6TH EDITION OF INTERNATIONAL CONFERENCE ON

GREEN CHEMISTRY AND RENEWABLE ENERGY

INTERNATIONAL CONFERENCE ON

ENVIRONMENTAL SCIENCE, SUSTAINABILITY & GLOBAL INNOVATION

JUNE 18-20, 2026
BARCELONA, SPAIN

Hotel Alimara
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6TH EDITION OF

International Conference on

GREEN CHEMISTRY AND RENEWABLE ENERGY

&

International Conference on

ENVIRONMENTAL SCIENCE, SUSTAINABILITY AND GLOBAL INNOVATION

HYBRID EVENT

18-20 JUNE 2026

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Fellow of European Academy of Sciences, Belgium

Welcome Message

Prof. Dr. Antonio Albuquerque

University of Beira Interior, Covilhã, Portugal

Dear colleagues and fellow researchers: It is with great enthusiasm that I join you for this important conference dedicated to pioneering sustainable water solutions. The transition to a circular water economy is one of the most pressing challenges and exciting opportunities of our time. In my keynote, we will explore the transformative synergy between photobioreactors and constructed wetlands – a nature-based innovation that can turn impaired water into a reliable resource. This approach is more than a treatment technology; it is a scalable paradigm for water reclamation, nutrient recovery, and ecosystem resilience. I look forward to sharing insights from applied research on how we can advance water security and sustainable industrial pract.

Welcome Message

Prof. Dr. Carme Ferré-Pavia

Universitat Autònoma de Barcelona, Spain

Dear congress organizers, speakers and visitors, it is an honor and pleasure to welcome you all and dedicate a few words to you. Climate change is a global problem that must be addressed urgently, with commitment and from all possible disciplines. As a professor and researcher in the field of communication, I have been reflecting on how we can contribute to the knowledge and application of communication on climate change and resilience in the face of emergencies. In Firstly, it is important to understand how social communication tools are used for this purpose. Secondly, we need to understand what empowering, positive communication that leads to climate action should look like. Finally, we need to put action into practice with young people to encourage them to communicate proactively about the issues that affect them. I am hopeful that over the next few days, we will have the opportunity to share research, knowledge, activities and a joint commitment to combating climate change.

Welcome Message

Prof. Dr. Cristian Ravariu

National University of Science and Technology
Politehnica Bucharest, Romania

Dear Participants of the Green Chemistry 2026 Congress,

Here I extend a few words of welcome to all of you. It gives me great pleasure to share with you my enthusiasm for participating in this international scientific forum, where multiple beneficiary fields of green chemistry technological routes are present together.

Although we've seen significant progress in the development of electronic devices appealing to green chemistry routes, some critical gaps remain. To extend the types of Graphene-based transistors, it is necessary to develop several techniques for their simulation. Several factors may contribute to this, including an overwhelming variety of models and sensor applications, so that this Congress is benefic for all teams.

The theme of the year highlights the crucial interest for advanced nano-bio-materials and the novel technologies, under a unique opportunity for innovation and collaboration.

Your ideas and contributions are highly expected at this important international event. Welcome to Green Chemistry 2026!

Welcome Message

Prof. and Dr. Dai-Yeun Jeong

Director of Asia Climate Education Center, South Korea
Emeritus Professor at Jeju National University, South Korea

Contemporary era is defined as a risky society in terms of various environmental problems, which are caused by industrialization having been promoted since the 18th century for improving material affluence and convenience in everyday life. A wide range of strategies are being launched at a global, national and local level for promoting industrialization while solving environmental problems. As all of us know, these strategies are synthesized into nature-based, technology-based, and socioeconomic system-based approach.

In the above context, EnviWorld-2026 is, in a narrow sense, an event to seek for the future direction and content of environmental sustainability at a global innovation through environmental science. However, in a broader sense, EnviWorld-2026 is a platform for exploring the direction and content responding to the contemporary risk society. This is proved from the list of detailed scientific sessions.

Even though EnviWorld-2026 is a small step towards solving the contemporary risky society, the small step would be the foundation for the big step to save the earth. It is not doubt that your active participation in EnviWorld-2026 contributes greatly and significantly not only to development

Welcome Message

Helena Belchior Rocha

Iscte - University Institute of Lisbon (CIES), Portugal

Dear Colleagues and Friends,

It is with great pleasure that I welcome you to the 6th Edition of the International Conference on Green Chemistry and Renewable Energy, held in the wonderful city of Barcelona. This year's theme, "Synergizing Green Chemistry and Renewable Energy for Global Sustainability," invites us to explore innovative paths toward a more resilient future.

As a member of the Scientific Committee, I am honored to introduce a sub-theme: "Local actions, global impact: Community-centered approaches to green chemistry and renewable energy for sustainability." This focus reminds us that transformative change often begins at the grassroots level, where communities lead the way in sustainable practices.

Barcelona, a city renowned for its architectural beauty, cultural richness, and environmental initiatives, offers the perfect backdrop for our discussions. May its spirit of creativity and collaboration inspire us to forge meaningful connections and bold solutions for a greener tomorrow.

Welcome Message

Prof. Dr. Hossam A. Gabbar

Ontario Tech University, Canada

Dear congress participants, visitors, and attendees,

I am delighted and honored to welcome you all to the unique and special event of Green Chemistry 2026. The increasing geopolitical challenges and climate change and environmental stressors pose an urgent and increasing mandates upon all of us to promote green chemistry with advanced and clean biotechnologies. The emerging area of green chemistry includes key and potential areas such as green nanotechnology, clean energy sources, hydrogen and alternate fuel, environmental and pollution control, green polymer and materials, green agriculture, renewable energy, clean nuclear and energy technologies, waste management, computational methods, modeling and simulation techniques, and their applications in industries and communities. The event will provide great opportunities to discuss and adapt modern methods, science, systems, and technologies to support the emerging mandates of climate change with cleaner communities, higher productivity, safer products, and improved quality of life. I am confident that the sessions, presentations, and discussions will bring great benefits to all participants with takeaway strategies and technologies to deploy around the world. Together will make the transition to a cleaner and brighter future.

Welcome Message

Dr. Sn. Habil. Oleksandr Novoseltsev

General Energy Institute of the National Academy of Sciences of Ukraine, Ukraine

Dear Congress visitors, it is my honour and pleasure to express a few words of welcome. This study addresses the urgent challenges of climate change, energy security, and technological innovation by proposing a shift from centralized urban energy systems to self-sufficient, sustainable models. It introduces an interdisciplinary methodology combining systems theory, comparative advantage, and market economics, framing energy as a service shaped by supplier–consumer interaction. This approach enhances community efficiency and resilience to military, technological, and climate threats. Aligned with the European Green Deal, EU policies on distributed generation, decarbonization, and digitalization, it provides a foundation for the sustainable eco-development of territorial communities, supporting a future-oriented transition toward more secure, productive, and adaptive energy systems.

Welcome Message

Prof. Dr. Patrick Martin

University of Artois, France

Dear Colleagues, Dear Congress Visitors,

It is an honor and a pleasure to write you a few words of welcome. Green Chemistry is currently experiencing unprecedented progress, thanks in particular to the exploration of new biomasses and low-impact technologies. This opens up new application perspectives by obtaining biomolecules or biopolymers with greater selectivity. The biomasses currently used are either of plant origin, such as algae. And these biomasses are either by-products of agricultural and aquaculture operations. The recovery of certain biomasses involves the replanting of existing crops and thus contributes to the maintenance of biodiversity. This chemistry therefore makes it possible to provide green solutions while having a positive impact on the environment.

May this Congress allow you to present your results and make contacts; it will in any case be a source of new inter-university or university-industry collaborative projects. I wish you all an excellent congress.

Welcome Message

Dr. Sergey Suchkov MD

N.D. Zelinskii Institute for Organic Chemistry of the Russian Academy of Sciences, Russia

International Conference on Environmental Science, Sustainability & Global Innovation Barcelona, Spain

Dear Colleagues, Partners, Researchers, Practitioners, Caregivers, Entrepreneurs, Business leaders and Friends,

On behalf of the Organizing Committee of International Conference on Environmental Science, Sustainability & Glob-al Innovation, scheduled to be hold in June 18-20, 2026, in Barcelona, Spain, it is my genuine pleasure to welcome you to this important event organized and supported by Magnus Group.

I wish to extend a sincere welcome to leading experts, researchers, biodesigners and bioengineers, decision-makers, and professionals from all over the world to participate in the Conference, exchanging experiences and sharing achievements regarding a wide range of topics related to environmental protection.

Environmental science is an interdisciplinary field, which focuses on understanding and addressing environmental issues to promote sustainability and conservation, whilst covering a variety of subareas like climate change, pollution, biodiversity loss, resource depletion, and other local and global issues. The latter would dictate a crucial role of the trend in preserving and safeguarding the natural resources of the Globe. By increasing resource-driven efficiency by transitioning to a circular economy - where materials are reused, re-manufactured or recycled - more effective management of ecosystems and concerted climate action is achievable.

The study of environmental processes and the balance of nature is arguably one of the most important academic and applied challenges of our time. In this context, the mission of this Grand Event is to develop targeted activity on the environmental front and to continue to implement various blueprints for environmental protection, including combating climate change, improving air and water quality, improving population and human health, and

advocating resources circulation, as well as solicit stakeholder and public support for those issues. The global objective of the Event is to propose a concept of international center of reference for environmental engineering addressing the interactions between environment and human health and exploiting this knowledge to the design of novel chemical processes and products servicing the sustainability objectives. The above-mentioned paradigm should be based on extensive collaboration with international scientific networks including universities, research and design centers, regulatory authorities and industry from all over the world.

Simultaneously, on food and environmental hygiene front, we endeavor to further enhance environmental hygiene, ensure food safety and a stable food supply, foster sustainable development of agriculture and food design, etc.

The Conference will prompt a permanent information stream between environmental experts and policy-makers to perform adequate regulations and creation of new guidelines to advance environmental science, technologies and applications, as well as implementation in daily practice. Given its interdisciplinary nature, we draw from a diversity of theoretical and methodological approaches to study environmental issues in their comparative and historical contexts, considering social, ecological, political, economic, and artistic constraints and possibilities.

This Global and Unique Event will be one of the great platform is to share our thoughts and exchange ideas on how to chart our journey forward to reach new heights. The Conference will provide the ideal forum to stimulate ideas and establish collaborations as well as to initiate intense discussions to secure projects of the newest generations and to feature a highly interactive, stimulating and multidisciplinary Program including workshops, plenary sessions and panel discussions. Personally I am proud to be involved into this auspicious event where a large number of world's leading personalities will be exchanging new scientific ideas and sharing their innovative research and experiences in their respective fields. In this context, please share your ideas and look for optimal solutions to promote innovation in environmental science and related applications.

We do hope that you will enjoy the meeting and that your interaction with your colleagues will stimulate a creative exchange of ideas and will be personally rewarding!

Welcome Message

Tomayess Issa

Curtin University, Australia

Dear Congress attendees,

I extend a warm welcome to all of you. The promotion of sustainability awareness in higher education is a crucial responsibility that enhances students' understanding and encourages ethical behavior to address the challenges posed by pollution, waste, carbon emissions, energy, and resources. Postgraduate students at an Australian university are actively involved in units that focus on sustainability, green IT, corporate sustainability, and Sustainability and Global Business Study Tour. Through their coursework and assessments, students engage in both practical and theoretical work, which helps them shift their mindset and improve their technical and interpersonal skills for academic and professional endeavors. This initiative has raised awareness of cultural and environmental issues, developed technological expertise, and instilled a commitment to environmental stewardship.

Welcome Message

Dr. Vijayan Gurumurthy Iyer

Techno-Economic-Environmental Study and Check Consultancy Services, India

Dear Green Chemistry 2026 Participants, Distinguished Delegates, Esteemed Guests, Fellow Researchers, and Colleagues

Sustainable Greetings!

On behalf of the organizing committee, it is great honour to warmly welcome you to the 6th Edition of International Green Chemistry and Renewable Energy, which to be held online and hybrid mode during 18-20th, June 2026 at Barcelona, Spain.

We are gathered here at a critical moment when climate change and control and resource depletion demand urgent and multidisciplinary solutions. The theme of this year's event and activity are Synergising Green Chemistry and Renewable Energy for Global Sustainability. The papers that are to be presented here have the potential to reshape our industrial landscape sustainability and improve global quality of life. The hazardous substance and waste that are increasing more and more, it is required to conduct Environmental Impact Assessment" (EIA) process which can be defined as the systematic identification and evaluation of the potential EIA effects of proposed projects, plans, policies, programs, or legislative actions relative to the physical-chemical, biological, radio-active, cultural, and socio-economic components of the total environment. EIA process monitors and controls products' focus and processes' focus that are the traditional ways of organization by surveying vertical dimensions and modern ways of organization by surveying horizontal dimensions. The Green Chemistry and Renewable Energy (GCRE)concern by reducing the environmental impacts associated with the manufacture, use and disposal of products and/ or services. GCRE strategies should include reducing the waste amount, and/or toxicity of engineering materials or 6Ms. My topic is entitled "Importance of Green Chemistry with a Case Study for the Sustainable Industrial Development", which discusses EIA, GCRE and Total Quality Management (TQM) as a combined approach. I encourage each of you to participate actively and forge new partnerships. Together, we can accelerate the transition towards a cleaner and more sustainable industrial future. Thank you for your TQM commitment to this vital international conference. I wish you all an inspiring and productive conference.

Welcome Message

Prof. Dr. Yarub Al-Douri

European Academy of Sciences, Belgium

The Green Chemistry 2026 is one of the specialized and reputed institutes nationwide. It is giving the task of improving the scientific achievements in nanotechnology and nanoscience, and working hardly on several areas related to science and engineering. Green Chemistry 2026 is to improve networking and presenting a platform for scientific discussions. It is organized to donate the scientists, engineers, academicians, researchers, students and companies an opportunity for presenting their latest research finding, discoveries, ideas and products to focus on its wide applications. With renowned speakers, qualified participants and industrial experts, Green Chemistry 2026 offers a valuable chance to all delegates to share, learn and exchange views, opinions and thoughts for the future of their respective research areas. It may generate to create links and network amongst established scientist and students from all over the world for the betterment of science and engineering to solve common problems and improve the future.

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About Magnus Group

About

Magnus Group, a distinguished scientific event organizer, has been at the forefront of fostering knowledge exchange and collaboration since its inception in 2015. With a steadfast commitment to the ethos of Share, receive, grow, Magnus Group has successfully organized over 200 conferences spanning diverse fields, including Healthcare, Medical, Pharmaceutics, Chemistry, Nursing, Agriculture, and Plant Sciences.

The core philosophy of Magnus Group revolves around creating dynamic platforms that facilitate the exchange of cutting-edge research, insights, and innovations within the global scientific community. By bringing together experts, scholars, and professionals from various disciplines, Magnus Group cultivates an environment conducive to intellectual discourse, networking, and interdisciplinary collaboration.

Magnus Group's unwavering dedication to organizing impactful scientific events has positioned it as a key player in the global scientific community. By adhering to the motto of Share, receive, grow, Magnus Group continues to contribute significantly to the advancement of knowledge and the development of innovative solutions in various scientific domains.

About
CPD Accreditation

About

EnviWorld-Green Chemistry 2026 is officially accredited for Continuing Professional Development (CPD) by the **CPD Group (UK)**, a globally recognized provider of continuing education certification. CPD accreditation ensures that professionals continue to enhance their knowledge, skills, and competencies through structured learning activities.

At **EnviWorld-Green Chemistry 2026,** participants can earn **1 CPD credit for every hour of attendance** in conference sessions. These credits formally recognize the time spent in professional learning and support ongoing professional development across clinical, academic, and research fields.

Earning CPD credits demonstrates a commitment to maintaining high professional standards and staying updated with the latest developments in ophthalmology. CPD participation can also support **career advancement, license renewal requirements, and academic or professional portfolios,** depending on the policies of individual institutions or regulatory bodies.

In addition to educational value, the conference provides opportunities to engage with experts, researchers, and peers from around the world, encouraging knowledge exchange and professional networking.

Attending **EnviWorld-Green Chemistry 2026** not only offers a high-quality scientific learning experience but also provides internationally recognized CPD credits that reflect participants' dedication to continuous professional growth.

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KEYNOTE PRESENTATIONS

Antonio Albuquerque

GeoBioTec, Department of Civil Engineering, Faculty of Engineering, University of Beira Interior, Covilhã, Portugal

Biography: António Albuquerque is Head of the Department of Civil Engineering at the University of Beira Interior (Covilhã, Portugal), as well as the Director of the GeoBioTec@UBI research unit. With over 35 years of experience, his work spans the areas of drinking water treatment and distribution; drainage, treatment, and reuse of wastewater; rainwater and stormwater management and reuse; integrated water management in urban and rural contexts; and the valorisation of mineral and industrial waste. He is author or co-author of more than 400 publications, including books, patents, book chapters, journal articles, conference papers, technical standards, manuals, technical reports, and academic texts.

Synergistic integration of photobioreactors and constructed wetlands for reclaimed water production

The transition toward a circular water economy demands innovative solutions capable of transforming a wide range of impaired water sources, from industrial effluents to agricultural runoff and stormwater, into reliable, reusable resources. This keynote explores the transformative potential of a hybrid Nature-based Solution (NbS) that synergistically integrates Photobioreactors (PBRs) and Constructed Wetlands (CWs) for advanced water reclamation. It will examine how this system operates as an engineered ecological cascade. A microalgae-bacteria consortium within the photobioreactor performs high-efficiency first stage treatment, removing pollutants like organic matter, emerging pollutants of concern, and nutrients while generating valuable microalgae biomass. The constructed wetland subsequently acts as a robust polishing stage, leveraging phytoremediation, microbial processes, and substrate filtration to remove residual contaminants and stabilize water quality to reusable standards. Drawing on applied research, including case studies, this talk will demonstrate how this integrated approach can achieve high removal efficiencies for key pollutants while facilitating nutrient recovery. The discussion will extend to its applicability across diverse sectors, such as dairy processing, textile manufacturing, and urban wastewater and stormwater management, highlighting its versatility in addressing varied water quality challenges. Therefore, this keynote positions the photobioreactor-wetland synergy not merely as a treatment technology, but as a scalable, low-energy paradigm for reclaimed

water production. It will conclude by outlining its role in closing the water loop, supporting sustainable industrial practices, and contributing to water security within a circular economy framework.

Merve Alkac, Bayram Gündüz*

Department of Engineering Basic Sciences, Faculty of Engineering and Natural Sciences, Malatya Turgut Ozal University, Malatya, Türkiye

Biography: Prof. Dr. Bayram Gündüz is a scholar in Solid State Physics, specializing in optoelectronic materials, organic semiconductors, and functional nanomaterials. He received his Ph.D. from Fırat University. He has authored nearly 100 SCI/SCI-Expanded publications, delivered about 150 international conference presentations, and contributed to over 25 research projects. His work has received around 2,000 citations (h-index: 24). His research focuses on photonic devices, organic field-effect transistors, and graphene-based materials, aiming to bridge fundamental solid-state physics with advanced technological applications.

Smart biomaterials for the future of healthcare: Linking structure, mechanics, and light–matter interactions in dental and orthopedic systems

In this talk, I would like to emphasize how modern healthcare is being transformed by the emergence of smart biomaterials that go far beyond traditional structural roles. Today, materials used in medical applications are no longer expected to serve only as passive supports; instead, they are designed to actively contribute to diagnosis, treatment, and advanced biomedical device technologies. This shift reflects a growing interdisciplinary approach in materials science, where mechanical performance, chemical stability, biological compatibility, and optical functionality are considered together as interconnected design parameters. In particular, dental and orthopedic biomaterials provide clear examples of this evolution. In dental applications, materials must not only withstand mechanical loading but also reproduce natural optical characteristics such as translucency, color harmony, and controlled interaction with light during photoactivated procedures. In orthopedic systems, materials such as bone cements are primarily required to provide mechanical fixation and long-term stability while maintaining compatibility with surrounding biological tissue. Although these two application areas differ in function, both are fundamentally governed by how material composition and microstructure determine overall performance.

In this presentation, I will highlight how optical and mechanical properties are intrinsically linked in these systems. What I would like to particularly underline in this talk is that the integration of optical functionality into mechanically robust biomaterials opens new opportunities for next-generation healthcare technologies. These include smart implants,

optical biosensing platforms, and minimally invasive diagnostic systems. Ultimately, this integrated perspective supports the development of truly multifunctional biomaterials and aligns with the future direction of personalized medicine and advanced biomedical device engineering.

Carme Ferré-Pavia*, Alejandra Nieto-Sandoval, Luisa Martínez Garcia

Universitat Autònoma de Barcelona, Media, Communication and Culture Department, Spain

Biography: Dr. Carme Ferré-Pavia is Full Professor in the Department of Media, Communication and Culture at the Universitat Autònoma de Barcelona (Spain). She is the director of her department and also of the Research Group on Communication and Social Responsibility (Comress-IncomUAB). She is the author of a dozen monographs and around a hundred scientific journal articles. Her research interests focus on media ethics, social responsibility and the use of social media, especially those of young communicating climate change.

Young communicating climate change on social media: Facts and proposals

In the context of the current climate emergency, effective communication on Climate Change (CC) is paramount in order to inform and raise awareness. Our research on CC on TikTok, conducted during various climate summits, revealed a substantial decrease in the number of CC-related videos during the Egypt Summit compared to the previous summit. While the Glasgow Summit was notable for addressing primarily environmental issues, the Sharm el-Sheikh one saw a politicisation of the discourse, often unrelated to the climate issue. It is evident that only a limited number of sources were cited in the videos, and it is concerning that the majority of these sources did not disclose the origin of the information they conveyed. In light of the prevailing circumstances, we conducted another research based on workshops that will empower young people to communicate climate change in a close, positive and constructive manner.

Cristian Ravariu[1*], Bianca Adiaconiță[2], Eugen Chiriac[2], Marioara Avram[2]

[1]National University of Science and Technology Politehnica Bucharest, Faculty of Electronics ETTI, Dept. of Electronic Devices Circuits and Architectures Splaiul Independentei 313, Sect.6, 060042, Bucharest, Romania

[2]Dept. of Micro and Nano-Fluidics National Institute for Research and Development in Microtechnologies–IMT 126A Erou Iancu Nicolae Voluntari Ilfov, Romania

Biography: Prof. C. Ravariu studied Microelectronics at the Polytechnic University of Bucharest, Romania. He worked as scientific researcher first 5 years at Institute of Microtechnology, Bucharest, then joined the Polytechnic University of Bucharest. Since 2013 he obtained the position of Full Professor at the Polytechnic University of Bucharest, Faculty of Electronics, Romania. He has published more than 250 research articles. Since 2014 he is Chairman of the Romanian IEEE Electron Devices Chapter and his main interest is in nano-bio-devices, organic semiconductors for electronic devices and biomedical research.

