2026 INWES-APNN & TWiST Annual Conference

From Gender Equity to an

I.D.E.A.L. Civilization

Building the Future We Aspire to Create

Program BooK



When : Nov 3rd- 6th, 2026

Where : National Sun Yat-sen University (NSYSU), Kaohsiung, Taiwan



2026 INWES-APNN & TWiST Annual Conference

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Welcome Message

It is our great honor and pleasure to welcome you to the 2026 INWES-APNN & TWiST Annual Conference, held on November 3–6, 2026, in the vibrant harbor city of Kaohsiung, Taiwan. At a time when humanity faces unprecedented environmental, technological, and societal challenges, this international gathering represents both a call to action and an opportunity to envision a better future together.

Under the overarching vision of “From Gender Equity to an I.D.E.A.L. Civilization,” we celebrate the contributions and transformative leadership of women engineers and scientists while exploring how science, technology, education, and international collaboration can help build a more inclusive, equitable, and sustainable world. I.D.E.A.L. stands for Inclusion, Diversity, Equity, Appreciation, and Love—five interconnected values that remind us that scientific advancement and human development must progress hand in hand.

Women engineers and scientists play indispensable roles in advancing research, driving innovation, shaping policy, leading industries, and inspiring future generations. Yet achieving meaningful gender equity requires collective action across all sectors of society. Through this conference, we seek to challenge gender bias, strengthen women's leadership, encourage allyship through the spirit of HeForShe, and explore how emerging technologies, particularly artificial intelligence, can promote equity rather than reinforce existing inequalities. We also recognize the transformative potential of interdisciplinary STEAM education in fostering creativity, collaboration, and inclusive innovation.

A distinctive feature of this year's conference is the integration of the Sustainable Development Goals (SDGs) and Inner Development Goals (IDGs), recognizing that meaningful and lasting societal transformation requires not only systemic change, but also the development of our inner capacities. Through seven thematic workshops, dedicated IDG sessions, interdisciplinary scientific forums, and interactive exchanges, participants are invited to explore how self-awareness, empathy, collaboration, and courageous leadership can translate into collective action for a sustainable future.

We are especially delighted to welcome distinguished international delegates, scientists, engineers, educators, policymakers, industry leaders, IDG practitioners, and representatives of professional networks and civil society organizations from around the world. Beyond sharing knowledge and research achievements, we hope this gathering will cultivate lasting friendships, meaningful partnerships, and new possibilities for collaboration across disciplines, generations, and cultures.

May the 2026 INWES-APNN & TWiST Annual Conference inspire us not only to imagine

an I.D.E.A.L. civilization, but also to take meaningful steps toward creating it—together. Welcome to Kaohsiung, and we wish you an inspiring and memorable conference!



Prof. Chao-Ping Hsu
Chair, 2026 INWES-APNN & TWiST Annual Conference
President, TWiST



Prof. Chih-Peng Li
Co-Chair
President, National Sun Yat-sen University



Prof. Chia C. Wang
Chief Organizer
Department of Chemistry & Aerosol Science Research Center
National Sun Yat-sen University



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(許昭萍理事長)
(President, TWiST)



Co-Chair, Prof. Chih-Peng Li
(李志鵬校長)
(President, NSYSU)
(#HeForShe)

Chief Oganizer



Prof. Chia C. Wang
(王家蓁教授)
Dept. of Chemistry
& Aerosol Science
Research Center,
NSYSU

Local Organization Committee



Prof. Hui-Fen Wu
(吳慧芬教授)
Dept. of Chemistry, NSYSU



Prof. Shuchen Hsieh
(謝淑貞教授)
Dept. of Chemistry, NSYSU



Prof. Wan-Jen Huang
(黃婉甄教授)
Institute of Communications Engineering, NSYSU



Prof. May-Ru Chen
(陳美如教授)
Dept. of Applied Mathematics, NSYSU



Asso. Prof. Shih-Hui Liu
(劉世慧副教授)
Dept. of Biological Sciences, NSYSU



Prof. Jing-Ru Weng
(翁靖如教授)
Dept. of Marine Biotechnology and Resources, NSYSU



Asst. Prof. Ya-Yun Cheng
(鄭雅匀助理教授)
School of Medicine, NSYSU



Prof. Yen-wen Peng
(彭渰雯教授)
Institute of Public Affairs Management, NSYSU



Guest Asst. Prof.
Ching-Ling Chu
(朱謹伶客座助理教授)
Aerosol Science Research Center, NSYSU



Prof. Tsung-Hsien Lin
(林宗賢教授)
Dept. of Photonics, NSYSU



Asst. Prof. Yen-Lin Cho
(卓宴琳助理教授)
Dept. of Marine Environment and Engineering, NSYSU



Assoc. Prof.
Wen-Ling Hong
(洪文玲副教授)
Dept. of Naval Architecture and Ocean Engineering, NKUST



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Organized by (主辦單位)

- INWES-APNN (國際女工程師與科學家網絡 - 亞太國家網絡)
- The Society of Taiwan Women in Science and Technology (台灣女科技人學會)
- National Sun Yat-sen University, NSYSU (國立中山大學)
- Aerosol Science Research Center, NSYSU (國立中山大學氣膠科學研究中心)
- Taiwan Kaohsiung IDG Hub for SDGs (台灣高雄內在發展目標聯盟)
- Chinese Institute of Engineers, CIE (中國工程師學會)

Advised & Supported By (指導單位)

- Ministry of Education, MOE (教育部)
- National Science and Technology Council, NSTC (國家科學及技術委員會)

Sponsored By (贊助單位)

- Taiwan Semiconductor Manufacturing Company, TSMC (台灣積體電路製造股份有限公司)
- Economic Development Bureau, Kaohsiung City Government (高雄市政府經濟發展局)
- Taiwan International Ports Corporation, TIPC (台灣港務股份有限公司)
- Chemical Society of Taiwan, CST (台灣化學學會)
- MediaTek (聯發科技教育基金會)



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Program

Main Venue : Sun Yat-sen Hall (逸仙館), National Sun Yat-sen University

(unless otherwise indicated)

Nov 3rd (Day 1)

09:00-09:30	Registration & Check-in
09:30-10:00	Opening Ceremony Opening Host: Prof. Chia C. Wang (王家蓁)
	Opening music Performance 1. Opening Remark of TWiST's President, Dr. Chao-Ping Hsu (許昭萍理事長) 2. Opening Remark of Government Representatives, Vice President Bi-khim Hsiao (蕭美琴副總統) 3. Opening Remark of NSYSU's President, Prof. Chih-Peng Li (李志鵬校長) 4. Opening Remark of INWES's President, Prof. Sarah Peers 5. Opening Remark of APNN's Chair, Jane Torrano Tapel
	Group Photos
10:00-11:00	Plenary Speech Moderator : Dr. Chao-Ping Hsu 10:00-10:30 · How to Stand Firm as a Woman Scientist in Plant Biology and Sustainable Agriculture Dr. Yi-Fang Tsay (蔡宜芳) (Vice President and Distinguished Research Fellow in the Institute of Molecular Biology, Academia Sinica, Taiwan) 10:30-11:00 · Lessons Learned from Advancing Women through Collective Action Prof. Ursula Keller (ETH Zurich, Switzerland)
11:00-12:00	Workshop I : Facing and Fixing Gender Bias v.s. Environmental Crisis Moderator: Prof. Hsiao-Wen Zan (冉曉雯) 11:00-11:30 · Women Scientists Shaping the Blue Economy: Integrating Biogeochemical Oceanography with SDGs and Inner Development Goals for an I.D.E.A.L. Ocean Future Prof. Fani Sakellariadou (Dept. Maritime Studies, University of Piraeus, Greece & President of Div. VI, IUPAC) 11:30-12:00 · Volunteers who support women in engineering to innovate, lead, and inspire the communities around them Dr. Pauline N. Kawamoto (Chair, IEEE R10 WIE Committee, Japan and Faculty of Engineering, Shinshu University, Nagano, Japan)
12:00-13:30	Lunch - Nostalgic Taiwan-style Bentobox @ IR 1001 & 1002 Lecture Hall, International Research Bldg. 1F
13:30-14:30	Workshop II : Empowering Women and Leadership Development Moderator : Academician Prof. Kopin Liu (劉國平院士) 13:30-14:00 · Reflections on Leadership and Gender Equity Prof. Chao-Ping Hsu (許昭萍) (President, TWiST & Distinguished Research Fellow, Academia Sinica, Taiwan) 14:00-14:30 · Self-advocacy for women's self-leadership Dr. Keng-hui Lin (林耿慧) (Institute of Physics, Academia Sinica, Taiwan)

14:30-15:20	IDGs Session I : Understanding Moderator : Prof. Chia C. Wang · Introduction of IDG & Empathy Prof. Anita Nowak (McGill University, Canada)		
15:20-16:10	Poster Session & Coffee Break @ International Research Bldg. 1F Lobby		
16:10-17:10	ALOHA Science, Technology & Sustainability Forums		
16:10-17:10	I. Air, Aerosols and Health @ Sun Yat-sen Hall Moderator : Prof. Chia C. Wang (王家蓁)	II. Ocean and watersphere sciences @ Hua-Li Hall, International Research Bldg. 1F Moderator : Prof. Jing-Ru Weng (翁靖如)	III. Enterprises & ESG I. @ Kwang-Chung Hall, International Research Bldg. 2F Moderator: Prof. May-Ru Chen (陳美如)
	· From Cleaner Air to Changing Chemistry : What Isotopes Reveal about $PM^{2.5}$ in Seoul Prof. Meehye Lee (Dept. of Earth & Environmental Sciences, Korea University, South Korea) · Bridging Science to Action : Protecting Children's Health Through Better Indoor Air Quality for a Sustainable Future Prof. Juliana Jalaludin (Universiti Putra Malaysia, Malaysia)	· How Close Are We to the Stream? Dr. Chia-Ning Yang (楊佳寧) (Director, River Basin Environment Center, Ministry of Water Resources ; Sinotech Engineering Consultants, Ltd.) · Connecting Science, Policy and People for Ocean Conservation Dr. Shiau-Yun Lu (陸曉筠) (Ocean Conservation Administration, Ocean Affairs Council, Taiwan)	· Breaking Barriers : Leading Complex Space Missions as a Woman Engineer Joan Chen (陳玉芬) (Taiwan Space Agency Taiwan) · Women's Leadership and Well-Being : Building Resilient and Sustainable Communities. Angela Feng (馮有薇) (Founder, NESS Wellness, Taiwan)
17:10-18:10	**Workshop III : How SDGs x IDGs can help achieve gender equity and facilitate an I.D.E.A.L. planet for all?** Moderator : Prof. Ursula Keller 17:10-17:40 · How Can Interdisciplinary Collaboration Help Women Advance Across Scientific Fields ? Prof. Hemda Garelick (Professor Emerita Dept. Natural Sciences, Middlesex University, London, UK & Former president of Div VI (2021-23), Former IUPAC executive Board, involvement with the IUPAC Science Board, representing IUPAC on SCGES) 17:40-18:10 · From Aerosphere to Breathing Civilization: Co-Creating an I.D.E.A.L. and Sustainable Planet for ALL, and the Key Roles of Females Prof. Chia C. Wang (王家蓁) (Prof. Dept. Chemistry and Director, Aerosol Science Research Center, National Sun Yat-sen University, Taiwan)		
18:30-21:00	Gala Dinner & Cultural Night @ Sunset Beach Resort Outdoor Beach (西子灣沙灘會館 戶外沙灘)		

Nov 4th (Day 2)

08:30-09:00 Registration & Check-in

09:00-10:00

Workshop IV : Equity from Within- Awakening the Divine Feminine and Masculine Traits Within Everyone
Moderator : Dr. Keng-hui Lin (林耿慧)

09:00-09:30
· From Science to Civic Leadership: Why the World Needs More Women Scientists in the Room
Dr. Josephine Tsang
(former Executive Director of Chemical Institute of Canada, Canada)

09:30-10:00
· Equity from Within: From Inner Wholeness to a Sustainable Future - Bringing Eastern Wisdom into Dialogue with Contemporary Science
Prof. Kesari Singh
(Dean, Research & Development and Academic Affairs, Sri Sri University, India)

10:00-11:00

Workshop V : Breaking the Boundaries : Transdisciplinary STEAM Education
Moderator : Prof. Yen-wen Peng (彭淵雯)

10:00-10:30
· STEAM and Gender
Prof. Sarah Peers
(New Model Institute for Technology and Engineering (NMITE), UK & President, INWES)

10:30-11:00
· How Scientists can Communicate Science Issues to General Public
Prof. Kong- Joo Lee
(Emeritus Professor, Ewha Womans University, Korea)

11:00-11:10 Break

11:10-12:10

ALOHA Science, Technology & Sustainability Forums

IIV. Land, Forests and Biodiversity @Sun Yat-sen Hall Moderator: Prof. Shih-Hui Liu (劉世慧)	V. Climate changes and net-zero carbon emission @ Hua-Li Hall, International Research Bldg. 1F Moderator: Prof. Fani Sakellariadou	VI. Enterprises & ESG II. @ Kwang-Chung Hall, International Research Bldg. 2F Moderator: Prof. Hsunling Bai (白曛綾)
· From Contamination to Circularity : Environmental Biotechnology for Land Protection Prof. Diane Purchase (Middlesex University, London, UK) · Vertical Frontiers : Female Leadership in Canopy Biodiversity, Giant Tree Mapping, and Citizen Science" Dr. Rebecca Chia-Chun Hsu (徐嘉君) (Taiwan Forestry Research Institute, Ministry of Agriculture, Taiwan)	· Decarbonising the Malaysian Fleet: A Multiscale Framework Linking Combustion Dynamics, Vessel Emissions, and CII Compliance. Dr. Wan Nurdiyana Wan Mansor (Universiti Malaysia Terengganu, Malaysia) · New Green Manufacturing Technology : Flow Chemistry Prof. Ya-Yu Chiang (蔣雅郁) (Dept. Mechanical Engineering, National Taiwan University, Taiwan)	· Beyond ESG：From Inner Development to Sustainable Impact ～ The Heart Valley Appro-ach to SDGs × ESG × IDGs" Pearl Wen (文蓓蓓) (Founder & CEO, Heart Vallery ESG Education Park, Taiwn) · Sustainable Actions to Climate Assets : Biochar Carbon Removal would be the Driving Force Yuyan Li (李雨燕) (Chief Knowledge Officer, TCHAR CO., LTD. Taiwan)

12:10-13:20 Lunch - Nostalgic Taiwan-style Bentobox
@ IR 1001 & 1002 Lecture Hall, International Research Bldg. 1F

13:20-14:30	**Workshop VI : AI v.s. Gender Equity- Friend or Foe?** Moderator : Dr. Wen-Jean Hsueh (薛文珍) 13:20-13:50 · Beyond Representation: Women's Leadership, Gender Equity and Sustainable Institutional Legacy — The BAQ2018 Malaysia Case Study Eva Chen (陳怡樺) (CEO, Trend Micro Inc., Taiwan) Contributed Talk 13:50-14:10 · Beyond Representation: Women's Leadership, Gender Equity and Sustainable Institutional Legacy — The BAQ2018 Malaysia Case Study Ts. Dr. Noor Zaitun Yahaya (Global Enviro Enterprise, Kuala Kangsar, Malaysia) 14:10-14:30 · AI and Women's Academic Leadership: Enabler or Barrier to Gender Equity in Higher Education? Dr. Nguyen Ngoc Trang (Nguyen Tat Thanh University, Vietnam)
14:30-15:20	IDGs Session II : Experiencing Moderator : Prof. Anita Nowak · Experiencing IDGs Mila Aliana (Chief Weaver, IEEE Planet Positive 2030; Member of IDG Directory Board) (co-facilitated by Mila, Prof. Anita Nowak and Prof. Chia Wang)
15:20-16:10	Poster Session & Coffee Break @ International Research Bldg. 1F Lobby
16:10-18:10	Tours / Activities: A. CONNECT IDG Beach Concert By Sizihwan Bay @ Sunset Beach Resort Outdoor Beach B. Kaohsiung Green Harbor Boat Tour C. Tech Tour I : Aerosol Science Research Center D. Tech Tour II : Kaohsiung Smart City Center E. Chi-Jin Island Lighthouse Tour
19:00-21:30	Conference Banquet & Cultural Night @ Grand Ballroom, InterContinental Kaohsiung 3F

Nov 5th (Day 3)

08:30-09:00	Registration & Check-in
09:00-10:00	**Workshop 7 : He for She** Moderator : Prof. Shuchen Hsieh (謝淑貞) 09:00-09:30 · Global Science without Barriers: Addressing Gender Inequality with Evidence-Based Strategies Prof. Paul Walton (Dept. of Chemistry, University of York, UK) 09:30-10:00 · He for She, Chemistry for All: Creating Opportunities for Women in Science Dr. Brian Li (International Union of Pure and Applied Chemistry, IUPAC)
10:00-10:30	Break

10:30-12:00	**IDG Session III : Enabling Change** **Moderator : Mila Aliana** @ Sun Yat-sen Hall 10:30-11:00 · **Inner Resources: Cultivating Inner Capacities for Leadership and Change** Maureen Chen & Warren Oz (Brahma Kumaris, Australia) 11:00-11:30 · **From Being to Relating : The Relationship with Myself, Others and Mother Earth** Prof. Hsunling Bai (Aerosol Science Research Center, NSYSU, Taiwan) 11:30-12:00 · **The Way Out Is In : Integrating IDGs × SEL × SDGs — The Taiwan Experience** Prof. Chia C. Wang (Aerosol Science Research Center, NSYSU, Taiwan)	TWiST General Meeting of Members (台灣女科技人學會會員大會) @ IR 1002 Lecture Hall, International Research Bldg. 1F Host : Dr. Chao-Ping Hsu *Note : This session will be conducted in Mandarin
12:00-13:30	**Lunch Buffet** **@ IR 1001 Lecture Hall, International Research Bldg. 1F**	2026 Corning Taiwan x TWiST Outstanding Paper Award Ceremony (康寧女性研究員最佳論文獎頒獎典禮) @ IR 1002 Lecture Hall, International Research Bldg. 1F
13:30-16:30	**APNN Country Report (15 mins for each country)** **Host : Jane Torrano Tapel (APNN Chair)** 1. ATSE – Australia : Dr. Marlene Kanga (Pre-recording) 2. KWSE and Dong-A University – South Korea : Dr. Chaedeok Lim (KWSE President) 3. FedMES – Myanmar : Myat Myitzu 4. PII – Indonesia : Sri Hidayati (Pre-recording) 5. JNWES – Japan : Mari Oyama 6. OSVSWA – India : Dillip Pattanaik 7. PIET/ IEM – Malaysia : Zuhaina Zakaria 8. TWiST-Taiwan : Dr. Chao-Ping Hsu (TWiST President) 9. VAFIW – Vietnam : Lương Hong Thuy (Deputy Head of International Relation Committee of VAFIW) 10. WISE Nepal : Jun Hada (Pre-recording) 11. PTC-WEN Philippines : Jhoanna Soriano 12. WSTEM Mongolia : Dr. Mend Amgalan	
16:30-17:30	**APNN Assembly Meeting**	
17:30-18:00	Closing Ceremony	

Nov 6th (Day 4) (Optional)

09:30-17:00	**Cultural Excursions (in parallel):** **A. Fo Guang Shan Buddha Museum** **B. Kaohsiung Heritage Tour: Railway & History Museum** **C. Meinong Hakka Cultural Museum** **D. Taiwan Indigenous Peoples Cultural Park**



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Dr. Yi-Fang Tsay
蔡宜芳博士

Vice President and Distinguished Research Fellow, Academia Sinica, Taiwan

E-mail: yftsay@as.edu.tw

Areas of Expertise: Plant Molecular Biology

簡歷 Biography

I received my bachelor's and master's degrees from the Department of Botany at National Taiwan University and my Ph.D. in Biology from Carnegie Mellon University.

My research focuses on plant nutrition, particularly the molecular mechanisms underlying nitrate transport and signaling. I identified the first nitrate transporter gene in plants and subsequently uncovered several novel mechanisms involved in nitrate transport. I also pioneered studies demonstrating that nutrient transporters can function not only as transporters but also as sensors, a concept now widely referred to as the transceptor function. These discoveries have contributed substantially to our understanding of plant nutrient acquisition and signaling and have been widely cited in the plant biology literature and major plant physiology textbooks.

In addition to my research, I have been actively involved in the international plant science community. I served as an Editor of Plant Physiology for 12 years and contributed to two widely used textbooks, Biochemistry & Molecular Biology of Plants, published by the American Society of Plant Biologists, and Plant Physiology and Development, edited by Taiz and colleagues. I have also served as a contributing member of F1000/Faculty Opinions since 2018 and as a Section Head since 2021. I was invited by Nature to contribute a News & Views article and have twice been invited by the Annual Review of Plant Biology to write review articles.

Over the past decade, I have delivered approximately 30 invited lectures at international conferences, universities, and research institutions. I have also served as chair, co-chair, organizer, or committee member for a number of international scientific conferences.

In recognition of my contributions to plant science, I was elected an International Member of the U.S. National Academy of Sciences in 2021 and an Academician of Academia Sinica in 2024, member of The World Academy of Sciences (TWAS) in 2026. Through my research and international academic activities, I continue to work toward advancing our understanding of plant nutrient signaling and contributing to the broader plant science community.

Inspirational words:
Facing invisible inequalities with love and resilience will make you stronger and empower you to move forward with a positive attitude.

How to stand firm as a women scientist in plant biology and in sustainable agriculture

Yi-Fang Tsay

AffilitionInstitute of Molecular Biology, Academia Sinica, Taipei, Taiwan
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Abstract

To sustain global crop production, approximately 110 million metric tons of nitrogen fertilizer are applied each year, while the production of nitrogen fertilizer itself consumes a substantial fraction of global energy. In addition, nitrogen fertilizer that is not taken up by crops can lead to serious environmental problems. Improving nitrogen-use efficiency is therefore an important challenge for sustainable agriculture.

Under most agricultural conditions, nitrate is a major form of nitrogen acquired by plants from the soil. My contribution to this field began with the identification of CHL1, the first nitrate transporter gene cloned from plants, using Arabidopsis thaliana as a model system. We subsequently demonstrated that CHL1 not only functions as a nitrate transporter but also acts as a nitrate sensor, enabling plants to perceive external nitrate availability and coordinate physiological and molecular responses required for nitrate uptake, transport, and assimilation. Studies of CHL1 and its homologues further challenged several long-standing concepts in nitrate transport and revealed previously unrecognized mechanisms governing nitrate allocation within plants. These discoveries have also suggested new strategies for improving nitrogen-use efficiency and developing more sustainable approaches to crop production.

