of Russian Federation, 20003; The Grigoryev Prize laureate by Russian Academy of Science, 2015.

Title: Smart Ecologization of Cities based on Optimal Investment Strategies for Energy Modernization of Buildings

Dr. Andrii Polyvianchuk* and Dr. Olga Arsenyeva

Professor

Vinnitsia National Technical University (VNTU), Ukraine

Research Interest

Energy, environmental, and economic efficiency of building heat supply systems

Abstract

The study is devoted to solving the urgent problem of eliminating ecological-economic losses from the inefficient use of fuel and energy resources in the field of urban heat supply due to the operation of buildings with low levels of energy efficiency. The technology of strategic planning of optimal energy-efficient modernization of buildings (OEEMB) is presented, which allows determining the most effective investment strategies for implementation of energy-saving measures in technical complexes "building-heat supply system" with minimal expenditure of financial resources and terms of payback. The basic principles of the technology are: phased, rational and optimality of the modernization process of research objects. The created technology was verified on the basis of buildings for various purposes: educational institution, residential building, private house, group of typical buildings and group of buildings of various types. The results of the research prove the high economic efficiency of the OEEMB technology, the application of which allows to significantly reduce the amount of investment resources required for energy modernization of buildings by 10.1-22.8% with an insignificant increase in their payback period by 0.2-0.5 years. The research proves the unprofitability of continuing to use the studied facilities in the current energy and economic state, which is accompanied by excessive financial costs, which annually exceed the economic effect of the implemented OEEMB strategies by twice as much. The versatility of the proposed technology is noted, which allows to determine the optimal strategies for implementing the existing economic potential of inefficient technical systems.

Biography

Dr. Andrii Polyvianchuk (born in 1969, Luhansk, Ukraine) is a specialist in the fields of energy and environmental safety of cities and transport ecology. Doctor of Technical Sciences (2013), Professor (2016). Graduated from the Baltic State Technical University (St. Petersburg, 1994) in the specialty "Spacecraft and boosters". In 1995-2014, he worked at the Volodymyr Dahl East Ukrainian National University (Luhansk) in positions: from engineer to professor of the Department of Ecology, Deputy Director of the Research Institute of Applied Ecology (2000-2003), Dean of the Faculty of Natural Sciences (2013-2014). He is the developer of the first measuring complexes in Ukraine for controlling normalized mass emissions of diesel particulate matter – mini-tunnel (2000), microtunnel (2004). Since 2014 - Professor of the Department of Internal Combustion Engines of the National Technical University "Kharkiv Polytechnic Institute". Developer of automated measuring complex for environmental diagnostics of transport diesel engines (2015). Since 2016 - Professor of the Department of Engineering Ecology of Cities of the O.M. Beketov National University of Urban Economy in Kharkiv. Developer of innovative scientific laboratories: ecological monitoring (2017) and energy-efficient building heating systems (2018). Since 2022 - Professor of the Department of Ecology, Chemistry and Environmental Protection Technologies of VNTU. Scientific supervisor of a series of national scientific and applied projects in the field of energy ecology.

Title: Borate Bioactive Glasses with High Calcium Content

Ms. Katarzyna Kozubal, Patrycja Gaćkowska-Gondek, Michał Dziadek, and Katarzyna Cholewa-Kowalska*

Ph.D. Candidate

AGH University of Krakow

Poland

Abstract

Borate bioactive glasses (BBGs) represent a promising new category of ceramic materials with unique properties that distinguish them from traditional bioactive glasses. By substituting silica ions with boron ions within the glass matrix, BBGs gain specific benefits relevant to bone and tissue regeneration. Boron is known to enhance bone growth, support cellular activity, and improve the bioavailability of other minerals. This makes BBGs an exciting option for developing materials that not only promote healing but actively support essential biological processes.

This study focuses on synthesizing and characterizing BBGs to assess how different synthesis methods impact their bioactivity and structural properties. The glasses were developed in a binary oxide system ($40\text{B}_2\text{O}_3$ - 60CaO mol%) using two approaches: traditional melting and the sol-gel technique, with the latter incorporating four organic boron precursors to explore how they influence the final material properties.