Simulations of graphene layers used for the field effect transistors graphene based

Field Effect Transistors with Graphene (G-FETs) seem to be a serious candidate, as alternative to the traditional MOSFET transistors, benefiting from small dimensions, sometimes devices created on a single atomic layer, but accompanied by higher currents than in silicon, as the literature reported. Therefore, the G-FETs simulation represents a strong tool to develop this device area. The most reputable device simulation software is Silvaco. However, in the libraries of this software does not exist graphene, as a semiconductor material. However, graphene is a 2-dimensional sheet of carbon atoms, arranged in hexagonal shape, a configuration similar to the diamond. Therefore, the first G-FET transistor simulated in this work will use diamond with user-defined intrinsic properties. A G-FET transistor was simulated, starting from the manufacturing process in Athena. A layer of SiO_2 about 80nm thick is grown on a Si wafer, over which a diamond film about 180nm thick is deposited. A thin layer of Al_2O_3 of 5nm is deposited on top, as a gate insulator, and the polysilicon acts on top as a gate electrode, as in the MOSFET case. Laterally, the Source and Drain Al contacts are deposited, in the final G-FET structure. The structure is then loaded into Atlas to verify its functionality. Several simulated transfer characteristics, ID-VG, for pure diamond (Eg=5eV) and for various other band-gap Eg widths or impurities or electrodes material, on the diamond semiconductor were simulated.

The simulations are compared and matched to some measurements of experimental transistors from literature. Finally, this paper presented an algorithm how simulations tools from standard industry can be adapted to offer simulations match with experimental curves, for transistors made by non-standard materials, like Single-Layer Graphene (SLG), or Nano Crystalline Graphite (NCG).

Dai-Yeun Jeong

Director Asia Climate Change Education Center, South Korea
Emeritus Professor at Jeju National University, South Korea

Biography: Prof. and Dr. Dai-Yeun Jeong is presently the Director of Asia Climate Change Education Center and an emeritus professor of environmental sociology at Jeju National University in South Korea. He received BA and MA degree in sociology from Korea University (South Korea), and PhD in environmental sociology from the University of Queensland (Australia). He was a professor of environmental sociology at Jeju National University (South Korea) from 1981 to 2012. His past major professional activities include a teaching professor at the University of Sheffield in UK, the president of Asia-Pacific Sociological Association, a delegate of South Korean Government to United Nations Framework Convention on Climate Change (UNFCCC) and OECD environmental meeting, and a member of Presidential Commission on Sustainable Development Republic of Korea, etc. He has published 60 environment-related research papers in domestic and international academic journals and 13 books including Environmental Sociology. He has conducted 100 unpublished environment-related research projects funded by domestic and international organizations.

The concept of environment and its relationship with humans

Humans live not only with others, but also in the relation with environment which is the external reality. Therefore, the research on environment is conducted from various perspectives in natural and social science under the name of environmental engineering and environmental sociology, etc. However, the concept of environment remains unclear, and the research on nature is often perceived as environmental research.

According to how to define conceptually a reality, the direction and contents of the research on the reality is different, also human way of life in relation to environment is different. Therefore, it is very important and significant in both academia and human life to examine the concept of environment and its relationship with humans.

In this context, this paper aims at establishing the concept of environment and, based on the concept, to examine the relationship between environment and humans. In order to achieve the objectives, this paper will be composed of the following parts.

Part 1: <What Is Environment?> will be explained. The explanation will be composed of firstly <what concept is> and secondly <kinds of concept>. Based on the two, the concept of environment will be defined. Finally, environmental system which exists as an integrated reality being composed of conceptual components of environment will be explained.

Part 2: <The Mutual Relationship between Humans and Nature> will be explained. This paper will focus on nature among the categories of environment, therefore, the explanation will be composed of two sessions. One is the impact of nature on humans, and the other is the impact of humans on nature.

Part 3: As the concluding remarks, Part 3 will examine the implication of industrialization having caused nature being polluted/destroyed, and followed by the carrying capacity of nature which will be a guideline suggesting the limitation, direction, and content of the human intervention in nature in the future.

Dr. Heather M. Coleman

School of Pharmacy and Pharmaceutical Sciences, Ulster University, Ireland

Biography: Dr. Heather Coleman is a Senior Lecturer in Pharmaceutical Chemistry and the Associate Research Group Lead and Postgraduate Tutor in the School of Pharmacy and Pharmaceutical Sciences at Ulster University. Her research over the last 30 years has been focussed primarily on the fate, analysis and removal of contaminants of concern in the environment. This has involved pharmaceuticals, endocrine disrupting chemicals, antibiotics, personal care products in water, wastewater and animal waste, involving both chemical analysis by high resolution techniques and invitro/in vivo biological analysis. She has also investigated antibiotic removal using alternative water treatments and prescribing rates and attitudes to antimicrobial resistance across the healthcare sector.

Sustainable low-cost adsorbents for the removal of pharmaceutical contaminants from wastewater

The release of antibiotics and other pharmaceuticals into aquatic ecosystems through household, industrial and agricultural wastewater poses significant environmental risks and adverse effects on human and animal health. Conventional water treatment technologies often exhibit limited efficiency in removing these persistent contaminants, highlighting the need for improved, sustainable and cost-effective treatment strategies.

Adsorption has emerged as a promising method for contaminant removal, with activated carbon widely recognized for its high adsorption capacity and versatility in water treatment systems. However, its relatively high cost restricts large-scale application, particularly in resource-limited regions. Consequently, low-cost alternative adsorbents derived from agricultural and industrial by-products such as sawdust, seaweed, biochar, clay minerals and modified zeolites are gaining increasing attention. These materials have demonstrated potential for the removal of pharmaceuticals and heavy metals from aqueous environments.

This study investigates sustainable materials, specifically sawdust and seaweed, as alternative adsorbents for the removal of contaminants of emerging concern from water. While these materials offer notable economic and environmental advantages, their adsorption performance and underlying mechanisms require systematic evaluation. The findings of this research aim to contribute to the development of affordable and sustainable wastewater treatment solutions for the effective removal of pharmaceutical pollutants in wastewater prior to discharge into the environment.

Helena Belchior Rocha

Iscte-University Institute of Lisbon (CIES), Portugal

Biography: Helena Belchior Rocha holds a PhD in Social Work, Professor in the Department of Political Science and Public Policy and integrated researcher at CIES-ISCTE. From 2018 to 2025, Deputy Director of the Laboratory of Transversal Skills (LCT) (Soft Skills Lab), from 2018 to 2025, Director of the LCT's Center for Transversal Skills, and from 2022 to 2025, Director of the LCT's Language Center. She involved in national and international projects, including three Marie Curie, Horizon projects, Erasmus and several Cost Actions. Her articles, book chapters, and communications at national and international scientific events in the areas of Social Services theory and methodology, sustainability, community intervention, ethics, human rights, social policies and well-being, education, and transversal skills. She is a member of the editorial and scientific boards of national and international journals. And Helena is a member of the Scientific Committee of the Department of Political Science and Public Policy and member of the Plenary Scientific Council of Iscte.

Local actions, global impact: Community-centered approaches to green chemistry and renewable energy for sustainability

In the face of escalating environmental challenges and social inequalities, the transition to sustainable systems must be both technologically innovative and socially inclusive. This presentation explores the link of green chemistry and renewable energy through the lens of community-centered social intervention. Drawing on case studies and research, it highlights how local communities, particularly those in vulnerable or under-resourced context, can become active agents in co-creating sustainable solutions.

With the integration of principles of green chemistry with decentralized renewable energy initiatives, communities can reduce environmental harm while fostering social cohesion, economic resilience, and environmental justice. The presentation will examine how grassroots engagement, local knowledge, and inclusive governance can amplify the impact of scientific and technological advances, ensuring that sustainability transitions are equitable and culturally grounded.

Ultimately, this contribution argues that global sustainability goals are best achieved when local actions are empowered, and when green chemistry and renewable energy are not only seen as scientific domains but as tools for transformative social change.

Hossam A. Gabbar, Professor, P.Eng., Fellow IET (FIET), Distinguished Lecturer IEEE NPSS, Director of Advanced Plasma Engineering Lab (APEL)

Department of Energy and Nuclear Engineering, Faculty of Engineering and Applied Science, Ontario Tech University, Oshawa, Ontario, Canada

Biography: Dr. Gabbar is a full Professor in the Faculty of Energy Systems and Nuclear Science, and cross appointed in the Faculty of Engineering and Applied Science, at Ontario Tech University (UOIT), where he established the Energy Safety and Control Lab (ESCL), Smart Energy Systems Lab, and Advanced Plasma Engineering Lab. He is the recipient of the Senior Research Excellence Aware for 2016, UOIT. He is recognized among the top 2% of worldwide scientists with high citation in the area of energy. He is a Distinguished Lecturer of IEEE NPSS, and he is a Fellow IET (FIET). He is leading national and international research in the areas of smart energy grids, energy safety and control systems, and waste-to-energy using advanced plasma technologies. Dr. Gabbar obtained his B.Sc. degree in 1988 with first class of honor from the Faculty of Engineering, Alexandria University (Egypt). In 2001, he obtained his Ph.D. degree from Okayama University (Japan). From 2001 till 2004, he joined Tokyo Institute of Technology (Japan), as a research associate. From 2004 till 2008, he joined Okayama University (Japan) as an Associate Professor, in the Division of Industrial Innovation Sciences. From 2007 till 2008, he was a Visiting Professor at the University of Toronto. He also worked as process control, safety, and automation specialist in energy and oil & gas industries. Dr. Gabbar has more than 290 publications, including patents, books / chapters, journal, and conference papers.

Advances in plasma-based waste treatment

This talk presents advanced approaches for plasma-based waste treatment. Different designs of plasma torches and generation systems are discussed, including RF, DC, and MW plasma, are analysed and compared for waste-to-energy and radioactive waste treatment applications. Novel plasma torch design is proposed to support different scales and types of waste treatment. Process engineering techniques for gasification and pyrolysis process are integrated with the radioactive waste treatment process, which are illustrated with waste characterization. The proposed approaches showed reduced waste treatment costs, risks, volumes, in addition to reduced greenhouse gas emissions and improved lifecycle performance. Plasma systems are utilized for nuclear and municipal waste treatment with analysis of different waste categories and types. Process design is discussed for plasma torch that can reduce the volume and lifecycle cost of waste processing. Simulation methods and experimental setups demonstrate lab-scale process technologies for plasma-based waste treatment.

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Tetyana Yevtukhova

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Biography: Dr. Oleksandr Novoseltsev is the Head of Department of the General Energy Institute of the National Academy of Sciences of Ukraine, specializing in the field of energy systems modeling, energy efficiency and energy management in the municipal sector through the implementation of investment projects in the field of energy services. With over 30 years of experience in research and practice, Dr. Novoseltsev is the author of over 30 peer-reviewed publications and 5 books on eco-transformation of energy systems in urban areas, and has also presented papers at international conferences in the USA, Japan, France, Germany, Canada, Hungary, Bulgaria, Poland and Ukraine.

The business logic of service-oriented transformation of urban energy systems

The service-oriented transformation of energy systems of urban communities is considered in the context of innovative development of decentralization technologies, energy security and renewable energy in the context of global climate challenges and technological digitalization. The main work task is to develop a service-oriented transformation paradigm that considers the multilateral interaction of market participants and digital transformation. This paradigm would ensure flexibility and adaptability to changing market conditions, promote the integration of renewable energy sources, and encourage consumers to actively participate in energy processes. This paper formalizes the concept of service-dominant logic for energy systems of urban communities. This concept involves integrating physical energy flows, digital services, and the interaction of market participants into a single model for creating cooperative value. This allows us to consider the energy system as not only an infrastructure for energy supply but also a complex socio-technical system that generates added value through the integration of services, such as balancing, demand management, analytics, peer-to-peer exchange, and digital pricing. We consider applying the principles of comparative advantages to optimize the allocation of energy system resources, which would allow for more efficient use of local resources, reduce costs, increase system stability, and ensure better integration of renewable and decentralized energy sources into the energy balances of urban communities. We consider a comprehensive, multi-level modeling approach for this type of energy system that takes into account nonlinear interactions between different types of agents (producers, consumers, prosumers, and aggregators) in a service-oriented environment. Agent-oriented simulations will enable us to reproduce emergent effects in complex energy systems.

Alexis Spalletta, Joanne Chojnacki, Eloïse Lemaire, Aurore Chaumier, Nicolas Joly, Ludovic Chaveriat, Vincent Lequart, Patrick Martin*

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Biography: Patrick Martin is a Professor at the University of Artois (Béthune, France) and Director of the Artois site of the Unit Transformations et Agroressources (ULR 7519) is expert in bio-based chemistry (extraction, characterization, formulation/modification). He has specialized in the conception of bio-based products starting from biomolecules and biopolymers as raw material by chemical pathways. His current research interests are in the field; glycochemistry and lipochemistry (surfactants, liquid crystals, biocontrol, biopesticides, drug targeting), secondary metabolites (anti-oxidants, dyes) and biomaterials (plastic, concrete).

Macroalgae: An interesting source of highly diversified specific polysaccharides–Psamal project

Seaweed are used by coastal populations for centuries for their high nutritional value, but today represents a major economic development challenge. Macroalgae are a high-potential renewable bioresources with a fast-growing value-added market. Among many bioactive components derived from algae, glycans are polysaccharides of variable size, distinguished by their multiple properties, especially antioxidant, antimicrobial, anticarcinogenic, immunostimulant and anti-inflammatory ones. These algal polysaccharide bioactivities are mainly attributed to the complex, highly branched polymeric structures and specific chemical compositions, including sulfated groups. For example, galactans and fucoidans are sulfated polysaccharides of interest (Figure 1A).

Thus, algal polysaccharides show great potential for applications in the food and feed, pharmaceutical, phytosanitary, nutraceutical and cosmetic sectors, justified by the attraction of active ingredients of natural origin. Nevertheless, despite their potential to generate numerous high value-added products and biomolecules, algae remain under-utilized in Europe.

The present work focuses on the evaluation of polysaccharidic content (carrageenan, xylan, galactan, fucoidan) of three macroalgae cultivated in our regions (Opalgue project), two species of red algae, i.e. *Palmaria Palmata* (PP) and *Porphyra Purpurea* (PU), and a brown one, *Saccharina Latissima* (SL). Various extractions and treatments were carried out. Conventional maceration-type extractions in H_2O/Ethanol mixtures at 40°C, 150rpm

for 4h and polysaccharide-selective extractions in H_2O at 80°C, 150rpm for 2h were compared. Total Phenolic and Flavonoic Content (TPC and TFC), total sugars (Figure 1B) and sulfates were determined using UV spectrophotometric methods, as well as polysaccharidic chemical characterization.

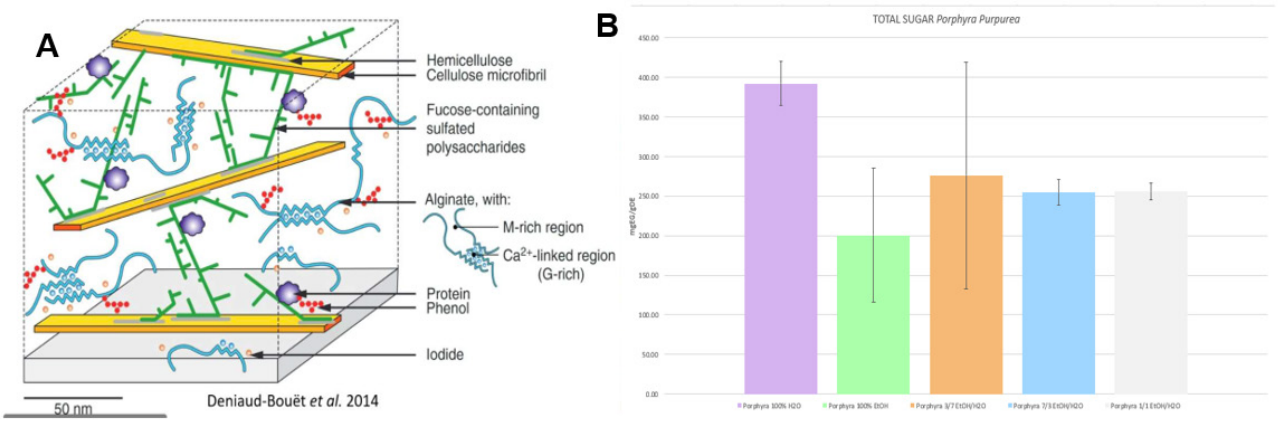

Figure 1: Polysaccharides found in algae (A). Total sugar content in mgEG/gDE for non-selective extraction in *Porphyra purpurea*.

For example, the selective polysaccharide treatment condition provided significant total sugar quantities up to 764mg EG/gDE (mg glucose equivalent/g dry extract) instead of 400mg EG/gDE in non-selective aqueous extraction in Porphyra extract. At the same time, the antioxidant activities of every extract were carried out. These extracts are currently tested for their antimicrobial, antifungal and biostimulant activity (Malgabio project). In the near future, tests to obtain oligosaccharides from algal polysaccharides will be carried out in the laboratory, by chemical, mechanochemical and enzymatic processes.

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Biography: Dr. Sergey Suchkov was born in Astrakhan, Russia, into a family of medical doctors. He earned his MD from As-trakhan State Medical University in 1980 and his PhD from Sechenov University in 1985. He received advanced training at the NIH (Bethesda, USA), Wills Eye Hospital (Philadelphia, USA), and several British universities under the Royal Society for Immunology. Dr. Suchkov has held numerous academic and leadership roles, including Direc-tor of the Division for Clinical Immunology & Immuno biotechnology at MONIKI, and Professor and Chair of the De-partment for Personalized & Precision Medicine at Sechenov University. He has also served as Vice-Director of the Institute for Biotech & Global Health at Ros BioTech National University. Currently, Dr. Suchkov is Professor of Medicine & Immunology and Director of the Center for Bio design at the N. D. Zelinskii Institute of Organic Chemis-try, Russian Academy of Sciences. He also serves as R&D Director at In Med Star (Russia–UAE) and Senior Sci-entific Advisor to the China Hong Kong Innovation International Business Association. He is an active member of several international scientific organizations, including the New York Academy of Sciences, EPMA, ISPM, PMC, AMEE, ACS, AHA, ARVO, and ISER, and is Secretary General of the United Cultural Convention (UCC), Cam-bridge, UK.

Personalized and Precision Medicine (PPM) as a unique healthcare model through design-driven biotech and upgraded business marketing to secure the planetary ecosystem and biosafety

Personalized & Precision Medicine (PPM) whilst playing a crucial role in the modern healthcare services, it is already an important topic in public and private health care debates with clear importance in the future. PPM uses methods of molecular analysis in order to identify genetic mutations and to evaluate each individual's risk of contracting a given disease. The measurement of complex environmental factors that exert pressure on our health has not kept pace with genomics and historically has not provided a similar level of resolution.

Most diseases result from the complex interplay between genetic and environmental (exposomal) factors. The exposome is an OMICS-scale characterization of the non-genetic drivers of health and disease. With the genome, it defines the phenome of an individual.

Mapping the exposome is ultimately about understanding the divergence between our genetic predispositions and our biological reality. It requires not just studying environmental chemicals, it is about studying all of the chemicals, endogenous and exogenous alike, that influence human biology. Meanwhile, functional exposomics to associate environmental exposure to phenotype complements functional genomics linking genotype to phenotype. For instance, risk and progression of common, non-communicable diseases, crucially depend on environmental and behavioural factors rather than genetic ones! For effective risk identification, we will actually need to integrate genetic effects with environmental exposures. A broader understanding of disease that includes gene-environment interactions would enable individuals and healthcare providers to realistically see genetics as just one of a suite of precision tools to achieve healthier living, rather than a powerful method to reliably predict future disease!

The concept of “PPM” refers to the possibility of fine-tuning diagnoses and therapies to the bio profile of each patient. The PPM-based Ecosystem, for instance, is a strategic initiative from the PPM-related Scotland-Innovation Centre that brings together healthcare, life sciences and academic organizations that want to align their activities through partnership to deliver PPM programs more efficiently and effectively.

With the help of computational health sciences and as the knowledge network is developed, patients and providers will be able to see how environmental, social and behavioural factors relate to the patient in front of them. The exposome concept is maturing and gaining increasing applications in human and wildlife studies. Significant progress has been made in multi-ple areas but there are still multiple obstacles to actionizing the exposome to directly benefit patients and contribute to disease prevention. Working together across disciplines, we can actionize the exposome to increase our understanding of the etiology of chronic heterogene-ous and multifactorial diseases toward the goal of intervention and future disease prevention.

Tomayess Issa

Curtin University, Perth Western Australia, Australia

Biography: Dr. Tomayess Issa has 26 years of teaching experience in Australia. She has supervised students working on PhD, Master of Philosophy, and Master Dissertations. Three of her PhD students were commended by the Chancellor of Curtin University. Her research interests include information systems, smart technologies, sustainability, and innovative teaching approaches. She has written several books and articles for peer-reviewed journals and has been recognized with teaching, learning, and research awards both nationally and internationally.

Enhancing postgraduate student's perspective of sustainability awareness in Australia: A practical experience

The aim of this research is to deepen the comprehension of sustainability awareness among postgraduate students enrolled in three specific units: ISYS6004 Green Information Technology and Sustainability, MGMT6085 Corporate Sustainability Immersion, and MGMT6068 Sustainability and Global Business Study Tour. These units are aligned with UNSDG 7, 8, 9, 11, 12, 13, 16, and 17. Universities are focusing more on sustainability education to prepare students to address global challenges responsibly. This includes expanding their understanding of economic, social, and environmental concerns, with a focus on technology waste, energy consumption, recycling, Indigenous knowledge, sovereignty, and community well-being. The units offer hands-on sustainability experience through MGMT6068 to Jordan and Singapore in 2023 and 2025, respectively, while MGMT6085 engages students in devising practical solutions for a company in Swan Valley through on-site visits. ISYS6004 tasks students with formulating a sustainable IT strategy to tackle IT challenges in a real-world organization, both locally and globally. Feedback from 700 students reveals that completing these units, which involve individual and group assessments, has improved students' technical and interpersonal skills for academic and professional endeavors, while also raising awareness of cultural and environmental issues, technological proficiency, and a dedication to environmental stewardship.