Scientific progress, however, does not always follow an easy or predictable path. Challenging an established theory requires strong evidence, persistence, and the courage to stand by one's observations even when they differ from prevailing views. In this seminar, I will share not only the scientific journey that led from the discovery of the first plant nitrate transporter to new concepts in nitrate sensing and utilization, but also some of my experiences as a woman scientist navigating challenges, questioning conventional wisdom, and continuing to move forward in plant biology.

Keywords: Transporter, Plant Biology



Prof. Ursula Keller

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簡歷 Biography

Ursula Keller is a pioneer in ultrafast laser science and technoloy. She was a professor in physics at ETH Zurich from 1993 to 2025 and directed directed the Swiss national research program NCCR MUST (Molecular Ultrafast Science and Technology) from 2010 to 2022. She received her Diplom in physics from ETH Zurich in 1984 and her Ph.D. from Stanford University in 1989. She began her independent research career as a Member of Technical Staff at Bell Labs (1989–1993).

She was a co-founder and board member for Time-Bandwidth Products 1995-2014 (acquired by JDSU in 2014) and for GigaTera from 2000 to 2003, a venture capital funded telecom company during the “telecom bubble phase” which was acquired by Time-Bandwidth in 2003. More recently she has been a co-founder of K2 Photonics in 2023. She also served on the supervisory board of Jenoptik from 2022-2026.

Keller made groundbreaking contributions to ultrafast solid-state and semiconductor lasers, including the development of semiconductor saturable absorber mirrors (SESAMs), ultrashort pulse generation in the single-cycle regime, frequency comb stabilization, the attoclock technique and attosecond transient absorption spectroscopy for probing quantum dynamics.

Her work has been recognized with numerous international awards, including the Swiss Science Prize Marcel Benoist (2022), IEEE Edison Medal (2019), OSA Frederic Ives Medal and SPIE Gold Medal (both 2020), European Inventor Award for lifetime achievement (2018), international member of the U.S. National Academy of Engineering (NAE 2026), the U.S. National Academy of Sciences (NAS 2021) and the Royal Society in London (FRS 2025) and two ERC Advanced Grants (2012 and 2018). She supervised 101 Ph.D. students, published over 540 peer-reviewed papers, and holds an h-index of 126 with more than 61,000 citations (Google scholar). In 2022, she published the graduate textbook Ultrafast Lasers (Springer Verlag).

Lessions Learned from Advancing Women through Collective Action

Ursula Keller

Physics Professor Emeritus, ETH Zurich, Switzerland
Email: keller@phys.ethz.ch

Abstract

Advancing women in science and engineering is not solely a women's issue; it is essential to institutional excellence, scientific innovation, and the responsible use of talent and public resources. Drawing on the collective action of women faculty at MIT—documented in the landmark 1999 MIT Report and, more recently, in the 2023 book The Exceptions—and on my experience establishing the ETH Women Professors Forum at ETH Zurich, I will examine how coordinated advocacy, evidence-based analysis, and committed male allyship can drive lasting institutional change.

The talk will address persistent structural barriers, including decision-making concentrated within small informal networks, inconsistent procedures, unequal access to institutional resources and opportunities, and heightened exposure to bias when women assume leadership roles. These failures damage careers, waste talent, and undermine institutional credibility. I will argue that transparent governance, clear accountability, and equitable, performance-based access to resources and influence are prerequisites for inclusive excellence. Ultimately, the success and integrity of our institutions depend on their ability to recognize and integrate talent beyond the dominant in-group. The central lesson is that change is possible—but it requires collective action, supporting measures and a shared commitment from women and men to build cultures that reward merit, expand opportunity, and accelerate innovation.



Prof. Fani Sakellariadou

Professor Emerita in Geochemical Oceanography,
Dept. of Maritime Studies, University of Piraeus, Gr.
President, Division VI, and member of Science Board, IUPAC
Member, International Science Council Expert Group on Plastic Pollution.

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Areas of Expertise: marine sediment geochemistry, with particular emphasis on heavy metal speciation and organic matter analysis; seabed mining; microplastics pollution; clean and smart shipping; and the sustainable blue economy.

簡歷 Biography

Dr. Fani Sakellariadou is a geochemical oceanographer and Professor Emerita of Geochemical Oceanography in the Dept of Maritime Studies at the University of Piraeus (UniPi), (Greece). She holds a Ph.D. in marine geochemistry from the Royal School of Mines, Imperial College London. She also holds an M. Phil in Oceanography and a B.Sc. in Chemistry from the National and Kapodistrian University of Athens, as well as a Diploma (D.I.C.) in organic synthesis from Imperial College London.

She is President of IUPAC Division VI - Chemistry and the Environment, a member of the IUPAC Science Board, and a member of the International Science Council (ISC) Expert Group on Plastic Pollution. She has served as an expert for the UN Division for Ocean Affairs and the Law of the Sea (DOALOS) on marine pollution, and for 15 years, as a national expert on air pollution for the European Union.

Dr. Sakellariadou served as Director of the Laboratory of Geochemical Oceanography at the University of Piraeus from 2002 to 2025. In 2018, she founded the MSc program "Sustainable Blue Economy" and served as its Director until 2025. She also served as Chair of the Department of Maritime Studies at UniPi for four years and as a Visiting Researcher in the Department of Mechanics and Maritime Sciences at Chalmers University of Technology, Sweden.

Her professional experience includes working as a Marine Geochemistry Expert at “Hydrex Expertise in Water, as a Marine Geochemist at the Hellenic Centre for Marine Research (HCMR), and as a Researcher at the School of Electrical Engineering of the National Technical University of Athens.

Her main research interests include marine sediment geochemistry, with particular emphasis on heavy metal speciation and organic matter analysis; seabed mining; microplastics pollution; clean and smart shipping; and the sustainable blue economy.

She is a member of the writing team for Chapter 6 of The Third World Ocean Assessment (WOA III) (United Nations, 2026).

She has published numerous scientific papers and two books and has been invited to deliver scientific presentations at numerous international conferences and events. In 2026, she was also invited to present to the Special Standing Committee on Environmental Protection of the Hellenic Parliament.

Inspirational words:
Protecting, conserving, and sustainably managing our ocean and its resources requires genuine gender equality in ocean science. In today’s uncertain world, overcoming complex environmental challenges demands collective action. By uniting diverse perspectives, we can drive innovation, pioneering discoveries, and eco-friendly lifestyles necessary to secure long-term marine sustainability.

Women Scientists Shaping the Blue Economy through Biogeochemical Oceanography: Advancing the SDGs and the Inner Developent Goals toward an I.D.E.A.L. Ocean Future

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Abstract

The Blue Economy offers major opportunities for sustainable economic growth while protecting marine ecosystems and the essential services they provide. Achieving this vision requires sound scientific knowledge, interdisciplinary collaboration, and inclusive leadership. Women scientists have made significant contributions to biogeochemical oceanography, advancing understanding of nutrient cycling, carbon sequestration, ocean acidification, deoxygenation, contaminant transport, and emerging pollutants such as plastics and PFAS.

As an interdisciplinary field integrating chemistry, biology, geology, and physics, biogeochemical oceanography provides the scientific foundation for ecosystem restoration, marine spatial planning, pollution management, and sustainable maritime activities. These contributions directly support the Sustainable Development Goals, particularly SDG 14, while also advancing SDGs 3, 6, 9, 12, 13, and 17.

Addressing today's interconnected ocean challenges, however, requires more than scientific expertise. It also depends on leadership, collaboration, systems thinking, ethical decision-making, and resilience. The Inner Development Goals complement the SDGs by fostering these human capabilities, enabling scientists to translate knowledge into effective policy and societal action.

This paper highlights the unique role of women scientists in connecting research, environmental policy, and international cooperation to promote a sustainable Blue Economy. It shows how integrating biogeochemical oceanography with the SDGs and IDGs can accelerate progress toward an I.D.E.A.L. Ocean Future. This integrated approach shows that achieving ocean sustainability depends not only on scientific innovation but also on the leadership, values, and collaborative capacity of the global scientific community.

Keywords: Blue Economy, IDGs, Ocean Challenges, Oceanography, SDGs.



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Areas of Expertise: professional communication, ICT for long-term health care environments, software formalization

簡歷 Biography

Pauline N. Kawamoto began her professional career at General Instrument as a software engineer and soon became an independent software consultant before pursuing advanced degrees in information engineering and system design technologies at Shinshu University in Nagano, Japan. Kawamoto joined the Faculty of Engineering at Shinshu University, Department of Information Engineering in 1996 and is now a professor there in the Engineering Core Division. She has been a member of IEEE for 33 years and is currently serving as the IEEE Region 10 Women in Engineering Committee Chair, representing North Asia.

Inspirational words:
Sometimes the joy of solving a big problem is not that different from solving a small problem. Be resourceful and always choose the work and path that matters most to you.

Volunteers who support women in engine-ering to innovate, lead, and inspire the com-munities around them

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Abstract

In this talk, Pauline N. Kawamoto, IEEE Region 10 Women in Engineering Committee (R10 WIEC) Chair (North Asia) will introduce the activities of Women in Engineering affinity groups and share perspectives on how leadership and professional growth can happen in any stage of career through volunteering within the global IEEE community. Kawamoto will introduce the vision and initiatives of IEEE R10 WIEC, highlighting efforts to strengthen collaboration, engagement, and a sense of belonging for women in engineering across the Asia-Pacific region so that they can work wholeheartedly with all of the innovative potential they hold on the problems in society that matter most to them. The talk will explore how participation in global technical communities can broaden perspectives and create opportunities for leadership and cross-cultural collaboration and aims to encourage students and young professionals to actively engage in international communities, pursue opportunities beyond disciplinary and geographical boundaries, and contribute to a welcoming and connected engineering community.

Keywords: IEEE Region 10 Women in Engineering Committee, Leadership, Cross-cultural collaborations



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簡歷 Biography

Chao-Ping (Cherri) Hsu (許昭萍) is a Distinguished Research Fellow at the Institute of Chemistry, Academia Sinica, Taiwan, where she leads a theoretical and computational chemistry group. She received her B.S. (1990) and M.S. (1992) in Chemistry from National Taiwan University and her Ph.D. in Chemistry (1998) from the California Institute of Technology under Prof. Rudolph A. Marcus. She was then a Miller Fellow at the University of California, Berkeley, working with Profs. Graham Fleming, Martin Head-Gordon, and Teresa Head-Gordon. She joined Academia Sinica as an Assistant Research Fellow in 2002, and was promoted to Associate Research Fellow (2007), Research Fellow (2013), and Distinguished Research Fellow (2025).

Dr. Hsu is internationally recognized for her pioneering work on characterizing electronic coupling in electron transfer and energy transfer with first-principles quantum chemistry. Her group also develops excited-state methods, transition current density analysis, and machine-learning models for charge and energy transfer, and she has worked on mathematical modeling for systems biology. Her honors include the Li Foundation Heritage Prize (2002), the Wu Ta-You Memorial Award (2008), the Academia Sinica Junior Researcher Award (2009), the Pople Medal of the Asia-Pacific Association of Theoretical and Computational Chemists (2010), the Shui-Mu Foundation Outstanding Young Scholar Award (2011), the Academia Sinica Investigator Award (2017), and the Outstanding Research Award of the National Science and Technology Council (2011 and 2023).

She serves on the Editorial Advisory Board of The Journal of Chemical Physics, as an Associate Editor of Theoretical Chemistry Accounts, and as a Center Scientist at the National Center for Theoretical Sciences. She founded the Taiwan Society for Theoretical and Computational Molecular Science (T2CoMSA).

Dr. Hsu is equally committed to advancing women in science and technology. She is President of the Society of Taiwan Women in Science and Technology (TWiST) and Deputy President of INWES, and has led TWiST's work on diversity, equity, and inclusion.

Inspirational words:
The world still holds many biased opinions about women, but please remember: we are better than we think, and better than others think. Do not let those opinions set your limits. Moreover, you do not need a title to lead: lead by appreciating the people around you and by listening carefully to yourself.

Chao-Ping (Cherri) Hsu[1,2*]

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Abstract

Following a typical academic path, I became an Assistant Research Fellow after my postdoc, a role that required me to mentor students and run research projects independently. My early struggles in leading a research group led me to seek out methods for communicating well and drawing on collective wisdom. Women are not necessarily born better leaders, but because we are often not presumed to hold authority, we may be more inclined to lead through listening and collaboration. This approach is increasingly needed. With declining birth rates and shifting generational expectations, top-down leadership no longer works well for attracting and retaining young talent, while an inclusive culture nurtures creativity and better research. In this talk, I will reflect on my learning path, including Nonviolent Communication (NVC), Appreciative Inquiry, and several leadership workshops. Leadership training is often regarded as way to help women succeed, but these skills benefit everyone, so I advocate for making them widely available to all. I will close with my hope for an academic community in which everyone's talents are fully realized, and we treat one another with kindness.

Keywords: Inclusive leadership; Gender equity; Academic mentoring.



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Areas of Expertise: Biological physics, mechanobiology, 3D cell culture, and soft matter physics.

簡歷 Biography

Keng-hui Lin is a Research Fellow at the Institute of Physics, Academia Sinica, Taiwan, where she became the institute's first female faculty member in 2004. She received her Ph.D. in Physics from the University of Pennsylvania in 2002, studying soft matter physics and subsequently conducted postdoctoral research at Harvard University.

Her research lies at the interface of physics and biology, focusing on how cells sense and respond to the dimensionality of their microenvironments and uncovering physical principles in biological systems. Drawing on her background in soft matter physics, she pioneered microfluidic methods for fabricating highly uniform three-dimensional cell culture scaffolds and developed spherical microwell platforms to investigate how spatial confinement and curvature regulate cell behavior and differentiation. Her scaffold technology has been successfully commercialized. More recently, her interdisciplinary research revealed how mechanical waves enable zebrafish to detect the extent of tissue loss and regulate regeneration, a discovery featured on the cover of Nature Physics in 2023.

Keng-hui Lin has received several honors, including the Academia Sinica Presidential Scholars Program (2025–2027), the Academia Sinica Career Development Award (2014), the Taiwan Outstanding Young Female Scientist Award (2013), and TWAS Young Affiliates (2011).

Beyond research, Lin is dedicated to strengthening the biological physics community and advancing gender equity in science. She founded the Division of Physical Biology and Biological Physics within the Physical Society of Taiwan in 2022 and served as its inaugural chair through 2026, fostering interdisciplinary research and international collaborations. She also helped establish the Physical Cell Biology Subgroup of the Biophysical Society.

A committed advocate for women in physics, she has promoted institutional and national policy changes, initiated support networks for female physicists, and co-founded the Gender and Diversity Equity Society at Academia Sinica. She currently serves on the American Physical Society's (APS) Committee on the Status of Women in Physics and just received the APS fellowship this year for her “data-driven leadership advancing gender equity in physics through research, policy reform, and inclusive governance.”

Inspirational words:
The pursuit of science is inherently empowering. It gives us the courage to question established beliefs, challenge boundaries, and imagine possibilities beyond what society expects of us. The courage to challenge scientific paradigms is the same courage we need to challenge societal barriers. This courage is not defined by gender; it is a human quality that everyone possesses and deserves the opportunity to exercise.

Self-advocacy for women's self-leadership

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Abstract

In this talk, I will share my personal journey as a physicist, from pursuing unconventional research directions to navigating challenges in a male-dominated academic environment. I will reflect on how self-advocacy involves recognizing our own worth, speaking up against unfairness, asserting our professional authority, and making choices that reflect our values rather than others' expectations. Self-advocacy is not simply about seeking recognition or advancing individual interests; it is about exercising agency and taking responsibility for shaping our own paths.

Scientific excellence alone does not guarantee recognition, equal opportunities, or the freedom to pursue one's ambitions, especially for women. This effect has been known as Matilda effect, which drives women out of academia as the most recent study shows [1]. Social expectations, implicit biases, and institutional cultures can shape how our abilities are perceived, how our contributions are valued, and whose voices are heard. Learning to advocate for ourselves is therefore an essential part of becoming leaders of our own lives and careers.

Ultimately, self-leadership begins when we stop allowing others to determine our place. By finding the courage to speak for ourselves, we can also challenge the structures that limit others, transforming personal empowerment into collective progress. We cannot always control how others perceive or treat us, but we can choose our own narrative about our own journey.

Keywords: Self-advocacy, Self-leadership, Matilda effect



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簡歷 Biography

She is a professor in the Dept. of Earth & Environmental Sciences at Korea University, Korea. Her work focuses on the photochemical cycles involving reactive nitrogen and VOCs that produce ozone and fine aerosol. She holds a BS and MS in Oceanography from Seoul National University, Korea and a Ph.D. from the Graduate School of Organography at the U. of Rhode Island, USA.

Inspirational words:
Enjoy your journey in search of truth, and write your own story.

From Cleaner Air to Changing Chemistry: What Isotopes Reveal about PM2.5 in Seoul

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Abstract

Air quality has improved substantially across East Asia following reductions in emissions from coal combustion and other major pollution sources. Yet declining concentrations of fine particulate matter (PM2.5) do not necessarily mean that the remaining pollution has the same sources or chemistry at lower levels. To investigate these changes, we examined a seven-year record of PM2.5 in Seoul using carbon and nitrogen isotopes as fingerprints of emission sources and atmospheric processing.

The isotope record shows that coal-associated aerosol carbon declined markedly, consistent with cleaner fuel use and reduced coal combustion. However, severe PM2.5 episodes continued to occur with nitrogen signatures and chemical conditions indicating an important role for reactive nitrogen from combustion and associated emission-control processes. At lower particle concentrations, non-fossil carbon became more prominent through episodic transboundary biomass burning and an increasing summer contribution. Even in summer, however, the more oxidant-rich and polluted conditions remained strongly influenced by fossil-fuel-related emissions.

These observations show that cleaner air is not simply a diluted version of past pollution. Successful emission control can change the relative importance of sources, alter the balance of atmospheric precursors, and expose previously obscured contributions. Further

improvement in East Asian air quality will therefore require strategies that consider how emission controls reshape atmospheric chemistry, while complementing national actions with regional cooperation to address pollutants and precursors transported across national boundaries. Such an approach is increasingly important as air-quality management develops alongside broader decarbonization efforts.

Keywords: PM2.5; Carbon and nitrogen isotopes; Air quality transition; Reactive nitrogen; Transboundary pollution.



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Areas of Expertise: Indoor Air Quality, Air Quality and Health Impacts
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簡歷 Biography

Prof. Dr. Juliana Jalaludin is a Professor of Environmental Health at Universiti Putra Malaysia (UPM), specialising in Indoor Air Quality, Air Quality and Health Impacts, and Environmental and Occupational Health. With over 28 years of experience, she is recognised for her contributions to air pollution research, exposure assessment, and environmental health policy. She previously served as Head of the Department of Environmental and Occupational Health at UPM (2016–2020) and currently leads the Research Team for Air Quality and Health Impacts.

Prof. Juliana serves as an Environmental Health Expert for the National Environmental Health Action Plan (NEHAP) under the Ministry of Health Malaysia. She has contributed to the National Clean Air Action Plan (NCAAP), Clean Air, Blue Skies, and the national consultancy on revising the Malaysia Air Pollution Index (MAPI). Her research covers indoor and outdoor air pollution, traffic-related air pollution, industrial exposures, transboundary haze, and health risks among vulnerable populations.

She leads the AIRCHAMP research project at UPM and serves as an International Expert Advisor to the Global Open Air Quality Standards (GO AQS) initiative in the United Kingdom. She is a Board Member of the Asian Aerosol Research Assembly (AARA) and has held leadership and advisory positions in national and international clean air initiatives, including the Malaysia Clean Air Society (MyCAS).

With over 600 publications, including journal articles, conference proceedings, books, and newspaper articles, Prof. Juliana has made significant contributions to environmental health research and scientific communication. She has held editorial roles with international journals, including Aerosol and Air Quality Research, Aerosol Science &

Technology, Asian Journal of Atmospheric Environment, and International Journal of Environmental Health Research. She has also assessed research proposals for national and international funding agencies.

Her international scientific leadership includes serving as Co-Chairperson and Head of the Scientific Committee for the Asian Aerosol Conference 2024 and Co-Chair of CEM Asia 2026. She has received numerous awards and recognitions for her academic excellence and research contributions at university, national, and international levels, including recognition at international scientific conferences. She has extensive experience leading multidisciplinary teams, organising scientific conferences, and fostering collaboration among researchers, policymakers, and industry stakeholders. Through research, mentorship, and policy engagement, she is committed to translating scientific evidence into practical solutions that protect public health and create healthier, more sustainable environments for future generations.

Inspirational words:
As women in science and research, we may face challenges, but never let them limit our potential. Be genuine, be kind to others, and always uphold your integrity. Stay humble, work hard, and remain consistent in what you do. True success is not measured only by awards, publications, or positions, but by the positive difference we make in people's lives and the legacy we leave for future generations. Do good, stay true to your values, and trust that with sincerity and perseverance, the right opportunities will come.

Bridging Science to Action: Protecting Children's Health Through Better Indoor Air Quality for a Sustainable Future

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Abstract

Children spend a substantial proportion of their time in schools, where indoor environmental conditions can influence their health, well-being, and learning performance. Rapid urbanisation and increasing air pollution in Malaysia have heightened concerns about children's exposure to pollutants from both outdoor and indoor sources. Children are particularly vulnerable to these exposures because of their developing respiratory and immune systems and the potential long-term consequences of exposure during critical stages of growth. Recognising the importance of protecting this vulnerable population, children's environmental health has been identified as a priority under Malaysia's National Environmental Health Action Plan (NEHAP). Scientific evidence from air quality and environmental health research provides an important foundation for understanding the relationship between air pollution exposure and adverse health outcomes among children. Exposure assessment, epidemiological investigations, and the application of biomarkers can help characterise exposure and investigate biological responses, including inflammation, genetic susceptibility, and epigenetic changes. However, scientific evidence must be translated into practical measures, effective policies, and sustainable interventions to achieve meaningful improvements in children's health. In Malaysia, the development of Indoor Environmental Quality (IEQ) Guidance for Schools represents an important step towards establishing healthier and safer learning environments. Building on this initiative, a Roadmap for the Future School Environment is needed to guide the implementation of evidence-based strategies for indoor air quality monitoring, pollution source control, ventilation management, and exposure reduction. Such efforts should consider the diverse conditions of naturally ventilated and air-conditioned schools and address challenges associated with particulate matter, gaseous pollutants, biological contaminants, and thermal comfort. International collaboration through the Global Open Air Quality Standards (GO-AQS) initiative offers an additional opportunity to advance transparent, science-based

indoor air quality benchmarks and support the development of stronger national guidance. Aligning school indoor air quality management with appropriate international benchmarks, alongside effective implementation and monitoring, can help protect children from preventable environmental exposures. This presentation will highlight the importance of bridging scientific evidence, policy development, and practical action to create healthier school environments. By strengthening collaboration among researchers, policymakers, education authorities, and other stakeholders, Malaysia can advance effective indoor air quality mitigation strategies that safeguard children's health, support their well-being and learning, and contribute to a healthier and more sustainable future.