Structural analysis provided insights into the bonding and amorphous nature of the materials. To evaluate the bioactivity, the BBGs were immersed in SBF, mimicking physiological conditions, and assessed for apatite formation—a key marker for bioactive potential—using SEM/EDX, FTIR, and ICP-OES. XRD confirmed the amorphous structure of all glass samples, while FTIR analysis revealed the presence of borate units that distinguish these materials from silica-based bioactive glasses. After SBF immersion, FTIR, SEM, and ICP-OES analyses verified apatite layer formation on the BBGs, indicating their bioactivity and compatibility with bone-like tissue. These findings highlight BBGs as a valuable material for regenerative applications, leveraging the biofunctional benefits of boron to advance biomedical implant technology.

Acknowledgements

This work was supported by the Excellence Initiative – Research University” program for AGH University.

Biography

MSc Eng Katarzyna Kozubal is a Ph.D. Candidate specializing in Biomedical Engineering at AGH University of Krakow, Poland. Her research focuses on developing bioactive borate glasses for both hard and soft tissue engineering, exploring these materials in bulk and fibrous forms. Affiliated with the Faculty of Materials Science and Ceramics, Department of Glass Technology and Amorphous Coatings, she actively contributes to advancing biomaterials science. Additionally, she is a member of the Polish Society for Biomaterials and the Polish Ceramics Society.

Title: Injectable Hydrogels Based on Chitosan-Gelatin Biomaterials as Carriers of Biologically Active Compounds

Ms. Weronika Gura, Szymon Salagierski, Weronika Sobkowicz, Michał Dziadek, and Katarzyna Cholewa-Kowalska*

Ph.D. Student

AGH University of Krakow

Poland

Abstract

The development of injectable hydrogels for controlled delivery of biologically active compounds is a promising approach in tissue engineering and regenerative medicine. Hydrogels based on biopolymers, particularly those with a chitosan-gelatin matrix, are gaining immense popularity. A characteristic feature of chitosan, which makes this polymer especially attractive for biomedical applications, is its analogy to glycosaminoglycans – one of the main components of the extracellular matrix (ECM), allowing it to mimic the ECM, which is crucial in regenerative medicine and biotechnology. Gelatin is also highly popular due to its biocompatibility, biodegradability, presence of RGD cell binding motif, and ability to form stable three-dimensional networks, enabling the creation of materials with favorable mechanical and biological properties. Biologically active compounds, such as resveratrol, exhibit a range of beneficial therapeutic properties, including anti-inflammatory, antioxidant, and neuroprotective effects, making them promising candidates for the treatment of various diseases and supporting tissue regeneration processes. The objects of the present study are injectable chitosan-gelatin-based hydrogels obtained by dynamic covalent coupling chemistry and enriched with resveratrol at concentrations of 1%, 5%, 10% and 15%. The study was conducted to evaluate the effect of the active substance used on the physicochemical, mechanical and rheological properties of the hydrogels. The materials were incubated in PBS solution to assess their degradation kinetics. Resveratrol release studies were conducted to evaluate the sustained delivery of the biologically active compound. Mechanical properties were tested using a tensile testing machine, and the self-healing behavior of the materials was examined through optical microscopy. Finally, rheological analyses were performed as a function of time and frequency. The developed and synthesized hydrogels show significant potential as novel injectable materials for tissue engineering, particularly for bone and cartilage regeneration. This work was supported by the National Science Centre, Poland (Grant no. 2023/49/N/ST11/02999) and the “Excellence Initiative – Research University” program at AGH University.

Biography

Ms. Weronika Gura is a first-year Ph.D. Student at the AGH Doctoral School, specializing in biomedical engineering. She holds a master's degree in biomedical engineering with a focus on biomaterials engineering. Additionally, she has earned an FCE certificate in English and a specialized certificate in biomedical engineering English.

Her research interests focus on hydrogel materials, particularly those based on biopolymers, as well as additive manufacturing techniques, especially 3D printing. She is conducting research on hydrogel materials that may in the future serve as bioinks for 3D bioprinting, aimed at developing materials for bone and cartilage tissue regeneration.