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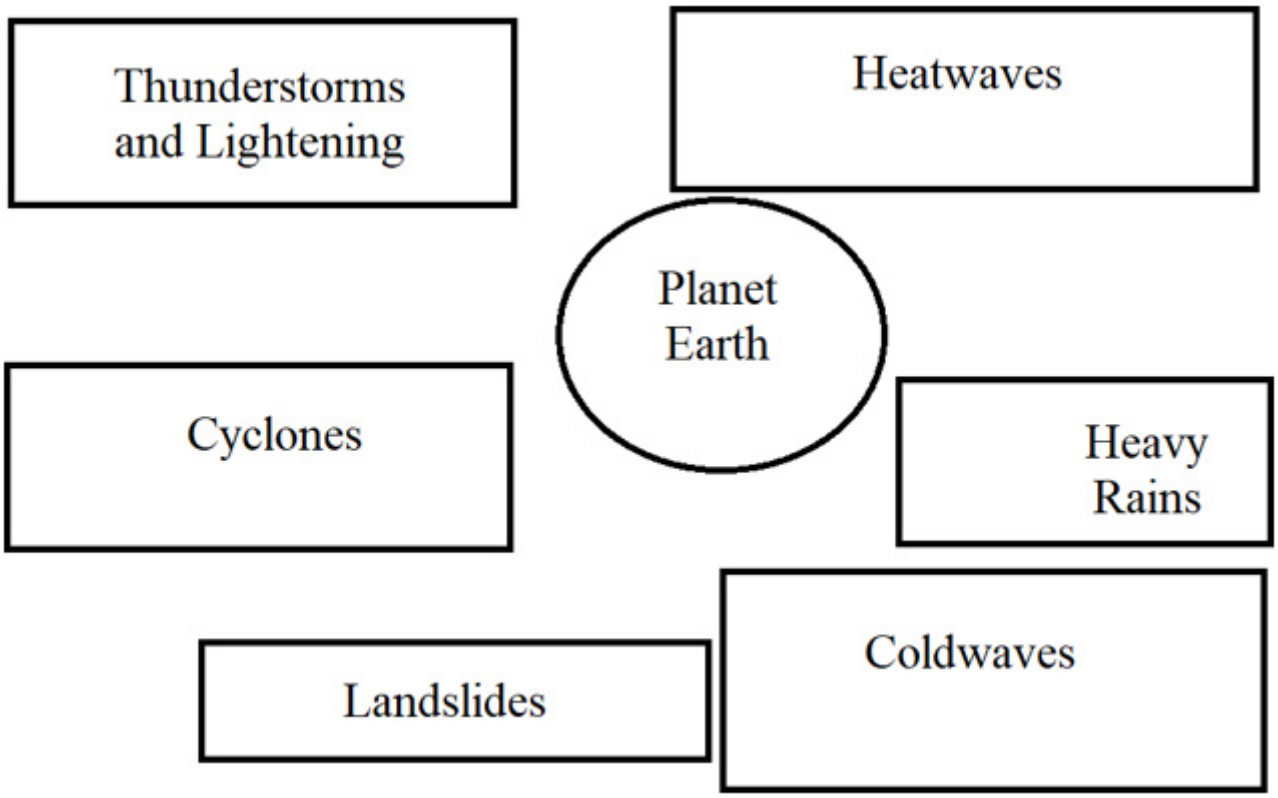
Biography: Dr. Vijayan Gurumurthy Iyer studied Environmental Science and Engineering with Specialization in Green Chemistry at the Indian School of Mines, Dhanbad, India and post graduated as Master of Technology, M.Tech, in 1998. He received his Ph.D. degree in Environmental Science and Engineering in 2003 at the same institution. He has served in Indian Council of Agricultural Research (I.C.A.R.) with effect from 22.05.1985 (FN) to 10.02.1998 (FN). In the year 2006, he joined the post-doctoral fellow at the World Scientific and Engineering Academy and Society (WSEAS), Athens, Greece. After ten years of postdoctoral research, he obtained the position of Professor at the Institute of Technology, Haramaya University, Harar, Ethiopia, East Africa. He has published more than 470 research articles in recognized journals and conference proceedings including recognized abstracts h.index of 70. and total number of 7245 citations. Visited Shanghai and Quinson at China, Singapore, Athens, Port Blair Andaman and Havoloc Islands, Bangkok Thailand, Frankfort Germany and Haramaya, Ethiopia.

Importance of green chemistry with a case study for the sustainable industrial development

Climate and weather changes are serious threats and should be controlled effective, efficient and combined managerial approach. The world has been experiencing extreme weather events due to climate crisis for about 90% of the days. Though the year, different parts of the world reeled in floods, heat waves, and cyclones giving adverse environmental health effects on plant, animal and human health. Global temperatures are now not to breach 1.5°C of warming within the next five years as per the El Nino, Neutral and La Nina phenomena.

In 2023, India experienced 365 days of extreme weather events like heat waves, cold waves, heavy rains, floods, cyclones, landslides, thunderstorms and lightening and others. As per the publication and citation of techno-economic-environmental impact study and check conducted, extreme climate and weather will become increasingly intense and frequent. The damage that this would cause to our ecosystems will be irreversible. National Climate Policy Act (NCPA) process is suggested that will integrate different policies and laws to protect environment, climate, weather, biodiversity and sustainable development of its people as the climate change is real and deed to be controlled as per figure given below.



Climate change is a serious threat and should be controlled effectively and efficiently by conducting Environmental Health Impact Assessment (EHIA) process. Green chemistry is discussed titled 'Indian cotton Double Roller (DR) ginning industries using Chrome Composite Leather Clad (CCLC) rollers and design and development of green chemistry rollers towards Sustainable Industrial Development (SID)'. SID can be defined as the industrial development which meets the needs of the present without compromising the ability and efficiency of future generations to meet their own needs. "Environmental Impact Assessment Process" (EIA process) can be defined as the systematic identification and evaluation of the potential impacts (effects) of proposed projects, plans, programs, or legislative actions relative to the physical-chemical, biological, cultural, and socioeconomic components of the total environment. The objective is to conduct Environmental Health Impact Assessment (EHIA) process that is to systematically identify and evaluate potential environmental health impacts of CCLC rollers used in Indian CCLC Double Roller (DR) ginning industries with relative to the physical - chemical and biological can be referred as entitled "natural or biophysical environment" and the cultural and socioeconomic environment represents entitled "man-made environmental components" of the total environment. The systematical identification and evaluation of bio- accumulation and bio-magnification environmental health effects of climate change on soil and plants including cotton seed plants completed. Investigation has been done for such health effects of Polycyclic Aromatic Hydrocarbons (PAHs) such of those harmful substances in Pumpkins, Bt Cotton, viz., Fluorene, Phenanthrene, Acenaphthylene, Acenaphthylene and Acenaphthene of about 10 ppm in mg/Kg as PAHs (MAC: 0.1mg/kg).

Most of the cotton ginning operations are performed by using DR ginning machines which serve an important role in the Indian cotton ginning industries. The rollers used are made of CCLC covering fixed to a shaft. The CCLC contains about 18,000 to 36,000mg/kg (ppm) (1.8%-3.6%) of chromium particles. The chromium stabilizes the CCLC by cross linking the collagen fibres in chromium leather tanning industries. Chromium salts, especially chrome alum and chromium (III) sulfate are used in chromium-tanning of leather. Chromium tanned leather contains between

3 to 5% of chromium, which is tightly bound to the proteins. For certain types of projects, such as nuclear power plants, it may be necessary to address psychological impacts on nearby residents as per reference entitled "Can Change Damage Your Mental Health?" Nature, Volume 295, January 21, 1982, pp.177-179 for the necessity to address psychological impacts on nearby residents and reference entitled "An Environmental Health Impact Assessment (EHIA) process" published by World Health Organization (WHO) titled 'Health and Safety component of Environmental Impact Assessment 'from WHO publication, Copenhagen in 1987". Although the form of chromium used for tanning is not toxic hexavalent variety, there remains interest in the management of chromium in the tanning industry such as recovery and reuses, direct / indirect recycling, use of less chromium or 'chrome-less tanning is need to be practiced to better manage chromium in tanning with respect to green chemistry. Chromium salts or chromates in contact with skin, lungs and stomach result in dermatitis and lung and esophagus cancer and brain tumor among Indian gin and textile mill workers. Brief or occasional contact may not pose a problem. Potassium dichromate is a chromium salt or chromate and is a common metal making up a significant part of the earth's crust. The most common home exposure of chromate is leather. The majority of leather goods, including shoe and gloves, are tanned with chromates. It is necessary to avoid chromate tanned leather gloves, and shoes. Vegetable tanned leather gloves and shoes or plastic shoes and Oak Bark -Tanning in the traditional manner is recommended compare to chromate tanned leather. For those with shoe dermatitis from chromate and leather, wearing heavy socks or reducing perspiration and moisture may help to reduce dermatitis. The amount of chromium found in all skin layers due to chromium permeation through human skins in diffusion cells. In ginning factories, when the seed-cotton is processed in DR ginning machine, the lint cotton is contaminated with hexavalent and trivalent chromium dust of about 140 to 1990mg/kg (ppm), Cr (VI) and Cr(III) which is carcinogenic substance against the safe limits of 0.1ppm. Ion chromatographic method and atomic absorption spectrometry method are employed for determining chromium content in all samples and Chromium (VI) found more with increased total chromium concentration in samples due to increasing level of application of potassium dichromate and is found cancer among all skin dermatitis workers. The percentage of chromium found During the cotton ginning process due to persistent rubbing of CCLC over stationary knife the chromium particles are adsorbed into lint cotton such that the spun yarns and woven fabrics get contaminated about 100 to 200ppm which according to eco-standards should not be more than 0.1ppm. The CCLC rollers used in cotton roller ginning machines get powdered during the ginning process. As chromium is a specific dust, gin and mill workers and residents are directly exposed to this carcinogenic substance and are vulnerable to environmental health hazards. To offset this problem, pollution-free eco-friendly washers/rollers both for laboratory and commercial studies have been fabricated and experimented. Green chemistry attempts are made to alternate dust-producing grinding CCLC ginneries. Environmental Health Inventory (EHI) serves as the basis for evaluating the potential environmental health impacts both beneficial and adverse of a proposed action. Environmental Health Impact Statement (EHIS) describes the affected environmental health or environmental health setting without the project. Green design and development of the EHI is an initial step in the EHIA process of climate control as the climate change is real. It is concluded that EHIA process (CCPA) as green chemistry is conducted for certain projects, plans, programs, legislative actions, policies in the project planning and decision-making process.

Keywords: Chemistry, Environment, Gin, Green, Sustainability.

Prof. Dr. Yarub Al-Douri

Fellow of European Academy of Sciences, Belgium

Biography: Prof. Dr. Yarub Al-Douri is a Fellow of European Academy of Sciences. Al-Douri is winner of the prestigious Khalifa International Award for Date Palm and Agricultural Innovation 2024. He has initiated Nanotechnology Engineering MSc Program and Nano Computing Laboratory. He has received numerous accolades including winner of IAAM Scientist Award by International Association of Advanced Materials, Sweden 2022, World's Top 2% Scientists by Stanford University, USA 2023, 2022, 2021 & 2020, World's Top 2% Scientist Career-Long Citation Impact by Stanford University, USA 2020, OeAD Award, Austria 2020, Japan Society for the Promotion of Science (JSPS) Award 2019, Asian Universities Alliance (AUA) Award 2019, the total is 76 awards. Al-Douri is Associate Editor of Nano-Micro Letters (Q1, IF=31. 6, Springer), Editor-in-Chief of Experimental and Theoretical Nanotechnology, Editor-in-Chief of World Journal of Nano Science and Engineering. His research field focuses on nanotechnology, renewable energy, nanoelectronics, nanomaterials, modelling and simulation, semiconductors, optical studies. Finally, Al-Douri is a public figure at international media in the UK, Singapore, Malaysia, Qatar and UAE. Al-Douri has more than 880 publications including Citations < 13000, h-index=62, i10-index=249 and US$ 5.1M research grants. Finally, Al-Douri is one of the Middle-East, North of Africa, Malaysia and Southeast Asia's most renowned scientists known for his contributions in Nanotechnology and renewable energy, and a public figure at international media in the UK, Singapore, Malaysia, Qatar and UAE.

Morphological studies of quaternary alloy

Ceramic-based quaternary II–VI materials have attracted much interests because their constituent elements have important characteristics, high characteristics of structure and optic applicable for digital recording heads, telecommunications, transformers, computers, sensors, photovoltaics, antibacterial and others. The $MgZnFe_2O_3$, $CoZnFe_2O_3$ and $NiZnFe_2O_3$ quaternary alloys nanoparticles are tetrahedral materials of chalcopyrite structure. They have been prepared by green technique; their structural properties are varied as atomic number varies. Due to limited or unavailability resources of the mentioned quaternary alloys nanoparticles, the cost is a challenge. However, green synthesis has reduced their cost.

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Av. Alper Yilmaz
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Towards a just transition insurance mechanism integrating climate risk, social protection, and green finance

The accelerating impacts of climate change expose workers worldwide to unprecedented socioeconomic risks. Extreme weather events-floods, wildfires, droughts, heatwaves, and storms-are no longer occasional shocks but recurring disruptions that erode job security, income stability, and occupational health. Current social insurance systems, largely designed for conventional economic cycles and individual contingencies, remain ill-equipped to address collective climate-induced risks. Against this backdrop, this article proposes a novel policy and financial architecture: A Just Transition Insurance System (JTIS) that combines disaster-related wage protection with green investment strategies, embedded within existing climate governance frameworks such as the EU Emissions Trading System (ETS).

1. **Conceptual foundation: Linking just transition and climate risk insurance:** The concept of a "just transition" has emerged as a normative principle in international climate law and labor governance, emphasizing the need to reconcile decarbonization with social justice. However, most policy approaches remain confined to employment reallocation and retraining schemes, neglecting the urgent reality of climate disasters that directly displace or incapacitate workers. By creating a dedicated insurance mechanism, the JTIS seeks to institutionalize solidarity among states, employers, and employees while mobilizing climate finance to buffer social vulnerability. In this model, climate-induced disasters are treated not merely as humanitarian emergencies but as structural labor risks requiring systemic insurance solutions.

2. **Financing architecture: Multi-stakeholder contributions**
   The JTIS is financed through a hybrid model: State contributions reflect the social policy obligation to secure citizens against systemic risks. Employer contributions operationalize the principle of responsibility for occupational safety and continuity of employment. Employee contributions ensure minimum participation and strengthen solidarity within the system.
   ETS revenues provide the innovation: A portion of carbon pricing income is redirected to support disaster-related social protection, thus linking emissions responsibility with labor resilience. This diversified financing model mitigates fiscal asymmetry, embeds polluter-pays principles, and aligns with the broader EU framework for climate finance allocation.

3. **Green investment nexus: Dual social and climate benefits:** A distinguishing feature of the JTIS is its integration of green finance mechanisms. A share of collected premiums and ETS revenues would be invested in renewable energy, resilient infrastructure, and sustainable transport. These investments generate twofold outcomes:
   Social dividends: Stable returns to sustain disaster payouts.
   Climate dividends: Carbon credit generation through offset mechanisms, reinvested in adaptation and mitigation projects. By embedding insurance within the carbon economy, the JTIS transforms social protection into an instrument of ecological transition.

4. **Role of insurance and reinsurance companies:** Insurance providers are not mere intermediaries but potential catalysts of sustainable finance. By channeling portions of their revenues into green projects, insurers can expand their role beyond risk transfer to risk transformation. Moreover, reinsurance mechanisms enable the diffusion of large-scale catastrophic risks across global capital markets. Reinsurers may employ green financial instruments-such as sustainability-linked bonds or transition funds-to stabilize their exposure. This expands the reach of the JTISF beyond domestic or regional boundaries, embedding climate solidarity into the global financial architecture.

5. **Catastrophe bonds and alternative risk transfer:** To supplement traditional insurance and reinsurance, the JTIS could issue catastrophe bonds (Cat Bonds), which securitize disaster risks by transferring them to capital market investors. If no disaster occurs, investors enjoy above-market returns; if disasters strike, proceeds are redirected to worker compensation. Importantly, this model can be adapted into Green Cat Bonds, where raised capital simultaneously finances adaptation projects. Furthermore, for jurisdictions adhering to Islamic finance principles, a sukuk-based model could replace conventional interest-bearing instruments. Here, investors share in project-generated profits rather than fixed coupon payments, while accepting reduced returns in disaster years as a form of social solidarity.

6. **Beyond compensation: Education and transition support:** The JTIS should not be limited to post-disaster compensation. A portion of funds could be earmarked for worker retraining and green skill development, facilitating transitions into sustainable industries. This broadens the scope of the insurance from reactive protection to proactive capacity-building, aligning disaster resilience with long-term just transition goals. Workers not

only receive income security during crises but also gain pathways into climate-resilient employment sectors.

7. **Legal and governance implications:** From a legal perspective, the JTIS necessitates a hybrid governance framework:
   International alignment: Consistency with International Labour Organization (ILO) just transition guidelines and the Paris Agreement's climate finance commitments.
   Regional integration: Embedding within EU ETS governance to ensure predictability and enforceability.
   National implementation: Domestic legislation to formalize contributions, establish eligibility criteria, and regulate fund distribution. Such multi-level governance enhances legitimacy and avoids fragmentation across jurisdictions.

8. **Expected outcomes and systemic impact**
   The integrated JTIS model generates cascading benefits: Workers obtain disaster-related income guarantees and green re-employment opportunities. Employers reduce liabilities through risk-sharing while contributing to systemic resilience. Governments strengthen social cohesion and climate adaptation capacities. Insurers and reinsurers expand market opportunities via innovative green instruments. Society gains from synchronized social protection and ecological sustainability. This framework transcends the binary of climate mitigation vs. social justice by institutionalizing both within a single financial architecture.

9. **Conclusion:** The urgency of climate disruption requires reimagining social protection systems beyond their conventional boundaries. The Just Transition Insurance represents a transformative approach thorough integrating disaster-related wage protection with green finance, carbon markets, and innovative risk transfer instruments. By aligning labor rights, financial innovation, and ecological imperatives, this model establishes a blueprint for climate-resilient welfare states. Far from being a mere insurance scheme, the JTIS embodies a new form of climate constitutionalism-anchoring workers' rights within the architecture of global sustainability governance.

Biography

Mr. Alper YILMAZ, founding partner of Gungor Yilmaz Law Firm, graduated from Galatasaray University, Faculty of Law and started his career in Arthur Andersen, he then served as a senior attorney in Ernst & Young. Mr. Yılmaz advices his clients on a wide range of consultancy and litigation services and has a significant reputation particularly in Labor Law, Corporate Law, Real Estate Law. He is the author of numerous published articles in this regard as well as a lecturer in labor law trainings, seminars, conferences, panels and workshops for more than 10 years. Mr. Yılmaz, fluent in French and English, is also a member of Labor and Social Security Law Journal Editorial Board.

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From peripheral margin to smart city: The impacts of the new Lisbon airport on centrality

In recent decades, metropolitan areas have been profoundly transformed not only by the intensification of the urbanization process, but also by inspiration drawn from the Smart City paradigm. These dynamics extend from consolidated urban spaces to suburban territories, contributing to the redefinition of relationships between the center and the periphery.

In this context, this research aims to analyze the territorial transformations in Benavente, on the peripheral edge of the Metropolitan Area, driven by the location of the new Lisbon Airport. This type of infrastructure plays a structuring role in territorial organization, changing the dynamics between central spaces and peripheral zones.

The main goal is to implement a pilot-project in Benavente, a pioneering Smart City experience, inspired by pivotal examples at both, the global scale, such as Dubai or Singapore, and the European realm, such as Barcelona or Copenhagen, through a partnership between the Municipality and the private i-tech sector. Among the planned actions in the Pilot-Project there is the testing of an integrated network of sensors and Internet of Things (IoT) technologies for the real-time collection of territorial data, digital platforms for the management and analysis of urban data, to support municipal decision making processes, as well as mobile applications aimed at managing incidents across various infrastructures and improving communication with citizens and their engagement.

There is the expectation that the results achieved in this research may contribute to establishing Benavente as a pole of urban centrality within the metropolitan context. From the Pilot-Project, there is the main outcome that the results will encourage the consolidation of this and other Portuguese territories as smart cities.

Keywords: Smart Cities, Peripheral Areas, Urban and Metropolitan Centrality, New Lisbon Airport, Benavente.

Biography

Dr. Virtudes is a scholar/researcher at the Department of Architecture, University of Beira Interior (Portugal). She was a Post-Doc researcher at LISA Lab. of Interdisciplinary Spatial Analysis, University of Cambridge (UK). She holds a PhD in Problems of Architecture and Modern City: Theory, History and Project, by the Institute of Spatial Planning, University of Valladolid (Spain), a PhD in Architecture by the University of Beira Interior (Portugal), a Masters in Urban Planning by the University of Lisbon (Portugal), a Degree in Architecture by ESAP Porto (Portugal) and a Degree in Urban and Regional Planning, by the University of Aveiro (Portugal).

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Assessment of insect biodiversity in industrial hemp crops

Industrial hemp (*Cannabis sativa L.*) has increasingly been recognized as a sustainable agricultural crop, with low environmental impact and high potential to promote biodiversity in agricultural systems. Although its pollination is anemophilous and therefore independent of insect pollinators (Lipson Feder et al., 2021), hemp produces large quantities of pollen (O'Brien & Arathi, 2019), making it a relevant food resource for beneficial insects, particularly during periods of scarcity of entomophilous flowering plants (Saunders, 2018). The recurrent presence of bees on hemp inflorescences suggests that this crop may play a complementary role in maintaining pollinator diversity and abundance in intensive agricultural landscapes (González-Varo et al., 2013; Potts et al., 2010). In this context, the present study was developed within the Bgreener project, in the cross-border Euroace region (Central Portugal, Extremadura, and Alentejo), with the aim of assessing the contribution of industrial hemp to entomological biodiversity. The trial was conducted over two growing seasons (2024 and 2025), with four industrial hemp varieties established (Futura 75, Fibror 79, Santhica 27, and Mona 16). Biodiversity assessment was based on insect sampling using entomological aspiration in two contrasting areas: A hemp crop plot and a fallow plot with spontaneous vegetation. Sampling followed a zig-zag pattern to ensure spatial representativeness. Insect identification was carried out using the Rapid Biodiversity Assessment (RBA) methodology, allowing functional and taxonomic classification of captured individuals. Results showed higher insect abundance and richness in the hemp plot compared to the fallow area. In 2024, 365 insects were captured in the hemp plot and 126 in the fallow plot; in 2025, captures increased to 482 and decreased to 63 insects, respectively. Hemiptera and Coleoptera were the most abundant orders in both years, with phytophagous insects predominating. Nevertheless, a consistent presence of effective

pollinators was recorded, namely from the families *Apidae, Andrenidae*, and *Vespidae*. The results demonstrate that industrial hemp acts as a temporary ecological hotspot, contributing to increased functional biodiversity in agricultural environments. Therefore, this crop has the potential to be integrated as an ecological infrastructure in sustainable farming systems, although its implementation should be assessed on a case-by-case basis, considering landscape context and adjacent crops.

Biography

Andreia Saragoça completed her BSc at the age of 33 at the University of Extremadura, Badajoz, Spain, and is currently in the final year of the Master's degree in Sustainable Agriculture at the Polytechnic Institute of Portalegre, Portugal. She is a research fellow in the BGREENER project, which focuses on industrial hemp as a promoter of biodiversity. She has published two scientific papers in the field of agronomy. She is also currently pursuing a PhD in Science and Technology of Agroforestry Systems at the University of Extremadura.