Keywords: Indoor Air Quality; Children's Environmental Health; School Environment; Air Pollution Exposure; Health Risk Assessment; Policy and Action; GO-AQS; Sustainability.

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Dr. Shiau-Yun Lu

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簡歷 Biography

Dr. Lu, the Director-General of the Ocean Conservation Administration (OCA), is also faculty from National Sun Yat-sen University. She received her doctoral degree at the Harvard University School of Design. Her expertise includes marine policy, ocean and coastal management, ocean conservation, marine spatial planning, environmental planning and management, and environmental education. The major businesses are handled by the OCA including planning, coordination, and implementation of marine ecological and environmental protection, marine biodiversity conservation and restoration, marine protected areas (MPAs), conservation and management of marine non-fishery resources, marine pollution prevention, marine conservation education and information.

Connecting Science, Policy and People for Ocean Conservation

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Abstract

Effective ocean conservation requires more than scientific knowledge alone. It depends on how science is translated into policy, how governance systems respond to emerging environmental challenges, and how people are empowered to participate in long-term ocean stewardship. This presentation explores Taiwan's efforts to strengthen ocean conservation through an integrated approach that connects scientific evidence, policy development, digital platforms, and public participation. Recent developments in Taiwan include the implementation of the Marine Conservation Act, the advancement of science-based marine governance, and strengthened monitoring of marine ecosystems, biodiversity, and pollution. Scientific data and emerging technologies increasingly support decision-making related to marine protected areas, other effective area-based conservation measures (OECM), coral reef conservation, marine pollution control, blue carbon, and climate resilience.

Equally important is the role of people in generating knowledge and sustaining conservation action. Taiwan has been expanding marine citizen science by encouraging members of the public to participate in ecological observation, environmental monitoring, and reporting. The iOcean platform provides a digital interface for integrating marine information, public participation, and environmental observations, helping connect scientific data with broader societal engagement. In parallel, the Local Ocean Stewardship Program supports community-based conservation across coastal and island areas, enabling local groups to conduct ecological surveys, habitat restoration, marine debris removal, patrols, environmental education, and conservation outreach.

Together, these initiatives demonstrate a shift from government-centered management toward a more collaborative model of ocean governance. By connecting scientists, policymakers, marine citizen scientists, local communities, and civil society, conservation can become more adaptive, inclusive, and grounded in both scientific evidence and local

knowledge. Taiwan's experience shows that science provides the evidence, policy creates the framework, digital platforms enable connection, and people transform conservation goals into sustained action. Strengthening these linkages will be essential for building a resilient and healthy ocean in a rapidly changing world.

Keywords: Ocean conservation; Marine citizen science; Community-based conservation; Marine governance



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Areas of Expertise: stream restoration, fluvial geomorphology, watershed environmental planning

簡歷 Biography

Dr. Yang earned her Master's degree in Civil Engineering at the University of Tokyo and her Doctoral degree in Landscape Architecture and Environmental Planning at the University of California, Berkeley. She served in academia and private firms in both the United States and Japan before joining Sinotech in 2014. As an interdisciplinary expert, she integrates river engineering, ecology, and landscape architecture in her practices. In recent years, she has dedicated herself to promoting Nature-based Solutions (NbS) for watersheds and the planning and design of stream restoration projects. Her works have received wide acknowledgement, including the Grand Prize and the Annual Restoration Award at the Taiwan River Restoration Excellence Awards, the Taiwan Landscape Awards, and the Taipei Master Craftsman Award.

Currently, she leads multiple government projects, including Applying Fluvial Geomorphology to the Management and Restoration of Streams in National Forests, The Master Plan for the Sustainable Development of Matai'an, Research and Establishment of Interdisciplinary Healthy Watershed Indicators, and Promoting Climate Change Adaptation through Nature-based Solutions. Furthermore, she regularly serves as an instructor for educational and training programs in both public and private sectors, actively promoting engineering practices that harmonize with ecology.

Inspirational words:
The world will be a better place if you participate more. Your innate power of being soft yet strong will lead you through all sorts of challenges.

How Close Are We to the Stream?

Chia-Ning Yang[1*]

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Abstract

Large rivers nurture civilizations, while small creeks nourish the souls. Yet, somewhere along the way, rivers and creeks have grown further and further apart from us. We rely heavily on water resources extracted from the streams and dwell in shelters built with sand and gravel mined from the watersheds, but we often fail to intellectually comprehend the living, organic essence of these waterways.

This lecture focuses on the idea of “spontaneous use”—catching frogs, skipping rocks and other daily interactions with nearby streams that can only survive in cities with enough ecological vigor and cultural grace (cf. Yang, 2004). The speaker will talk about her childhood experiences with a creek and how such experiences directed her research interest and career choice.

The lecture also introduces restoration projects spearheaded by the speaker in Taiwan, including her childhood creek. It will also highlight her concurrent research in fluvial geomorphology. A river is essentially an energy system; as we gradually master its energy dynamic mechanisms, disaster prevention can transform from piecemeal, reactive containment to systematic adaptation.

Keywords: Stream restoration, Spontaneous use, Fluvial geomorphology

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簡歷 Biography

Yu-Feng Chen received her bachelor's degree in Nuclear Engineering from National Tsing Hua University, her master's degree in Aeronautics and Astronautics from National Cheng Kung University, and her Ph.D. in Power Mechanical Engineering from National Tsing Hua University in 2002.

Throughout her career, she has accumulated extensive experience in software development, microfluidic chip design, semiconductor advanced packaging, and management in R&D program. She spent two years in developing injection molding simulation software at CoreTech System Co., Ltd. (Moldex3D), followed by three years in microfluidic chip design and development at ITRI. After then she spent nearly ten years at TSMC, where she specialized in advanced packaging technology development.

In 2022, she joined Taiwan Space Agency (TASA) and worked on the development of Formosat-8 remote sensing satellite program. Since then, she has served as a Technical Project Manager, and then Deputy Project Manager, progressively expanding her responsibilities from technical execution and integration to cross-functional coordination, project and people management until now.

During her tenure, the team successfully launched the first satellite of the Formosat-8 constellation and completed its initial imaging mission. In recognition of the team's achievements, the project received the Future Tech Award at FUTEX 2026.

Inspirational words:

My interdisciplinary academic training and industry experience have provided me with a solid foundation in engineering and strengthened my ability to integrate knowledge across different disciplines. I expect my experience of R&D and team management can inspire more women to pursue their careers in engineering, embrace challenges, and break through barriers. I also believe that by recognizing their potential and willing to take on new challenges, women can play key roles in future tech industry.

Breaking Barriers: Leading Complex Space Missions as a Woman Engineer

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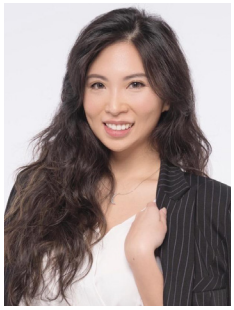
Abstract

Optical remote sensing satellites are complex systems that require not only strong technical expertise and systematic thinking, but also the ability to coordinate multidisciplinary teams effectively. Drawing on my experience as a Deputy Program Manager and Technical Program Manager, this talk will explore the challenges and key lessons learned in executing complex space missions, and the topics will include integrating the optical remote sensing instrument with satellite bus, balancing technical considerations against schedule risks, and coordinating teams with diverse expertise to achieve mission objectives.

From the perspective of a deputy program leader, I will also share my observations on the contributions of women engineers to complex engineering projects. In addition to their strengths in communication and cross-disciplinary integration, women engineers can bring a strong sense of responsibility and commitment to fairness, helping teams work collaboratively and move projects forward effectively. Through practical examples, I will illustrate how these qualities can be leveraged to support project execution and translate into tangible results.

Ultimately, I hope this talk will inspire more women to recognize their strengths, overcome barriers, and expand their capabilities and influence across diverse engineering fields.

Keywords: Optical Remote Sensing Satellite, Satellite Bus, Cross-Discipli-nary Integration, Women Engineers



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Areas of Expertise: Women's leadership, workplace well-being, corporate wellness, ESG, organizational resilience, DEI, human-centered leadership, mindfulness and inner development, community building

簡歷 Biography

Angela Feng is the Founder of NESS Wellness, a Taiwan-based well-being platform dedicated to advancing workplace well-being, women's leadership, and human-centered organizational transformation across Asia.

With over 14 years of experience in Asia-Pacific marketing, strategic communications, business development, and stakeholder engagement, Angela has worked across luxury, wellness, technology, entrepreneurship, and social impact sectors. Through NESS Wellness, she designs and leads corporate well-being, mindfulness, leadership, DEI, and ESG-aligned programs for companies and communities seeking to build healthier, more resilient cultures.

Angela's work sits at the intersection of women's empowerment, mental well-being, ESG, and sustainable development. She has participated in UN Commission on the Status of Women related dialogues and NGO forums, where her work has focused on women's empowerment, community action, cross-sector collaboration, and the role of well-being in advancing more inclusive and sustainable societies.

Her current work explores how well-being can move beyond individual self-care and become a foundation for resilient leadership, healthier organizations, and collective impact. She believes that sustainable communities are built not only through innovation, policy, and economic progress, but also through inner capacity, emotional resilience, psychological safety, and systems that allow people to thrive.

Inspirational words:
Your voice, knowledge, and lived experience are part of your leadership. You do not need to wait until you feel fully ready to contribute. Stay curious, stay connected to your values, and remember that real change is built through both inner strength and collective action.

Women's Leadership and Well-Being: Building Resilient and Sustainable Communities

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Abstract

Women's leadership is often discussed through the lens of representation, empowerment, and professional advancement. Yet in a world shaped by climate uncertainty, technological disruption, social fragmentation, and rising workplace stress, leadership must also be understood as the capacity to build resilience within people, organizations, and communities.

Building on the broader gender equality and women's empowerment agenda discussed in global platforms such as the United Nations Commission on the Status of Women, this talk explores how women's leadership can connect individual well-being with collective action and sustainable development. Women's empowerment is not only about access to opportunities, but also about building the knowledge, confidence, support systems, and social conditions that allow women and communities to act with autonomy and resilience. From the perspective of NESS Wellness, this session examines well-being as a strategic foundation for sustainable leadership and ESG practice. Mental and emotional well-being are not separate from organizational performance or social impact; they shape how people communicate, collaborate, make decisions, respond to crisis, and sustain long-term change. When workplaces and communities cultivate psychological safety, inclusion, and inner capacity, they become more able to support innovation, gender equality, and sustainable transformation.

The talk connects women's leadership, workplace well-being, ESG, SDGs, and Inner Development Goals to propose a more integrated model of resilient community building. It invites participants to consider how leaders, organizations, and cross-sector partners can move from individual empowerment to collective resilience, and from awareness to action.

Keywords: Women's Leadership, Well-Being, ESG, Sustainable Comm-unities, Gender Equality, Organizational Resilience, Inner Development Goals

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Prof. Hemda Garelick

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Areas of Expertise: Environmental Chemistry and Environmental Microbiology

簡歷 Biography

I am a chemist and a microbiologist and have always sought to integrate the work from different scientific areas and find a way in which the different areas can inform each other. In my inaugural lecture in 2011, I highlighted my approach towards the 'understanding the interplay between health, environment and pollution and bridging the gap between knowledge and practice.

- Supervised to completion 16 PhD and 26 DPRof (Doctorate in Professional Studies) students.
- Supervise to completion approx. 150 MSc project students
- Associate Editor: Pure and Applied Chemistry 2023-
- Associate editor: Frontiers in Microbiology, section Antimicrobials, Resistance and Chemotherapy 2019-
- External examiner for MSC in Radioecology at the University of Life Science, Norway 2008-2019.
- invited PhD examiner to the University of Leiden, the Netherlands- 2018
- Invited referee: The Portuguese Foundation for Science and Technology (FCT) : 2013-2014
- A Panel Member for the Research Council of Norway. 2009-2012
- Chair of Departmental Ethics Committee 2005-2010
- Panel: Responsive Mode Projects in Environment and Development (FRIMUF)
- Member of the executive committee of the Committee of Heads of Environmental Science (CHES) and a representative of Middlesex University. 1999- 2008.
- External examiner for University of Plymouth, School of Earth Ocean and Environmental Science. BSc Environmental Science 2005- 2009

- External examiner for University of Central Lancashire. BSc Environmental Science. 2001-2006
- External examiner for London School of Hygiene and Tropical Medicine. MSc Infectious Diseases. Distance Learning. 1999-2003
- Examined 10 Doctoral level students and numerous at Master level and chaired numerous examination panels
- Fellow of the Higher Education Academy, UK
- Awarded the IUPAC 2025 Distinguished Women in Chemistry or Chemical Engineering award
- A member of 35 IUPAC projects task groups (20 completed)
- Elected member of IUPAC 'Executive Board' 2023-2025
- Representative of the IUPAC Executive Board on the 'International Science Council (ISC)' 'Standing Committee for Gender Equality in Science (SEGES) and Chair of the 'Best Practice working group'.
- A member of the Global Women's Breakfast (GWB) task group https://iupac.org/gwb/ 2019-

https://repository.mdx.ac.uk/repository/search?q=hemda&page=1&sort=date
https://scholar.google.com/citations?view_op=new_articles&hl=en&imq=Hemda+Garelick#
https://orcid.org/0000-0003-4568-2300 ,

Inspirational words:
Keep going and persist and don't let your belief in yourself be undermined

How can interdisciplinary collaboration help women advance across scientific fields?

Hemda Garelick

Former president Div. VI, IUPAC
IUPAC representative on SSGES https://gender-equality-in-science.org/members-of-the-committee/
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Abstract

This presentation will use the example of Environmental Science which is a multi-disciplinary subject and its role in enabling collaboration between scientists from all disciplines and backgrounds (subject, country, language, gender).
Environmental Science addresses diversity of scientific issues related to different environmental compartments (air, water, soil, geological structure etc.) using different methods (e.g. analytical chemistry, geo- chemistry, geology. microbiology, Public Health, social science etc.).

The importance of diversity is that it enables the introduction of new points of view and outlooks both scientific and contextual. It takes us out of our tunnels and into the open space shining different lights on things. As any chemist with basic knowledge knows, different light waves show you completely different views. The integration of these views enables us to build complex pictures from data derived from multiple observations.

The endeavour to have an overall picture also encourages interaction between individuals from different fields and gender interaction enabling the scientific context to become enriched.

Keywords: Environmental Science, Scientific Diversity, Scientific interaction



Prof. Chia C. Wang

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Areas of Expertise: Physical Chemistry, Aerosol Chemistry and Physics, Biophysical Chemistry, Aerosol Medicine, Scientific Instrumentation Development, STEAM Education

簡歷 Biography

Professor Chia C. Wang is a physical chemist, aerosol scientist, interdisciplinary innovator, and science educator dedicated to connecting scientific discovery with human health, environmental sustainability, and societal transformation. She earned her Ph.D. in Chemistry from the University of California, Berkeley, and is Professor of Chemistry and Founding Director of the Aerosol Science Research Center (ASRC) at National Sun Yat-sen University, Taiwan.

Prof. Wang's research spans aerosol physical chemistry, atmospheric and environmental science, biomedical innovation, and airborne transmission of respiratory pathogens. During the COVID-19 pandemic, her two influential publications in Science (2020 and 2021) helped advance international recognition of airborne transmission and effective strategies for preventing respiratory infections, contributing to a paradigm shift in public health perspectives.

Beyond fundamental research, Prof. Wang is committed to translating scientific knowledge into meaningful societal impact. She founded AeroMUSIC, an international co-learning initiative that connects museums (M), universities (U), K–12 schools (S), industry partners (I), and communities (C) through transdisciplinary STEAM education. By developing innovative curricula and experiential learning approaches, she seeks to enhance public understanding of aerosol science, strengthen connections between people and the environment, and inspire collective action toward sustainability.

In 2022, Prof. Wang joined international efforts to advance the Inner Development Goals (IDGs) in support of the United Nations Sustainable Development Goals (SDGs) and established Taiwan's first IDG Hub. In 2025, she was invited to speak at the Inner Development Goals Summit in Stockholm, Sweden, sharing Taiwan's experiences in integrating science, education, inner development, and sustainability.

Prof. Wang has introduced the concept of the Aerosphere, highlighting the fundamental role of aerosols as a dynamic interface connecting Earth's atmospheric, aquatic, terrestrial, biological, and human systems. Building upon this perspective, she is advancing the vision of Breathing Civilization, which integrates aerosol science, One Health, human development, and ecological sustainability. As Taiwan's National Representative to the IUPAC Division of Chemistry and the Environment, Prof. Wang actively promotes international scientific collaboration, interdisciplinary education, and inclusive leadership. Her work embodies the spirit of I.D.E.A.L.—Inclusion, Diversity, Equity, Appreciation, and Love—and reflects her belief that science can empower individuals and communities to co-create a healthier, more equitable, and sustainable future for all.

Inspirational words:

Listen to your heart. Manifest your dream without fear.

From Aerosphere to Breathing Civilization: Co-Creating an I.D.E.A.L. and Sustainable Planet for All- The Key Roles of Women in Science and Technology

Prof. Chia C. Wang

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Abstract

In this presentation, I will share my scientific journey from physical chemistry to aerosol science, exploring how aerosols influence air quality, climate, public health, and ecosystems across molecular, cellular, environmental, and societal scales.[1-3] I will introduce the concept of the Aerosphere, a unifying systems framework that recognizes aerosols as a dynamic interface connecting Earth's major systems, including the atmosphere, hydrosphere, lithosphere, biosphere, and anthroposphere. Through the lens of the Aerosphere, we can better understand the invisible yet profound connections linking molecular processes, Earth systems, human health, and planetary sustainability.

I will also share my experience in developing AeroMUSIC, an interdisciplinary co-learning initiative at the Aerosol Science Research Center (ASRC), National Sun Yat-sen University. Drawing on our research into the airborne transmission of respiratory viruses,[4.5] I will demonstrate how scientific discoveries can be translated into accessible and engaging public communication through comics and animation, helping accelerate a paradigm shift in disease prevention and public health.[6] By integrating science, art, education, and community engagement, AeroMUSIC illustrates how transdisciplinary collaboration can foster scientific literacy, environmental awareness, and collective action toward One Health.

Building upon these scientific and educational experiences, I will introduce the emerging vision of Breathing Civilization, which recognizes breathing as a fundamental connection among humanity, all living beings, and the Earth's interconnected systems. Moving beyond scientific and technological solutions alone, this vision calls for integrating the Inner Development Goals (IDGs) with the Sustainable Development Goals (SDGs) to cultivate the awareness, values, and capacities needed for meaningful societal transformation.

Finally, I will reflect on the key roles of women scientists and engineers in bridging disciplines, fostering inclusive leadership, and inspiring collaborative innovation. Guided by the spirit of I.D.E.A.L.—Inclusion, Diversity, Equity, Appreciation, and Love— this presentation invites participants to reimagine science not only as a means of understanding our world, but also as a transformative force for co-creating a healthier, more compassionate, equitable, and sustainable planet for all.

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簡歷 Biography

Dr. Josephine Tsang is a scientist, executive leader, educator, and community builder whose career has spanned research, industry, higher education, public engagement, community service, and national leadership.

Most recently, Josephine served as Executive Director of the Chemical Institute of Canada, representing more than 4,000 chemists and chemical engineers across Canada. Throughout her career, Josephine has been drawn to the places where science meets people, communities, and decision-making. At TELUS Spark (Calgary Science Centre), she advanced public dialogue on climate change, energy transitions, and sustainability. At Mount Royal University, she encouraged students to explore the connections between science, technology, society, and the choices we make about our collective future.

Her own journey has also taken her beyond traditional scientific spaces into community leadership, board service, philanthropy, and public life, including running for elected office. She serves on a national STEM funding adjudication committee and has contributed to initiatives in public health, youth leadership, community development, and science engagement. She is also the founder of ChangentYYC, pay-what-you-can youth leadership initiative inspired by the United Nations Sustainable Development Goals that encourages young people to see themselves as agents of change and act in their communities.

Believing that scientists have an important role to play beyond the laboratory, Josephine is particularly passionate about creating more space for women scientists and diverse voices in the rooms where decisions are made, and about bringing evidence, curiosity, empathy, and lived experience to the complex challenges facing our communities and our world.

Josephine holds a Ph.D. in Physical Organic Chemistry from Queen's University, Canada, and a B.Sc. (First Class Honours) in Applied Chemistry from the University of Calgary, Canada.

From Evidence to Influence: Women Scientists in Civic Leadership

Josephine Tsang, Ph.D.[1*]

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Abstract

Scientific training teaches us to question assumptions, weigh evidence, solve complex problems, and make decisions when certainty is impossible. Those skills matter far beyond the laboratory. Drawing on a career spanning industry, education, public engagement, executive leadership, and my own experience running for public office, this presentation explores how women scientists can bring our voices into leadership and civic life. It reflects on the confidence and vulnerability it takes to step into unfamiliar spaces, the importance of listening to different perspectives, and the value of bringing scientific thinking, empathy, curiosity, and lived experience to the decisions that shape more inclusive, sustainable communities, and our shared future.

Keywords: Women Scientists, Civic Leadership, Inclusive Leadership, Evidence & Decision-Making, Community Participation, Sustainable Futures

References: Not applicable



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Areas of Expertise: Environmental Economics; Sustainability; Development Economics; Higher Education and Research Strategy; Academic LeadershipLeadership

簡歷 Biography

Prof. (Dr.) Kesari Singh is an economist, researcher, and academic leader with over two decades of experience spanning higher education, research, and institutional development. She currently serves as Dean – Research & Development and Academic Affairs at Sri Sri University, India, where she provides strategic leadership for research and innovation, interdisciplinary initiatives, international partnrships, and academic excellence.. Her academic work is rooted in environmental economics, sustainability, and development economics, with a broader interest in development and public policy. She has also contributed to UNDP- and World Bank-funded projects, bringing an applied development perspective to her academic and research engagement.

Across her academic career, she has worked at the intersection of research, academic leadership, and institutional transformation, with a particular interest in building research cultures that cross disciplinary boundaries and connect knowledge with societal purpose.

At Sri Sri University, she is part of an academic environment that seeks to bring Eastern wisdom into dialogue with contemporary knowledge and science. This has deepened her interest in questions that go beyond conventional disciplinary boundaries: How can academic excellence coexist with inner well-being? How can sustainability be understood not only as an environmental or economic imperative, but also as a human one? And how can education and research nurture more conscious, equitable, and responsible leadership?