Title: CoO as A Modifier of Bioactive Borate Glasses

Ms. Patrycja Gaćkowska-Gondek, Katarzyna Kozubal, Michał Dziadek, and Katarzyna Cholewa-Kowalska*

Ph.D. Candidate

AGH University of Krakow

Poland

Abstract

Bioactive borate glasses (BBGs) offer distinctive advantages for tissue engineering due to their adaptable composition, which allows them to serve as effective inorganic carriers for therapeutic ions like cobalt, known to enhance angiogenesis. The properties of BBGs are influenced by the coordination and oxidation states of transition metal ions within the glass matrix.

In this study, BBGs were synthesized using both traditional melting and the sol-gel method, with various organic boron precursors. The glass composition was 80B₂O₃-11CaO-4P₂O₅-5CoO mol%.

Phase composition and crystallization tendencies were assessed using XRD, while FTIR provided insights into structural characteristics. UV-Vis spectroscopy and XAS (X-ray absorption spectroscopy) were employed to investigate cobalt's oxidation state and coordination. A simulated body fluid (SBF) assay was conducted to evaluate in vitro bioactivity. SEM-EDS was used to analyze the morphology and chemical composition of the samples after incubation, and ICP-OES was employed to investigate the release kinetics of B and Co ions and changes in Ca and P concentrations in the incubation solution.

The synthesized BBGs displayed a range of colors, attributed to cobalt ions existing in different oxidation states and/or various coordination environments. XRD analysis confirmed the amorphous nature of the samples, with minor crystallization of boric acid observed. FTIR spectra indicated boron in both tetrahedral and trigonal coordination. Both FTIR and SEM-EDS analyses showed the formation of an apatite layer after incubation in SBF, while ICP-OES further confirmed the bioactivity of the glasses.

Acknowledgements

This work was supported by the Excellence Initiative – Research University” program for AGH University.

Biography

Ms. Patrycja Gaćkowska-Gondek is a Ph.D. Candidate at the Faculty of Materials Science and Ceramics, AGH University of Krakow, Poland, affiliated with the Department of Glass Technology and Amorphous Coatings. Her research focuses on borate-based bioactive materials for hard and soft tissue engineering applications.

She has actively participated in innovative research projects, including synchrotron experiments investigating the redox state of transition metal ions in borate glasses.

As a member of the Polish Society for Biomaterials, she is dedicated to advancing interdisciplinary studies that integrate materials science, chemistry, and biomedical engineering.

Title: Laser-Directed Energy Deposition of Bioactive Glass on Ti-6Al-7Nb Titanium Alloy Substrate with Highly Refined Grain Structure

Dr. Katarzyna Cholewa-Kowalska, Szymon Bajda, Michal Krzyzanowski, Michal Dziadek, Mateusz Kopyscianski, Yijun Liu, and Adarsh Rai*

Associate Professor
AGH University of Krakow
Poland

Abstract

Titanium and its alloys are widely used in orthopaedic and dental implants due to their inertness. However, biological fluids can cause the release of potentially toxic ions like aluminum and vanadium from these implants. To mitigate this, researchers are exploring protective, bioactive coatings that can also bond naturally with living tissue. This study focused on applying S520 bioactive glass to an ultrafine-grained Ti-6Al-7Nb alloy using laser-directed energy deposition (LDED). The goal was to create a biocompatible material, free from vanadium, for load-bearing implants. The laser cladding process significantly altered the substrate: it melted the surface, incorporating the bioactive glass, and upon solidification, resulted in the formation of larger grains. Further below the surface, the laser-induced heat caused martensitic transformation, leading to the formation of α' acicular martensite, with a distinctive band with refined grains in the lower heat-affected zone. The presence of aluminum in the bioactive glass is a concern for potential toxicity as the glass dissolves. Despite this, the significant reduction in phosphorus concentration after 14 days confirms the high bioactivity of the produced material.

This work was supported by the National Science Centre, Poland (2016/21/N/ST8/00091) and the “Excellence Initiative – Research University” program at AGH University.

Biography

Dr. Katarzyna Cholewa-Kowalska is an Associate Professor at AGH University of Krakow, Poland, affiliated with the Faculty of Materials Science and Ceramics, within the Department of Glass Technology and Amorphous Coatings. Her research interests strongly focus on wide range of biomaterials and their applications, primarily in bone tissue engineering and regenerative medicine. This includes bioactive glasses in various form (powders/fibers/sinters/coatings) as well as composites with their uses. She is an author and co-author of over 90 scientific publications, actively leading and contributing to various research projects in biomaterials. she has been a member of both the Polish Society for Biomaterials and the Polish Ceramics Society.