Ana Isabel Cordeiro is an Assistant Professor at the Polytechnic Institute of Portalegre, where he teaches courses in Biology, Biochemistry, Genetics, Horticulture, Fruit Growing, Agricultural Production Technologies, Genetics, and Cannabis Breeding. He holds a PhD in Biology and Plant Production from the University of Extremadura (Spain) and is a specialist in the Cannabis Industry and Digital Agronomy from the University of Alicante. He is the leader of the BGREENER project–Biodiversity and Hemp in the EUROACE area (2024–2026) and author of several scientific articles in the areas of plant production, Cannabis sativa and applied microbiology.

Anniver Ryan P. Lapuz*, Celine Rose S. Jimenez, Juanito Jimenez, Cheyenne R. Marqueses, Daniel Anaya

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Production of bamboo pellet as an alternative and sustainable source of fuel

Bamboo is a fast growing and perennial woody grass distributed widely in the Philippines. Giant bamboo (*Dendrocalamus asper*) and kauayan-tinik (*Bambusa spinosa*) were selected for potential sustainable source of biofuel. Giant bamboo showed much higher culm diameter and culm thickness compared to kauayan-tinik. Bamboo poles were pulverized mechanically using chipper and hammermill while maintaining uniform size using a sieve. Pulverized bamboo where then converted in to pellet form using a 10HP pelletizer with 10mm die. Results showed proximate chemical analysis of pulverized raw bamboo compared to bamboo pellet showed little difference. The average VCM content of giant bamboo showed a 75.33% with a FC content of 21.35. While kauayan-tinik showed a higher an average VCM (77.83%) with a lower FC (19.26%) as compared to giant bamboo. Furthermore, torrefaction of bamboo pellets was conducted using a tube furnace. Various operating condition were used to determine the effect on the proximate chemical properties. In general, increasing the temperature from 240C to 320C increases its fixed carbon while reducing its VCM content.

Biography

Dr. Anniver Ryan P. Lapuz is a Supervising Science Research Specialist and head of the Physics and Mechanics Section at the Forest Products Research and Development Institute (FPRDI) under the Department of Science and Technology (DOST), Philippines. A licensed Chemical Engineer and a certified Professional Materials Engineer, Dr. Lapuz is actively engaged in research and development on biomass as renewable energy and cellulose nanomaterials. Currently, he focuses on bamboo as an alternative source of sustainable fuel as pellet and torrefied pellet. Development of second generation also from bamboo as

bioethanol is also being developed. He is also actively engaged in research and development on biomass as renewable energy and cellulose nanomaterials. Focusing on the extraction and utilization of cellulose nanomaterials derived from wood and non-wood materials as insulation material, reinforcement fillers and bioplastic. Dr. Lapuz earned his PhD in Bio agricultural Sciences from Nagoya University in Japan, and holds a Master's degree in Materials Science and Engineering, Master of Management in Business Management and Bachelor's degree in Chemical Engineering from the University of the Philippines.

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Economic growth, energy intensity, and carbon emissions in developing and emerging economies: Policy lessons from two decades of evidence

This study examines the relationship between economic growth, energy intensity, renewable energy, Research and Development (R&D), and fiscal capacity in explaining Carbon Dioxide (CO_2) emissions among 19 developing and emerging economies from 2001 to 2020. Data were sourced from the World Development Indicators (WDI) of the World Bank. All variables were converted into natural logarithms to stabilize variance and interpret elasticities. Due to the limited time dimension and absence of lagged dependent variables, the analysis employs a static panel model estimated using Fixed Effects (FE) and Random Effects (RE) estimators. The Hausman test determined the more efficient specification, while cluster-robust standard errors were applied to correct for heteroskedasticity and within-panel correlation.

Results indicate that economic growth and energy intensity significantly and positively influence CO_2 emissions, confirming that rapid industrialization and energy inefficiency remain dominant drivers of environmental degradation. In contrast, renewable energy consumption and R&D expenditure show significant negative effects, implying their potential to mitigate emissions through clean-energy transitions and innovation. The squared GDP term ($lnGDP^2$) produces a negative but weakly significant coefficient, offering limited support for the Environmental Kuznets Curve (EKC) hypothesis. Tax revenue is statistically insignificant, suggesting that general fiscal expansion alone is insufficient to achieve emission reductions without targeted green taxation.

The findings underscore the need for integrated policy strategies combining energy efficiency standards, renewable energy incentives, innovation support, and environmentally oriented fiscal reforms to achieve sustainable, low-carbon growth in developing and emerging economies.

Biography

Assis Kamu is an Associate Professor and Head of the Mathematics with Economics Programme at Universiti Malaysia Sabah (UMS), Sabah, Malaysia. He holds a PhD in Mathematics with Economics and has more than 15 years of academic and research experience in applied economics, econometrics, and socio-economic studies. He has served as principal investigator and co-researcher on national grants and consultancy projects focusing on fiscal policy, sustainable livelihoods, and economic modelling. His scholarly work spans over a hundred publications, and he actively supervises undergraduate and postgraduate research in quantitative economics and policy analysis.

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Global housing discourses: A systematic literature review

Achieving sustainable development inherently requires the convergence of economic, social, and environmental goals. The vulnerable population, consisting of poorer households, requires greater focus on policy innovation, regulatory tools, and institutional actions regarding social and economic sustainability to mainstream and push sustainable development. The United Nations 17 Sustainable Development Goals (SDGs), of which SDG 11 is directly dependent on the development of sustainable and affordable housing solutions. The housing affordability crisis and growing statistics of substandard housing are becoming a colossal developmental issue across the globe. Neo-liberal policies have promoted market-oriented development, which has initiated housing commodification (financialization) across developed and developing economies. The financialization of housing has escalated the affordability crisis further and led to concern about increasing speculation in the housing market. This paper investigates and analyzes the various perspectives centered around global housing debates. The research objective of this research is to propose directions for urban housing planning principles derived from synthesizing the global housing debates to guide and facilitate urban planners and authorities in mainstreaming sustainable and social housing development through policy innovation and development regulations. The research methodology follows a systematic literature review of high-quality peer-reviewed journals. Web of Science and Scopus databases were utilized to identify a total of 147 journals. The global housing debates are systematically categorized under economic, equity, and environmental dimensions, ranging from the need to de-financialize the housing market to the capability perspective of housing policy, including inclusionary housing policy, among others. This study goes beyond reflecting the systematic literature review of global housing debates to propose an innovative approach to urban planning by identifying planning principles in the domain of urban housing. The second part of the research objective is achieved by recommending eight urban housing planning principles through extensive analysis of the findings from the literature review.

Biography

Prof. Avlokita Agrawal is a Professor in the Department of Architecture and Planning with the following research interests: Sustainability in the Built Environment, Energy Efficiency in Buildings, Indian Knowledge Systems, Passive Design, Traditional Architecture, Thermal comfort, Thermal comfort through passive features, and Sustainable Tourism development.

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Synthesis, crystallographic elucidation, and anticancer evaluation of totarol–1,2,3-triazole hybrids

The incorporation of 1,2,3-triazole motifs into natural products is a powerful strategy to improve biological activity. In this study, totarol-based 1,2,3-triazole hybrids were synthesized via Copper-Catalyzed Azide–Alkyne Cycloaddition (CuAAC) click chemistry. This approach enabled the efficient construction of structurally diverse hybrid molecules.

Structural characterization was achieved using NMR, FT-IR, and HRMS techniques, while single-crystal X-ray diffraction provided unambiguous structural validation for selected derivatives. DFT calculations were performed to investigate electronic properties and molecular reactivity, and molecular docking studies were carried out to predict binding interactions with cancer-related targets.

In vitro cytotoxic evaluation against fibrosarcoma HT-1080 cells revealed that several triazole hybrids exhibited significant anticancer activity. The experimental findings were in good agreement with docking results and DFT-derived descriptors, confirming the relevance of triazole hybridization in enhancing the anticancer potential of totarol.

Keywords: Totarol, 1,2,3-Triazole, Click Chemistry, X-ray Crystallography, DFT, HT-1080.

Biography

Ayoub Boualli is a fourth-year PhD candidate in organic chemistry at the Faculty of Sciences Semlalia, Marrakech. His research focuses on the valorization of medicinal plants and the

functionalization of terpenic compounds isolated from natural sources. In particular, his work centers on the valorization of *Tetraclinis articulata* (thuya) wood sawdust through the hemisynthesis of natural and hemisynthetic derivatives and the evaluation of their anticancer activity. With solid expertise in organic synthesis and hemisynthesis, Ayoub's research contributes to the advancement of medicinal chemistry and the development of novel bioactive molecules.

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Sustainable recovery of materials from end-of-life photovoltaic panels

The rapid global expansion of solar energy has drawn attention to the challenge of managing End-of-Life (EOL) Photovoltaic (PV) panels. With growing volumes approaching retirement, developing sustainable recycling strategies is essential to reduce environmental risks and recover valuable resources. Conventional modules are difficult to recycle due to multilayered back sheet polymers, particularly those containing fluorinated compounds that release harmful emissions during processing.

Bifacial solar panels, an increasingly common technology, differ structurally as they lack a polymer back sheet and rely solely on Ethylene-Vinyl Acetate (EVA) as the encapsulant. This design simplifies recycling and offers opportunities for more efficient and environmentally responsible recovery of materials.

This study introduces an optimized thermal treatment using a modified pyrolysis reactor operated under inert conditions. The approach effectively degrades EVA with minimal emissions, allowing recovery of clean glass, reusable solar cells, copper tape, and a polymerized oil. Process conditions were refined through Response Surface Methodology (RSM) and Box–Behnken Design (BBD), yielding a significant fraction of polymerized oil at controlled heating rates and temperatures. Characterization of the oil using Thermo Gravimetric Analysis (TGA) and Fourier-Transform Infrared Spectroscopy (FT-IR) confirmed properties suitable for lubricant and fuel-related applications, aligning with relevant standards.

By tailoring recycling solutions to the unique structure of bifacial panels, this research demonstrates how solar waste can be transformed into a resource stream that directly

supports circular economy principles. Beyond minimizing environmental impact, the process highlights a pathway to reintroduce recovered materials into manufacturing and energy applications. Such innovation ensures that the growth of renewable energy technologies is complemented by equally sustainable end-of-life solutions, reinforcing the long-term viability of solar power systems.

Biography

Dr. Chitra Sulkan is a researcher and innovator in sustainable solar energy, specializing in the recycling and recovery of materials from end-of-life Photovoltaic (PV) panels. During her dual PhD via AcSIR-RMIT, she developed advanced expertise in solar panel waste management, chemical process optimization, and circular economy applications. She also has industry experience as a Lead Researcher, focusing on process development and scaling up innovative recycling methods. Presently, she is working as a Research Assistant at the University of Melbourne, Victoria, Australia. Dr. Sulkan has published multiple peer-reviewed articles, and actively participates in international conferences and scientific communities. Her work transforms PV waste into valuable resources, supporting sustainable solar energy systems.

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Effects of Nitrogen (N_2) shielding and purging gases on weld performance in austenitic stainless steels: An overview

Nitrogen (N_2) is one of the alloying elements in Austenitic Stainless Steels (ASS) and play an important role in various industries, especially oil and gas industries, since it enhances mechanical strength, corrosion resistance, austenite stabilization, and grain refinement. Nitrogen (N_2) plays a dual role as a shielding and purging gas in ASS welding. Shielding gas is critical in protecting the molten weld pool from atmospheric contamination. Meanwhile, purging gas is applied to the underside of the weld bead, especially in processes like Gas Tungsten Arc Welding (GTAW) and Plasma Arc Welding (PAW), to prevent oxidation and contamination that can compromise corrosion resistance and mechanical performance. However, when N_2 is introduced excessively during ASS welding, particularly through shielding and purging gases, N_2 can contribute to weld defects such as porosity, nitride formation, and poor penetration. Besides N_2, other common shielding gases for ASS welding include Argon (Ar), Helium, and mixtures of Ar with small amounts of oxygen or carbon dioxide. These gases ensure a stable arc, regulate heat input, and prevent oxidation, thereby contributing to weld integrity. Among them, Ar is the most widely used shielding and purging gas due to its inert nature and ability to produce consistent and high-quality welds. While Ar remains the preferred shielding and purging gas, N_2 is sometimes used as a cost-effective alternative, improving mechanical properties and enhancing corrosion resistance. However, as mentioned earlier, excessive N_2 incorporation may lead to detrimental effects, particularly porosity and nitride precipitation, which can weaken the weld. Hence, its effect on weld quality varies depending on welding parameters and material type. Notice that the limited review study gathers and summarizes the existing studies on shielding and purging gases using N_2 compared to Ar as shielding and purging gases for the ASS welding processes. To

address this research gap, this review study aims to provide a more comprehensive study on the effects of shielding and purging gases using N_2 compared to Ar in influencing ASS weld quality.

Biography

Assoc. Prof. Ir. Ts. Dr. Christine Yeo Wan Sieng is an Associate Professor at Universiti Malaysia Sabah, Faculty of Engineering. She holds a PhD and MPhil in Chemical Engineering from Curtin University and a bachelor's in Bioprocess-Chemical Engineering from Universiti Teknologi Malaysia. With over 18 years of combined industry and academic experience, she has served as an engineer in environmental and oil & gas sectors before transitioning to academia. Her research spans sustainable energy, agriculture, and AI applications. A professional engineer and accreditation panel member, she is dedicated to excellence in teaching, research, and advancing sustainable engineering practices.

Chung-Yu Guan[1,2*], Wei-Han Lin[1], Bo-Wen Wang[1], Wei-Ching Li[1], Bo-Chen Shen[1], Cheng-Lin Feng[1], Kai-Xiang Zhuang[1], Yi-Ching Chang[1], Yan-Zhen Chu[1], Cheng-Shin Chen[1]

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Plant microbial fuel cells for net zero emissions, renewable energy, green and sustainable remediation, and waste valorization

The world is facing a convergence of critical challenges, including energy scarcity, climate change, and pervasive environmental pollution. This study proposes an integrated and sustainable solution through the application of Plant Microbial Fuel Cells (PMFCs) across forestry, agricultural, and environmental systems. PMFCs exploit rhizosphere microorganisms to oxidize plant-derived organic compounds, generating electricity via bioelectrochemical reactions while simultaneously enhancing carbon sequestration, producing green energy, enabling heavy-metal remediation, and promoting waste valorization.

Wastewater treatment produces large quantities of sludge, and conventional disposal methods such as landfilling and incineration are energy-intensive and environmentally detrimental. Sintered sludge represents a sustainable alternative, converting waste into functional materials for energy-related applications. In parallel, increasing volumes of wood and plant waste pose growing environmental concerns, for which biochar offers an effective valorization pathway. Both sintered sludge and biochar are thermochemically derived materials with high potential for resource recovery.

Four case studies were conducted to evaluate PMFC performance under different valorization strategies. In Case Study 1, sintered sludge granules were employed as PMFC substrates using the native Taiwanese grass *Spodiopogon formosanus* Rendle. Soil-based PMFCs produced 100–200mV, significantly outperforming soil microbial fuel cells without plants (20–30mV). While 100% sludge-based MFCs exhibited rapid voltage decay, the corresponding PMFCs sustained stable outputs of 150–200 mV, highlighting the critical role of plant–microbe interactions in system stability.

Case Study 2 investigated arsenic-contaminated soil planted with *Cyperus malaccensis* Lam. ssp. monophyllus. (Vahl) T. Koyama. Biochar addition markedly enhanced microbial activity, plant growth, and electricity generation, achieving a peak voltage of 566±13.21mV while reducing soil arsenic concentrations from 70mg/kg to 57.92±0.01mg/kg through synergistic phytoremediation and bioelectrochemical processes.

In Case Study 3, *Ipomoea batatas* (sweet potato leaves) was employed to evaluate long-term PMFC performance with varying ratios of sintered sludge and biochar. The soil–sludge mixture produced the highest average peak voltage (481.08 mV), attributed to mineral-rich sludge adjusting soil pH to conditions favorable for electroactive microbes.

Case Study 4 demonstrated the valorization of plant biomass waste through biorefinery processes, converting cellulose-rich feedstocks into levulinic acid, with yields of 35 and 52 carbon mol% from bamboo culms and branches under optimized conditions.

Overall, this study demonstrates that PMFC systems integrated with valorized sludge, biochar, and biomass biorefinery technologies offer a promising pathway for clean energy generation, carbon reduction, environmental remediation, and circular resource utilization.

Biography

Chung-Yu Guan is currently Associate Professor in the School of Forestry and Resource Conservation, National Taiwan University. He was an Associate Professor in Department of Environmental Engineering at National Ilan University. He was a Visiting Scholar at the Hong Kong Polytechnic University in Hong Kong and Kyushu Institute of Technology in Japan. Chung-Yu Guan holds Ph.D. from National Taiwan University, Taiwan. He has published over 40 SCI journal papers these five years and serves as Gust Editor of some SCI Journal. His team aspires to develop green technologies for net zero emissions, renewable energy, green and sustainable remediation.

Didier Grillot
H2D Global, France

A chemistry without oil: Why and how Europe can transition beyond fossil feedstocks

The European chemical industry remains structurally dependent on fossil feedstocks, not only as an energy source but as a source of carbon. Although chemicals represent a limited share of total oil and gas consumption, they account for a significant fraction of industrial greenhouse gas emissions due to feedstock decomposition and energy intensive processes. In the context of European climate neutrality targets, rising carbon prices, resource volatility, and geopolitical exposure, continued reliance on fossil carbon is increasingly incompatible with long term industrial competitiveness.

This presentation first addresses why European chemistry must decouple from fossil feedstocks. Fossil resources are predominantly extracted to be combusted, whereas chemical production requires molecular carbon that can, in principle, be sourced from alternative and renewable pools. The challenge therefore lies less in reducing chemical demand than in redefining carbon sourcing strategies for chemical value chains.

The second part demonstrates that such a transition is technically feasible and economically viable. Complementary pathways are emerging, combining sustainable biomass, recycled organic carbon, captured CO_2 coupled with low carbon hydrogen, and deep electrification of processes. Technologies including bio based olefins, chemical recycling, methanol to olefins platforms, electrified cracking, and phosgene free synthesis routes have moved beyond proof of concept and are approaching industrial deployment. While this transition significantly increases electricity demand, analyses show that economic growth can be decoupled from fossil carbon use provided that low carbon power and circular material flows scale simultaneously.

Finally, a concrete industrial-academic case study is discussed through an ongoing European CIFRE PhD project focused on the development of bio based isocyanates and polyether polyols for polyurethane and construction chemical applications. Without disclosing confidential results, the project illustrates how conventional fossil based molecules can be progressively substituted while maintaining performance and industrial relevance.

Biography

Didier Grillot, educated as chemical engineer and with 35 years of experience, is the founder and managing director of H2D, an innovation driven company specializing in high performance polymer systems, polyurethanes, and construction chemicals. With an industrial background in chemical engineering and sustainable materials, he focuses on bridging academic research and industrial deployment. His current work includes the development of bio based and circular chemical solutions, industrial decarbonization strategies, and European collaborative research projects aimed at reducing fossil dependency while maintaining competitiveness.

Edward Paul S Marasigan

Forest Products Research and Development Institute, Philippines

Design and development of multi functional school furniture

This study presents the development and evaluation of the Silyang Pinoy prototype, an innovative enhancement of Department of Education(DepEd) in the Philippines existing school chair and desk designs, integrating a versatile bed feature for use during calamities. The prototypes include four models: elementary chair, elementary table, secondary chair, and secondary table, constructed from metal square tubes, composite boards, and locally sourced engineered bamboo boards to ensure cost alignment with DepEd standards.

Strength and durability assessments, conducted at the Department of Science and Techology – Forest Products Research and Development Institute (DOST-FPRDI) Furniture Testing Center in the Philippines following PNS ISO 7173:2006 standards, confirmed the prototypes' structural integrity. Field testing was carried out in strategically selected schools in the Philippines specifically in the province of Camiguin, Palawan, and Apayao, these regions noted for bamboo utilization and serving as disaster shelters. Survey evaluations by 182 students assessed the prototypes' ergonomics, functionality, and acceptability.

Results indicated high acceptability for elementary students, particularly in quality, durability, and comfort, although secondary students reported the need for enhancements in strength and ergonomics to accommodate greater physical demands. Specific findings from the three provinces highlighted consistent performance for elementary users, while secondary users emphasized areas for improvement to withstand intensive use.

Cost analysis demonstrated significant savings compared to DepEd's pricing, with reductions ranging from 17.52% to 21.76%. The study also included promotional activities, training sessions, and participation in national exhibitions to foster support and partnerships for wider implementation.

Overall, the Silyang Pinoy prototype shows promise as a cost-effective, multifunctional school furniture solution, particularly for elementary use, with recommendations for further enhancements to meet the needs of secondary students effectively.

Biography

Edward Paul S. Marasigan works as a Senior Science Research Specialist at the Department of Science and Technology – Forest Products Research and Development Institute (DOST-FPRDI) in the Philippines. He earned his Master's degree in Agricultural Engineering, majoring in Farm Power and Machinery, from the University of the Philippines Los Baños, and his Bachelor's degree in Mechanical Engineering from Laguna State Polytechnic University. He has been actively involved in research and development projects related to machinery design, process improvement, and sustainable technologies for the forest products and allied industries. He has led several government-funded projects, including the development of engineered bamboo processing machines, wastewater treatment systems, and the Silyang Pinoy—a multifunctional and ergonomic school chair. In addition, he mentioned that he is currently heading a project to establish Regional Forest Products Innovation and Training Centers aimed at promoting research, innovation, and sustainability in the forest-based sector.

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Sustainable reduction of heavy metal uptake in contaminated soil using walnut shell as a biosorbent

Environmental pollution caused by toxic heavy metals has become a major global concern due to its negative impacts on ecosystems, agricultural production, and human health. Heavy metals can accumulate in agricultural soils and enter the food chain through plant uptake, posing serious risks to food safety. Therefore, the development of sustainable and environmentally friendly remediation methods is essential. This study evaluated the effectiveness of walnut shell as a natural biosorbent for reducing the uptake of heavy metals by coriander (Coriandrum sativul L.) cultivated in contaminated soil. Ground walnut shells, both untreated and treated with different concentrations of phosphoric acid, were incorporated into the soil. Harvested coriander samples were prepared according to AOAC standards, and heavy metal concentrations were determined using atomic absorption spectrometry.

The results demonstrated that walnut shell significantly reduced the accumulation of heavy metals in coriander. The highest efficiency was achieved when walnut shell was treated with 2% phosphoric acid and applied to the soil at a concentration of 2% (w/w). Under these conditions, lead (Pb) showed the greatest reduction, reaching up to 85% compared with the contaminated control. The biosorbent began its activity immediately after application to the soil and continued to function effectively without causing adverse environmental effects. The findings suggest that walnut shell is an inexpensive, sustainable, and environmentally friendly biosorbent that can be used to reduce heavy metal contamination in agricultural systems and improve food safety.