Her work and academic interests are increasingly shaped by the belief that addressing complex global challenges requires not only new knowledge and technologies, but also new ways of thinking, leading, and relating to one another.

Inspirational words:
Let curiosity be stronger than the fear of failure. Ask questions others may not ask, challenge the status quo, and never let existing boundaries define what is possible. Do not wait until you feel completely ready- step forward, experiment, and create your own path. Knowledge gives you capability, but believing that your voice and ideas matter gives you the courage to use it. Stay rooted in your values, remain open to learning, and have the courage not just to think outside the box, but to redefine it.

Equity from Within: From Inner Wholeness to a Sustainable Future Bringing Eastern Wisdom into Dialogue with Contemporary Science

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Abstract

Gender equity has conventionally been advanced through interventions in external structures- representation, opportunity, participation, voice, and leadership. While these dimensions remain fundamental, the notion of "equity from within" draws attention to a complementary and less visible question: even as societies seek to dismantle gender-based barriers to opportunity, to what extent do gendered assumptions continue to shape the human qualities associated with leadership, achievement, and social contribution?

Contemporary research provides an important empirical point of departure for this inquiry. Studies of gender stereotypes and leadership suggest that, even as conventional perceptions of women's and men's roles continue to evolve, gendered associations with particular human qualities and models of leadership remain evident. This raises a deeper question: are we de-gendering opportunities faster than we are de-gendering human potential?

Against this background, the talk places contemporary empirical insights in dialogue with an Eastern wisdom perspective, drawing specifically on the Indian philosophical representation of Ardhanarishvara, in which Shiva and Shakti are represented within an indivisible form. Ardhanarishvara is approached neither as scientific evidence nor as a contemporary theory of gender, but as a philosophical lens for examining complementarity, integration, and wholeness. This dialogue between empirical inquiry and philosophical reflection provides a basis for reconsidering whether capacities conventionally perceived as oppositional or culturally coded as masculine or feminine must remain divided or gender-bound.

The central proposition is that equity from within is not about making women more masculine or men more feminine; it is about enabling every individual to access and cultivate a fuller range of human capacities—courage and compassion, agency and

shifts the discourse from either/or categorisation towards integration, and ultimately towards a more holistic understanding of human potential.

The discussion extends this principle from the individual to leadership, education, institutions, and sustainability. Contemporary institutions increasingly need to reconcile objectives too often framed as competing alternatives: excellence and inclusion, performance and well-being, innovation and responsibility, and growth and sustainability. Education has a distinctive role in enabling this integration by creating meaningful dialogue between scientific knowledge and wisdom traditions, competence and character, and outer achievement and inner development.

The talk ultimately argues that sustainable transformation is not solely technological, economic, or institutional; it also has an irreducibly human dimension. Bringing Eastern wisdom into dialogue with contemporary science therefore offers a framework for considering how inner development and human wholeness may contribute to more inclusive leadership, responsible institutions, and sustainable futures. The transformation sought in the world may also require a transformation in how human potential itself is understood and cultivated- not more masculine, not more feminine, but more whole.

Keywords: Equity from Within, Eastern Wisdom, Gender Equity, Human Wholeness, Inner Development, Sustainable Development



Prof. Sarah Peers

President, INWES
Head of Academic Skills, New Model Institute for Technology & Engineering (NMITE), England, UK

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簡歷 Biography

As Head of Academic Skills at New Model Institute for Technology & Engineering (NMITE) a new university in England with a new approach to engineering education, Sarah leads on the mathematics pedagogy and the so-called soft skills for NMITE's degree programmes. She also drives NMITE's Access and Participation Plan for diversity and inclusion, for gender, neurodiversity, social mobility.

Sarah's degrees are largely mathematical followed by a mechanical engineering PhD in the application of AI and reliability tools to the maintenance of structures. She is a Fellow of the Institute of Mathematics and its Applications (IMA), a Fellow of the Institute of Innovation & Knowledge Exchange (IKE) and Advisor to the IKE's STEM Foundation. She has expertise in skills strategy and policy development for innovation, STEAM (science, technology, engineering, mathematics and the arts) education, and she was integral to the development of Uruguay's national "STEM Plan" for gender in schools.

Sarah has over 30 years of engineering education experience at multiple levels, tempered with consultancy for industry. She has championed gender equality in STEM since 1992 and has been active in INWES for 10 years. She believes in global collaboration to improve the lives of women and men.

Gender and STEAM: Redefining engineering education and challenging perceptions

Dr Sarah Peers, INWES President

New Model Institute for Technology & Engineering (NMITE), England, UK

Abstract

Despite decades of outreach, persistent gender gaps remain a defining challenge in university-level STEM programmes. Traditional STEM cultures often rely on rigid, hyper-specialized frameworks that inadvertently alienate women by reinforcing narrow archetypes of scientific capability and objectivity.

This talk explores how transitioning from STEM to STEAM—by intentionally integrating the liberal arts both as a discipline and as a way of thinking—can challenge these perceptions and lower the institutional and cultural barriers keeping women out of these fields.

One area needing transformation is mathematics for engineering and technologists: moving away from its traditional reputation as an exclusionary "filter" and repositioning it as a creative, language of patterns, and narrative skill. This talk will outline the approach taken in a new engineering higher education institute and share some of the wins and losses. By weaving philosophical inquiry, historical context, and humanistic critique into technical training, universities can cultivate inclusive learning environments that value diverse perspectives, and ultimately enriches STEM.



Dr. Kong-Joo Lee

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Areas of Expertise: Rosics of biological and clinical processes Worldwide collaborate wisdom (Climate and Environment and Infectious Diseases, the Network has published more than 200 articles and documents on its website (www.jiphyunnet.or.kr), Carbon Neutrality, the Rediscovery of Microorganisms, Astronomy and Aerospace, Neuroscience, Artificial Intelligence, Food and Agriculture, the Wise Use of Medicine, Ecology, Quantum Mechanics, Mathematics, and Environmental Chemistry)

簡歷 Biography

Kong-Joo Lee was a Professor up to 2021 and is now a Distinguished Professor Emeritus in College of Pharmacy of Ewha Womans University. After received her Ph. D from Department of Chemistry at Stanford University in 1986, she worked in Cancer Biology at Stanford Medical School as a Postdoctoral fellow, in Korea Research Institute of Standards and Science (KRISS) as a Senior Researcher and joined as a Professor to Ewha Womans University.

Kong-Joo Lee's research interests include the development of methodologies for identifying the post-translational modifications employing cutting edge proteomics (MODi, SEMSA, Dbond) and the understanding the protein regulation in ROS-related signaling processes related to cancer metastasis and neuronal system by publishing over 120 papers. She is very interested in the redox regulation of proteins in response to ROS, and found that oxidative modifications of redox-sensitive cysteine residues play key roles for changing the protein structure and controling the functions employing NPSB-labeling and HDX-MS. She is working on finalizing ROSics.

She is a member of Korea Academy of Science and Technology (KAST) and served as an Editorial Board Member of Molecular & Cellular Proteomics, USA. She has been professor at Ewha Womans University as a Provost for Research Affair and Dean of Graduate School and served as Advisor to the Korea President for Science Technology. She also served as President of INWES (International Network of Women Engineers and Scientists, 2011-2017) for supporting women's network in science and engineering worldwide. Twenty-one world-class scientists in Korea agreed on the need for collective wisdom, Jiphyun Network, and founded the non-profit corporation, in 2022 to build a reliable system based on science and technology. She organized Jiphyun Network as President (2022-2025).

Inspirational words: In dramatically changed world-class science and technology, students and researchers have open mind and find new concept to solve by dynamic collaboration with colleagues.

JIPHYUN NETWORK as a Platform for Providing Reliable Information by Countering Misinformation and Building Truth and Trust in Science and Technology

Kong-Joo Lee, Professor Emeritus

Ewha Womans University, Seoul, Korea

Abstract

The Jiphyun (集　賢) Network was established in 2022 as a nonprofit organization by twenty-eight world-class Korean scientists and engineers who recognized the need to harness collective wisdom to counter misinformation and disinformation and to build truth and trust in science and technology. During the COVID-19 pandemic and the era of rapid digital transformation, the proliferation of misinformation and disinformation on the Internet and social media created considerable confusion and highlighted the need for a new culture of providing accurate and reliable scientific and technological information to society. To address this need, the Jiphyun Network has developed an online platform that collects and shares professional and accessible science and technology knowledge based on accurate information and the collective wisdom of experts rather than individual opinions. The platform freely disseminates this knowledge to serve a wide range of audiences, including citizens, students, the media, entrepreneurs, policymakers, and other stakeholders.

Beginning with the topics of Climate and Environment and Infectious Diseases, the Network has published more than 200 articles and documents on its website (www.jiphyunnet.or.kr), as well as through Naver Premium Content and Daum. These materials, written by leading scientists and experts in their respective fields, have covered a wide range of subjects, including Carbon Neutrality, the Rediscovery of Microorganisms, Astronomy and Aerospace, Neuroscience, Artificial Intelligence, Food and Agriculture, the Wise Use of Medicine, Ecology, Quantum Mechanics, Mathematics, and Environmental Chemistry. New content is published regularly at every Tuesday. New Jiphyun webtoon and youtube are published to expand to the background audience the contents to Published weekly Network documents

The Jiphyun Network aims to contribute to the development of a more trustworthy society by providing reliable science and technology information through an open and accessible platform. By promoting the sharing of collective scientific knowledge across national and disciplinary boundaries, the Network seeks to strengthen public trust in science and technology and offer hope and informed perspectives in an era of rapid digital transformation.



Prof. Diane Purchase

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Areas of Expertise: Environmental Biotechnology; Environmental Microbiology; Bioremediation of Heavy Metals and Contaminated Land; Soil Health and Land Protection; Emerging Contaminants and Microplastics; E-waste and Resource Recovery; Microbial Biocementation; Biosurfactants; Science–Policy Interface

簡歷 Biography

Diane Purchase is Professor of Environmental Biotechnology in the Department of Natural Sciences at Middlesex University London, where she leads the Biodiversity, Environment, Community and Sustainability (BECoS) research group. Over more than 20 years, her work has centred on one question: how microorganisms can be harnessed to protect land, water and human health from pollution.

Her research spans the bioremediation of heavy metals and emerging contaminants, microplastic pollution, biofilms, biosurfactants and microbial biocementation. Her work on electronic waste links treatment with resource recovery, in support of a more circular economy. This research has produced more than 150 peer-reviewed publications, together with book chapters and edited books.

Professor Purchase holds several editorial and international leadership roles. She is Co-Editor-in-Chief of Environmental Geochemistry and Health and an Associate Editor of Environmental Science and Pollution Research. Within the International Union of Pure and Applied Chemistry (IUPAC), she is President-Elect of the Chemistry and the Environment Division and will become its President in 2027. Her IUPAC projects cover carbon sequestration measurement, carbon capture technologies, and metals and environmental chemistry.

She is equally committed to making sure research informs policy. As Co-Chair of the Healthy Land Advisory Group of Applied Microbiology International (AMI), she helped shape the policy report Improving Soil Health in the UK (2026), and she provided input to the UK Parliament POSTnote The Future of Fertiliser Use (2024).

A Fellow of the Royal Society of Biology, the Royal Society of Chemistry and the Institution of Environmental Sciences, she regards mentoring and inclusion as central to scientific leadership. As an AMI Trustee (2023–2026), she served on the society's Diversity and inclusion Committee from its establishment in 2024, holding the organisation accountable as it developed and launched its first such strategy. She is a member of the organising team of the IUPAC Global Women's Breakfast, an annual international event that connects women in chemistry and raises awareness of the challenges women scientists face. She mentors early-career scientists through AMI's mentoring programme and the IUPAC Young Observers programme.

Inspirational words:
Microbes are among the smallest organisms on Earth, yet they can help us tackle some of our biggest environmental challenges. Never underestimate what you can change. Be brave, embrace your inner geek — I certainly have — and go and blaze your own trail.

From Contamination to Circularity: Environmental Biotechnology for Land Protection

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Abstract

Land is a major sink for many pollutants. Legacy contaminants such as metals, metalloids and persistent organic compounds occur alongside newer environmental contaminants, including plastics, while electronic waste (e-waste) can release both inorganic and organic pollutants. Microorganisms offer potentially resource-efficient approaches to addressing these pressures, and their diverse biochemical capabilities can also be harnessed for remediation, resource recovery and soil improvement. This presentation traces these applications, from contamination to circularity, drawing on two decades of research.

Extremophilic fungi can tolerate and biosorb toxic metalloids: an Acidomyces acidophilus strain isolated from a historical Cornish tin mine showed a maximum As(V) uptake of 171 mg g^{-1} dry biomass, although co-occurring antimony reduced uptake by nearly 40%.[1] E-waste, which reached 62 million tonnes globally in 2022, almost half of it generated in Asia,[2] can be viewed both as a hazard to environmental health and as an urban mine containing valuable resources.[3] A Penicillium expansum strain isolated from contaminated land bioleached around 70% of praseodymium, neodymium and gadolinium from waste printed circuit boards within 24 h.[4] Finally, microbial biocementation via the carbonic anhydrase pathway can stabilise fine-grained railway foundation soil through $CaCO_3$ precipitation, with unconfined compressive strength reaching approximately 1 MPa under the experimental conditions.[5] The process also has potential to couple soil stabilisation with CO_2 sequestration.

The presentation also considers how environmental biotechnology can contribute to evidence-based decision-making, drawing on examples from national soil-health initiatives and IUPAC technical reports, and the interdisciplinary collaboration required to move promising methods from laboratory research towards field application. Microorganisms are among the smallest organisms on Earth, yet they can help address some of our largest environmental challenges; harnessing them is one route towards protecting land for a more sustainable future.

Keywords: Environmental biotechnology; Bioremediation; E-waste; Rare earth elements; Biocementation; Circular economy

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Areas of Expertise: Forest canopy ecology and epiphytes, Species distribution modeling, Global climate change.

簡歷 Biography

My research revolves around the epiphytic plants in tropical wet forests, particularly focusing on the regional distribution and the community ecology. An El Niño event had intrigued me about climate change impacts on epiphytes that are considered relatively sensitive to atmospheric change. From 2014, I began to explore forest canopies of giant trees. In 2023 January, we located the tallest (84.1m) Taiwania tree (The heaven sword) at the upstream of Da'an river in Formosa Taiwan.

Inspirational words:
Just Do iT!

Vertical Frontiers: Female Leadership in Canopy Biodiversity, Giant Tree Mapping, and Citizen Science

Rebecca Chia-Chun Hsu

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Abstract

Giant trees are critical to ecosystem health, carbon storage, and microclimate stability, yet their global distributions remain poorly understood. Taiwan represents a critical hotspot, supporting trees that exceed 80 m in height. This project aimed to locate Taiwan's tallest trees and evaluate the drivers behind their distribution. Starting in 2014 as a grassroots search by local tree enthusiasts, the initiative evolved in 2022 into a multidisciplinary effort integrating nationwide Airborne Laser Scanning (ALS) data with crowdsourcing. The resulting national map identified 941 giant trees (≥ 65 m) and verified an 84.1 m Taiwania cryptomerioides as the tallest known tree in East Asia. As project PI and field expedition leader, the author presents the journey of mapping Formosa's giant trees, highlighting the role of female leadership in bridging advanced remote sensing technology, canopy biodiversity research, and public citizen science.

Keywords: Canopy ecology, Giant tree mapping, Airborne laser scanning, Citizen science, Female leadership

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簡歷 Biography

Dr. Wan Nurdiyana Wan Mansor is a Senior Lecturer at the Faculty of Ocean Engineering Technology, Universiti Malaysia Terengganu (UMT), Malaysia. She obtained her Ph.D. in Mechanical Engineering from Colorado State University, USA, where she studied combustion and emissions in dual-fuel engines through experimental research and computer simulation. Her research focuses on improving diesel engine performance, alternative fuels, diesel emissions reductions, and understanding air pollution. Recent interests include combining experimental studies with artificial intelligence and machine learning to develop solutions for cleaner engines and a sustainable maritime industry. She also values international collaboration, with academic connections involving National Cheng Kung University (NCKU), National Taiwan Ocean University (NTOU), and National Pingtung University of Science and Technology (NPUST), Taiwan. Dr Wan Nurdiyana has authored 56 manuscripts with 12 H-index. She has led and contributed to research projects with a total funding value of over RM480, 000, supported by the Ministry of Higher Education (KPT), Universiti Malaysia Terengganu (UMT), and industry collaborators. She also has developed several intellectual property outputs. Dr. Wan Nurdiyana Wan Mansor has actively contributed to knowledge transfer through programmes and activities at university, national, and international levels. Her involvement includes academic seminars and research exchanges with institutions in Taiwan, Indonesia, and the Philippines, as well as school outreach programmes and collaborative initiatives with universities, industry partners, and educational institutions in Malaysia.

Inspirational words:

Disney once said, “if you can dream it, you can do it”. Never afraid to dream big. Manifest your success. Regardless, in your research or life, always have goals. It may not be easy journey, but with grit, passion, perseverance, determination, success will be waiting for you at the finish line. Nike says, “Just do it”. Act. Do not wait for the perfect moment to start. Mark Zuckerberg’s: ideas do not come out fully formed, and progress comes from acting instead of waiting for perfection. There will be failed experiments, rejected papers, and moments when you doubt yourself. Do not let these experiences define your worth. You must learn from them, adapt, and keep moving forward.

Dream big. Start now. Embrace failure. Keep going.

Decarbonising the Malaysian Fleet: A Multiscale Framework Linking Combustion Dynamics, Vessel Emissions, and CII Compliance

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Abstract

The maritime industry is under growing pressure to decarbonise in line with the IMO's greenhouse gas reduction strategy. However, effective decarbonisation requires connecting insights across multiple scales, from the engine combustion chamber to individual vessel operations and, ultimately, to fleet-wide regulatory compliance. This presentation traces a decade-long body of research that builds this multiscale evidence base and demonstrates how it has been integrated into a functional, interactive net-zero decision-support framework. At the combustion chamber level, computational modelling of diesel and dual-fuel engine systems established the fundamental links between fuel composition, combustion behaviour, and exhaust emissions. Complementary experimental studies on alternative fuels, including palm oil methyl ester (POME) blends, nano-additive enhanced fuels, and plastic-derived fuels, demonstrated that biofuel and dual-fuel strategies can achieve meaningful reductions in NOx, CO_2, and particulate matter at the engine level. These results affirm that fuel-switching is a technically viable pathway for maritime emission reduction. At the vessel level, artificial neural networks (ANN) were developed to predict emissions under varying operational conditions, while spatio-temporal analyses assessed the environmental footprint of shipping activities along key corridors. A comprehensive analysis of Carbon Intensity Indicator (CII) compliance and CO_2 emission trends were conducted for 494 Malaysian-flagged ships operating between 2019 and 2022, using data from Jabatan Laut Malaysia. The findings revealed that approximately 41% of vessels received D or E CII ratings, indicating critical compliance risks. Correlation analysis further showed that ship type, deadweight tonnage, and fuel type significantly influence carbon intensity, underscoring the potential for fleet-wide biofuel and dual-fuel

adoption to improve CII performance. To bridge these research levels, this study presents a newly developed interactive web-based decision-support framework. The tool connects engine-level fuel performance data, vessel-level emission predictions, and fleet-level CII compliance status. It features a fleet dashboard for macro-level compliance tracking, a "what-if" fuel scenario simulator that uses combustion-level emission factors to project CII rating improvements, and a recommendation engine that prioritises mitigation strategies identified from published literature. This presentation will demonstrate the framework's capabilities in providing stakeholders with evidence-based, actionable recommendations for achieving net-zero emissions.

Keywords: CII; CO_2 emissions; Maritime decarbonisation; Multi-scale framework; Net zero; Malaysian fleet; IMO 2050



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Areas of Expertise: Flow chemistry and continuous manufacturing; liquid–liquid extraction and phase separation; multiphase flow and microfluidics; pool boiling and bubble dynamics; fluid management in microgravity

簡歷 Biography

Ya-Yu Chiang is an Associate Professor in the Department of Mechanical Engineering at National Taiwan University (NTU), where she leads the Multiscale Fluid Manipulation (MFM) Laboratory. She received her B.S. from National Taiwan Normal University, her M.S. in Applied Mechanics from NTU, and her Ph.D. in Biochemical and Chemical Engineering from Technische Universität Dortmund, Germany, carrying out her doctoral research at the Leibniz-Institute for Analytical Sciences (ISAS). After working as a research scientist at the University of Southampton and as a postdoctoral research associate at University College London, she joined National Chung Hsing University in 2016 and moved to NTU in 2023.

Her research connects fluid mechanics, heat transfer, and chemical processing, combining experiments, simulation, and analysis. Her group invented a helix-wire core-annular liquid–liquid extractor and separator that achieves continuous, low-energy phase separation, and has integrated it into continuous-flow platforms for biodiesel and pharmaceutical production. Recent work adds in-line optical sensing, machine learning, and automation toward decentralized green manufacturing, and extends passive bubble management to boiling heat transfer, electronics cooling, and drop-tower microgravity experiments at ZARM, Germany. Her work has appeared in Green Chemistry (cover article), Separation and Purification Technology, ACS Applied Materials & Interfaces, Chemical Engineering Journal, and Journal of Flow Chemistry.

Her honors include the NSTC Ta-You Wu Memorial Award (2024), the Corning Outstanding Female Researcher Award (2023), the Excellent Young Engineering Professor Award of the Chinese Society of Mechanical Engineers (2022), the NSTC 2030 Cross-Generation Young Scholars Program (2022), and the Taiwan Future Tech Award (2021). She serves as Award Committee Chair of APCOT 2026 and Communication Chair of MicroFIP 2027, and is working to build a flow chemistry community in Taiwan and across Asia.

Inspirational words:
I trained in mechanical engineering, earned my doctorate in chemical engineering in Germany, and now work at the meeting point of fluids, chemistry and energy. Every move across a field or a country felt uncertain at first, and every one of them became a strength. Do not wait until you feel completely ready or until someone tells you that you belong. Ask questions that excite you, build things with your own hands, and let your curiosity lead you across disciplinary boundaries. Find mentors and peers who believe in you, and become that person for the next woman behind you. Science needs your perspective, and a sustainable planet needs your ideas.

New Green Manufacturing Technology: Flow Chemistry

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Abstract

Chemical and pharmaceutical manufacturing still relies largely on batch reactors, where large solvent inventories, long heating and cooling cycles, and energy-intensive separation steps account for much of the waste and carbon emissions of a process. Flow chemistry, in which reactions proceed continuously in small channels and tubes, shortens diffusion and heat transfer distances, allows precise control of residence time and temperature, and keeps only a small volume of hazardous material in the process at any moment. These features make flow chemistry a practical route toward greener, safer and decentralized production. However, the reaction is only one part of a process. Work-up steps such as washing, extraction and phase separation are still commonly performed in batch, and they have become the main bottleneck for fully continuous operation.