Title: Calculating the Active Volume of Dislocation Nucleation of Third-generation Semiconductor Silicon Carbide Using Nanoindentation

*Mr. Jun-Yu Wang**, Yuan-Fu Wang, Yuan-Wen Liu, Chen-Hsuan Lin, Pin-Chen Pan, and Jacob C. Huang
Ph.D. Student
National Sun Yat-sen University
Taiwan

Abstract

The third-generation semiconductors, such as silicon carbide (SiC), possess excellent electrical properties and are widely utilized in various applications, including power electronics, high-frequency devices, and extreme environment systems. However, the presence of internal defects within these materials can significantly impact their overall performance, making the study of defect characteristics crucial for improving material reliability. In this research, we employ statistical analysis to determine the activation volume associated with the first dislocation nucleation event (first pop-in) in SiC during nanoindentation. Since the occurrence of pop-in is exponentially dependent on the applied stress, it can be described as the plastic deformation rate under a given load. By considering the contact volume surrounding the indenter, we can calculate the activation volume of dislocation nucleation. Furthermore, we systematically compare the activation volume and its distribution trends on two different SiC crystal planes: $2.4 \text{ \AA}^3$ for the (0001) plane and $2.8 \text{ \AA}^3$ for the (11 $\bar{2}$ 0) plane. Our findings contribute to a deeper understanding of the mechanical deformation mechanisms of high-hardness materials and provide an essential foundation for exploring stress-induced deformation behaviors of SiC at the nanoscale under a fixed strain rate. This study also offers valuable insights for optimizing SiC-based devices where mechanical reliability is critical, particularly in applications requiring high durability and performance stability.

Biography

Mr. Jun-Yu Wang is a Ph.D. Student in the Department of Materials and Optoelectronic Science of Sun Yat-sen University, Kaohsiung, Taiwan. His research direction is aimed toward the defect analysis of 4H-SiC, by using XRD, EBSD, TEM, nanoindentation, and FIB techniques. He can be contacted via e-mail address, felixwang121960066@gmail.com.





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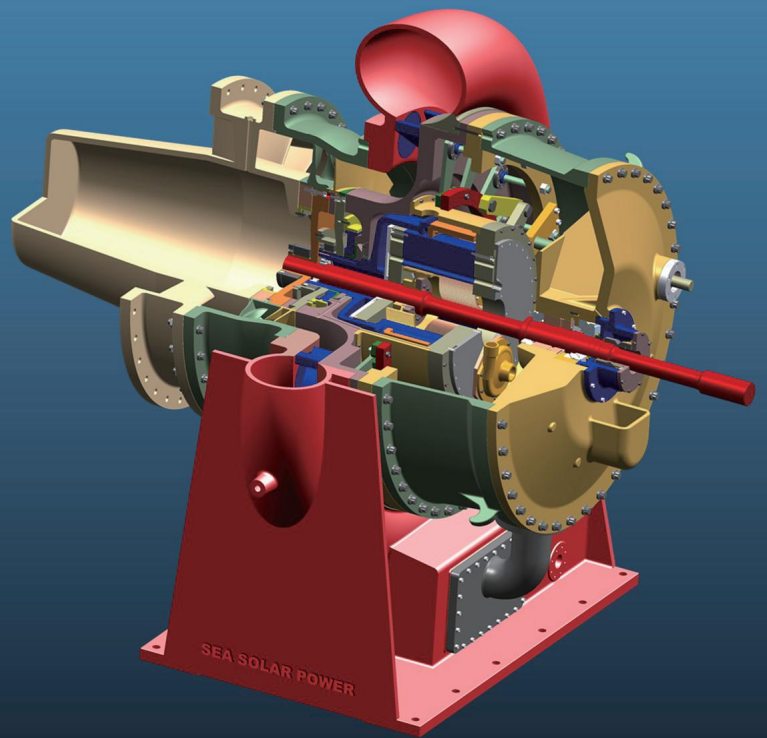
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