Keywords: Walnut Shell, Biosorption, Heavy Metals, Lead (Pb), Cadmium (Cd), Nickel (Ni), Contaminated Soil, Coriander, Food Safety, Sustainable Agriculture, Environmental Remediation.

Biography

Dr. Fatemehsadat Mirmohammadmakki received her PhD in “Food industrial engineering and science - Food Chemistry” in 2021 from Islamic Azad University, Sciences and Research Branch. Fatemehsadat then joined the research group at the same institution. Fatemehsadat research focuses on agricultural products, edible oils, and extracts, with a specialization in biosorbents for reducing heavy metals in food, soil, and wastewater. Also, Fatemehsadat is researcher of Medical Ethics and Law Research Center, Shahid Beheshti University of Medical Sciences. A lecturer and researcher, Fatemehsadat has contributed to sustainable pollution control and has published over 10 research articles and participated in more than 50 national and international conferences.

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Supercritical biomass gasification system integrated with carbon capture and valorization for sustainable energy production

Every year, Portugal faces problems related to wildfires during the warm seasons due to the lack of deforestation plans that allow the clearing of agricultural and forest areas. Considering that 35% of the national territory consists of forest areas, this is a matter of extreme importance to avoid disasters such as the one that occurred in 2017, which resulted in the death of more than one hundred people. In this study, the ASPEN PLUS software was used to simulate and model the supercritical water gasification of agricultural biomass (olive pomace and wine pomace) and forest biomass (Eucalyptus globulus and pine bark), combined with a carbon capture system, aiming at the production of energy, heat, and hydrogen. It was found that the molar fraction of hydrogen is higher when olive pomace is used, and this value increases with increasing temperature. Increasing pressure causes the molar fraction of hydrogen to decrease, while, conversely, the molar fractions of carbon dioxide and methane increase for all biomasses used. The molar fraction of hydrogen also decreases when the feed concentration increases, in all cases. Regarding the lower heating value and cold gas efficiency, olive pomace also presents the highest values (11.03 MJ/m^3 and 76.17% at 800°C and 22.1 MPa, respectively). The lower heating value decreases with increasing temperature, whereas the cold gas efficiency increases with increasing temperature. The amount of CO_2 captured increases with increasing temperature and with increasing feed concentration. The highest values of energy produced, energy efficiency, and exergy efficiency were obtained when Eucalyptus globulus was used, with values of 458kW, 25%, and 20%, respectively, at 700°C, 22.1 MPa, and 5% feed concentration.

Biography

Filipe Neves holds a BSc and MSc in Mechanical Engineering from the University of Trás-os-Montes e Alto Douro, where they are currently pursuing a PhD in Applied Physical Sciences. Author of papers in the areas of renewable energy systems, particularly biomass combustion and gasification, computational fluid dynamics (CFD) and heat transfer. Filipe Neves has extensive experience in simulation and analysis advanced tools such as ANSYS and ASPEN.

Felipe Augusto Moro Loureiro

Pos-Doctorate, Chemistry Department; Federal University of Espírito Santo (IQ-UFES), Brazil

Bioenergy from biomass waste

Biomass waste, especially from municipal sewage sludge and agro-industrial activities, represents an abundant resource that can be converted into renewable energy through several established and emerging conversion technologies. Key methods include anaerobic digestion, gasification, pyrolysis, and hydrothermal liquefaction, which can yield products such as biogas, bio-oil, hydrogen, and nutrient-rich fertilizers. Anaerobic digestion is particularly effective, as it utilizes microorganisms to decompose organic materials in wastewater sludge, yielding biogas primarily composed of methane and carbon dioxide. This process helps stabilize waste, mitigates environmental risks, and addresses public health concerns.

The document highlights the sustainability benefits of integrating bioenergy systems into local communities and industries. Decentralized bioenergy production facilitates energy security, reduces transmission losses, supports local economic growth, and encourages job creation. Microgrid models are presented as efficient frameworks for harnessing and distributing bioenergy, especially in regions with high waste production and variable energy needs. These models enhance resilience by reducing reliance on centralized grids and offer flexibility through hybrid AC/DC systems, combining various renewable sources with conventional backup generators.

Economic and policy challenges remain significant barriers to bioenergy adoption. High collection and transportation costs, limited infrastructure, policy gaps, and insufficient public awareness often impede the growth of biomass-based energy solutions. The lack of subsidies and competitive market prices compared to fossil fuels further complicates commercialization, particularly in developing economies. Nonetheless, ongoing research and government support can substantially improve the efficiency and cost-effectiveness of biomass conversion technologies, aiding the transition to a more sustainable energy sector.

Brazil serves as a pertinent case study due to its substantial agro-industrial biomass waste production and ongoing efforts to transition from fossil-based energy sources. Investment in circular economy models and renewable resource development can help mitigate environmental impact, stimulate new industry growth, and support national sustainability goals.

In summary, bioenergy from biomass waste offers significant opportunities for environmental preservation, energy independence, and socio-economic development. Its sustainable deployment relies on advancements in conversion technology, infrastructural investment, and supportive policy frameworks to ensure its role in combating climate change and achieving energy security.

Biography

Felipe Augusto Moro Loureiro holds a PhD in Chemical Engineering from UFRJ, with solid experience in renewable energies and R&D projects, especially in the development of membranes and polymeric materials for fuel cells and the analysis of their applications in sustainable energy. Felipe works as a senior researcher and coordinator in initiatives related to the green hydrogen chain (Power-to-X) and polymeric devices in fuel cells. With extensive experience in project management and the development of innovative technologies, Felipe has distinguished himself in the execution of studies and pilot scales aimed at the production of bioenergy, green hydrogen, and combustible gases from organic waste.

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Modeling hypersalinization processes in tropical coastal lagoons and their morphodynamic implications in navío quebrado lagoon, colombia

Coastal lagoons are productive transitional ecosystems, yet highly sensitive to environmental variability. In the Colombian Caribbean, Navío Quebrado Lagoon, located within the Los Flamencos Flora and Fauna Sanctuary, is a shallow system intermittently connected to the sea through a lagoon inlet. In this ecosystem, salinity largely determines the ecological structure; however, its equilibrium is increasingly threatened by hypersalinization processes associated with climate change and local pressures.

Although previous studies have addressed regional hydrodynamics, limited knowledge persists regarding the mechanisms controlling salinity dynamics, particularly under changes in lagoon–sea connectivity. To address this gap, the modelling system EFDC+ Explorer was implemented to analyze the spatial and seasonal variability of salinity during 2024, integrating field measurements and secondary information. Model calibration assessed using RMSE, Nash–Sutcliffe efficiency, and R^2, showed a consistent fit for both water levels and salinity.

A reference simulation, based on the observed opening and closing dynamics of the inlet, was compared with three scenarios: E1, a permanently open inlet; E2, a permanently closed inlet; and E3, the permanent opening of a second inlet while the original inlet retained its observed behavior. The results indicate that the alternation between inlet opening and closure, together with evaporation, controls the salinity regime. Under the reference condition, the model reproduced critical hypersalinity events over 164 days, with salinity ranging from 0 to 200 ppt. In contrast, E1 and E3 reduced salinity to ranges of 0 – 66.9 ppt and 0 – 44.5 ppt, respectively, whereas E2 deteriorated the hydrological and water quality conditions of the system.

This study provides a tool to assess the hydroenvironmental vulnerability of the lagoon and to support management and conservation strategies for tropical coastal systems exposed to climate change and morphological transformations.

Biography

Dr. Franklin Manuel Torres Bejarano holds a degree in Sanitary and Environmental Engineering from Universidad de la Costa, Colombia, a Master's degree in Engineering from the National Autonomous University of Mexico, DEPFI-UNAM, and a Ph.D. in Environmental Engineering from the Mexican Petroleum Institute, Mexico. He is currently a faculty member in the Department of Environmental Engineering at the University of Córdoba and leader of the Research Group on Modelling and Assessment of Environmental Systems. He has participated in several research and development projects and has published in national and international journals on topics related to hydrodynamic modelling and contaminant transport, water resource management in coastal and continental surface ecosystems, and water quality assessment through satellite image processing.

Greta Adorni[1*], Angelo Carini[1], Michela Lomazzi[2], Loredana Battipaglia[1], Orsola Vecchi[1], Elettra Diacci[1], Alessandro Vurchio, Margherita Gianferrari[1], Davide Borrini[1], Valeria Cavatorta[1]

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Pharmaceuticals in the environment: Recent progresses for an effective and responsible environmental risk management

The presence of pharmaceuticals in the environment is a growing global concern. Chiesi Farmaceutici S.p.A., as a member of the European Federation of Pharmaceutical Industry Association (EFPIA), shares the widespread concern raised by the presence of pharmaceuticals in the environment and embraces the adoption of the Resolution of the European Parliament on the Strategic Approach to Pharmaceuticals in the Environment (PiE). In accordance with its commitment to operate with integrity, in a socially and environmental responsible care, Chiesi applied a tiered approach for the identification of potential environmental risks of Active Pharmaceutical Ingredients (APIs) and related products in order to define an environmental targeted assessment strategy. In this study, all the main potential environmental exposure patterns were investigated, and specific systems to reduce and treat manufacturing discharges were identified. LC-MS analytical methods were developed to monitor and then subsequently estimate a Predicted Environmental Concentration (PEC). As directed by EFPIA guidance, environmental fate alongside ecotoxicological studies were carried out in order to set the appropriate hazard levels and safe concentrations (PNECs: Predicted No Effect Concentrations). Preliminary monitoring campaigns were planned with the goal of refining the predicted PEC thus providing a realistic and responsible view of potential hazards and risks. The study addressed the characterization of the environmental risk in terms of the quotient PEC/PNEC which for the APIs studied was demonstrated to be below 1. Hence, an environmental risk from manufacturing discharge was reasonably excluded.

Biography

Greta Adorni is a lead scientist at Chiesi Farmaceutici SpA. She holds a master's degree in Pharmaceutical Chemistry and Technology (2015) and a Ph.D. in Drug Sciences, Biomolecules and Health Products (2020) from the University of Parma, Italy. Her doctoral research focused on the development of an inhalation powder to be administered as DPI for the treatment of cystic fibrosis patients. Greta joined Chiesi in 2023 and has since then been supporting late phase projects for worldwide market authorization.

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Techno-economic analysis of a hybrid solar thermal-biogas powered dryer for fruit dehydration

As of 2024, the global population had reached 8.2 billion and is expected to grow by 2 billion in the next 30 years, raising concerns about food security. Reducing post-harvest losses, which account for nearly one-third of global food waste, is critical, especially in developing countries. This study evaluates the techno-economic feasibility of a hybrid solar thermal-biogas drying system to enhance efficiency and sustainability in fruit drying. The research involved designing and simulating a hybrid tray or cabinet dryer to address challenges of intermittency and continuity in traditional drying methods. Simulations were conducted using Solid Works while the experimental design followed the Box-Behnken methodology in Design Expert software. Optimized parameters included an air velocity of 2m/s, material thickness of 7.5mm, temperature of 60°C, and a final moisture content of 10.5%. A prototype was built and tested, showing significantly shorter drying times of 9.8 hours and increased capacity compared to open sun drying. The hybrid system achieved a moisture removal rate of 78.3%, surpassing the 42.3% rate of sun drying. Financial analysis showed a Return On Investment (ROI) of 68.01%, a Net Present Value (NPV) of USD 321, and a simple payback period of 1.47 years thus outperforming open sun drying with an ROI of 28.0%, NPV of USD 1.6, and a simple payback period of 3.57 years. Sensitivity analysis indicated that revenue fluctuations and operational costs significantly impact financial viability. A 10-20% revenue drop, or a 10% cost increase extended the simple payback period and reduced ROI and NPV. The hybrid system presents a sustainable and cost-effective drying solution. Further research on different crops, environmental conditions, and industrial scaling is necessary.

Keywords: Solar Thermal, Biogas, Fruit Drying, Hybrid Dryer, Modeling and Simulation, Techno-Financial Analysis.

Biography

Dr. Hillary Kasedde is a Senior Lecturer and researcher in the Department of Mechanical Engineering in the School of Engineering at the College of Engineering, Design, Art and Technology, Makerere University, Kampala with a specialization in materials science and engineering and sustainable energy engineering. He obtained his PhD in 2016 from KTH Royal Institute of Technology, Stockholm, Sweden. His research interests are in the fields of materials science and engineering, chemical engineering separation processes, mineral resource and mining engineering, renewable energy conversion, energy recovery, and the environment, energy systems modelling and simulation. He has published more than 40 research articles.

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Study of the kinetics of gas-phase reactions within the framework of a non-equilibrium approach

Within the framework of the non-equilibrium approach, an analysis of the kinetics of H-atom transfer reactions in the gas phase was carried out. The main objects of the study are the reactions of methane with methyl and hydroxyl radicals ((energy calculation level CCSD(T)6-311+GB3LYP6-31+G). The study leads to the conclusion about significant differences in the mechanisms of symmetric (first) and asymmetric reactions. Common in both cases is the first stage of the reaction: the movement of the system along the Minimum Energy Path (MEP) due to the translational energy of the reactants to a certain point b. At this point, the energy of the reactants is zero (the stopping point of the reactants). In the case of a symmetric reaction, the second stage of the reaction, tunneling of the H-atom (movement along the tunneling coordinate r, orthogonal to the MEP), in accordance with the Generalized Franck–Condon Principle (GFCP), occurs in two stages. In the first, a reorganization of the system occurs, leading to symmetrization of the system potential along the coordinate r, and in the second, the actual tunneling of the H-atom in the double-well potential. Unlike in this case, in the asymmetric reaction, the tunneling of the H-atom occurs via a single-stage mechanism, in which the movement of the H-atom is accompanied by a reorganization of the system. As in the first case, the tunneling of the H-atom occurs in a double-well potential at a fixed distance between the donor and acceptor atoms. The second difference between the two reactions concerns the behavior of the system at the moment of reactants collision. In the symmetric reaction, the tunneling of the H-atom occurs directly from point b. In the asymmetric case, due to the oscillation of the bond between the donor and acceptor atoms in the collision complex, further movement of the system along the MEP is possible and, as a consequence, an increase in the tunneling rate. Finally, as shown by the kinetic analysis, the lifetime of the collision complex has a certain influence on the shape of the kinetic dependence in this case. The calculated values

of the thermal rate constants make it possible to reproduce the experimental data with good accuracy over the entire studied temperature range. In general, the study confirms the validity of the non-equilibrium approach as an alternative to modern dynamic models for describing the kinetics of H-atom transfer reactions in a gas phase.

Biography

Igor Romanskii is graduating from Moscow Institute of Fine Chemical Technology named after M.V.Lomonosov, Romanskii worked at the Research Institute of Chlorine Industry in 1961–1965 and in 1965-1973 at L. Ya. Karpov Physicochemical Research Institute From 1974 until my retirement in 2000, Romanskii was an employee at the Research Institute Organic Semi-product and Dye Staffs. Romanskii Ph.D. was received in 1981 (supervisor A. I. Shatenshtein). The field of scientific interests: problems of reactivity and kinetics in proton and hydrogen atom transfer reactions.

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Evaluation of a pilot-scale constructed wetland planted with *Limnocharis flava* for the treatment of gold mining-impacted waters in Ayapel, Córdoba

Heavy metal contamination associated with gold mining represents one of the most critical environmental issues affecting aquatic ecosystems in Colombia, due to its adverse effects on water quality, biodiversity, and productive activities related to water supply and agriculture. In regions where mining activities are carried out intensively, the release of toxic elements such as mercury (Hg), lead (Pb), chromium (Cr), and manganese (Mn) has generated significant environmental degradation processes that impact both surface water bodies and the ecological dynamics of wetlands and tropical floodplain systems. In this context, the present study evaluated the efficiency of a pilot-scale batch-type constructed wetland planted with *Limnocharis flava* as a sustainable and low-cost alternative for the remediation of contaminated waters in the Ayapel swamp system, Córdoba, Colombia.

The experimental design included the initial physicochemical characterization of contaminated water, considering parameters such as pH, electrical conductivity, dissolved solids, and dissolved oxygen, as well as the assessment of the phytoremediation capacity of the species through Bioconcentration Factor (BCF), Translocation Factor (TF), and Transfer Coefficient (CT) analyses. In addition, the effect of three planting densities (low, medium, and high) on the removal of the evaluated metals was analyzed over a 30-day experimental period.

The results demonstrated an overall removal efficiency greater than 78% for the analyzed metallic contaminants, reaching maximum efficiencies of up to 91.6% for Hg removal. Simultaneously, significant improvements in the physicochemical characteristics of the treated water were observed, reflected in pH stabilization, conductivity reduction, and increased

dissolved oxygen levels. Furthermore, a density-dependent response was identified: Low planting densities mainly promoted metal retention in root tissues, whereas medium and high densities enhanced the translocation of metals toward aerial plant structures. Overall, the findings demonstrate that *Limnocharis flava* has considerable potential for phytoremediation applications in constructed wetlands, highlighting planting density as a key parameter for optimizing treatment performance and supporting the recovery of water systems impacted by mining activities in tropical ecosystems.

Keywords: Phytoremediation, *Limnocharis Flava*, Heavy Metals, Artificial Wetland, Water Quality.

Biography

Iván José Marsiglia Chams is a master's graduate in Environmental Sciences from the University of Córdoba, Colombia. His research focuses on phytoremediation, constructed wetlands, water treatment, and heavy metal contamination associated with gold mining activities. He has participated in scientific dissemination activities related to environmental remediation and sustainable water management. His current work evaluates the phytoremediation potential of *Limnocharis flava* for the treatment of mining-impacted waters in Ayapel, Córdoba.

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Green mechanochemistry meets catalysis: Molybdenum–hydrazone complexes for mild oxidation reactions

Hydrazides, carbohydrazides, and their related analogs are versatile building blocks in heterocyclic and coordination chemistry, with potential applications in catalysis, materials science, and molecular sensing. Among them, 2-thiophenecarboxylic hydrazone ligands remain relatively underexplored, despite evidence that their metal complexes can exhibit catalytic and electronic functionality. Traditional syntheses of such complexes often rely on solvent-intensive methods, which pose environmental and sustainability concerns.

Mechano chemistry provides a green alternative, using mechanical energy to drive reactions under solvent-free or minimal-solvent conditions. Techniques such as neat grinding and Liquid-Assisted Grinding (LAG) enable rapid and efficient preparation of ligands and metal complexes while reducing chemical waste, energy consumption, and environmental impact.

In this work, we report the mechanochemical synthesis of novel molybdenum complexes based on 2-thiophenecarboxylic hydrazone ligands. Their catalytic potential was evaluated in the oxidation of benzyl alcohol, chosen as a benchmark reaction for sustainable oxidation chemistry. Reactions were carried out under mild, environmentally friendly conditions, demonstrating that mechanochemically prepared complexes can enable selective and efficient oxidation using benign oxidants.

In addition to catalysis, the electronic properties of the Mo-hydrazone complexes were investigated, revealing promising semiconducting behavior. The dual focus on catalytic activity and electronic performance underscores the multifunctionality of these materials and illustrates how green synthetic strategies can yield compounds with broad applicability.

Overall, this study highlights how mechanochemical synthesis can integrate green chemistry principles with functional performance, offering a sustainable route to metal-hydrazone complexes for oxidation catalysis and materials applications. These findings pave the way for environmentally responsible design of multifunctional coordination compounds, bridging catalysis and electronic materials in a single, sustainable platform.

Biography

Dr. Jana Pisk is an Associate Professor of Chemistry at the University of Zagreb, Faculty of Science, where she has been a member of the Department of Chemistry since 2007. She earned her Ph.D. in 2012 and has conducted extended research in catalysis at the Laboratoire de Chimie de Coordination in Toulouse, France. Her scientific work centers on the coordination chemistry of molybdenum and vanadium compounds, with a strong focus on their catalytic applications in oxidation processes. Dr. Pisk has authored more than fifty publications and is actively engaged in advancing sustainable catalytic methodologies and functional inorganic materials.

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Quinazolines: Green synthesis, characterization and biological activities

This research explores the synthesis, characterization, and biological evaluation of quinazoline derivatives using green chemistry principles for sustainable pharmaceutical development. By adopting environmentally responsible strategies—such as using renewable feedstocks, non-toxic solvents, and energy-efficient techniques—the study aims to reduce the ecological footprint associated with conventional organic synthesis. These methods not only lower hazardous waste and energy usage but also enhance cost-effectiveness and environmental safety. The synthesized quinazolines are evaluated for their antibacterial, antifungal, and antiviral properties, emphasizing their potential as sustainable alternatives in modern drug development. This research highlights the integration of green chemistry into heterocyclic drug synthesis. Nitrogen-containing heterocycles are indispensable in medicinal chemistry due to their vast biological and therapeutic potential. These structures appear in over 90% of newly approved drugs and play vital roles in pharmaceuticals, agrochemicals, and veterinary medicine. Alkaloidal nitrogen compounds, in particular, significantly influence metabolic pathways and therapeutic activities. Quinazoline, a notable heterocycle first synthesized in 1869, serves as a privileged scaffold in drug design. It is associated with a wide spectrum of biological activities, including antibacterial, anticancer, antihypertensive, anti-inflammatory, and antimalarial properties. Notable derivatives like Gefitinib and Erlotinib are used effectively in cancer therapy. Recent advances in synthetic methodologies—such as phase-transfer catalysis, microwave-assisted synthesis, and metal-catalyzed reactions—have greatly expanded the biological applications of quinazolines. In parallel, thiophenes and benzothiophenes, synthesized via Grignard reactions, cyclization, and Suzuki coupling, exhibit potent antibacterial and anticancer properties. Pyrazoles, synthesized through hydrazine condensation and ring closure, are also known for their antimicrobial, antifungal,

and anticancer activities. The alarming rise of multidrug-resistant bacteria calls for novel antibacterial agents. Our research investigates the synthesis of quinazolin-2-amines coupled with thiophene or pyrazole moieties. While these pharmacophores have been explored individually, their combination is a novel strategy that could enhance antibacterial efficacy and open new directions in drug discovery.

Biography

Mrs. Jenifer Robinson is the Assistant Vice Principal (Science & French) at Indian School Al Wadi Al Kabir, Oman, holds M.Sc. degrees in Chemistry and Applied Psychology, an M.Phil. in Chemistry, and is pursuing a Ph.D. at K.R. Mangalam University, India. With 27 years of experience, she is a CBSE Best Teacher Awardee (2022) and a certified CBSE Resource Person (2025). Passionate about sustainable chemistry, she designed Chemistry Smart Drawings for visual learning. She has presented internationally, including at AMGSE-2024, ICBSDG-2025, and the Green Chemistry Conference in Paris (2024), with publications and CPD-accredited contributions to environmental sustainability.