This talk introduces our work to close that gap. We developed a core-annular liquid–liquid extractor and separator in which a stretchable helix wire placed along the channel axis guides one liquid phase and merges dispersed droplets by changing the interfacial pressure, enabling continuous phase separation without membranes, centrifugal force or large settling tanks. The separator handles organic solvent–water systems and liquids with viscosities up to about 2000 mPa·s, and its operation can be monitored and adjusted through in-line optical sensing and machine learning. By integrating this separator with microreactors, we built a continuous biodiesel platform that combines transesterification, in-line washing and oil–water separation, reaching an average fatty acid methyl ester yield of 91%, phase purity up to 95%, and about 35% lower water consumption, with a lower carbon footprint in a comparative life-cycle assessment. In continuous aspirin synthesis, the same approach delivered a product mass fraction of 97.5% with fewer side products than the batch process. Finally, I will discuss scale-up, automation, and how compact flow platforms could support sustainable aviation fuel and on-demand chemical production on the path to net-zero carbon emissions.

Keywords: Flow chemistry; Continuous manufacturing; Liquid–liquid phase separation; Biodiesel; Net-zero carbon emission

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文蓓蓓

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Areas of Expertise: Sustainability Education (SDGs, ESG & IDGs), Corporate ESG Transformation and Sustainability Engagement, Inner Development and Sustainable Leadership, Film Curation, Cultural Innovation and Public Engagement, Environmental Education and Cross-Sector Collaboration

簡歷 Biography

Pearl Wen is the Founder and CEO of Heart Valley ESG Education Park in Taichung, Taiwan, and the Founder and Curator of the Spiritual Film Festival. Her work brings together film, environmental education, and sustainability learning, connecting personal reflection with public engagement and collective action.

She founded the Spiritual Film Festival in 2017 and established Heart Valley in 2020. Through film screenings, facilitated dialogue, nature-based activities, and cross-sector partnerships, she creates learning experiences that connect ecological sustainability, cultural engagement, and personal wellbeing. Her approach draws on the Sustainable Development Goals, ESG practices, and Inner Development Goals.

Pearl is an environmental educator certified by Taiwan's Ministry of Environment and a B Corp consultant certified by the B Corp association in Taiwan. Her experience includes curriculum planning and teaching for low-carbon workforce development programs, as well as sustainability education for businesses, universities, government agencies, and communities.

She spoke at the 2023 APEC Youth Impact Forum and the 2025 APEC YES Challenge. In 2025, she also participated in a Ministry of Environment discussion on net-zero green living, just transition, and gender issues.

Alongside her educational work, Pearl serves as Community Lead of the IDG Taichung Community Hub and as a member of Taichung City's cultural and creative industries promotion committee. She chaired the digital animation jury for the 2024 Taiwan International Student Design Competition and teaches as an adjunct lecturer at Chaoyang University of Technology and Tunghai University.

Pearl holds a bachelor's degree in Audiovisual Communication from Shih Hsin University and a master's degree from Emerson College in the United States. Drawing on her experience in film production, cultural entrepreneurship, and education, she seeks to make sustainability accessible through meaningful experiences that help people connect with themselves, others, and nature.

Inspirational words:
Begin by looking within to understand who you are, what matters to you, and the unique strengths you bring. Then turn outward, bringing your curiosity, creativity, courage, and compassion into the world to create something meaningful and beautiful. As you do, you may discover that new possibilities unfold naturally.

Peace in the world begins with peace within ourselves. Nurture that inner peace, and let it guide how you listen, collaborate, and care for others.

Stay curious, ask questions, and seek mentors and peers who support your growth. You do not need to have every answer before you contribute, and you do not have to face challenges alone.

Trust your voice, begin with one meaningful step, and help create space for others to grow alongside you.

Trust your journey, follow your heart, and let your inner light inspire positive change in the world.

Beyond ESG: From Inner Development to Sustainable Impact

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Abstract

Sustainability requires both supportive external systems and the inner capacities to turn shared goals into meaningful action. While the Sustainable Development Goals (SDGs) provide a global direction and environmental, social and governance (ESG) practices guide organizational responsibility, the Inner Development Goals (IDGs) draw attention to the human capacities that support transformation.

This presentation shares a practice-based approach to sustainability education developed through Heart Valley ESG Education Park, established in 2020 within Taichung's Maple Garden Ecological Park in Taiwan. Heart Valley connects ecological sustainability, cultural engagement, and personal wellbeing through experiential learning. Building on the presenter's experience with the Spiritual Film Festival, founded in 2017, its activities combine film screenings, facilitated dialogue, nature-based learning, and cross-sector collaboration. These experiences are designed to help participants reconnect with themselves, others, and nature while exploring the IDG dimensions of Being, Thinking, Relating, Collaborating, and Acting.

The presentation proposes a six-stage learning pathway—SEE, FEEL, REFLECT, CONNECT, ACT, and IMPACT—to connect awareness and emotional engagement with reflection, relationships, and practical sustainability actions. The final stage emphasizes reviewing outcomes, listening to feedback, and identifying opportunities for continued learning. The pathway is offered as a framework for practice and reflection rather than a validated model of impact.

In alignment with the conference's I.D.E.A.L. values of Inclusion, Diversity, Equity, Appreciation, and Love, the presentation explores how sustainability education can encourage diverse voices, inclusive participation, and shared responsibility across disciplines and generations. It considers how educational institutions, businesses, and communities can connect organizational commitments with personal meaning and collective action.

The central message is that inner development complements institutional responsibility and systemic change. Together, they can help translate sustainability commitments into thoughtful, collaborative, and accountable action.

Keywords: SDGs, ESG, IDGs, Sustainability Education, Experiential Learning, Collective Action

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2. Inner Development Goals. Inner Development Goals. https://innerdevelopmentgoals.org/



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Areas of Expertise: Biochar carbon removal, ecology, ecological assessment

簡歷 Biography

With a background in life science research, previously worked at the Biodiversity Research Center of National Chung Hsing University. Deeply concerned about the ecosystem impacts of climate change, she hopes to address the root causes of biodiversity destruction and increase resilience to climate change through a net-zero biochar carbon removal initiative. At TCHAR, she is responsible for industry-academia-industry research projects, sustainable education promotion, and connecting the international biochar value chain.

Inspirational words:
Observe and listen more. In this AI era, learn to discern the meaning behind events, see the world from your own heart, maintain curiosity, cherish your original aspirations, value partners with similar ideals, and do your best.

Sustainable Actions to Climate Assets: Biochar Carbon Removal would be the Driving Force

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Abstract

Achieving climate goals by 2050 requires both a rapid reduction of greenhouse gas emissions (GHG) and the removal of any remaining, unavoidable emissions from the atmosphere. The IPCC recognizes biochar as a viable Negative Emissions Technology (NET) and Carbon Dioxide Removal (CDR) technology. The EU has even designated biochar carbon removal (BCR) as a permanent CDR method which mean biochar can effectively remove CO2 from the atmosphere and store it permanent, which can be validated under the Carbon Removals and Carbon Farming (CRCF) regulation. The IPCC assesses that biochar has the potential to ultimately remove 2.6 billion tons of carbon dioxide annually globally. In voluntary carbon removal market transactions, BCR accounts for over 80% of the successful delivery rate of all carbon removal methods, demonstrating its technological maturity and scalability. Biochar carbon sinks have been recognized by international and scientific data as a stable and sustainable net-zero action.

In Taiwan, biochar is not only used in agriculture, but a carbon negative sustainable material. Responding to Taiwan's industrial landscape, a new innovative path has emerged, combining international validation, corporate net-zero transformation, and market trust through a systematic integration of industry, government, academia, and research. Climate action is no longer just a slogan; it can be transformed into a climate asset that can be verified by third parties. From the sustainability of raw materials to technological processes, product validation, product innovation and R&D, end-product applications, and carbon sink calculations, Taiwan's biochar industry conveys a new concept to the world. From biochar products to climate assets, "Climate Assets" represents responsible product manufacturing. Using European biochar certificate (EBC)-verified biochar to produce products has multiple benefits, achieving carbon insetting results and helping to increase corporate trust. To align with international climate action, Taiwan's biochar industry must adhere to international standards and frameworks. The Ministry of Environment announced a target of removing million tons of carbon from biochar per year in 2030 in August 2026. The “Biochar Taiwan Team” needs everyone's participation.

Keywords: Sustainable action, Biochar carbon removal, European biochar certificate, Climate asset

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Eva Chen
陳怡樺

TREND Chief Executive Officer and Co-Founder

簡歷 Biography

Since co-founding Trend Micro in 1988, Eva Chen has played a central role in shaping the company into one of the world's leading innovators in Internet content security.

Before becoming CEO in late 2004, Eva served as executive vice president from 1988 to 1996 and as CTO from 1996 to 2004. During her tenure, she led the development of a series of industry firsts, from pioneering unique security products to transformative security management strategies that helped establish Trend as a global security leader.

Eva holds dual master's degrees in business administration and management information systems from the University of Texas. She also earned a bachelor's degree in philosophy from Chen Chi University in Taipei.

The Mind of AI — Being Your Best Self in the AI World

Eva Chen

Abstract

Is AI a friend or a foe? Drawing on three decades in cybersecurity — and a philosophy degree — Eva Chen explores how AI actually "thinks." Modern AI learns by induction: it generalizes from the sum of human writing, inheriting not only our knowledge but also our biases. So, is AGI male or female? Neither — AGI is a mirror, reflecting the data we feed it and the boundaries we set for it. Just as civilization never needed to control how people think in order to govern how people act, we do not need to control how AI thinks; we need to engineer what AI agents are allowed to do. That makes AI safety a matter of guardrails — identity, permissions, monitoring, stop gates — and makes diversity in AI not decoration, but safety engineering: whoever builds the guardrails encodes the values. The talk closes with a message for every woman in STEM: don't compete with AI at being AI — use it as your amplifier, and be your best self in the AI world.



Dr. Noor Zaitun Yahaya

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Areas of Expertise: Atmospheric Sciences; Air Quality Management; Environmental Monitoring; Artificial Intelligence and Big Data Analytics; Transport Emissions; STEM Education; Women's Leadership in Science

簡歷 Biography

Ts. Dr. Noor Zaitun Yahaya is an environmental scientist, Professional Technologist and former Senior Lecturer at Universiti Malaysia Terengganu (UMT), Malaysia. She holds a PhD in Transport and Environment from the Institute for Transport Studies, University of Leeds, United Kingdom. Her research and professional expertise encompass atmospheric sciences, air quality management, transport emissions, environmental monitoring and the application of artificial intelligence and big data analytics to environmental modelling.

She is the Founder and Past President of the Clean Air Forum Society of Malaysia (MyCAS), Past President of the Asian Aerosol Research Assembly (AARA), and a Board Member of the International Union of Air Pollution Prevention and Environmental Protection Associations (IUAPPA). I am also served as the General Chair of the Asian Aerosol Conference (AAC2024), held in Kuching, Sarawak, Malaysia, and am currently serving as the Inaugural Chair of CEM Asia 2026 (Emissions & Air Quality Monitoring Conference), scheduled for 17–19 November 2026 at the Kuala Lumpur Convention Centre, Malaysia. These leadership roles reflect my continued commitment to advancing international scientific collaboration, knowledge exchange, and capacity building in atmospheric sciences and environmental sustainability.

She has contributed to environmental policy development, international research partnerships and professional capacity-building programmes, including training in R programming and AI-based air pollution modelling.

Her leadership as Local Host Chair of the Better Air Quality Conference 2018 helped establish a lasting institutional legacy, recognised through the Anak Sarawak Legacy Award presented to MyCAS in 2023. Currently, she is Chief Executive Officer of Global Enviro Enterprise and a Visiting Scholar at National Sun Yat-sen University, Taiwan. She advocates inclusive leadership, international STEM collaboration and the use of real-world environmental data to inspire the next generation of scientists and engineers.

Inspirational words:
“Believe in your abilities, embrace challenges and never allow boundaries to limit your ambitions. Leadership is not only about personal achievement; it is also about creating opportunities for others. Through knowledge, collaboration and perseverance, you can make science a force for positive change and inspire future generations of women in STEM.”

Beyond Representation: Women's Leadership, Gender Equity and Sustainable Institutional Legacy — The BAQ2018 Malaysia Case Study

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Abstract

Gender equity in science and environmental governance extends beyond numerical representation to encompass meaningful participation in leadership, decision-making, professional development and institutional transformation. International scientific conferences provide strategic opportunities to strengthen women's leadership while generating sustainable societal and institutional legacies. This study examines the 10th Better Air Quality Conference (BAQ2018), held in Kuching, Sarawak, Malaysia, on 14–16 November 2018, as a case study of gender-responsive leadership and long-term institutional legacy.

A qualitative retrospective case-study approach was employed, drawing upon conference records, organisational documentation and the legacy assessment framework submitted to Business Events Sarawak (BESarawak). The analysis focuses on women's leadership participation, professional capacity building, institutional partnerships and measurable conference outcomes across social, economic, environmental and governance dimensions.

The documented findings indicate that women represented 60.6% of the conference organising committee and volunteers (43 women and 28 men). Targeted professional training, leadership responsibilities and organisational engagement were incorporated into conference planning to enhance women's management capabilities and future leadership opportunities. BAQ2018 attracted more than 700 delegates from 50 countries, featured over 30 exhibition booths and generated approximately RM2.5 million in direct delegate expenditure. Its broader institutional legacy included scientific knowledge exchange,

young researcher development and international collaborations involving Clean Air Asia, the Asian Aerosol Research Assembly (AARA) and the International Union of Air Pollution Prevention and Environmental Protection Associations (IUAPPA).

In 2023, MyCAS received the 10th Anak Sarawak Legacy Award in recognition of the conference's contributions and lasting legacy. The case illustrates how women's leadership development can be integrated into international scientific conference management and sustained through professional networks and institutional partnerships. It offers a transferable framework for advancing gender-responsive leadership and sustainable institutional development, supporting Sustainable Development Goal 5 (Gender Equality) and SDG 17 (Partnerships for the Goals).

Keywords: Gender Equity; Women's Leadership; BAQ2018; Conference Legacy; Institutional Sustainability; Environmental Governance; Malaysia



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簡歷 Biography

Dr. Trang Ngoc Nguyen is a Vietnamese educator and researcher with more than 25 years of expe-rience in teaching, academic management, professional development, and international cooperation. She earned her PhD in Education in 2017 and currently works as a lecturer and researcher at Nguyên Tat Thanh University, Vietnam.

She is a member of the Vietnam Association for Intellectual Women (VAFIW), affiliated with the Ho Chi Minh City Association for Women Intellectuals. Her academic interests include artificial in-telligence in education, digital learning ecosystems, entrepreneurship education, Education for Sus-tainable Development, STEM/STEAM education, and gender issues in higher education.

Her publications and conference presentations have explored digital transformation, educators' digi-tal competencies, project-based entrepreneurship learning, sustainable education, and the use of generative AI in teaching and learning. More recently, she has focused on how emerging technolo-gies may influence women's participation, professional visibility, and leadership opportunities in higher education. Her current work explores how AI may create both opportunities and challenges for women's participation and gender equity in higher education.

Through teaching, research, professional exchange, and collaboration, she hopes to contribute to stronger connections among educators, researchers, and professionals in the Asia-Pacific region, while supporting thoughtful, responsible, and inclusive approaches to emerging technologies.

Inspirational words:
”Stay curious, keep learning, and have confidence in your own voice. Embrace new opportunities and technologies with responsibility, connect with and support one another, and use your knowledge to make a positive contribution. Every small step toward inclusion, equity, and sustainability can help create a better future for the next generation of women.”

AI and Women's Academic Leadership: Enabler or Barrier to Gender Equity in Higher Education?

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Abstract

Artificial intelligence (AI) and digital transformation are reshaping academic work, research practice, and institutional decision-making in higher education. Yet for women academics, greater digital participation does not necessarily translate into greater leadership authority. This study examines the conditions under which AI may enable or constrain gender equity in academic leadership. A systematic integrative review was conducted using 37 records retrieved from Scopus. Following title, abstract, and full-text screening, 20 studies met the eligibility criteria and were included in the final synthesis. Exploratory keyword co-occurrence mapping using VOSviewer was combined with thematic synthesis to identify patterns across individual, organizational, and institutional levels. The findings indicate that AI is best understood as a conditional enabler. At the individual level, AI literacy, digital self-efficacy, and career agency may strengthen research participation and digitally mediated leadership. However, these benefits do not automatically translate into career advancement. At the organizational level, sponsorship, workload allocation, professional recognition, and transparent advancement pathways determine whether individual capabilities become leadership opportunities. At the institutional level, AI-supported practices may reproduce existing inequalities in evaluation, visibility, and scholarly voice unless accompanied by transparency, human oversight, accountability, and women's meaningful participation in technology-related decision-making. The study proposes a multilevel framework linking AI capability and agency, organizational conversion, and gender-responsive AI governance. It argues that AI can advance gender-equitable academic leadership only when digital participation is translated into recognition, opportunity, and substantive decision-making authority.

Keywords: Women's academic leadership; Artificial intelligence; Digital transformation; Gender equity; Career agency; AI governance

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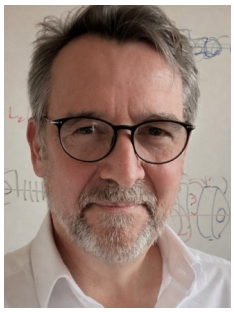
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簡歷 Biography

Paul Walton obtained his PhD in 1990, followed by two years as a NATO/SERC postdoctoral fellow at the University of California, Berkeley, USA. He joined the Department of Chemistry at York as a faculty member in 1993. Between 2004 and 2010 he was chair of department. His main research area is bioinorganic chemistry, in which he has made contributions to the understanding of copper oxidases, including the discovery of the histidine brace, the bioinformatic method of signal-strapping and anglerase metalloproteins. Paul is an internationally-known advocate of equality in sciences and lectures widely on the subject.

He has also been Editor of Dalton Transactions (2004-2008), chair of Heads of Chemistry UK, chair of the Royal Society of Chemistry's Diversity Committee, was named as a 'Person of Influence' by the University of Toronto's Women in Chemistry Group and is one of the RSC's 175 Faces of Chemistry.

Gender equality in academia: why is it so slow?

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Abstract

Over nearly all scientific organisations, across every country and across time one finds that the progression of women in research/academia is significantly hindered when compared to men. Such a universal truth represents an enormous loss of talent, including in our very own academic communities.

Recent years have seen some progress in understanding the principal factors behind this phenomenon and there has been some progress in new schemes which are designed to address the lack of women in senior scientific positions. These schemes have also met with some resistance which, in itself, has been revealing of the reasons why there is such a difference in the progression rates of men and women in science. This presentation discusses some of the evidence behind gender inequality in academia, and—most importantly—how that can be translated into day to day practice within an academic context.



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簡歷 Biography

Brian Li is a scholarly publishing and science communication professional committed to advancing international collaboration, outreach, and gender equality in science. He previously worked as an editor at the Royal Society of Chemistry, with experience spanning materials chemistry, environmental science, and sustainability publishing.

Brian is actively involved in the International Union of Pure and Applied Chemistry (IUPAC), contributing to scientific publishing, chemistry education, environmental chemistry, science communication, and public engagement. He serves on the IUPAC Subcommittee on Publications and the Editorial Boards of Chemistry International and Pure and Applied Chemistry, and is involved with the Committee on Chemistry Education and the Division of Chemistry and the Environment.

Brian is particularly engaged in initiatives that advance women in science. He is a task group member of the IUPAC Global Women's Breakfast and Distinguished Women in Chemistry or Chemical Engineering projects and contributes to the Women in Green and Sustainable Chemistry initiative. He also co-chairs the IUPAC Chemistry and Art initiative, bringing together creative arts, chemistry education, and public engagement. In addition, he serves on the Organising Committee of the IUPAC | CSC 2027 General Assembly and World Chemistry Congress in Montréal, Canada.

Beyond IUPAC, Brian is a member of the Communications Working Group of the Standing Committee for Gender Equality in Science. Across these roles, he is passionate about amplifying diverse voices, creating opportunities for young scientists, and advancing the visibility, participation, and recognition of women across the global scientific community.

Inspirational words:
Believe in your potential, trust your curiosity, be confident in your ideas, celebrate your achievements, learn from setbacks, and never underestimate the value of your voice. CHemistry and science are strengthened by different perspectives, and your experiences, questions, and creativity will have the power to shape their future.

He for She, Chemistry for All: Creating Opportunities for Women in Science

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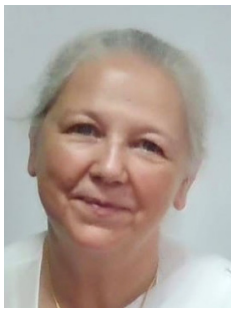
Abstract

Advancing gender equality in chemistry requires the active participation of the entire scientific community and sustained efforts to enhance the visibility, recognition, and opportunities of women at all career stages. Studies have identified persistent gender disparities across academic career progression and scholarly publishing, highlighting the importance of professional networks, recognition, and institutional action in creating a more inclusive chemical sciences community. [1–3]

This presentation will discuss approaches to advancing women in science through activities of the International Union of Pure and Applied Chemistry (IUPAC) and Standing Committee for Gender Equality in Science (SCGES). Examples include the Global Women's Breakfast [4], which connects scientists worldwide and provides a platform for dialogue on gender equality; the Distinguished Women in Chemistry or Chemical Engineering Awards [5], which recognise the achievements and leadership of women chemists; and the IUPAC Women in Green and Sustainable Chemistry project [6], which promotes the visibility and contributions of women addressing global sustainability challenges. The IUPAC Chemistry and Art [7] initiative will also be presented as an example of using creative approaches to broaden participation and connect chemistry with education, communication, and public engagement.

Drawing on these experiences, the presentation will explore how international scientific organisations, professional communities, and individual scientists can translate commitments to gender equality into practical actions. By strengthening collaboration, recognising achievements, increasing visibility, and creating opportunities for participation and leadership, the chemistry community can support the next generation of women scientists and contribute to a more inclusive future for chemistry.

Keywords: IUPAC, Gender Equality, Women in Chemistry, Science Communication, Chemistry Education, Public Engagement.



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簡歷 Biography

Member, Brahma Kumaris Asia Pacific Regional Coordinating Team; Member, Core Team, Brahma Kumaris Council of National Coordinators; Director, Brahma Kumaris Yarra Valley Retreat Centre; National Coordinator, Brahma Kumaris, Taiwan; Convenor, annual Inner Peace Inner Power Retreat, India; Convenor, annual Ancient Wisdom for Inner Stability Retreat held throughout Asia for Buddhists.

Coordinator, Future of Power dialogue series, held in 50 cities in India exploring 'soft power'.

Founding Member, Food Link, Hong Kong, rescuing surplus food to feed vulnerable communities and reduce waste.

Founder, Khmer Independent Life Team (KILT), Siem Reap Cambodia, helping people affected by landmines to live independently through establishing a social enterprise.

Maureen has been practicing Raja Yoga meditation with the Brahma Kumaris for 50 years and currently lives at the Yarra Valley Retreat Centre near Melbourne, Australia. Having spent 30 years in Asia, she helped establish and sustain BK centres in in Australia, Hong Kong, Cambodia, Philippines, Japan and Taiwan.

Maureen is the author of Mystic at the Edge, a Western Woman Coloured by Asia.

Inspirational words:

We are extraordinarily fortunate to have found our passion—it is the force that unlocks our human potential and allows us to meaningfully shape the world. In our pursuit of excellence, however, we must remember that true perfection is not relentless output; it is balance. Our physical bodies, our relationships, and the natural world all rely on delicate equilibrium to thrive. In my own journey, the most vital balance has been pairing passion with tranquility—tempering drive with the philosophical wisdom required to sustain hope.

It is easy to feel angry, exhausted, or helpless when striving to mitigate climate change, standing up for justice, or simply trying to guide our patients and loved ones toward what is best for their health. When the weight of those challenges feels overwhelming, I am reminded of the Serenity Prayer: ‘Grant me the serenity to accept the things I cannot change, the courage to change the things I can, and the wisdom to know the difference.’

The Inner Resource: Cultivating Inner Capacities for Leadership and Change

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Abstract

There is a quiet restorative revolution underway in communities across the world. Much of it is being led by women and girls who may be working in our neighborhoods, institutions, laboratories, and communities. What is the source of their courage, resilience, and determination?

I believe it comes from an inner resource: a deeper awareness of who they are beyond social labels, acquired identities, and limiting beliefs. By connecting with their innate values, strengths, and wisdom, they are discovering a source of power that transcends gender.

One model of this restorative movement is the Brahma Kumaris, the world's largest spiritual organization led by women, working in partnership with men across more than 130 countries. Since its beginnings in 1936, gender equality and the empowerment of women have been central to its vision and practice.

As a non-governmental organization with Consultative Status at the United Nations Economic and Social Council for more than four decades, the Brahma Kumaris contributes to the achievement of the Sustainable Development Goals by offering a spiritual perspective on issues of global concern through a network of more than 2,000 teaching centers worldwide.

Why should we specifically empower women in STEM?

Because diverse scientific teams generate broader perspectives and more innovative solutions. Women often have direct experience of the challenges facing communities and can therefore become powerful agents of change. Closing the gender gap is essential if we are to meet the growing demand for science, technology, engineering, and mathematics professionals around the world.

But true empowerment is about more than representation. It is about creating environments in which women are heard, respected, supported, and able to lead.

True leadership is not simply a matter of authority. It is presence, resilience, integrity, and the courage to create change. When women are affirmed and their voices are valued, they build communities characterized by perseverance, cooperation, and peace.

At the same time, we must recognize that many women face significant barriers. Some experience discrimination, exclusion, harassment, or burnout and quietly disappear from public life. If we are serious about empowerment, we must create spaces where setbacks can be processed, resilience strengthened, and meaningful networks of support established.

Change is only possible through contribution leadership: recognizing that meaningful change is rarely linear; change is slow. It is important that we speak up and appreciate that we raised our hands and contributed to a larger cause, through consistent acts of courage and service.
Today we frequently discuss natural resources, human resources, and financial resources, often focusing on what is lacking. Yet one of society's greatest wastes of resources occurs when women scientists are viewed primarily as ‘women’ rather than as ‘scientists.’ The very fact that these women have reached the laboratory, research institute, or field site demonstrates remarkable intelligence, capability, and perseverance. Yet one in three still experience sexual harassment. The cost is not only personal; it is economic. In a landmark study in 2018 in Australia, it was estimated that workplace sexual harassment cost Australia an estimated $3.8 billion in costs to individuals, workplaces and the cost to government.*

External change alone is not enough. The challenge before us is not simply a lack of resources. It is a lack of access to what I believe is humanity's greatest resource: the power of human consciousness.

The Gender Snapshot 2026 Report**, released by UN Women and the UN Department of Economic and Social Affairs (UN DESA), shows that where women hold real power, outcomes improve across every dimension of the 2030 Agenda for Sustainable Development – from peace to education, and from poverty to climate action. Women continue to face systemic barriers at every stage and are disproportionately steered away from the portfolios that command the highest security and economic power.

The findings of this report reveal that funding for gender equality has fallen to its lowest level since 2021. Not one single indicator on the Sustainable Development Goal for gender equality (SDG 5) is on track to be met by 2030. At current rates, gender equality remains 171 years away.

In response to this sobering reality, the Inner Development Goals (IDG) movement emerged. As the coordinator of the Taiwan Kaohsiung IDG Hub, Professor Wang Chia Chen is leading the integration of the IDG into Taiwan's academic and sustainability frameworks. Her efforts focus on the idea that external environmental protection requires transforming human inner capabilities.

There are Five IDG Goals:
1. Being conscious and living with integrity.
2. Thinking mindfully.
3. Relating with empathy, connectedness, and appreciation.
4. Collaborating through inclusivity and clear communication, enhancing co-creation.
5. Acting with optimism, perseverance and courage

Through applying the IDG we can learn to recognize, nurture, and utilize the vast resources that exist within each individual. It is time to listen, to act together with competence and integrity; to reaffirm one another and to serve together as the palliative caregivers for a world in crisis.

The greatest resources available to each of us are 1) the mind: our capacity to reflect, perceive, create; and 2) the intellect: our capacity to discern, our conscience and intuition. For thousands of years, contemplative traditions have explored this inner landscape. The Brahma Kumaris *** continue this exploration through the practice of Raja Yoga meditation, a study shared by Buddhists, Hindus and other ancient traditions having shared a long period of interchange up to about 500 CE.

In my early twenties, I encountered meditation and began exploring the nature of consciousness. I realized that if I wanted to contribute meaningfully to the world, I needed to understand the mind and the inner causes of human behavior.

This insight is reflected in the opening words of the UNESCO Constitution: "Since wars begin in the minds of men, it is in the minds of men that the defences of peace must be constructed."

I have come to believe that raising human consciousness is one of the most powerful ways of addressing the root causes of the challenges we face today.

Everything we need already exists within us. Peace is not something we have to acquire. Love is not something we have to manufacture. Wisdom and inner strength are not external commodities. They are qualities that emerge naturally when we let go of the mental patterns that obscure them.

Increasingly, modern science is beginning to explore these experiences.

My own search for the vocabulary to describe inner experiences led me to the field of neurotheology, which examines how spiritual experiences manifest within the brain and influence neural architecture.

Researchers are exploring how meditation, prayer, contemplation, and experiences of awe affect cognition, well-being, resilience, and creativity. The evidence increasingly suggests that heightened awareness supports greater collaboration, ethical behavior, innovation, and psychological resilience.

One experience of particular interest to both science and spirituality is referred to as the ‘flow state.’ Flow occurs when attention becomes fully focused. Self-consciousness diminishes. Time seems to disappear. Action feels natural and effortless. It occurs when your skills match the challenge of the task, making the work feel natural and smooth.

Athletes, musicians, artists, scientists, and innovators frequently describe these moments when they seem to move beyond effort into a state of deep engagement and peak performance.

Research in neuroscience suggests that during these experiences certain regions of the brain quieten while large-scale neural networks become more synchronized. What emerges is not a diminished capacity, but often an enhanced one: greater creativity, clarity, integration, and effective action.

Neuroscientist, Arne Dietrich, describes how when in flow your prefrontal cortex temporarily powers down. On an EEG this shows up as a drop in frontal beta power. The planning, self-monitoring and inner speech becomes quiet, and something remarkable happens. The brain does not just become less active overall. Something else takes over, the ‘gamma surge’. Instead of the prefrontal cortex becoming a bottleneck for performance as it handles everything one at a time with conscious oversight, gamma oscillations synchronise distant brain regions, these regions share information directly. The motor cortex, visual cortex and auditory cortex all communicate simultaneously. This then leads into the flow state.

The question is: can we learn to cultivate this state intentionally?

I believe we can.

The practice of open-eyed Raja Yoga meditation trains us to be fully engaged while remaining internally calm. We learn to observe rather than react, to remain present rather than overwhelmed, and to respond with wisdom rather than impulse.

In other words, we learn to be simultaneously relaxed and yet concentrated. It is this balance that opens the door to flow.

And perhaps this is where science and spirituality meet: not in opposition, but in a shared exploration of human potential.

As we seek solutions to the complex challenges of our time, let us not overlook the greatest resource available to us. Beyond technology, beyond economics, beyond policy, lies the immense and largely untapped power of human consciousness. By developing our inner resources, we develop our capacity to create a more peaceful, just, sustainable, and compassionate world.

Keywords: Inner Development Goals, Social Development Goals, Women Leadership, Neuroscience, Brahma Kumaris United Nations Office

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**** Professor Arne Dietrich, Professor of Cognitive Science,,Department of Psychology, American University of Beirut https://www.sciencedirect.com/science/article/abs/pii/S0165178106000199



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簡歷 Biography

Professor Hsunling Bai is a Professor Emerita at the Institute of Environmental Engineering, National Yang Ming Chiao Tung University. Her primary research experience and expertise include air pollution control, environmental catalysis, and carbon dioxide capture technologies.

After nearly 30 years of research on global warming, Professor Bai profoundly realized that elevating human consciousness has a critical impact on sustainable development. Driven by her passion for this field, she applied for early retirement in 2020 to dedicate herself to personal inner growth. In 2024, she was invited to serve as a Visiting Professor at the Aerosol Science Research Center, National Sun Yat-sen University, a position she currently holds. Her present focus lies in integrating the Sustainable Development Goals (SDGs) with the Inner Development Goals (IDGs).

In addition to her academic work, Professor Bai also serves as an instructor for A Course In Light (ACIL, a meditation course) and as a facilitator for free-writing workshops. Deeply passionate about the connection between human consciousness and holistic health, she is dedicated to promoting initiatives that bridge environmental well-being with holistic personal wellness.

From Being to Relating: The Relationship with Myself, Others and Mother Earth

Hsunling Bai

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Abstract

Facing today's climate and environmental crises, technology alone is not enough without inner change and caring leadership. Connecting Social and Emotional Learning (SEL), the Inner Development Goals (IDGs), and the SDGs, this talk shares a journey of myself from Being to Relating. By building self-awareness, women in science and technology can find inner strength, peace, and confidence—starting with a healthy relationship with oneself.

From this grounded inner space, we naturally connect better with Others through empathy, active listening, and psychologically safe teamwork. Finally, this connection spontaneously widens to Mother Earth. Instead of just using natural resources, we learn to care for our living planet, using our science and technology to heal and protect our shared home.

Keywords: Inner Development Goals (IDGs), Social and Emotional Learning (SEL), Sustainable Development Goals (SDGs), Women in STEM, Conscious Leadership, Regenerative Sustainability



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簡歷 Biography

Professor Chia C. Wang is a physical chemist, aerosol scientist, interdisciplinary innovator, and science educator dedicated to connecting scientific discovery with human health, environmental sustainability, and societal transformation. She earned her Ph.D. in Chemistry from the University of California, Berkeley, and is Professor of Chemistry and Founding Director of the Aerosol Science Research Center (ASRC) at National Sun Yat-sen University, Taiwan.

Prof. Wang's research spans aerosol physical chemistry, atmospheric and environmental science, biomedical innovation, and airborne transmission of respiratory pathogens. During the COVID-19 pandemic, her two influential publications in Science (2020 and 2021) helped advance international recognition of airborne transmission and effective strategies for preventing respiratory infections, contributing to a paradigm shift in public health perspectives.

Beyond fundamental research, Prof. Wang is committed to translating scientific knowledge into meaningful societal impact. She founded AeroMUSIC, an international co-learning initiative that connects museums (M), universities (U), K–12 schools (S), industry partners (I), and communities (C) through transdisciplinary STEAM education. By developing innovative curricula and experiential learning approaches, she seeks to enhance public understanding of aerosol science, strengthen connections between people and the environment, and inspire collective action toward sustainability.

In 2022, Prof. Wang joined international efforts to advance the Inner Development Goals (IDGs) in support of the United Nations Sustainable Development Goals (SDGs) and established Taiwan's first IDG Hub. In 2025, she was invited to speak at the Inner Development Goals Summit in Stockholm, Sweden, sharing Taiwan's experiences in integrating science, education, inner development, and sustainability.

Prof. Wang has introduced the concept of the Aerosphere, highlighting the fundamental role of aerosols as a dynamic interface connecting Earth's atmospheric, aquatic, terrestrial, biological, and human systems. Building upon this perspective, she is advancing the vision of Breathing Civilization, which integrates aerosol science, One Health, human development, and ecological sustainability. As Taiwan's National Representative to the IUPAC Division of Chemistry and the Environment, Prof. Wang actively promotes international scientific collaboration, interdisciplinary education, and inclusive leadership. Her work embodies the spirit of I.D.E.A.L.—Inclusion, Diversity, Equity, Appreciation, and Love—and reflects her belief that science can empower individuals and communities to co-create a healthier, more equitable, and sustainable future for all.

Inspirational words:

Listen to your heart. Manifest your dream without fear.

The Way Out Is In: Integrating IDGs × SEL × SDGs— The Taiwan Experience

Prof. Chia C. Wang

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Abstract

Addressing the complex challenges of our time—including climate change, environmental degradation, and social inequality—requires more than scientific discoveries, technological innovations, and policy interventions. It also calls for transforming how we perceive ourselves, connect with others, and relate to the world around us. In this presentation, I will share our journey in Taiwan in advancing the Inner Development Goals (IDGs) as a pathway toward achieving the United Nations Sustainable Development Goals (SDGs). Since establishing Taiwan's first IDG Hub in 2022, we have explored diverse approaches to integrating inner development into higher education, scientific communities, professional networks, industry partnerships, and public engagement. Through interdisciplinary workshops, experiential learning, STEAM education, and cross-sector dialogues, we have sought to bridge disciplinary, generational, cultural, and societal boundaries while fostering awareness, empathy, collaboration, and collective action. Drawing on initiatives implemented between 2022 and 2026, I will highlight our practical strategies for integrating IDGs into existing aerosol science and SDG-oriented programs and connecting them with Social and Emotional Learning (SEL). These experiences range from nature-connectedness and mindful breathing workshops to K–12 teacher development, women's scientific leadership, community co-learning, and international sustainability forums. Rather than treating inner development as a separate agenda, our approach emphasizes embedding it within existing educational and societal systems, building upon local strengths, and creating opportunities for meaningful participation and co-creation. I will also reflect on lessons learned from our experiences in Taiwan and discuss how these approaches may be adapted across different cultural, educational, and institutional contexts. Guided by the spirit of I.D.E.A.L.—Inclusion, Diversity, Equity, Appreciation, and Love—this presentation invites participants to explore how cultivating inner capacities can inspire collective transformation and help co-create a healthier, more equitable, compassionate, and sustainable planet for all.



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Poster ID: A-01

Coupled Microplastic and Microbiome Dynamics in Urban Air of the Klang Valley: Influence of Tropical Meteorology and Implications for Inhalation Exposure

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Abstract

Urban atmospheric aerosols comprise a complex mixture of physical and biological particulates, including microplastics and airborne microorganisms, yet their combined characteristics in tropical environments remain under-explored. This study integrates atmospheric microplastic measurements with 16S rRNA gene sequencing-based microbiome profiling to characterise bioaerosol composition, distribution patterns, and potential inhalation exposure risks across traffic-impacted urban centres in the Klang Valley, Malaysia. Sampling was conducted at three locations representing an urban-suburban gradient: Meru (FP07), Damansara, Petaling Jaya (FP09), and Kuala Selangor (FP12), under typical tropical meteorological conditions characterised by high temperatures (30.78-35.85 °C), elevated relative humidity (72.18-86.03%), stable atmospheric pressure, and low-to-moderate wind speeds that favour particle persistence and resuspension. Atmospheric microplastic concentrations ranged from 9.41 to 12.35 particles m^{-3} at the selected sites, with the highest abundance and deposition rate observed at FP12, followed by FP07. Polymer analysis revealed polyethylene and polyacetylene as dominant components across all sites, with additional contributions from ethylcellulose, rayon, polyurethane, and polyacrylic polymers, reflecting mixed traffic- and urban-related sources. Estimated inhalation exposure rates for adults were highest at FP12 (0.055 and 0.045 particles kg^{-1} bw day^{-1} for males and females, respectively),highlighting enhanced exposure potential in environments with sustained particulateloading. Parallel microbiome analysis based on 16S rRNA (V3-V4) gene sequencing

demonstrated site-specific variation in microbial diversity associated with urban intensity. Higher microbial richness and diversity were observed at the less urbanised Kuala Selangor site, while lower diversity was recorded in densely trafficked Damansara.Dominant taxonomic groups included Cyano-bacteriia, Clostridia, Bacteroidia, and Negativicutes, indicating both environmental and urban influences on microbial assemblages. The co-occurrence of elevated microplastic concentrations, diverse polymer surfaces, and complex airborne microbial communities under stable tropical meteorology suggests potential interactions between physical and biological aerosol components, with implications for respiratory exposure in urban populations. This integrated assessment provides a comprehensive baseline for understanding atmospheric bioaerosols in Southeast Asian cities and supports evidence-based air quality management aligned with SDG 3 (Good Health and Well-Being), SDG 11 (Sustainable Cities and Communities), and SDG 13 (Climate Action).

Keywords: Atmospheric microplastics; Airborne microbiome; 16S rRNA gene sequencing; Polymer distribution

Poster ID: C-01

Combination of Autotrophic Bioreactor and Capacitive Deionization for Perchlorate Removal

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Abstract

This study investigated the integration of an autotrophic bioreactor with capacitive deionization (CDI) to remove perchlorate (ClO4−) from contaminated water. The bioreactor was packed with elemental sulfur (S0) particles as both electron donors and biofilm-supporting media and inoculated with sulfur-oxidizing bacteria (SOB) culture. The reactor was continuously fed with artificial wastewater in upflow mode and operated at 25 °C under initial perchlorate concentration of 200 mg/L, while CDI was performed with carbon fiber (CF) and carbon cloth (CC) electrodes. Two treatment sequences were compared: CDI followed by the bioreactor (CDI→bioreactor) and the bioreactor followed by CDI (bioreactor→CDI). In the CDI→bioreactor sequence, CDI removed 54% of perchlorate and both CDI and bioreactor showed a total perchlorate removal of 95%. In the bioreactor→CDI sequence, the bioreactor removed 80% and bioreactor and CDI showed a total of 93%. Applying CDI first avoided interference from sulfate, which is produced during autotrophic denitrification and competes for electrosorption sites, whereas applying CDI after the bioreactor removed sulfate but risked electrode fouling and clogging by excess sludge and biofilm. Standalone CDI consumed only 0.0994 kWh/m3 (levelized cost of water < 0.1 $/m3) with an electrosorption capacity of 2.20–16.26 mg/g, whereas the combined system consumed about 2097.7 kWh/m3. These findings indicate that coupling SOB autotrophic denitrification with CDI is a promising, energy-efficient strategy for perchlorate removal when sequence order and electrode fouling are carefully managed.

Keywords: Autotrophic bioreactor, Capacitive Deionization (CDI), Perchlorate

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Poster ID: C-02

Women as Agents of Change in Plastic Waste Management

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Abstract

Plastic pollution has arisen as a major environmental challenge, particularly in fast-growing regions with poor systems of waste segregation, collection, recycling, and disposal. This improper waste management fosters the buildup of plastic waste in land and water habitats. However, as women are key stakeholders in solid waste management, their participation and involvement in plastic waste management also become significant. Therefore, the present study explores women's roles, participation, and potential in sustainable plastic waste management. The study also examines women's potential involvement in segregation, collection, reuse, recycling, upcycling and awareness-generation activities, while also identifying the socioeconomic, institutional and technological challenges that limit their participation.

Taking a gender sensitive approach with environmental sustainability and circular economy principles, the study highlights the capability of women to mitigate plastic pollution in terms of reduction and conservation. The findings are expected to provide a framework for developing inclusive, community-based and economically viable plastic waste management strategies, especially in developing countries.

Keywords: Women, Plastic waste, Participation, Management strategies.

Poster ID: C-04

Plant-Mediated Ag-Cu-Co Trimetallic Nanomaterials: A Sustainable Nanotechnological Strategy for Effective Aedes aegypti Larval Control

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Abstract

Background

Mosquito-borne diseases, particularly those transmitted by Aedes aegypti (A. aegypti), remain a significant public-health concern, highlighting the need for effective and environmentally sustainable larvicidal strategies. Plant-mediated synthesis of multimetallic nanomaterials represents a promising strategy by combining the bioactive properties of phytochemicals with the synergistic effects of multiple metal components. In this study, the larvicidal potential of plant-supported Ag-Cu-Co nanomaterials against Aedes aegypti was investigated.

Methods

Ag-Cu-Co-based nanomaterials were fabricated through a green synthesis approach using Phyllanthus niruri (P. niruri) and Calotropis gigantea (C. gigantea) plant extracts as natural reducing, stabilizing, and functionalizing agents. The resulting nanomaterials were evaluated for their larvicidal activity against A. aegypti larvae at different concentrations. Larval mortality was monitored following exposure, and concentration-dependent toxicity was assessed to determine their efficacy as potential nanolarvicides.

Results

Both plant-mediated Ag-Cu-Co nanomaterials demonstrated pronounced larvicidal activity against A. aegypti. The P. niruri-supported Ag-Cu-Co nanomaterial exhibited substantial toxicity, with an LC50 value of 14.76%. In comparison, the C. gigantea -supported Ag-Cu-Co trimetal oxide demonstrated exceptionally high larval mortality, reaching approximately 98% at 25 µg mL-1. The enhanced activity is attributed to the synergistic interaction among Ag, Cu, and Co components and the phytochemical functionalities derived from the respective plant extracts.

Conclusion

These findings demonstrate that plant-mediated Ag-Cu-Co nanomaterials possess considerable potential as effective larvicidal agents against A. aegypti. Their green synthesis, high larval mortality, and multicomponent mode of action highlight their promise as a sustainable nanotechnology-based approach for mosquito vector management. Further studies on environmental safety, mechanism of larval toxicity, and field-scale applicability could facilitate their

development into practical next-generation nanolarvicides.