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Environmental control and valorization of olive mill wastewater: Influence of harvest timing and extraction technology

Olive Mill Wastewater (OMWW) represents one of the major environmental pollution challenges associated with the olive oil industry in Mediterranean countries, particularly in Lebanon, due to its high organic load, acidic nature, and elevated concentrations of phenolic compounds that limit natural biodegradation and threaten soil and water ecosystems. This study evaluates the temporal evolution of phenolic pollutant concentrations in OMWW generated during the 2025 olive-harvesting season in the Hasbaya region, South Lebanon, with the aim of assessing pollutant dynamics and identifying sustainable management opportunities.

Samples were collected every ten days from mid-October until the end of the harvesting season from both automatic (three-phase) and traditional (stone-based) olive extraction systems. Total polyphenol concentrations were quantified to investigate: (1) the variation of phenolic pollutant load throughout the harvesting period and (2) the impact of extraction technology on pollutant release and partitioning between olive oil and wastewater fractions.

The results demonstrated that traditional extraction systems promoted significantly higher phenolic migration into OMWW, particularly during late harvest stages, resulting in greater pollutant loads within the wastewater stream. The highest phenolic partitioning ratio was observed in very late harvest olives processed using traditional extraction systems (16.88±0.30). In contrast, automatic extraction systems favored increased retention of phenolic compounds within the olive oil fraction under specific harvesting conditions, thereby reducing pollutant transfer into wastewater. Harvest timing and extraction technology were found to play a critical role in determining phenolic distribution and environmental discharge potential.

The persistence of high phenolic concentrations highlights the necessity for effective pollutant control strategies and advanced wastewater management approaches. Simultaneously, the recovery of phenolic compounds from OMWW offers promising opportunities for environmental remediation and resource valorization through the production of natural antioxidants for food, cosmetic, and agricultural applications. This work contributes to the development of sustainable environmental management strategies for olive mill effluents and supports circular economy approaches in the agro-industrial sector.

Biography

Dr. Jeanne Andary is Associate Professor of Analytical and Food Chemistry and Dean of the Faculty of Health Sciences at Modern University for Business and Science (MUBS). Jeanne earned her PhD with jury felicitations from AgroParisTech in 2011, specializing in chemometrics, food analysis, and agro-industrial waste valorization. Jeanne's research focuses on green chemistry, olive waste valorization, furans, polyphenols, and sustainable environmental management. Jeanne has taught at several Lebanese universities, supervised numerous research projects, and is a member of the Global Food Regulatory Science Society (GFoRSS) and AOAC International.

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Spatial mapping of soil salinity in a semiarid region using a machine learning model based on spectral indices and ground data

The expansion of intensive agriculture has led to increasing soil salinity worldwide. highlighting the critical need for accurate soil salinity measurements is essential to address this situation. In this context, digital soil salinity mapping becomes necessary to properly manage soil resources in limited data regions. Therefore, this study aimed to map soil salinity using a Random Forest (RF) model that incorporated several spectral indices and physicochemical properties in the Tadla Plain. 149 samples were used to investigate the physical and chemical characteristics of soils in the study area. the dataset was divided into 70% of the ground data for model training and 30% for validation. The results show that 81.1% of the studied soil is non-saline, 15,5% is slightly saline, and 3,4% is moderately saline. However, statistical metrics showed that the RF model performed well with a Salinity Index (SI6), achieving a correlation coefficient (R2) of 0.80 and Root Mean Square Error (RMSE) of 0.084. Salinity indices SI1, SI2, SI3, SI4, SI5, and SI7 yielded results with low precision, with R2 values below−0.2. These findings provide valuable insights for developing strategies to mitigate soil salinity in semi-arid areas.

Biography

Khalid El Bahjaouy a PhD student in Environmental Geosciences at the Faculty of Sciences and Techniques, University Sultan Moulay Slimane, Beni Mellal, Morocco. He holds a Master's degree in Environmental Geomatics and a Bachelor's degree in Geology from Ibn Zohr University, Agadir. His doctoral research focuses on the spatial estimation and mapping of soil salinity and other soil properties using remote sensing data, spectral indices, machine learning and active learning models. Khalid has developed strong experience in GIS,

geostatistics, and digital soil mapping through several professional and academic projects. He has also worked as a geologist in the mining sector, contributing to geological mapping, environmental assessment, and resource exploration. His main research interests include soil degradation monitoring, digital soil mapping, environmental modeling, and sustainable land management in arid and semi-arid regions. Khalid aims to contribute to improving soil resource management using innovative geospatial approaches.

Kian Heng Liew
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Origin of sustainability - The nature's wonder of algae

The widely used word “sustainability” has many connotations in the built environment. Definition from Oxford Dictionary: Sustainability "the sustainability of economic growth" avoidance of the depletion of natural resources "the pursuit of global environmental sustainability”. UN started the 17 SDGS; many facets of sustainability on mother earth have been conceptualised to help Humanity. Sustainability is imposed on the living. These human driven activities artificially incorporate sustainability giving the “start line” in 2016 to a “deadline” of 2030. The human race must learn from Nature since billion years ago when sustainability was and is part of creation. Understanding sustainability shall start from the most natural level of humanity. Sustainability is about life and what is the best life making & living example to exemplify this message on Sustainability, Survivability, Buildability and Liveability? It is the nature's wonder of algae.

The writer has contributed on 7 UN SDGs in his profession covering back to nature's basics in food, feed, fuel & feat from algae as SDGs 1, 3, 4, 6, 7, 9 and 17. Algae has provide and still providing humanity-life evolving, involving, giving and sustaining with so much misconceptions, misgivings and misunderstandings! SDG 12 is new in this paper. Algae is the basis of life on mother earth and is in enhancing humanity on health & well being. This paper also exemplifies and explores the biological role of algae in humanity. Algae has sustainably demonstrated to all that our mother earth has is a humble origin.

Keywords: Origin, Sustainability, Survivability, Buildability, Liveability, Nature, Algae, Humanity.

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Spatio-temporal water storage solutions for climate whiplash: Downscaling, AI-enhanced detection, and cloud-orchestrated management for flood prevention and water security

Climate whiplash is becoming a serious challenge for water managers because extreme rainfall and drought now occur in faster and more disruptive cycles. This paper presents a practical framework for responding to that problem through precipitation forecasting, artificial intelligence, and smart water infrastructure. Using Merced County, California as the main test case, the study examines how future climate conditions may increase flood risk and how excess stormwater can be captured and stored for later use during dry periods.

The research begins with a historical analysis of precipitation from 2000 to 2024 and compares it with downscaled climate projections for 2026 to 2050 and 2051 to 2099. The results show a strong rise in extreme precipitation events, with flood risk increasing by about 150 percent in the near future and about 250 percent in the long term compared with the historical baseline. These projections suggest that current drainage systems and flood control infrastructure may not be enough to manage future storm intensity and frequency.

To move from forecasting to action, the study uses a Regional Convolutional Neural Network (RCNN) to scan satellite images and identify land areas that could be used for water storage. The model classifies terrain into useful categories such as lakes, reservoir areas, farms, and suburbs, and then helps locate sites that are suitable for capture and retention of floodwater. Candidate locations were checked against elevation data and terrain maps to confirm whether water could be safely stored in those areas. This process reduced the time needed to assess potential storage sites and created a faster way to support climate adaptation planning.

Based on the spatial analysis, the paper introduces the concept of Engineered Wetlands. These are hybrid water storage systems that combine natural landscape features with small dams, barriers, and flow control structures. In the Merced County case study, one proposed engineered wetland could store up to 2.5 million cubic meters of surface water. The design is intended to capture a large share of excess water during intense storms while also supporting water availability during dry months. In this way, the same system can help reduce flood damage and improve water security.

The study also proposes an Internet of Things and cloud-based monitoring system for real time water management. Sensors can track water levels and flow conditions, while cloud platforms can support remote control, data analysis, and automated response. This integrated approach offers a scalable and timely solution for regions facing climate whiplash. The paper shows that AI driven environmental intelligence can support both prediction and adaptation, providing a human centered and practical path toward more resilient water management.

Biography

Krishna Nidamarthi is an honors student from Dublin, California with strong interests in artificial intelligence, climate science, and computational biology. Krishna has developed AI models for ALS biomarker research, published at NeurIPS 2025, and climate adaptation, including a system to identify water storage areas for flood prevention which won second prize in California county science fair. As Vice President of Emerald STEM Club, he supported STEM education and taught Python to peers. Krishna has also volunteered with Heart in Motion for community outreach and athletics programs like San Fracisco marathon.

Dr. Lawal Yakubu Gada

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Decarbonizing Nigeria's economy: The role of green hydrogen

Despite global campaigns on sustainability, Nigeria's economy remains heavily dependent on fossil fuels, particularly oil and natural gas, making it vulnerable to climate risks, volatile global energy markets, and long-term decarbonization pressures. As a signatory to UNFCCC Paris Agreement and as global momentum toward net-zero emissions intensifies, with a population of over 200 million and less than 50% energy access, Nigeria must adopt transformative pathways that support economic growth while significantly reducing greenhouse gas emissions. This paper examines the role of "Green Hydrogen" as a strategic lever for decarbonizing Nigeria's economy and enabling sustainable industrial development. Drawing on Nigeria's abundant renewable energy resources, emerging hydrogen initiatives, and national energy transition targets, the study explores hydrogen's applications across power generation, transportation, fertilizer production, refining, and heavy industry. It analyses technological, economic, and policy dimensions, identifies key challenges, and proposes a phased national deployment roadmap. The findings demonstrate that green hydrogen can significantly enhance Nigeria's energy security, stimulate industrial diversification, attract Foreign Direct Investments (FDI), create green jobs, and position the country as a regional hub for clean energy. Strategic policy alignment, infrastructure investment, and international climate finance are critical to unlocking this opportunity.

Keywords: Decarbonization, Green Hydrogen, Climate Finance, Net-Zero and Climate Change.

Biography

Dr. Lawal Yakubu Gada studied Applied Chemistry at the Usmanu Danfodiyo University, Sokoto, Nigeria and graduated as B.Sc. (Hons), Applied Chemistry in 1994. He then proceeds to University of Abuja, Nigeria where he graduated with M.Sc., (Hons.), Analytical (Environmental) Chemistry in 2011. He then received his PhD degree in Sustainable Development in 2024 from Atlantic International University, Honolulu, USA. Mr. Gada is a Member of Chemical Society of Nigeria since 1996 and worked with reputable organizations like Shell Petroleum Development Company (SPDC), Warri, Nigeria, Nigerian National Petroleum Corporation (NNPC) and Renewable Energy Division of the Bank of Industry (BOI) respectively.

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Green synthesis of magnetosomes by *Acidithiobacillus ferrooxidans* and their potential applications

Magnetosome, synthesized by magnetosome-producing bacteria including Magnetotactic Bacteria (MTB) and Non-Magnetotactic Bacteria (Non-MTB), is a natural magnetic nanomaterial that integrates superparamagnetism, high stability, excellent biocompatibility, well-dispersibility and easily modifiable surface. It can be widely applied in biomedicine and bio-agriculture field. *A. ferrooxidans,* a typical non-MTB, only requires sufficient Fe(II) and suitable oxygen to produce magnetosome compared with MTB. Thus, it conferring greater flexibility and potential application in biomagnetic nanoparticles production. However, current mechanistic insights into magnetosome synthesis are mainly derived from studies on MTB. Therefore, we have systematically investigated the magnetosome synthesis characteristics of *A. ferrooxidans*. In our study, a magnetosome-producing bacterium *A. ferrooxidans* BYM was isolated and magnetically screened. The magnetosome produced by BYM consist of inorganic (Fe_3O_4) and organic components (lipid bilayer membrane). The magnetosome yield ranging from 0.5896 to 13.1291mg/g was achieved under different aeration rates, as well as varying concentrations of ferrous sulfate, ammonium sulfate, and gluconic acid at 30^{0}C. In order to further increase magnetosome production. We investigated the iron source selection, uptake mechanisms, and kinetic characteristics during magnetosome mineralization, and elucidated the underlying physicochemical processes. Furthermore, based on magnetosome phenomic parameters and multi-omics analyses, we propose a hypothetical model for magnetosome synthesis that includes membrane formation, iron uptake and transport, iron redox and crystal maturity. Our results will enable in-depth studies of magnetosome synthesis mechanism and yield improvement in non-magnetotactic magnetic bacteria. We have also further confirmed that magnetosomes hold significant application potential in the fields of drug delivery and biocatalysis.

Biography

Dr. Lei Yan is a professor at the College of Life Science and Biotechnology, affiliated with Heilongjiang Bayi Agricultural University. He holds a Ph.D. from Lanzhou University and was a visiting scholar at the University of Nevada. With over 20 years of experience in Environmental Microbiology and Synthetic Biology, he has led more than 40 research projects and published over 40 SCI papers. His work has an H-index of 29, with one paper receiving 300 citations. He is an editorial board member for International Biodeterioration & Biodegradation and Future Foods, and a recipient of the Publons Peer Review Award 2018.

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Synergistic antifibrotic potential of protocatechuic acid and D-Carvone in liver protection

Background: Liver fibrosis, driven by chronic injury, oxidative stress, and inflammation, represents a significant global health burden. Natural compounds such as Protocatechuic Acid (PCA) and D-Carvone (D-Car) possess known antioxidant and anti-inflammatory properties, but their combined therapeutic potential against liver fibrosis remains unexplored.

Purpose: This study aimed to investigate the synergistic antifibrotic effects of PCA and D-Car in both cellular and animal models of liver fibrosis.

Methods: A combined in vitro and in vivo approach was employed. In vitro experiments utilized the HSC-T6 hepatic stellate cell line, where cells were treated with PCA (50μM) and D-Car (50ng/mL), individually and in combination. Cytotoxicity (MTT assay), apoptosis (flow cytometry and Hoechst staining), and Annexin A2 levels were assessed. In vivo studies involved a CCl_4-induced liver fibrosis rat model. Following treatment with PCA, D-Car, or their combination, body weight, liver enzymes (ALT, AST, ALP, albumin), LDH activity, fibrotic markers (TIMP-1, Col1α1), antioxidant enzymes (SOD, Cyp2e1), inflammatory cytokines (IL-6, TNF-α, NF-κB), and histological changes were evaluated.

D-Car treatment significantly improved HSC-T6 cell morphology, reduced cytotoxicity (*p*<0.001), and decreased apoptosis compared to individual treatments. In vivo, PCA+D-Car restored body weight, normalized liver enzymes, downregulated TIMP-1 and Col1α1, enhanced

antioxidant activity (SOD1), and reduced inflammatory markers (*p*<0.01). Histological analysis confirmed improved liver architecture with reduced fibrosis and inflammation.

Conclusion: The combination of PCA and D-Carvone exhibits synergistic antifibrotic effects by mitigating oxidative stress, inflammation, and extracellular matrix deposition. These findings highlight its potential as a dietary or therapeutic strategy for liver fibrosis, warranting further clinical exploration.

Biography

Dr. Ling Yin is a researcher affiliated with the College of Medicine at the University of Florida, USA. Her research interests focus on hepatology, particularly the molecular mechanisms of liver fibrosis and the development of novel therapeutic strategies using natural compounds. She has contributed to several studies investigating the role of oxidative stress and inflammation in hepatic pathogenesis and the protective effects of phytochemicals.

Magda Regina Santiago
Instituto Biológico, São Paulo, Brazil

The important role of zebrafish in ecotoxicological studies

Residues from various pesticides, when they come into contact with water, contaminate fish in various locations around the world, altering hormonal activity during embryonic development, with anatomical and physiological changes, gonadal abnormalities and changes in the reproductive system. The sublethal effects of pesticides concern endocrine disruption in multiple fish and amphibians, with changes in hormonal activity during embryonic development, leading to changes in the anatomy, behavior and reproductive system of these animals. Therefore, the conscious use of these substances to control various pests in crops requires greater attention and requires further research in this field of biomedical science.

Currently, the early-life zebrafish (*Danio rerio*) is widely used as a sensitive and reliable alternative toxicity model, with several advantages, including embryonic transparency, rapid reproduction and development, sequenced genome, in accordance with the 3Rs Principle- which deals with the use of animals in research with ethics and principles aiming at reduction, replacement of animals and refinement of research, ease of breeding, small size of these fish when adults (4-5cm) and more than 70% similarity to the human genome, this fish of the cyprinid family "zebrafish" or "zebra fish" (*Danio rerio*) (Hamilton-Buchanan, 1822) as it is also known, has been increasingly used in scientific research, in several areas such as genetics, toxicology, oncology, ecology, and is even recommended by the Brazilian Association of Technical Standards (ABNT) and the Organization for Economic Cooperation and Development (OECD) for testing ecotoxicological.

It is important to emphasize that most studies analyze the harmful effects of pesticides for each active ingredient separately, despite the fact that exposure to pesticides is present in many locations and occurs simultaneously, leading to continued contact with multiple pollutants. This reinforces the need to analyze mixtures in continental waters, especially rivers. In this

lecture we address the importance of the FET (Fish Embryo Toxicity) Test for ecotoxicological studies and provide data on water from some Brazilian rivers from the perspective of pesticide residues and their harmful effects on fish.

Biography

Magda Regina Santiago is a Agronomist from ESALQ of the University of São Paulo (USP); Master in Public Health with a concentration in Environmental Health from the School of Public Health-USP (2001). PhD in Sciences from the School of Medicine of the University of São Paulo (2021). Currently, a scientific researcher at the Biological Institute. She has experience in Public Health, with an emphasis on Environmental Health, working mainly on the following topics: pesticide legislation, pesticide residues in vegetables and fruits, pesticide residues in environmental and drinking water, bioassays with zebrafish (Danio rerio, Hamilton-Buchanan, 1822) and insects of the Coccinellidae family.

Dr. Mahua Das Associate Professor

The Bhawanipur Education Society College, Under University of Calcutta, Guest Faculty, Earth Science, University of Calcutta, UGC Postdoctoral Research Awardee, India

Bengal estuarine mangroves and shelf biodiversity degraded by trawl seeking conservation

Hooghly estuarine mouth and continental shelf area of the Bay of Bengal offshore in West Bengal develops huge phyto-planktons reserve serving as the broad baseline of the Largest Mangrove Food Web, 'Sundarbans' (World Heritage Site, 1989), an excellent combination of aquatic food chain occupying continental shelf and estuaries as well as mangroves forest food chain in the coastal wetland. It exhibits numerous marine species ranging from the base level microscopic phyto-planktons and mangroves up to those of higher trophic levels, pivoted by Sundarban's Royal Bengal Tiger in the forest and large oceanic mammals under ocean. Non-selective trawl nets dragged through ocean bottom scoops out sea-floor biodiversity, also destroying under-sea habitat of phyto-planktons at the baseline of the food web. Additionally, massive trawl destruction of estuarine mangroves and heavy metal pollution in trawl resting spots also damaged the food-web baseline and triggered severe survival crisis for all apex species. Continuous destruction of non-commercial trawl discards is causing higher trawling mortality which is also triggered by trawl heavy metal pollution in deep sea fishing fields. This massive baseline species destruction already started collapsing the whole marine food pyramid, endangering all top consumers and worse affecting the fishing-dependant coastal population. Intensive trawl survey into the Tajpur-Shankarpur-Digha-Petua fishing zone has proved biodiversity richness inversely related to offshore distance, resulting in decreasing marine biodiversity loss with increasing depth and starting distance of trawling. So, shallower continental shelf with maximum benthic nutrients deposition shows higher trawl mortality indicating higher biodiversity loss. Ultimate huge mangroves loss, absence of prawn seedlings, sea conches and finally, extinction of a special fish species (Chandana Hilsa) seen before the last forty years, are evidenced. Suggested conservation strategy highlights mangroves restoration, no night fishing, instant release of trawl discards alive into ocean and above all, Trammel net application utilising its poorer selectivity with minimum abrasion on

continental shelf keeping undersea baseline shelf biodiversity intact. Trammel net enjoys poorer selectivity because of the tangling nature of three layers of netting instead of single layer of the commonly used gill net. So the fisherman can easily minimise by-catch shooting his net only in those areas obtaining maximum target species. Moreover, sea bed contact with trammel net is very limited only through footrope and also minimal contact through small anchors at each end. Though the anchors penetrate sea bed, this will have minimum ploughing effect on sea bed only during hauling. As not towed over sea bed, very little abrasion takes place and the thick undersea bed layer of marine biodiversity, specially the phyto-planktons remains mostly intact. This is considered just as a blessing to conservative eco-friendly Bengal offshore and estuarine fishing ensuring prosperous mangrove food web. As the richest biodiversity zone of Bengal, continental shelf still remains exposed to prolonged rampant anthropogenic trawl overuse as before, proper ecological restoration specially through the introduction of Trammel net must be made mandatory here continuously for a pretty long time to witness its miraculous impact on the World's largest Mangrove Food Web of the Sundarbans.

Biography

Dr. Mahua Das Associate Prof, Environmental Studies, B.E.S College, Present Guest Faculty, Earth Sc., University of Calcutta, Ex-Guest Faculty, Kalyani University, Netaji Subhas Open University. She completed three UGC Minor Research Projects and obtained UGC Postdoc Research Awardee, 2012-14, specialized is Marine biodiversity, Oceanic Environment, Mangroves Ecosystem, authored three publications in Springer Nature, three International Research E-Books, LAP-LAMBERT, Germany, ICESB (University of Oxford, U.K), International Journal of Management and Applied Science, Asian Fisheries Science, International Journal of Environmental Science, CPCB, India, delivered Special lectures in Asian Fisheries Forum, Malaysia, Tropical Ecology Congress, JNU, International Conference on Environmental Science and Biodiversity, Science Plus, Oxford, U.K, 7.12.23. and remains as Research Paper Reviewer, SPRINGER NATURE.

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Smart network for water contaminant detection and pollution monitoring based on the Internet of Things (IoT)

Rapid urbanization, population growth, and the overexploitation of resources in cities around the world have created environmental challenges for the monitoring, conservation, and management of resources. The implementation of sensor technologies to collect and analyze water quality data has become increasingly important for achieving sustainable urban development. A Smart Water Pollutant Detection Network (SWPDN) and a device (H2OG) a low-cost, with low energy consumption and high precision for real-time monitoring to quantify pH, Total Dissolved Solids (TDS), Electrical Conductivity (EC), Resistivity (R), and Ionic Strength (IS) in water using technologies such as the Internet of Things (IoT) was developed to provide a support tool for water management. The system was developed as a web application using technologies such as HTML, CSS, and JavaScript. It continuously receives data via an ESP32S module mounted on an expansion board, which connects various types of sensors. The data is sent to the web application upon user request, as well as to a Google Sheets spreadsheet for backup. The sensors were calibrated using buffer solutions with pH values of 4, 7, and 10, and Electrical Conductivity (EC) of 1413µS/cm (Hach). Analysis of variance using a Tukey test was performed by comparing the data obtained by the H2OG and a Hach HQ4200 device using HACH pHC101 and CDC401 sensors as a reference in the wastewater discharge area of a textile workshop. The results indicated that there is no statistically significant difference between the pH value obtained by the H2OG and the HQ4200 ($p=0.4305$), suggesting that the data sets are homogeneous. The SDT, EC, R, and FI showed significant differences when the data exceeded the calibration curve ($p=0.0004$). In a range of 200–800 units, these same parameters showed no significant differences ($p=0.6280$), a performance that can be attributed to the calibration range. The SWPDN system and the H2OG device represent an efficient solution for environmental monitoring. Further studies are needed to improve the precision and accuracy of certain parameters, explore

different water types, and integrate an intelligent agent for trend analysis. The widespread adoption of advanced sensors is a fundamental step toward achieving sustainable urban development in smart cities.