Keywords: Phyllanthus niruri; Calotropis gigantea; Aedes aegypti; Nanolarvicides; Synergistic effect.

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Poster ID: C-05

Structural and Allosteric Basis of the KEAP1 Superbinder Phenotype: Insights from Molecular Dynamics Simulations

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Abstract

Kelch-like ECH-associated protein 1 (KEAP1) regulates NRF2 turnover through its C-terminal Kelch domain, which forms a six-bladed β-propeller and recognizes two motifs within the NRF2 Neh2 domain: the high-affinity ETGE hinge and the weaker DLG latch. Cancer-associated KEAP1 variants V155F, G186R, and R320Q exhibit a superbinder phenotype in which NRF2 remains strongly associated with KEAP1 despite inefficient degradation. To investigate the structural basis of this behavior, microsecond-scale molecular dynamics simulations were performed for wild-type and mutant KEAP1 in both apo and NRF2-bound states. The three variants preserved the overall KEAP1 architecture but altered structural coupling between the 3-box/IVR-linker region and the Kelch domain. MM/GBSA calculations, energetic-landscape analysis, community network analysis, residue-contact analysis, and solvent-accessibility measurements revealed redistribution of IVR/linker-Kelch interactions together with mutation-specific remodeling of the Kelch β-propeller, particularly across Blades II-IV. These changes were expressed most consistently on the DLG-bound protomer. The canonical R380-D27′ and R415-D29′ interactions remained highly persistent, while additional DLG-associated contacts involving R483, S508, and neighboring residues became more prominent in the mutants. In contrast, the ETGE-associated interface remained comparatively conserved. Although V155F, G186R, and R320Q reached this state through distinct structural changes, their shared behavior was a more extensively engaged DLG-associated interface while ETGE anchoring remained largely intact. These findings provide a structural framework for understanding the KEAP1 superbinder phenotype and highlight the 3-box/IVR-linker-Kelch region as a potential site for future investigation of allosteric regulation and therapeutic modulation of KEAP1-NRF2 signaling.

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Poster ID: C-06

Two-Dimensional Vanadium Oxysulfide (VSOx) Nanosheets Exhibiting Oxidase-Peroxidase-Mimetic Activity for Efficient Ascorbic Acid Detection

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Highlights

- VSOx 2D nanosheets exhibit dual oxidase and peroxidase nanozyme activity
- Superoxide radical (O2- $^{\cdot}$) is confirmed as the dominant reactive species
- Oxidase-mode LOD of 0.009 μM among the lowest for colorimetric AA sensing
- Dual-pathway detection validated in blood serum and orange juice matrices
- Enzyme-free, cost-effective platform for on-site ascorbic acid monitoring

Abstract

Background

Although natural enzymes are essential catalysts in biological systems, their volatility, high production costs, and sensitivity to environmental factors have led to an increase in interest in inorganic nanozyme substitutes. Because of their adjustable redox states and mixed-valence chemistry, vanadium-based nanomaterials have become potential nanozyme platforms; yet their oxysulfide compositions are still largely unexplored as dual-enzyme mimetic sensing platforms.

Objectives

In order to fill a glaring void in the literature on nanozymes, this work describes the synthesis of two-dimensional (2D) vanadium oxysulfide (VSO_x) nanosheets and evaluates them as a bifunctional nanozyme with simultaneous oxidase-mimetic (OD) and peroxidase-mimetic (POD) catalytic activity for colorimetric ascorbic acid (AA) detection.

Results

The VSO_x nanosheets catalyzed TMB oxidation via both H_2O_2-independent (OD) and H_2O_2-activated (POD) pathways, with superoxide radical ($O_2^{\cdot-}$) confirmed as the dominant reactive

species. The mixed V^{4+}/V^{5+} oxidation states and synergistic M–O–S coordination environment were identified as the structural basis for dual catalytic activity. The OD-mode sensor achieved a limit of detection (LOD) of 0.009 μM over a linear range of 0.01–0.12 μM, among the lowest reported for colorimetric AA sensing. The POD-mode sensor yielded an LOD of 0.17 μM across 0.1–1.4 μM. Kinetic analysis revealed exceptional TMB substrate affinity (K_m = 0.0012 mM), surpassing natural horseradish peroxidase (K_m = 0.434 mM) and most reported nanozymes, indicating markedly superior substrate binding affinity.

Significance

Recoveries of 98.2–104.0% (RSD < 1.84%) in blood serum and orange juice validate the platform's real-world analytical reliability. The enzyme-free, dual-mode VSO_x sensing system provides a robust and cost-effective tool for ascorbic acid monitoring in food safety and clinical applications.

Keywords: 2D nanosheets; Vanadium oxysulfide; Multi-functional nanozyme; Colorimetric sensors; Reactive oxygen species; Ascorbic detection; Food and clinical analysis

Poster ID: E-01

GENETIC DIVERSITY OF WILD AND CULTIVATED RICE SPECIES FROM MEKONG DELTA , VIETNAM.

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Abstract

Genetic diversity and population structure in rice are key factors for breeding programs, conservation efforts, and the development of sustainable agricultural practices. Analysis of the level of diversity among the 200 traditional varieties is useful in breeding programs as this influences parental selection in varietal development. The diversity of the 200 traditional varieties were assessed using SSR , SNP and quantitative morphological characters. The study aims to evaluate the genetic diversity of traditional rice varieties in the genebank of Hight Vietnam, analyse correlation of characters for application in plant breeding and relate the results between morphological characters and molecular markers.

In agro-morphology based analysis, ANOVA showed highly significant differences among the 200 traditional rice varieties; correlation coefficients showed that all the traits were significantly correlated with each other except yield. The standardized Shannon-Weaver diversity indices for the quantitative morphological characters ranged from 0.68 to 0.95 with a mean of H' = 0.88. Cluster analysis using UPGMA grouped the 200 traditional varieties into six major clusters. Varieties collected from same collecting site were grouped together in the same cluster.

Molecular diversity analysis using 130 polymorphic SSR markers revealed genetic diversity among the 200 traditional varieties. The 200 traditional varieties generated eight clusters at 0.67 similarity coefficient. The mean Polymorphic Information Content (PIC) value of the markers was 0.27. Approximately 45.5% of the SNPs exhibited PIC values ranging from 0.27 to 0.65, indicating a moderate level of informativeness.Some with the same variety names were grouped into different clusters. Though they belong to the same cluster based on morphological markers, molecular analysis showed that they were actually genetically different. Most of the varieties (85%) belong to the same cluster (cluster VII). This indicates that these varieties are closely related.

Rainfed and deep water varieties were grouped separately (cluster IV for deep water rice and cluster VI for rainfed rice). Both the morphological and SSR markers were able to classify the rice varieties into these agro-ecological groups. A notable finding is that while the number of genes associated with eating quality in cultivated rice has increased, their diversity has diminished; this may stem from the loss of certain aroma-related genes, alongside the fixation and amplification of genes governing eating quality and resistance to specific diseases during the processes of domestication and artificial selection. This study not only reveals natural variations valuable for genetic research and breeding efforts but also enhances our understanding of the evolution and domestication of rice.

Keywords: Genetic diversity; Rice germplasm, Simple sequence repeat (ssr) ,Single nucleotide polymorphism(snp).

Poster ID: F-02

Comparative Physicochemical and Thermal Characteristics of Rice Hulls from Japan and the Philippines

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Abstract

Rice hull (RH) is an abundant agricultural by-product generated during rice milling and represents a potentially valuable renewable feedstock for energy recovery and the production of silica (SiO_2)- and carbon (C)-based materials[1,2]. RH typically accounts for approximately 20–33 wt.% of paddy rice and contains a distinctive organic–inorganic structure composed primarily of lignocellulosic components and biogenic SiO_2. Its composition and thermal behavior can vary with rice variety, cultivation environment, geographic origin, and processing conditions, which may consequently influence the properties of materials derived from it. However, comparative information on the physicochemical and thermochemical characteristics of rice hulls representing different rice varieties and geographic origins remains limited[3,4]. This study comparatively investigated the physicochemical, morphological, structural, compositional, and thermal characteristics of RHs obtained from Japan (JP) and the Philippines (PH) and evaluated the effects of washing and controlled calcination under oxidative and reductive environments. Representative japonica-type RHs were obtained from a rice miller in Omaezaki, Shizuoka Prefecture, Japan, while indica-type RHs were collected from Ilocos Norte, Philippines. As-received rice hulls (ARH) were washed with hot deionized water, oven-dried, and designated as washed rice hulls (WRH). The WRH samples were thermally treated at 700, 800, and 900 °C for 2 h under oxidative and reductive conditions to produce rice hull ash (RHA) and rice hull char (RHC), respectively. Morphological and dimensional characteristics of the ARH samples were examined by optical microscopy, while the surface wettability of the inner and outer epidermal surfaces was evaluated by water contact-angle measurements. Thermal behavior and energy changes were investigated using thermogravimetric–differential thermal analysis (TG-DTA) and differential scanning calorimetry (DSC), while elemental and oxide compositions were determined by X-ray fluorescence (XRF) and energy-dispersive X-ray spectroscopy (EDS). The structural, morphological, and chemical characteristics of the untreated, washed, and thermally treated samples were further examined using X-ray diffraction (XRD), Fourier-transform infrared spectroscopy (FTIR), and scanning electron microscopy (SEM). Nitrogen physisorption was performed to determine the textural properties, including specific surface area, pore volume, and pore-size characteristics, of the

RHA and RHC samples. The results demonstrated pronounced differences between the JP-RH and PH-RH in terms of morphology, composition, thermal behavior, silica crystallization, and textural properties. Optical microscopy confirmed differences in grain morphology, with the JP-RH material exhibiting shorter grains and the PH-RH material exhibiting medium-to-long grains[5]. SEM observations showed distinct epidermal surface architectures, while hot-water washing effectively removed adhering surface impurities from both sources[6]. Both samples exhibited hydrophobic outer epidermal surfaces. Elemental analyses further indicated that SiO_2 was more concentrated toward the outer epidermal region, consistent with the recognized role of biogenic SiO_2 in the structural reinforcement and protection of rice plants. TG-DTA revealed substantially different thermal decomposition behaviors. The residual mass of JP-RH was approximately 11.31–11.67%, compared with 30.83–35.52% for PH-RH, indicating a markedly higher inorganic residue in the PH-RH samples[2,7]. The principal thermal degradation region also differed between the two sources, occurring at approximately 513–554 °C by endothermic for JP-RH and 328–358 °C by exothermic for PH-RH[8,9]. DSC measurements showed total energy release values of 70.51–118.45 Jg^{-1} for JP-ARH and 80.87–88.48 Jg^{-1} for PH-ARH, demonstrating source-dependent differences in the thermal energy characteristics of the biomass. These variations indicate that rice variety and geographic origin can significantly influence the thermochemical conversion behavior of rice hull. Thermal treatment further produced distinct differences in the resulting SiO_2-rich and C-containing residues. Increasing calcination temperature generally promoted SiO_2 crystallization and reduced the surface area and pore volume of the thermally treated products while increasing pore width. XRD analysis indicated earlier development of crystalline SiO2 phases in the JP-derived samples, particularly at 900 °C10, whereas the PH-derived samples remained predominantly amorphous under comparable conditions9. FTIR spectra confirmed characteristic hydroxyl and Si–O-related functional groups[2,10]. Nitrogen physisorption showed predominantly mesoporous characteristics at 700 °C, whereas higher-temperature treatment produced changes in adsorption behavior and pore structure[11,12]. Notably, the calcined PH-derived samples exhibited approximately twice the specific surface area of their JP counterparts, while the JP-derived materials showed broader pore-size distributions. Overall, the findings demonstrate that rice variety and geographic origin substantially influence the physicochemical and thermochemical characteristics of rice hull and the properties of its thermally derived products. The results establish a comparative materials-property baseline for selecting and processing rice hull feedstocks for resource recovery, thermal conversion, and the development of SiO_2-, C-, and SiO_2–C-based materials. The study further highlights the potential of RH valorization as a pathway for converting an abundant agricultural residue into value-added resources, supporting circular biomass utilization and resource-efficient approaches relevant to climate action and low-carbon materials development.

Keywords: Circular economy, Indica rice, Japonica rice, Rice hull ash, Rice hull char

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Poster ID: F-03

AIS Based Assessment of Ship CO_2 Emission Patterns in the Johor-Singapore Maritime Corridor

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Abstract

Maritime transport contributes to global carbon dioxide (CO_2) emissions, particularly in high-traffic shipping corridors where diverse ship types and operating conditions coexist. This study assessed Automatic Identification System (AIS) activity in the Johor–Singapore maritime corridor in March 2025 and estimated CO_2 emissions for ships with technical information. The preprocessing, AIS records were matched to ship particulars and converted from consecutive observations into valid operating intervals. The ship emission was calculated using bottom-up method where engine power, load factor, interval duration, specific fuel consumption, and a fuel CO_2 conversion factor, then aggregated by ship category, speed state, time, and grid cell. Non-negative CANDECOMP/PARAFAC (CP) decomposition was applied to the resulting carbon dioxide (CO_2) emission tensor, with a rank of K=6 selected, yielding a relative error of 18.89%. The final population comprised 4,353 ships, 14,919,323 AIS records, and 149,376 ship hours. Estimated ME and AE emissions were 84,019 and 34,232 tons, respectively, totaling 118,251 tons of CO_2. Tankers, container ships, and bulk carriers contributed 40.0%, 32.8%, and 18.9% of total, respectively. Across all eligible ship categories, 76.5% of estimated CO_2 was emitted at speed of 5 knots or more but below 15 knots. In addition, the ten highest-emitting grid cells accounted for 59.6% of the total emissions. These findings identify activities and areas for more targeted assessment of maritime emission reduction measures.

Keywords: Maritime decarbonisation; AIS; Ship emission.

Poster ID: F-04

Breeding rice varieties resilient to climate-related emissions for the Mekong Delta, Vietnam

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Abstract

In recent years, greenhouse gas (GHG) mitigation has become a pivotal goal guiding global rice production. Rice cultivation in Vietnam is a significant source of emissions, particularly methane. To achieve breakthroughs in enhancing genetic efficiency and climate change adaptability, rice breeding programs in Vietnam are implementing a modernization roadmap that is both feasible and long-term in scope. Measuring emissions from rice production plays a crucial role in shaping national strategies toward Net Zero targets and monitoring implementation progress. Focusing on low-emission rice varieties—while ensuring high yield and quality—will enhance the efficiency and value of Vietnamese rice. In this study, initial parental materials were evaluated through phenotypic analysis—focusing on traits such as high yield, low emissions, large panicles, and short growth duration—combined with targeted genotyping. Backcross populations were generated from the selected parental lines. Marker-assisted backcrossing (MABC) was employed to select hybrid individuals, utilizing markers for target genes alongside markers RM223, RM240, RM162, RM256, and RM257 to genetic loci from the donor source. Suitable individuals and lines were selected and self-pollinated to produce F2 generations across six hybrid combinations. At this stage, a genetic map covering all 12 chromosomes was constructed to assess genetic relationships and identify individuals with the genetic background best suited to the breeding objectives of combining low emissions with high yield and pest resistance. Ultimately, the most promising candidates were selected from 30 rice lines screened for low methane emissions; these hybrids demonstrated a potential reduction in greenhouse gas emissions from rice paddies ranging from 3.7% to 21.5%. This screening process identified a variety associated with relatively low methane emission rates. Several high-yielding varieties—such as HATRI 25—were studied in relation to CH4 and N2O emissions; HATRI 25, characterized by large panicles, short stature, and high productivity, is beneficial for rice production and helps lower CH4 emissions. At the BC4F3 generation, these lines underwent further field selection, with HATRI 25, HATRI 60, HATRI 200, HATRI 50, HATRI 22, and HATRI 20 emerging as the most promising. These lines show potential for cultivation in the Mekong Delta and serve as valuable genetic resources for other country future research.

Keywords: Mekong Delta, Rice, Greenhouse gases.breeding, Yield

Poster ID: F-07

In Situ Operando Observation of Next-Generation Solar Cells

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Abstract

Next-generation solar cells have achieved remarkable progress in power conversion efficiency over the past decade. However, the mechanisms governing crystal growth, defect formation, and long-term stability are still not fully understood because these processes occur dynamically during material fabrication and device operation. Conventional ex situ characterization provides only limited information before or after processing, making it difficult to reveal the transient structural evolution that determines the final device performance.

In this presentation, recent advances in in situ and operando characterization techniques for next-generation photovoltaic materials, particularly halide perovskite solar cells, will be presented. Time-resolved synchrotron X-ray scattering and diffraction, together with optical characterization, enable direct observation of crystal growth, phase transition, and structural degradation under real device operating conditions.

Keywords: Perovskite solar cells, X-rays, In-situ operando

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Poster ID: F-08

Economic Readiness, Climate Risk Vulnerability, and Ecosystem Services Vulnerability: Evidence from Selected ASEAN Countries

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Abstract

Global climate change and ecosystem degradation have increasingly intensified nature-related risks, posing growing threats to socio-economic systems and the sustainable provision of ecosystem services. Although enhancing national adaptive capacity has become a central priority in global climate governance, existing research has primarily focused on the relationship between national adaptive capacity and overall climate vulnerability. Comparatively little attention has been paid to whether economic readiness can simultaneously reduce climate risk vulnerability and ecosystem services vulnerability, and few studies have examined whether its effects differ across these two dimensions, particularly in the context of ASEAN countries. To address these research gaps, this study investigates whether economic readiness can simultaneously reduce climate risk vulnerability and ecosystem services vulnerability, and whether its effects vary across these two dimensions. Drawing upon Resilience Theory and Socio-Ecological Systems Theory, an integrated analytical framework is developed to examine the influence of economic readiness on multidimensional climate vulnerability. The analysis is based on a balanced panel dataset covering Malaysia, Indonesia, Thailand, and Vietnam from 2010 to 2025. Economic readiness is measured using the Economic Readiness index from the ND-GAIN database, while climate risk vulnerability and ecosystem services vulnerability are measured using the Overall Vulnerability index and the Ecosystem Services Vulnerability dimension, respectively. Macro-level control variables are obtained from the World Development Indicators (WDI) database, and the proposed relationships are empirically examined using a two-way fixed-effects panel model.

The expected findings will reveal the effects of economic readiness on climate risk vulnerability and ecosystem services vulnerability, as well as the differences between these effects. The study further seeks to clarify the role of economic readiness in strengthening national climate adaptation capacity, enhancing socio-ecological resilience, and mitigating multidimensional climate vulnerability. Theoretically, the study develops an integrated analytical framework linking economic readiness, climate risk vulnerability, and ecosystem services vulnerability, thereby addressing the limited systematic comparison of different types of climate vulnerability in the

existing literature and providing a new theoretical perspective for understanding the mechanisms through which economic readiness influences multidimensional climate vulnerability. Practically, the findings are expected to provide empirical evidence and policy implications for ASEAN countries to enhance economic readiness, strengthen climate adaptation capacity, reduce multidimensional climate vulnerability, and promote regional sustainable development.

Keywords: Economic Readiness, Climate Risk Vulnerability, Ecosystem Services Vulnerability, Socio-Ecological Resilience, ASEAN Countries

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Poster ID: G-02

Engineering Education in India: Looking through a Women's Lens during the Third and Fourth Industrial Revolutions

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Abstract

The Third Industrial Revolution (IR 3.0) marked the transition from mechanical and analogue systems to digital technologies through advances in computing, electronics, and the internet, transforming production and trade (Turner, 2024). The Fourth Industrial Revolution (IR 4.0) has further accelerated this transformation through the integration of the physical, digital, and biological worlds (Oosthuizen, 2022). Together, these developments are commonly referred to as digital transformation. Digitalisation and automation have had profound implications for employment patterns and skill requirements. Against this backdrop, this paper examines the impact of IR 3.0 and IR 4.0 on women's engineering education and employment in India since 1990-91, following economic liberalisation and the widespread adoption of Information and Communication Technologies (ICTs) in business and industry. Data from the All India Council for Technical Education (AICTE) are used to analyse trends in engineering education. Since 1990-91, engineering education in India experienced remarkable growth in terms of institutional infrastructure, student enrolment, and women's participation, particularly up to 2015-16. The share of women in engineering enrolment increased substantially from about 7% to nearly 32% during this period. Although the proportion of women has remained broadly stable thereafter, the absolute number of female students, as well as total engineering enrolment, has declined. This trend may be associated with the ongoing transition from IR 3.0 to IR 4.0, which has altered the nature of technological skills, industry demand, and employment opportunities.

Keywords: Industrial Revolution (IR) 03& 04; Women, Technological Skills, Engineering Education, ICT

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Poster ID: G-05

Girls' STEM Pathways in Japan: Examining Social, Environmental, and Institutional Influences

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Abstract

Japan continues to face a significant gender gap in science, technology, engineering, and mathematics (STEM), with the proportion of women entering science and engineering fields remaining low by international standards. [*1*2] Although various initiatives have been implemented in Japan over the years to encourage girls and women to pursue STEM fields, these efforts have not yet resulted in a fundamental narrowing of the gender gap.

The author has been directly involved in two national initiatives that may contribute to addressing this challenge: the Japan Science and Technology Agency (JST) "Support Program for Girls' Choices of Science and Engineering Pathways" [*3] and the Cabinet Office Gender Equality Bureau's "STEM Girls Ambassadors" initiative. [*4]

Experience gained through the JST program as a steering committee member, it became clear that girls' choices of STEM pathways are influenced not only by individual factors such as their own interests and motivation, but also by social and environmental factors. These include regional disparities in access to information and hands-on experiences, as well as gender stereotypes and unconscious bias among parents and teachers. These interrelated factors suggest that providing support only when students begin making subject and university choices in high school is not sufficient. Opportunities to engage with science and technology, together with information about STEM education, professions, and careers, need to be provided continuously from the elementary and junior high school years onward.

Through activities as a STEM Girls Ambassador, the importance of making visible the diverse career paths of women who studied science and engineering and are now active in professional fields has also become increasingly clear. For girls to envision not only studying science or engineering at university but also the professions and careers that may follow, they need opportunities to learn about women with STEM backgrounds who are working in a wide range of fields. Sharing the experiences of women with diverse career paths increases access to relatable role models and plays an important role in helping girls recognize STEM as a realistic option for their own future.

Drawing on the author's direct involvement in these policies and practices, this study examines the individual, social, and institutional factors surrounding girls' educational and career choices in STEM and considers the effectiveness of current support approaches. Rather than simply encouraging girls to choose STEM, it explores how an environment can be created in which STEM is naturally perceived as one of the educational and career pathways available to them, regardless of gender or region of residence, and considers how more effective and continuous support can be developed.