Biography

María Guadalupe Pineda Arizmendi (born August 29, 1996) is a full-time professor at the National Technological Institute of Mexico, Tianguistenco campus, and a Ph.D. student in Computer Science at the Autonomous University of the State of Mexico. She studied Computer Systems Engineering at the Technological Institute of Higher Studies in Tianguistenco, where she achieved academic excellence and, in 2018, received an academic scholarship to study in Russia. She subsequently earned a master's degree in Computer Science, specializing in pattern recognition and artificial intelligence. She has presented her research at the Mexican Conference on Pattern Recognition and currently leads projects on indigenous languages, the environment, and sustainability.

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Classical optimization vs. artificial intelligence models for color removal in wastewater from denim washing

The classic optimization of a wastewater treatment process such as Coagulation-Flocculation (C-F) aims to establish operating conditions that maximize efficiency through the dosage of reagents, reaction times, and mixing rates. In recent years, Artificial Intelligence (AI) has developed various optimization models of interest for application in diverse fields, with the aim of validating their application and evaluating their potential use. The objective of this study was to determine and compare the optimal conditions for a C-F process for color removal in textile wastewater from denim washing, using a Multilevel Factorial (MF) experimental design with 24 experiments, as a classical optimization approach. The factors evaluated were reagent dose (g/L), agitation speed (RPM), and agitation time (min). Gradient Boosting (GB) and Evolutionary Differential (DE) algorithms were used as AI optimization models, and various metrics were used to compare the models' performance. By operating the C-F process under the optimal conditions estimated by the models, parameters such as color, turbidity, Electrical Conductivity (EC), final pH, Total Dissolved Solids (TDS), and Redox Potential (RP) were monitored. The results indicated that all models estimate a theoretical efficiency >90% for color removal. Validation tests of the operating conditions obtained based on the % color removal were as follows: For FM, 80.9% at 199.8RPM, 6.3min, 0.99g/L; GB from 38.9% at 20RPM, 5min, 0.75g/L, and DE from 83.9% at 20RPM, 30min, 1g/L. The DE algorithm demonstrated the best overall performance, exhibiting the lowest errors (MAE=12.9 and SES=22.1), a low PRESS value (2404), and the highest generalization capacity (R_(adj–predicted)($R^2_{adj-predicted}$ =0.925). These results indicate that this approach offers more stable and accurate predictions under the experimental conditions analyzed. The DE AI model performed best in the validation tests, with an average removal of 82% for color, 95.9% for turbidity, 43% for total dissolved solids, and a final pH of 9.8. It is possible that AI models can yield operating conditions that better align

with real-world situations. Methodological constraints regarding the availability of training data can be overcome by prioritizing the applicability of these advanced models in various water treatment optimization processes. The DE model achieved the best performance even though it was trained using an experimental dataset consisting of only 24 runs, demonstrating its ability to extract reliable patterns from small datasets.

Biography

María Guadalupe Pineda Arizmendi (born August 29, 1996) is a full-time professor at the National Technological Institute of Mexico, Tianguistenco campus, and a Ph.D. student in Computer Science at the Autonomous University of the State of Mexico. She studied Computer Systems Engineering at the Technological Institute of Higher Studies in Tianguistenco, where she achieved academic excellence and, in 2018, received an academic scholarship to study in Russia. She subsequently earned a master's degree in Computer Science, specializing in pattern recognition and artificial intelligence. She has presented her research at the Mexican Conference on Pattern Recognition and currently leads projects on indigenous languages, the environment, and sustainability.

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A test stand for water treatment systems and green hydrogen production units: Description and preliminary research

The transition from a hydrocarbon-based economy to renewable energy sources poses new challenges. Although renewable energy sources are environmentally friendly solutions, their operation is characterised by unpredictability and discontinuity of energy generation. One way to mitigate this problem at the level of an average household may be to use a low-power hydrogen production installation for heating, energy storage, or electricity generation. A test stand has been developed for testing such low-power installations. These installations consist of a water treatment system for electrolysis and a green hydrogen production unit with a maximum power consumption of 7kW. The test stand enables the measurement of water parameters at the inlet to the system and after the multi-stage filtration. The measuring system monitors the water supplied to the electrolysis device and its consumption during this process. Among other things, it checks the required level, pressure, and conductivity of water with an accuracy of 0.04µS/cm. The test stand measures the operating parameters of the hydrogen generation unit at its inlet and outlet. It has been designed to verify installations supplied with rainwater or mains water and to test one or more electrolysis modules simultaneously. The test stand can be used to verify water treatment systems for the electrolysis process and to verify individual modules or sets of hydrogen electrolysers at the design, prototyping, or full-scale production stages.

Biography

Dr. Eng. Mirosław Neska is currently the head of electrical and thermal testing laboratories at The Łukasiewicz Research Network–Institute for Sustainable Technologies, Poland, and the editor of the Energy Transformation section in The Journal of Sustainable Technologies (ISSN:1232-9312). He studied energy systems and industrial control systems at The AGH University of Science and Technology, Krakow, automation at The Casimir Pulaski University of Technology, and mechanical engineering at The Casimir Pulaski Radom University. Dr. Eng. Neska has participated in scientific and technological internships at The ICAM Nantes Technical University, France, The Caillau company, France, and The Vilnius Gediminas Technical University, Lithuania. He has authored or coauthored over 40 scientific publications and participated in over 35 national and international conferences. His professional interests include control systems, energy systems, renewable energy, programmable systems, measurement systems, and metrology.

Mohammed El Khasmi

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Impact of environmental stress on homeostatsis and meat composition in dromedary and rabbit

Growing consumer expectations regarding nutritional composition, quality, and food safety have increased global consumption of farmed meat. However, environmental stressors, including heat stress and transportation, as well as animal handling, significantly alter their homeostasis and meat quality parameters, including pH, water-holding capacity, and storage stability. In addition, post-mortem procedures such as refrigeration and cooking have a major impact on meat quality preservation. This literature review analyzes the impact of stress induced by different factors and handling before slaughter on homeostasis and meat composition, and the anti-stress and antioxidant effects of black cumin seed oil (NO) in dromedaries and rabbits, using the results provided by our recent work carried out in these thematics. The results reported in this review highlight that these two animal species are subjected to more stressful situations, which begin at the farm and then at the market, and continue with loading, transportation, distance traveled, stocking density during transportation, unloading, waiting time in slaughterhouses, deprivation of food and water, and the method of slaughter. These conditions do not meet international animal welfare standards resulting in a significant alteration of homeostatsis and meat quality of these species. This review also highlights the anti-stress and antioxidant potential of NO in these two animal species. Indeed, at the blood level, NO reduces cortisol, glucose and Malonialdehyde (MDA) levels and the neutrophil/lymphocyte ratio and increases the activities of Catalase (CAT), Superoxide Dismutase (SOD) and Glutathione Peroxidase (GSHPx). At the meat level, NO reduces MDA, thiols, ultimate pH, water losses during storage and cooking, and increases CAT, SOD and the sensory score. All the results of the reported work could guide future research with the aim of optimizing the animal welfare of dromedaries and rabbits before slaughter, preserving the quality of their meat and respecting consumer health. Legislation on welfare at all stages of the pre-slaughter process, and the use of nigella seeds as a dietary supplement for a few weeks before slaughter are recommended in these species.

Keywords: Stress Indicators, Blood, Meat, Oxidant Stress, Nigella, Morocco.

Biography

Mr. El Khasmi Mohammed is a Moroccan academic specializing in animal physiology and professor in the Department of Biology at the Faculty of Sciences Ben M'Sik of Hassan II University of Casablanca in Morocco. He holds a PhD (2002) focused on phosphocalcic metabolism in lactating camels and their newborns, and a third-cycle doctorate (1989) on beta-blocker activity and toxicity in rodents, and has more than 30 years of experience in research, teaching and community services. His main interests are metabolism, physiological and endocrine regulations, and the impact of stress and oxidative stress induced par the pre-slaughter handling of camels and rabbit on their homeostasis and meat quality. Internationally trained in France, Texas and Austria, Prof. El Khasmi is also a long-time member of ISOCARD and contributes actively as a reviewer and editorial board member for numerous scientific journals. He has published numerous articles (100) in renowned journals and presented the results of his research (200) in national and international conferences and workshops. His leadership in doctoral training and laboratory innovation underscores his contribution to academic excellence and veterinary sciences. He has supervised a large number of master and doctoral students. He was Director of Physiopathology and Molecular Genetics during 2017-2024, and now he is a member of Laboratory of Ecology and Environment and the International Society for Camelid Research and Development. A recurring theme in his research is the protective role of natural antioxidants-such as nigella oil-against oxidative stress in blood and meat.

Dr Nandagopal Paramesh
Sthira Environment, India

Impact of voluntary carbon markets on REDD+ projects globally

Although voluntary carbon markets have given REDD+ projects—which are essential for forest conservation-a sizable new source of money, they have also sparked questions about their integrity and quality. Although over-crediting, dubious results, and a "race to the bottom" are problems, the markets have fueled an increase in the number of REDD+ projects, providing cash that can support climate goals and forest protection. As market standards and integrity initiatives change to address these issues, recent trends indicate an increase in buyer desire for better, more reliable credits.

Positive Impacts:

Increased Support for Forest Conservation: REDD+ programs receive funding from voluntary markets, which gives governments and communities that live near forests financial incentives to preserve forests.

Market-Driven Growth: Projects that prevent unexpected deforestation and initiatives that address planned deforestation have grown significantly in the voluntary carbon market.

Institutional Development: In order to help projects fulfill higher standards and possibly open the door for these credits to enter compliance markets, revenue can be utilized in the short term to establish institutions for monitoring and reporting. Increasing private investment in REDD+: Market-based tools can be used to leverage public money.

Negative Impacts and Challenges:

Quality Issues: Research has shown that a large portion of REDD+ credits are "phantom credits," meaning they do not accurately reflect actual reductions in emissions. There is substantial discussion and data that suggests many REDD+ credits lack integrity.

"Race to the Bottom": The main objective of attaining true climate mitigation may be undermined by an incentive structure where developers are rewarded for producing more credits while consumers seek out the cheapest (often lowest quality) credits.

Questionable Results: Concerns regarding the true effects of CO2 reduction have been raised by claims of inadequate governance and weak verification, which have coincided with the quick growth of some initiatives.

Risk of "Greenwashing": Businesses may leverage a sizable market with dubious credits to postpone taking significant climate action and declare themselves "net-zero" without having enough of an impact.

Biography

Dr. Nandagopal has more than 18 years of professional job experience in the field of environmental services, as well as almost 20 years of research and development expertise in ecotourism, climate change, forestry, carbon trading, ecology, and the environment. He has experience in research and development efforts related to forestry, ecotourism, and climate change and sustainability concepts; non-governmental organizations. And he also got experience under KPIs, Materiality Assessments, GRI, AA1000, and sustainability reporting. Nandagopal has mostly under Environmental Impact Assessments and sustainability plan for environmental management; mining and forestry science, natural resources; waste management, reforestation and afforestation, ecotourism, biodiversity, biomass, and community development.

Olga Veilande* Ph.D; Dr. Dina Bite, Sc. Soc, Assoc. Prof; Agita Lūse, PhD, Assist Prof; Zanda Gailume-Zoharea
Riga Stradins University, Latvia

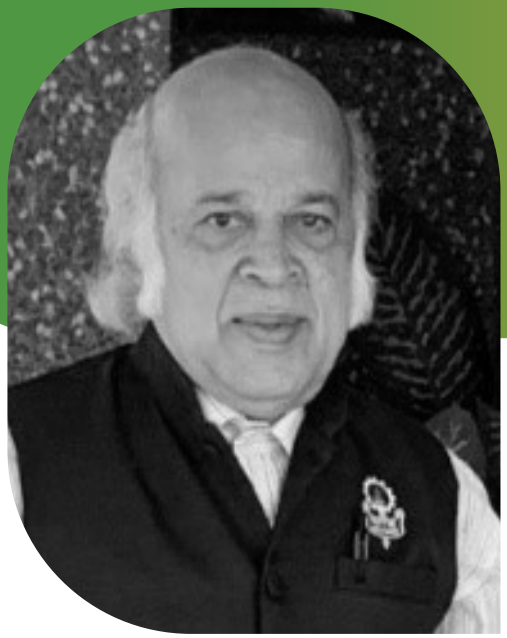
Sustainability governance in the health-care sector: Case studies of four public hospitals in Latvia

Climate change puts a twofold burden on the healthcare sector. On the one hand, healthcare must adapt to climate change by transforming the healthcare system to treat climate change-induced diseases and health disorders. On the other hand, it is acknowledged that the healthcare sector is responsible for almost 5% of global emissions, a figure which can even reach 10% in some high-income nations and lags behind other sectors in reducing its carbon footprint. To enhance the governance solutions in the Latvian public hospitals as well as develop recommendations to the public hospitals and the policy-maker, Riga Stradins University launched a Latvian Council of Science financed project "Socially Responsible Green Transition: Enhancing Governance Solutions to Empower Homo Climaticus in the Healthcare Sector" (Nr. Lzp-2023/1-034) in 2024. The goal of the project (study) is to enhance the governance solutions in the healthcare to empower the so-called Homo Climaticus, which is defined here as a rational agent who is aware of the long-term consequences of climate change and therefore acts responsibly in his/her everyday life (Bjorst, 2012). Based on the results of the systematic literature (165 papers), Tripple-bottom Line Concept, Corporate Governance concept as well as requirements of the European Sustainability Reporting Standards (Commission Delegated Regulation (EU) 2023/2772, ESRS), 49 potential measures have been identified for defining sustainability governance measures in the healthcare sector. Above measures were grouped and a new, four-dimensional (environmental, social, governance and economic) utility model was proposed for defining measures in the context of the sustainability linked to a framework for designing the corporate governance of the public hospitals. This study was aimed to assess the corporate governance of four public hospitals in Latvia against the defined measures. 48 semi-structured interviews were conducted. Preliminary findings indicate that all hospitals surveyed have undertaken some measures aimed at promoting sustainability, although the extent and nature of these initiatives vary

significantly across cases. Limitations of the study come from the sustainability reporting/ management framework within the scope of the ESRS as well as most of the studies have focused on public healthcare settings only. Future research directions may consist of further investigations of the actual outcomes in sustainability corporate governance of healthcare organisations that are based on their developed and adopted business models.

Biography

Olga Veilande Ph.D. candid. In Business Management and Economics. Olga holds an acting researcher position at the Riga Stradins University within the "Socially responsible green transition: Enhancing governance solutions to empower Homo Climaticus in the healthcare sector" project, as well as she is the Project Manager and a Lecture the Jean Monnet project "Green Business and Entrepreneurship in the EU Single Market". Olga Veilande does research in sustainability and Business management.



Prakash Kondekar

Indian Institute of Naturopathy, India

Green energy for planet's health

The present trend of growing tendency of converting agricultural land into non-agricultural one, is in turn affecting the Planet. An Aquaponics and hydroponics have to work together since it will be good for environment. Sylvia Bernstein has dedicated herself in connecting people and plants through indoor, soil-less gardening products. Aquaponics is a revolutionary system for growing plants by fertilizing them with the waste water from fish in a sustainable closed system. A combination of the best of aquaculture and hydroponics, aquaponic gardening is an amazingly productive way to grow organic vegetables, greens, herbs and fruits while providing the added benefits of fresh fish as a safe, healthy source of protein. On a larger scale, it is a key solution to mitigating food insecurity, climate change, groundwater pollution and the impacts of overfishing on our oceans.

Aquaponic Gardening is the definitive do-it-yourself home manual, focused on giving you all the tools you need to create your own aquaponic system and enjoy healthy, safe, fresh and delicious food all year round.

Hydroponics is a method of growing plants without soil, using waterbased mineral nutrient solutions in an artificial environment. This technique allows for efficient space utilization and water conservation, making it popular among home gardeners and commercial growers.

In the face of a rapidly changing climate, diminishing agricultural land and a growing global population, the quest for sustainable food alternatives has never been more urgent. Traditional farming and meat production are among the most resource-intensive industries on Earth, contributing significantly to greenhouse gas emissions and biodiversity loss. Solein, a trailblazing nutrition powder developed by Finnish company Solar Foods. Unlike anything currently on supermarket shelves, Solein is created without plants or animals. Instead, it's

produced using carbon dioxide from the air, water and renewable electricity. This novel approach has the potential to redefine how we think about food, making nutrition not only cleaner and greener but also potentially limitless. Looking ahead, Solar Foods envisions Solein being used not just on Earth but also in space exploration. Its ability to be produced in closed-loop systems using minimal inputs makes it ideal for off-world colonization efforts like Mars missions.

Critically, the production of Solein doesn't depend on soil, weather or climate, which means Solein can be produced anywhere in the world, even in deserts or the Arctic. emits no methane, requires 100x less land than plant-based proteins, and uses virtually no freshwater, marking it as one of the most sustainable food technologies developed to date.

The broader vision is a food system where protein is no longer extracted from nature but engineered sustainably, reliably, safely and locally, anywhere in the world. Solein represents a bold step forward in the evolution of food. It challenges the status quo by offering a protein source that doesn't compromise the planet's ecosystems or natural resources. As consumer awareness of climate and health grows, innovative products like Solein are not only welcome but essential.

Biography

Prof. (Dr.) Prakash Kondekar holds BSc (Hons), LLB, MD (Homeopathy), ND, and certifications in Ayurveda-Ratna and Bowtech (UK). An IIM Mumbai alumnus, he is Honorary Director of the Indian Institute of Naturopathy, a member of the American Diabetes Association, and Fellow of the Royal Society of Health, London. He serves as Senior Advisor to the Association of Food Scientists and Technologists (India) and holds advisory roles with CASMB, IIPA, and other institutions. With a career spanning agro-industry and academia, he has taught food technology programs, practiced medicine, and conducted over 1,100 health management workshops in India. Internationally, he has presented in the UK, USA, Germany, Singapore, UAE, Italy, and Spain. Recognized with the Most Outstanding Professor Award (2018 & 2020), he continues to guide Maharashtra government officers in health management.

Rahul Hajare
Sandip University, School of Pharmaceutical Sciences, India

Design space filling model, synthesis and evaluation of novel 2-indolinone HIV-1 inhibitors

Among currently available HIV-1 inhibitors hamper the polymerase activity of HIV-1 through allosterically binding to the binding pocket but geometry of the DNA and its cycle emergence mutations (especially K103N,Y181C) rapidly develop resistance and potency, efficacy is an another effort to address the structural feature of novel smaller building blocks (Li X et al., 2014).Specific recognition of ligands by HIV-1 protein is at the crucial biological functions so that binding affinities characterizes the strength of such recognition. Space filling model hinges and binding energies on a better way to interatomic interactions and its vital for to build interaction in specific, precise more authoritative. In those research advancements in computing, prediction of the binding affinity based on principles of molecular interaction has come to the forefront of active research and has been the subject potentially offers accurate prediction of binding energies of ligands to protein. Currently drugs used to treat HIV AIDS. Weed out HIV from all of its hiding places within the body is difficult. The approach can be used in bioinformatics practices, including complex binding energy estimation in novel HIV-1 inhibitors. Here we show how a space filling model-based approach used infection HIV-1 inhibitors and role of target compound located insight into the host cell machinery. Process technology by parallel synthesizer major was used for the purposes of synthesized 2-Indolinones potential derivatives. In vitro anti-HIV-1 activity of target compound 8- methoxy-5-(morpholin-4-ylmethyl)-4,4a,5,9b-tetrahydro-1H-pyrazino[2,3-b]indole-2,3 dicarbonitrile (1b) and studies have suggested that above is a novel reservoir has very low cytotoxicity (CC50>1mM) and it has been displays 15.5ug/ml to cell lines, TZM-bl. Also it displayed potent anti-HIV-1 activity and found 3.96µg/ml against laboratory adapted strains UG070, 7th PID. Ethics statement the study was conducted in accordance with basic principles of the Biosafety Laboratory II and III National AIDS Research Institute (ICMR) Pune. This study and the informed consent process were approved by the Indian Council of Medical Research New Delhi.

Biography

Dr. Rahul Hazare is a highly accomplished scholar. Dr. Rahul Hajare is young and 180 cm tall. He showed his intelligence by releasing the biography. Dr. Rahul Hazare is a scholar at the Hindu University of American, Florida. Dr. Hazare and Strong Hand are mentored by the esteemed Dr. Ramesh S. Paranjape, a globally respected scientist and former director of the National AIDS Research Institute. Dr. Rahul Hazare enjoyed every privilege as a student of the esteemed Dr. Ramesh S. Paranjape. A Brahmin from Pune and a Brahmin known for quality coaching, his character and high side reputation, sweet demeanor, and reserved nature, he is deeply rooted in his cultural values and shares a unique connection with his mentors and family, particularly his mother, Love, whom he has guided with his wisdom. He belongs to a high caste and has a higher compatibility with Brahmins. Dr. Rahul Hazare is known for his win by kindness.

Renata Denaro

Water Research Institute, National Research Council, Rome, Italy

Harnessing microbial specialization for nature-based marine bioremediation

Marine bioremediation offers a powerful example of how highly specialized biological functions can be transformed into effective blue solutions. Bacterial biodiversity provides a vast portfolio of metabolic capabilities, including the production of biosurfactants, siderophores and other active compounds that enhance hydrocarbon bioavailability, nutrient acquisition and overall degradation efficiency. These naturally evolved traits can be incorporated into nature-based strategies that aim to optimize bioremediation not by imposing external inputs, but by leveraging and guiding the processes that marine microbes already perform with remarkable specificity.

In parallel, the same microbial specializations can be repurposed for environmental monitoring through the development of biosensors based on responsive bacterial strains or functional genetic markers. Such tools enable real-time tracking of contaminant dynamics, microbial activity and ecosystem recovery, supporting more adaptive management of contaminated marine environments. The integration of ecological understanding with the functional potential of bacteria, asks a central question: Can the extreme specialization found in nature be harnessed to design scalable, sustainable and resilient solutions for marine ecosystem restoration? The evidence suggests that embracing, rather than simplifying, microbial complexity opens new pathways for optimized nature-based bioremediation in marine systems. Our research is focused on the optimization of bioremediation processes in marine environment with special attention to hydrocarbon pollution.