Keywords: STEM education, Girls' career choice, Gender gap, Role models, Unconscious bias

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Poster ID: G-06

Women's Empowerment and the Development of Women's Leadership Capacity: Two Sides of a Fundamental Issue in Advancing Gender Equality Across All Areas of Social Life

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Abstract

A Vietnamese proverb, "Trăm hay không bằng tay quen"—which may be understood as "practical experience outweighs theoretical knowledge"—highlights the importance of hands-on practice, continuous training, and real-world experience rather than relying solely on theoretical knowledge. From a gender perspective, this principle may be extended further: even when women are fully equipped with professional knowledge, workplace skills, managerial competencies, and other relevant capabilities, they cannot effectively develop their leadership capacity unless they are entrusted with concrete management responsibilities, even at entry-level managerial positions.

Against this background, drawing on survey data on women's participation in leadership and management across selected professional sectors in Ho Chi Minh City (HCMC), together with an analysis of the concept and implications of "empowerment," this report assesses the current status, potential, and capacities of women in leadership and managerial positions. Based on these findings, the report proposes several recommendations for advancing gender equality, in line with the spirit of the theme selected for the INWES-APNN & TWiST Annual Conference in November 2026: "Exploring the Pivotal Role of Women Engineers and Scientists in Building an I.D.E.A.L. and Sustainable Planet for All."

Keywords: Women's empowerment; Women leaders; Women managers; Gender equality, …In the age of al.

Poster ID: G-07

Beyond Access: Gender-Responsive Teaching Practices for Women's Participation in Technical and Vocational Education in the Philippines

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Abstract

Technical and vocational education and training (TVET) can widen women's access to technical careers, but access alone does not guarantee gender-equitable participation in occupations traditionally associated with men. This study examined the gender profile, instructional practices, and recommended strategies of trainers in selected technical vocational institutions in Misamis Oriental, Philippines. The analysis was drawn from the trainer component of a larger concurrent mixed-method study. Forty-five trainers from eight institutions completed an expert-validated questionnaire containing demographic and open-ended items. Descriptive statistics summarized the trainer profile, while thematic analysis identified recurring practices and recommendations. Male trainers comprised 71.11% of the sample and women 26.67%, indicating limited female representation; nevertheless, women were already teaching some non-traditional qualifications, including automotive servicing. Four recurring instructional practices emerged: motivating women to pursue male-dominated fields, providing equal training opportunities, presenting successful women as role models and mentors, and using gender-sensitive language. Trainers also recommended stronger gender and development awareness, deliberate encouragement of women's technical capability, communication of employment opportunities, and institutional support such as scholarships, safe learning environments, and measures to reduce stigma and bias. The findings indicate that gender-responsive TVET requires more than numerical access. Everyday pedagogy, visible female role models, supportive institutional arrangements, and deliberate disruption of gendered occupational expectations are necessary to strengthen women's pathways into technical, engineering-related, and skilled occupations. TVET trainers therefore occupy a strategic position in advancing inclusive and sustainable workforce development.

Keywords: Gender-responsive pedagogy; Women in TVET; Gender mainstreaming; Technical education; Women in STEM

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Poster ID: H-01

Tracking STEM Competency Growth via Exam-Item Classification: A Single-Cohort Case Study in Gamified Air Transport Management Education

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Abstract

Air transport management courses often lack instructional materials that translate students' strong interest in aircraft specifications into demonstrable cross-disciplinary competencies such as decision-making and problem-solving. A further, more fundamental challenge faces single-cohort teaching practice research: without a control-group design, quantitatively demonstrating that an instructional intervention genuinely improves students' STEM competency remains methodologically difficult a limitation common across single-class teaching practice studies. To address this, the present study integrated commercially available aircraft-performance-parameter card games into an air transport management course for 46 second-year students at a national university of science and technology in Taiwan. The intervention combined Problem-Based Learning (PBL) with the 6E instructional framework (Engage, Explore, Explain, Elaborate, Extend, Evaluate) across nine core course topics, including airline industry development, aircraft and traffic rights, pricing, subsidies, safety, and carbon emissions. Subject-matter experts were invited to judge a student-led card-game design competition, promoting students' practical application of aircraft performance parameters. The study's central contribution is a replicable, low-cost alternative for measuring STEM competency growth within a single-cohort setting, requiring no additional testing instruments. All ten midterm and ten final exam items were independently classified into Science (S), Technology (T), Engineering (E), and Mathematics (M) categories, and Pearson correlation coefficients between each category's items and overall exam scores were tracked across the two time points. Results show the S-category (scientific analysis) correlation rose from 0.586 at midterm to 0.737 at final (+0.151). Cross-disciplinary composite items showed the sharpest gain, shifting from a non-significant correlation (0.209) at midterm to a strong, significant correlation (0.687, +0.478) at final—the study's most notable growth indicator. The T-category (technical knowledge) showed steady improvement (+0.066). This qualitative shift from non-significant to significant correlation offers a more meaningful signal of deepening cross-disciplinary integration than raw score gains alone. In addition, instructional activities were cross-classified by students' reported interest and self-endorsed STEM competency gains into four quadrants—Strength, Potential, Problem, and Reconsider—providing a transferable decision

framework for allocating instructional resources, applicable beyond aviation to other applied engineering courses. A complementary student-designed card-game competition, judged by a panel of industry pilots and managers on criteria including technical innovation and scientific logic, achieved a 90.9% team completion rate (10 of 11 planned teams; 41 of 46 students), offering qualitative evidence of industry-relevant validity. This study offers teaching practice researchers a low-cost, replicable methodology for tracking STEM competency growth within single-cohort classroom settings without requiring an experimental control-group design serving as a practical reference for quantitatively assessing cross-disciplinary competency development in applied engineering education.

Keywords: STEM Competency Growth, Exam-Item Classification, Gamified Air Transport Management Education, PBL, 6E

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Poster ID: H-03

Teaching Binary Logistic Regression through the Titanic Dataset: A Pedagogical Case Study on Cross-Disciplinary Policy Interpretation in Transportation Planning Education

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Abstract

Transportation planning courses often face a gap between statistical modeling instruction and policy application: students may learn to run models and produce coefficients without fully grasping the social implications embedded in the numbers or the professional responsibility of interpreting them. Because real-world disaster and emergency-evacuation datasets are difficult to obtain, this study instead integrates binary logistic regression analysis using the publicly available Kaggle Titanic dataset into a transportation planning course, demonstrating how a statistical method can be transformed into a teaching tool for cross-disciplinary policy interpretation. In terms of instructional design, students were first guided through a complete SPSS workflow for binary logistic regression, including variable selection, the Omnibus test, the Hosmer-Lemeshow goodness-of-fit test, Nagelkerke R^2, and classification accuracy, with particular emphasis on interpreting the Exp(B) odds ratio—helping students understand that statistical output is not merely numerical but a decision-relevant indicator. This design highlighted the course's core message: the model describes behavior, but how to respond is the planner's responsibility. The analysis identified five statistically significant predictors of survival—Female, Age, SibSp, Pclass1, and Pclass2—with an overall model prediction accuracy of 80.3%. Students were then guided to translate each variable into a corresponding transportation policy issue: Female corresponds to gender-sensitive transport planning, echoing the EU's mainstreaming of this concept; Age corresponds to transport vulnerability and resilience principles for an aging society; SibSp showed that traveling with family members was associated with a higher mortality rate, pointing to the influence of familial ties on individual survival outcomes during emergency evacuation; and Pclass1/Pclass2 correspond to equity in the allocation of transportation resources. The course concludes with two key takeaways: first, Exp(B) is not just a number but a policy indicator, and individual-choice models are valuable precisely because they reveal disparities hidden behind averages; second, statistical models describe behavioral phenomena, but responding to them is the planner's responsibility—skilled transportation planners let the data speak while ensuring the voices of the vulnerable are heard. This study demonstrates that combining real-world data and rigorous statistical analysis with reflective instructional design can effectively help transportation

planning students bridge the gap between statistical technique and policy reasoning, offering a concrete pedagogical case for integrating STEAM methods into cross-disciplinary professional education.

Keywords: STEAM; Transportation Planning; Kaggle Titanic Dataset; Binary Logistic Regression; Cross-Disciplinary Policy Interpretation

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Poster ID: I-01

Promoting Quality Education (SDG 4): A Preliminary Exploration of the Design Impact Transition (DIT) Model for Advancing Inclusive Education

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Abstract

Background:
The advancement of inclusive education depends on collaboration between general education and special education teachers. Yet the two groups of teachers differ in role division, professional knowledge, and responsibility expectations, and in practice these differences often lead to communication difficulties, strained relationships, and difficulty reaching consensus. Such difficulties largely stem from divergent views on how educational support should be assessed, how instruction should be adapted, and how instructional goals should be set. This divergence proves difficult to resolve because the two groups of teachers fail to identify shared needs and common goals in the course of communication, so that potential opportunities for collaboration turn into opposition and conflict.

Purpose:
Accordingly, this study aimed to develop a communication module that reduces conflict. The module is intended to help general and special education teachers, when discussing inclusive education and support for students with special needs, express their inner perspectives with composure, understand one another's core values, and jointly construct educational goals and a division of responsibilities. In doing so, it seeks to build instructional consensus, foster collaboration between general and special educators, and inform the development of school-wide support strategies so that every student receives appropriate support.

Methods:
This study adopted design impact transition (DIT) as the framework for developing a course module. It incorporated the indicators of the Inner Development Goals (IDGs) into conflict management as communicative elements for transforming conflict. On this basis, the researchers designed a four-month professional co-learning community course for special education teachers.

One university professor served as course designer and facilitator. Participants included two university professors, one elementary school special education section chief, and three special education teachers. The course proceeded in three phases. The initial phase examined the challenges that schools currently face in implementing inclusive education. The middle phase introduced the principles of DIT, and participants practiced conflict transformation strategies that use IDGs indicators as communicative elements. In the final phase, all participants took part in focus groups to discuss and reflect on how the DIT model was applied in their teaching contexts and how effective it was. Focus group data were analyzed using content analysis. Results: The analysis indicated that applying the concept of DIT, with the IDGs as communicative elements, helped teachers communicate in concrete terms with colleagues from different professional backgrounds. It also made it easier for multiple perspectives and perspective-taking to emerge during discussions, which in turn advanced inclusive education in practice. Overall, participants affirmed that DIT and the IDGs materials contributed positively to the promotion of inclusive education. They also considered the course model applicable to collaborative contexts in educational administration and management.

Keywords: Inclusive education, Quality education, Design impact transition (DIT), Inner Development Goals (IDGs)

Poster ID: I-02

Extending Multi-Stakeholder Partnerships Across Disciplines: Course Design and Preliminary Findings on Integrating a Working-Together-Societal-Stakeholders Model into AI Care Robot Development

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Abstract

Background and Purpose:
As population aging accelerates and life expectancy continues to rise, demand for medical and care capacity in long-term care has grown substantially, placing considerable strain on both the care workforce and service delivery systems. Against this backdrop, artificial intelligence (AI) is increasingly being applied in care settings, and the provision of long-term care is extending from human labor toward human–machine collaboration. AI care robots and related smart products have accordingly become important means of supporting caregiving work and enhancing care quality. The central challenge in developing AI care robots for long-term care, however, lies not in programming competence per se. It lies in whether product design can accurately understand and respond to the pressing needs that caregivers and care recipients encounter in everyday care contexts. In response, this study adopted an impact-driven education approach to design a sustainability-oriented course. The course aimed to guide information service developers toward a design mindset that integrates technical problem-solving with an understanding of care needs and a commitment to human-centered care.

Course Design and Method:
The course was built on working-together-societal-stakeholders as its core design principle. It was developed through interdisciplinary collaboration with faculty from a Department of Information Management and embedded within the department's capstone programming project course. Students whose capstone projects focused on AI care robots engaged in experience sharing and focus group discussions with senior long-term care clinicians. These exchanges deepened the developers' understanding of unresolved problems and areas for improvement in long-term care practice, and the two groups jointly conducted problem assessment and strategic planning. The course further incorporated the Inner Development Goals (IDGs) framework to help developers

recognize, during the early stages of system development, the humanistic literacy, social responsibility, and systems thinking that AI care robot design requires. Data were drawn from course feedback forms and students' reflective journals and were analyzed using content analysis.

Results:
Content analysis identified three dimensions of course benefit. The first was self-awareness: students strengthened their ability to discern their own thinking patterns, recognized the limitations of their existing cognitive frames, and practiced perspective-taking and empathy. The second was social empathy: through in-depth dialogue with frontline caregivers, students gained a fuller appreciation of the complexity of industry needs and users' circumstances. The third was responsive design practice: students reexamined their design logic, restructured their program architecture, and refined system functions, thereby enacting a human-centered approach to development. Taken together, the findings of this pilot course offer preliminary evidence that a curriculum centered on cross-sector multi-stakeholder partnerships (SDG 17) is a viable pathway for cultivating AI care technology professionals who can respond to the needs of an aging society.

Keywords: AI care robots, Working-together-societal-stakeholders, Multi-stakeholder partnerships, Inner Development Goals, Impact-driven education

Poster ID: I-03

Applying Impact-Driven Education to Sustainability Education: The Design and Preliminary Exploration of a Social-Ecological Resilience Course

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Abstract

Background:
The rapid expansion of industry, agriculture, and technology has endowed humanity with unprecedented problem-solving capacities in resource use, environmental modification, and climate prediction and regulation. Yet this capacity for transformation and expansion has simultaneously encroached upon and degraded the habitats and ecological stability of other species. Such imbalance is no longer an isolated occurrence; rather, it constitutes a systemic loss of control accumulated through the long-term interaction between human civilization and ecosystems.

Purpose:
In the face of such structural problems, sustainability education urgently needs to cultivate students' capacity to understand, analyze, and solve problems from a holistic perspective. Drawing on impact-driven education as its pedagogical philosophy, this study implemented an instructional intervention combining film analysis with small-group discussion based on multi-focal model analysis in general education and teacher education courses at the university level, and examined the effects of this course design on students' sustainability awareness and inner capacities.

Methods:
The course adopts social-ecological resilience as its core concept. Resilience, in this sense, does not denote a mere return to a prior state; it emphasizes a system's capacity for transformation under conditions of high uncertainty and irreversibility. The course also incorporates the perspective of the Inner Development Goals (IDGs), contending that actors who lack inner capacities such as systems thinking, long-term orientation, empathy, and a sense of connectedness may repeatedly make destructive choices despite possessing advanced

technological capabilities. Participants were niversity students enrolled in general education and teacher education courses. Students' post-course reflective feedback was collected and examined through content analysis.

Results:
The findings indicated that the course helped students perceive the concrete manifestations of the Sustainable Development Goals (SDGs) in everyday life and become aware of their personal growth across the dimensions of the IDGs. Students also recognized their role as biosphere stewards, bearing responsibility for safeguarding planetary health. Furthermore, students came to understand that resources are finite, selective, and subject to change. Building on this understanding, they were able to draw on the perspective of social-ecological resilience and their inner developmental capacities to analyze diverse positions and needs in complex and shifting contexts, and to seek inclusive, mutually beneficial solutions with a responsible and problem-solving attitude.

Keywords: Sustainability education, Inner Development Goals, Social-ecological resilience, Impact-driven education

Poster ID: K-01

A Regional Policy Approach to Supporting Women's Career Continuity in STEM: The Case of Busan, Republic of Korea

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Abstract

Despite growing efforts to promote women's participation in science, technology, engineering, and mathematics (STEM), regional disparities in career opportunities and research environments remain significant challenges. In South Korea, the concentration of research resources and employment opportunities in the Seoul metropolitan area further complicates efforts to develop and retain women in STEM in non-metropolitan regions. This study presents a regional policy approach to supporting women's career continuity in STEM, focusing on Busan, South Korea. Drawing on regional statistics, a survey of 120 women in STEM, and six stakeholder interviews, the study identifies policy needs and develops a regional support framework. The proposed framework comprises four interconnected strategies: attracting women to regional STEM careers, supporting professional growth, preventing career interruptions and facilitating career re-entry, and strengthening institutional support. Particular attention is given to emergency childcare, temporary R&D personnel support, and career re-entry programs designed to maintain research continuity. By examining Busan's policy development process, this study highlights the role of regional governments in addressing women's career development needs. It offers a place-based policy framework for fostering more inclusive and sustainable regional STEM ecosystems.

Keywords: Women in STEM, Research Workforce, Regional Policy

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Poster ID: K-03

Synthesis and Characterization of Cellulose-Based Aerogels from Vetiver Grass (Chrysopogon zizanioides) for Oil Adsorption and Thermal Insulation

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Abstract

This study developed and characterized a cellulose-based aerogel derived from vetiver grass (Chrysopogon zizanioides) as a sustainable, biodegradable, and locally sourced material for oil adsorption and thermal insulation applications. Cellulose was extracted from vetiver grass biomass through sequential alkaline and bleaching treatments, achieving a yield of 26.74%. The extracted cellulose was incorporated with polyvinyl alcohol (PVA) and xanthan gum (XTG) through a sol–gel process, followed by freeze-drying to produce lightweight, porous aerogels. Surface modification with methyltrimethoxysilane (MTMS) via chemical vapor deposition (CVD) was subsequently performed to enhance hydrophobicity. The resulting aerogels were evaluated in terms of density, porosity, microstructure, functional groups, thermal conductivity, and oil adsorption performance. The developed aerogels exhibited low densities of 0.030–0.053 g/cm³ and high porosities of 96–98%, confirming the formation of a lightweight and highly porous structure. Thermal conductivity values ranged from 0.0231 to 0.0255 W/m·K, demonstrating promising thermal insulation performance relative to conventional insulating materials. For oil adsorption, the 0.5 g aerogel sample exhibited the highest capacities, reaching 29.1563 g/g for diesel oil and 30.1650 g/g for cooking oil, although adsorption performance declined after repeated reuse. These findings demonstrate that vetiver grass can serve as a viable cellulose source for the fabrication of multifunctional aerogels with favorable thermal insulation and oil adsorption properties. The developed material provides a promising approach for valorizing locally available biomass into an environmentally sustainable alternative for oil spill remediation and thermal insulation applications.

Keywords: Cellulose aerogel, Vetiver grass, Oil adsorption, Hydrophobicity, Thermal insulation

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2026 INWES-APNN & TWiST Annual Conference

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Michael Yang
President, Chinese Institute of Engineers (CIE)

Facing global challenges such as climate change, sustainable development, and artificial intelligence, the engineering and technology communities need diverse talent and perspectives. The expertise and leadership of women in engineering and technology are vital to social progress.

The Chinese Institute of Engineers (CIE) continues to encourage people from diverse backgrounds to enter the engineering field. Through the “I.D.E.A.L.” vision promoted at this event, we hope to unite efforts across sectors, address challenges with smart and sustainable solutions, and create a better, brighter, and more prosperous future for all.

Prof. L.J. Leu
President, Institute of Engineering Education, Taiwan (IEET)

Amid rapid changes driven by AI, digital transformation, and the transition to net zero, engineering and technology education must prepare future talent not only with professional knowledge and skills, but also with the ability to define and analyze problems, make sound judgments, solve real-world challenges with innovation and responsibility, think globally, and embrace lifelong learning.

With their expertise, creativity, resilience, and empathy, women in STEM make valuable contributions through their active participation and leadership. They are an essential force in advancing engineering and technology education worldwide.

I warmly wish the 2026 INWES-APNN & TWiST Annual Conference every success in celebrating the outstanding talents and inspiring achievements of women in STEM!

Sam Hung
General Manager, Fabulous Power Co.

Harnessing women’s talent in technology, AI, and geothermal energy to advance talent development, cross-disciplinary collaboration, and sustainable energy innovation—empowering more women to move from technology participants to energy leaders.
Let technology transform energy, and women lead the future.



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文學院 College of Liberal Arts(文LA)
藝術大樓 Fine Art Building(文FA)
海資館 Buiding of Marine Resouces(海MB)
海洋科學學院 College of Marine Sciences(海MA)
學生宿舍-武嶺 Dormitory - Wu-ling Villa
西灣學院 Si Wan College
綜合大樓 General Building (通GE)
海工館 Building of Marine Environment and Engineering (海ME)
學生活動中心 Student Center
圖資大樓 Library and Information Building(圖IL)
西灣學院 Si Wan College (10F西SW)
醫學院 College of Medicine(9F)
學生宿舍-翠亨 Dormitory - Tsui-heng Villa
學生宿舍-H/L棟 Dormitory - Building(H&L)
電資大樓 Building of Electrical Engineering(工EC)
教職員工宿舍 Faculty & Staff Dormitory
壽山門 Shoushan Entrance
登山街60巷「歷史場域及時空廊道溜滑梯」 Time Tunnel Slide of the Lane 60, Dengshan St., Historical Site
環工大樓 Building of Environmental Engineering (工EV)
材料大樓 Building of Materials(工MS)
管理學院 College of Management(管CM)
工學院 College of Engineering(工EN)
化學館 Building of Chemistry(理CH)
物理館 Building of Physics(理PH)
生科館 Building of Biological Sciences(理BI)
西子灣海域中心 Sizihwan Marine Sports Center
西灣藝廊 Sizihwan Art Gallery
中庭廣場 Square
西子灣 海水浴場 Sizihwan Beach
社會科學院 College of Social Sciences(社SS)
理學院 College of Sciences(理SC)
幼兒園 Kindergarten
行政大樓 Administration Building(行AD)
隧道口 Entrance of Tunnel
Poster Sessions & Coffee Break ALOHA Forums..etc.
Day 1 Gala Dinner
Day 2 Tour A
西子灣沙灘會館 Sunset Beach Resort
逸仙館 Sun Yat-sen Hall
Main Venue
體育館 Gymnasium(體GM)
中山貨櫃創業基地 NSYSU Startup Quarter
海堤停車場 The Pier Parking Lot
國際研究大樓 Building of International Research(國IR)
半導體及重點科技研究學院 College of Semiconductor & Advanced Technology Research(6F)
溜冰場 Skating Rink
網球場 Tennis Court
棒壘球場 Baseball Field
游泳池 Swimming Pool
操場 Athletic Field
中山社會實踐基地 NSYSU Social Engagement Space
高雄港 Port of Kaohsiung
大門 Main Entrance
西子樓校友會館 Sizih Alumni House
N
W
E
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國立中山大學地圖 National Sun Yat-sen University Campus Map
804 高雄市鼓山區蓮海路70號 / 804 No.70, Lien-hai Road, Gushan District , Kaohsiung, Taiwan
車輛管制:Vehicle Access Control
來賓汽車停車場:Visitor Parking Lots (Cars)
來賓機車停車場:Visitor Parking Lots (Scooters)
餐飲服務:Dining Service
租賃自行車:Bicycle Rental Station
總務處校安防護組
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