Biography

Renata Denaro is a researcher at the Water Research Institute of the National Research Council (CNR) and a lecturer in Marine Microbial Biotechnology at Tor Vergata University in Rome. She focuses on marine bioremediation, investigating the ecology, genetics, physiology and biotechnological potential of hydro carbon oclastic bacteria. Her research includes valuable microbial compounds, such as siderophores, and the development of bacterial biosensors. She has collaborated with national authorities to address regulatory and technological gaps in marine bioremediation. Author of 50 publications and book chapters, she is the inventor of a patent for sediment recovery and a recipient of an ITWIIN award.

Dr. Santosh Kumar Mishra Ph.D

Independent Researcher (Scholar), Retired from Population Education Resource Centre, Department of Life Long Learning and Extension, S.N.D.T. Women's University, Mumbai, Maharashtra, India

Researching into impact of climate change on land degradation and prevention strategies

Findings of research studies in several countries indicate that Climate Change [(CC), defined as "change in global or regional climate patterns"] accelerates Land Degradation [(LD) which is reflection of "decline in the quality, productivity, and economic value of land"]. CC influences LD through intensified extreme weather conditions, including (1) Droughts, (2) Heavy rains (flooding), and (3) Heatwaves. These contributing factors result in (increased) soil erosion, nutrient loss, desertification, and reduced soil biodiversity. The resulting situation threatens Food Security and Nutrition (FSN) situation, and endangers livelihoods (especially in drylands). There is, thus, urgent need for initiatives that are aimed at integrated land management and conservation to mitigate CC impacts. Prime objective of this paper is to present evidence-based description on impact of CC on LD. Also, it briefly outlines strategies for preventing LD. The author has used secondary data (largely 'qualitative' in nature), and method of data analysis is 'descriptive'.

Analysis of data in this research work indicates that CC is contributing factor for extreme weather situations that result in more frequent and severe heatwaves, droughts, wildfires, heavy rainfall, floods, and stronger storms (like hurricanes), and ocean warming (and resulting sea-level rise). LD is one of the most pressing environmental challenges globally, significantly impacted by the multifaceted and escalating effects of CC. It poses threat for FSN, biodiversity, and human livelihoods. As CC leads to increasingly erratic weather patterns, LD becomes more widespread. Importantly, LD reduces soil fertility which, in turn, negatively impacts overall crop productivity. The resulting outcome is FSN insecurity. The Food and Agriculture Organization (FAO) estimates that soil degradation reduces global crop yields by about 33%, contributing to food shortages and poverty. Further, degraded lands are prone to erosion, resulting in the loss of topsoil, nutrients, and organic matter essential for

plant growth. Furthermore, LD destroys habitats and reduces biodiversity, threatening plant and animal species that depend on healthy ecosystems for survival.

In view of the description presented above, it is imperative that the involved stakeholders take measures to prevent LD. Some of the key strategies for preventing LD include:

Promotion of Sustainable Land Management Practices: It envisages implementing sustainable agricultural practices.

Afforestation and Reforestation: This intervention aims to promote planting trees and restoring degraded forests to prevent soil erosion.

Erosion Control and Soil Conservation: It envisages implementing erosion control measures.

Integrated Water Resource Management: This strategy emphasises adopting integrated approaches to water management.

Policy Support and Governance: This intervention strategy calls for strengthening policy frameworks, land tenure systems, and governance structures to promote sustainable land use practices and enforce regulations against LD.

This paper briefly concludes that CC makes land less capable of supporting life and providing ecosystem services (like food & water). This happens primarily due to (1) Unsustainable human activities (for instance, deforestation, poor farming, and overgrazing); and (2) Environmental factors (for instance, drought, and soil erosion). The ultimate outcome is LD (including soil loss, desertification, and reduced biodiversity). CC adaptation and mitigation strategies are key for prevention of LD.

Keywords: Climate Change, Land Degradation, Extreme Weather Conditions, Contributing Factors, and Agricultural Productivity.

Biography

Dr. Santosh Kumar Mishra is Independent Researcher (Scholar), having retired from Population Education Resource Centre, Department of Lifelong Learning & Extension, S.N.D.T. Women's University, Mumbai, India. He underwent training in demography & acquired Ph.D. He has authored 6 booklets, 4 books, 31 book chapters, 109 journal articles, 2 monographs, 7 research studies, & 119 papers for national & international conferences (some with bursary). He has been awarded with Certificate of Excellence in Reviewing in 2017, 2018, 2021, 2022, & 2024; and conferred with Excellence of Research Award for outstanding contribution & recognition in the field of agriculture in 2021.

Dr. Santosh Kumar Mishra Ph.D

Independent Researcher (Scholar), Retired from Population Education Resource Centre, Department of Life Long Learning and Extension, S.N.D.T. Women's University, Mumbai, Maharashtra, India

Consequences of air pollution on health of women during pregnancy and unborn babies and interventions required

The author of this abstract is of the considered research view that good air quality is crucial for health of pregnant women. The World Health Organization (WHO) has highlighted that air pollution significantly harms pregnant women and their (unborn) babies. Air pollution (defined as "presence of substances in the air which have harmful or poisonous effects") significantly increases health risks of various types not only for women during pregnancy, it also results in preterm birth, low birth weight, stillbirth, gestational diabetes, and long-term issues like asthma, neurological disorders, and underdeveloped organs. Pollutants cause inflammation, oxidative stress, and reduce oxygen, thereby affecting both growth of unborn babies and maternal health.

The prime objective of this paper is to present discussion on how air pollution (negatively) impacts pregnant women and their unborn babies. It also outlines intervention measures women need to take to avoid exposure to air pollution. The author has used secondary data (largely 'qualitative' in nature), and method of data analysis is 'descriptive'.

Analysis of data in this research work indicates that air pollution (both indoor and outdoor) is a significant determinant of adverse health outcomes, particularly in vulnerable populations such as pregnant women and neonates (the neonatal period being the first four weeks of a child's life). When pollutants are inhaled, they enter the lungs and then pass into the bloodstream. It is important to note that from there, the harmful particles reach the placenta (the part of a woman's body that supplies oxygen and nutrients to the baby). This exposure of air pollutants from mother to the womb [which protects the baby and supplies the food through a tube (umbilical cord)] can reduce the amount of oxygen reaching the foetus. This situation causes several health complications for women (for instance, inflammation in the body). In this context, what is of concern is that these changes, over a period of time, can

increase the chances of pregnancy-related complications (like restricted foetal growth and high blood pressure). Exposure to polluted air can cause early warning signs that indicate the woman's body is under stress. During pregnancy, these symptoms may appear subtle (unnoticeable) but should never be overlooked, as they can signal complications developing over time. Some of the most common warning signs include breathing discomfort, persistent weakness, and (frequent) headaches, increased feelings of nausea or dizziness, irritated eyes and throat, and worsening of existing respiratory issue. Also, women should increase their immunity by choosing to healthy nutrition habits.

Health care providers and other stakeholders should design appropriate programs. Such intervention actions should encourage women to (1) Reduce exposure by staying indoors during high air pollution levels days, (2) Use air purifiers, (3) Wearing N95 masks during outdoor activities, (4) Improve home/indoor ventilation (especially while cooking), (5) Choose less polluted routes for walks, and (6) Avoid indoor smoke.

This paper briefly concludes that polluted air carry harmful particles (substances) that are harmful for maternal & child health. Pregnant women need to take steps to remain away from exposure to air pollutants.

Keywords: Air Pollution, Consequence, Health, Women, Pregnancy, Unborn Babies, Restricted Foetal Growth, and Interventions Required.

Biography

Dr. Santosh Kumar Mishra is Independent Researcher (Scholar), having retired from Population Education Resource Centre, Department of Lifelong Learning & Extension, S.N.D.T. Women's University, Mumbai, India. He underwent training in demography & acquired Ph. D. He has authored 6 booklets, 4 books, 31 book chapters, 109 journal articles, 2 monographs, 7 research studies, & 119 papers for national & international conferences (some with bursary). He has been awarded with Certificate of Excellence in Reviewing in 2017, 2018, 2021, 2022, & 2024; and conferred with Excellence of Research Award for outstanding contribution & recognition in the field of agriculture in 2021.

Saša M. Miladinović[1*], Emie Scheidegger[1], Romain Gabioud[1,2]
[1]University of Applied Sciences Western Switzerland (HES-SO Valais/Wallis), Switzerland
[2]University of Bern, Switzerland

Towards greener extraction of mycotoxins from protein concentrates for LC–MS/MS analysis

The growing demand for sustainable analytical methods calls for a re-evaluation of traditional sample preparation workflows, particularly in complex matrices such as protein concentrates. This study presents the development and optimization of a greener extraction method for the determination of 11 regulated mycotoxins using Accelerated Solvent Extraction (ASE) sample preparation for LC–ESI–MS/MS analysis in Multiple Reaction Monitoring (MRM) mode.

Method optimization focused on the systematic comparison of ASE parameters, including temperature, solvent composition, and formic acid concentration. Recoveries ranged from 80% to 120% for all analytes, with repeatability Relative Standard Deviations (RSDs) below 5% for most mycotoxins. Beyond analytical performance, the greenness of the method was quantitatively evaluated using the AGREEprep tool. The green assessment score improved from 0.26, for the conventional reference procedure, to 0.57 after optimization, reflecting a substantial enhancement in solvent sustainability and overall environmental impact.

This optimized ASE–LC–MS/MS workflow demonstrates that greener analytical chemistry can be achieved without compromising method robustness or accuracy. The approach aligns with the principles of Green Analytical Chemistry, offering a more sustainable framework for monitoring mycotoxins in protein-rich food matrices and supporting future efforts to harmonize environmental responsibility with analytical performance.

Biography

Professor Saša M. Miladinović earned his Ph.D. in analytical chemistry from the University of Arkansas, USA, focusing on High-Resolution Mass Spectrometry (HRMS) of synthetic polymers. After postdoctoral research in HRMS based proteomics at ETH Zürich (Aebersold lab) and experience in industry on LC–MS bioanalysis of small molecules and proteins, he joined HES-SO Valais/Wallis as an associate professor of bioanalytical chemistry. His research focuses on advancing LC–MS methodologies for complex biomolecules and promoting green analytical chemistry principles in sample preparation and analysis. He is also dedicated to mentoring and educating future scientists in sustainable and innovative analytical approaches.

Erkko Autio[1], Semra Bakkaloglu[2*], Jasmine Cooper[3], Noah Maurer[1], Shakeel Ramjanee[1], Nilay Shah[2], Livio Scalvini[1], Julian Smart[4], Antigoni Theocharidou[4], Maurizio Zollo[1]

[1]Leonardo Centre on Business for Society, Imperial College Business School, United Kingdom
[2]Department of Chemical Engineering, Imperial College London, United Kingdom
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Market-based insetting mechanisms for accelerating the chemical sector decarbonisation

The chemical sector contributes over 7% of global GHG emissions, with emissions heavily concentrated in Scope 3, presenting a formidable barrier to achieving net-zero targets. This work introduces an innovative Book-and-Claim (B&C) insetting market model—anchored in traceable Environmental Attribute Certificates (EACs)—designed to retain climate value within supply chains. Through the collaboration of engineers, economists, chemists, policymakers, and investors, our model operationalizes upstream emissions abatement (e.g., green feedstocks, CCS) as tradable low-carbon chemical attributes, enabling downstream actors across FMCG, automotive, apparel, and electronics to transparently claim and monetise their Scope 3 reductions.

Our roadmap outlines a phased digital architecture evolving from internal tools (2026–2027), to federated platforms (2027–2029), culminating in AI-enabled, smart contract orchestration post 2030. A dynamic activation approach supports concurrent validation, market formation, and system integration, each with tailored enablers and maturity metrics.

Economic analysis identifies a rapidly scalable market—potentially US $20 billion by 2035, with EAC prices between $56–240 tCO_2^{-1}, and downstream entities (e.g. plastics producers) achieving footprint reductions of ~40%. Importantly, EAC pricing exceeds marginal abatement costs, ensuring commercial viability, and supports durable premium positioning for low-carbon products.

Crucial enablers include development of interoperable digital registries, automated MRV systems, investment architectures, governance frameworks, and regulatory alignment with EU and international policies. These ensure integrity, transparency, and trust in the emerging market.

This model transforms abstract sustainability goals into actionable, investable mechanisms for systematically decarbonising hard-to-abate chemical value chains. It offers a replicable blueprint for market-driven transitions in other sectors, realigning economic incentives with environmental accountability.

Biography

Dr. Semra Bakkaloglu has been a Research Associate in the Chemical Engineering Department at Imperial College London since October 2020, with over 10 years of combined experience in academia, industry, and consultancy. Her research expertise lies at the intersection of environmental and chemical engineering. She specialises in GHG emission, negative emission technologies, sustainability, energy systems modelling, and market-based approaches to mitigate Scope 3 emissions. Her research has led to impactful publications in high-ranking journals and has contributed to policy frameworks and industrial practices aimed at achieving net-zero goals. Her received dual BSc degrees in Environmental Engineering and Chemical Engineering from the prestigious Middle East Technical University in Türkiye. She was awarded a Fulbright Scholarship to pursue an MSc in Environmental Engineering and Earth Science at Clemson University, USA. She worked for three years as a process engineer at the Turkish Petroleum Refinery Corporation. She later earned her PhD as an EU Horizon 2020 Marie Curie Early-Stage Researcher at Royal Holloway, University of London, UK.

Sergey Suchkov[1-13*], R. Holland Cheng[14], Hiroyuki Abe[7], Trevor Marshall[6,15]

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Unlocking the potential of design-driven biotechnology and Bioindustrial manufacturing to develop life-changing innovations and to re-shape the future of healthcare services

A new systems approach to diseased states and wellness result in a new branch in the healthcare services, namely, personalized and precision medicine (PPM). As we attempt to exit the Anthropocene and imagine a new, symbiotic way of existence, the ability to visualize the biological underpinnings of the personal, public, and planetary health continuum is becoming a remarkable asset. It has the potential to, at once, truly personalize healthcare, and at the same time undo the untenable status quo that otherwise maintains grotesque social inequities and the global spread of products that are unhealthy for person, place, and planet. Therefore, it is time to (re)claim the vital term clinical ecology (rooting from PPM-based ecosystems) – a label that once represented a fringe field focused on sick building syndrome.

Because of technological advances, particularly, PPM-based healthcare services, digitization increasingly influences health-related business models. IN this context, PPM is considered to be an emergent and complex phenomenon that encompasses several industries, has the po-tential to impact both private and public organizations as well as citizens worldwide but sur-prisingly has not yet been studied from an ecosystem perspective.

In terms of PPM-guided trends, design-driven biotech and synthetic biology are rapidly emerging interdisciplinary field that is primarily built upon foundational advances in systems biology combined with engineering design. The field considers living systems as program-mable at the genetic level and defined by the development of new platform technologies being interacted with the microenvironment. Originally rooted in innovative disciplines, bi-odesign has transcended into diverse bioindustries, including biotechnology. In the context of biotech product development, biodesign thinking offers a fresh perspective to address com-plex scientific, technological, and societal challenges. By focusing on the needs of end-users, whether they are healthcare professionals, environment-related experts, food designers, bi-odesign thinking creates a framework to drive innovation and generate meaningful solutions.

As the demand for medical treatment surges - fuelled by an ageing population, sedentary lifestyles, and breakthroughs in drug development and pharmaceutical technologies - the healthcare sector's environmental impact continues to escalate. Taking an eco-conscious ap-proach to the design of the bioproducts and bioservices gives special consideration to the environmental impacts of the latter over its entire lifecycle without sacrificing safety or regulatory compliance.

The social and behavioral sciences play a dual role in PPM to get integrated with the envi-ronmental factors in one and the new entity. The first is integrating information on lifestyle and exposures – demographics, environment, social support, sleep, exercise habits and the like – into a comprehensive picture of each individual's health. The second role is studying how patients and practitioners interact with emerging PPM approaches and technologies, to gain understanding that will lead to better policies and best practices.

The global PPM-related market is experiencing unprecedented growth, driven by advance-ments in genomic technologies, increased focus on personalized healthcare, and the rising prevalence of chronic diseases. PPM, which tailors treatment based on individual genetic, environmental, and lifestyle factors, is revolutionizing the healthcare landscape. As healthcare costs skyrocket and patient demographics become increasingly diverse, PPM emerges as a crucial, targeted approach to the prevention, predictive diagnosis, and treat-ment of diseases. By leveraging individual genetic information, lifestyle factors, and envi-ronmental insights, PPM disrupts the traditional one-size-fits-all model of healthcare deliv-ery, promising unprecedented personalization and efficacy. In this context, the design-driven and market-guided biotech industry has been a driving force behind groundbreaking innova-tions that have revolutionized healthcare, agriculture, and environmental sustainability. A global revolution has been in the making in planetary ecosystem, human healthcare and bi-osafety with convergence of

- Digital technologies;
- Multi-OMICS Big Data integration;
- Growing interest in the “variability science” of PPM and
- Planetary health scholarship that both scales up and integrates biological, clini-cal, and ecological contexts of health and disease.

By engaging the above-mentioned Big Data – and the interventions that are based upon them, design-supported PPM offers promise of highly individualized manipulations to prevent illness, optimization of structure and function, and concomitantly, the potential for (mis) using data to incur harm. PPM and design-driven biotech are still in its preliminary stages, but they have the potential to reshape the healthcare sector and the interactions of health with the environment. As we succeed to unravel the puzzle of the latter, we are at the cusp of a revolutionizing healthcare future.

Biography

Dr. Sergey Suchkov was born in Astrakhan, Russia, into a family of medical doctors. He earned his MD from Astrakhan State Medical University in 1980 and his PhD from Sechenov University in 1985. He received advanced training at the NIH (Bethesda, USA), Wills Eye Hospital (Philadelphia, USA), and several British universities under the Royal Society for Immunology. Dr. Suchkov has held numerous academic and leadership roles, including Director of the Division for Clinical Immunology & Immunobiotechnology at MONIKI, and Professor and Chair of the Department for Personalized & Precision Medicine at Sechenov University. He has also served as Vice-Director of the Institute for Biotech & Global Health at RosBioTech National University. Currently, Dr. Suchkov is Professor of Medicine & Immunology and Director of the Center for Biodesign at the N.D. Zelinskii Institute of Organic Chemistry, Russian Academy of Sciences. He also serves as R&D Director at InMedStar (Russia–UAE) and Senior Scientific Advisor to the China Hong Kong Innovation International Business Association. He is an active member of several international scientific organizations, including the New York Academy of Sciences, EPMA, ISPM, PMC, AMEE, ACS, AHA, ARVO, and ISER, and is Secretary General of the United Cultural Convention (UCC), Cambridge, UK.

Stephen Ballesty

In-Touch Advisory, Australia

Sustainable FM via the ISO 41000 series for facility management

Since 2012, ISO/TC 267 has published 12 current FM standards and technical reports, including revisions, with more publications under development. The ISO 41000 series of Facility Management (FM) standards contribute directly to the future of the FM profession and its value proposition. These international FM standards are being rapidly adopted as national standards in Australia and elsewhere, including ISO 41001:2018 (a second edition is due for release in 2026), a management system standard against which FM systems can be certified.

Additionally, with the development of ISO/TR 41019:2024, "FM's role in sustainability, resilience and adaptability", we are now better placed than ever to meet a range of SDG and ESG challenges. This presentation is for all Built Environment professionals interested in "Sustainable FM" and ready to make a real difference to our quality of life.

This Presentation will Cover:

- ISO/TC 267 background and the ISO 41000 series status, including ISO 41001:2018 FM Management System (and its 2026 revision).
- Defining FM and supporting the UN's Sustainable Development Goals (SDGs) and Environmental, Social and Governance (ESG) principles.
- Development of ISO/TR 41019:2024 "FM's role in sustainability, resilience and adaptability" and implications for FM across the SDGs and with the ESG principles.
- Consideration of FM's contribution to a more productive, sustainable and liveable Built Environment for all.

- Practical guidance on systems, models and steps towards achieving a "Sustainable FM" approach. This presentation is for all Built Environment professionals interested in "Sustainable FM" and ready to make a real difference to our quality of life.

Biography

Stephen is the founder of In-Touch Advisory. In addition, he currently serves as an RICS Governing Council member, Asia Pacific seat; as a UNSW Casual Academic; on IFMA's FM Consultant Council board; and is the EuroFM Ambassador to Australia. Since 2012, Stephen has been a member of the Standards Australia MB-022 committee for FM standards, and an Australian delegate to ISO/TC 267 developing the ISO 41000 series. Currently, he serves as ISO/TC 267's global liaison to the ISO 53000 (sustainable development goals) and ISO 55000 (asset management) series.

Stephen T F Poon
MILA University, Malaysia

Resilience through ecological ethics: Towards a sustainable global food system

Food security in the Asia Pacific region is increasingly shaped by interconnected pressures, including climate change, population growth, geopolitical instability, and supply chain disruptions. As nations confront these overlapping challenges, the concept of food security has evolved beyond mere availability to encompass accessibility, affordability, nutrition, and resilience. Environmental, Social, and Governance (ESG) frameworks have emerged as critical guiding principles, influencing how governments, corporations, and communities' approach sustainable food systems. Within this context, innovation, entrepreneurship, and cross-sector brand collaboration are not only complementary strategies but essential drivers of meaningful and scalable transformation.

From an environmental perspective, the region faces acute vulnerabilities such as extreme weather events, land degradation, and water scarcity. ESG-driven initiatives are encouraging the adoption of climate-smart agriculture, regenerative farming practices, and circular food systems that minimize waste and resource use. Technological innovation plays a pivotal role here, with advancements in precision agriculture, alternative proteins, and digital supply chain monitoring helping to optimize productivity while reducing environmental impact. Startups and agri-tech entrepreneurs are particularly influential, introducing agile solutions tailored to local contexts, from vertical farming in urban centres to AI-powered crop management tools for smallholder farmers.

Socially, food security strategies must address inequality and ensure inclusive access to nutritious food. In many parts of Asia Pacific, rural communities and marginalised populations remain disproportionately affected by food insecurity. Entrepreneurial ventures that integrate social impact models, such as cooperative farming platforms, micro-financing for farmers, and community-based distribution networks, are helping bridge these gaps. At

the same time, corporate brands are increasingly aligning with ESG goals by supporting fair trade practices, transparent sourcing, and nutrition-focused product innovation. These efforts not only enhance food accessibility but also build consumer trust and long-term brand equity.

Governance remains a cornerstone of effective food security systems. Policymakers are tasked with creating enabling environments that support innovation while ensuring regulatory alignment and food safety standards. Public-private partnerships are proving especially valuable, facilitating knowledge exchange, investment flows, and infrastructure development. Regional collaboration across borders is equally important, as food systems are inherently transnational. Shared frameworks for trade, sustainability standards, and crisis response mechanisms can enhance collective resilience.

Brand collaboration is emerging as a powerful catalyst in this landscape. By leveraging shared resources, expertise, and market reach, companies can co-create solutions that would be difficult to achieve independently. For instance, partnerships between food producers, technology firms, and logistics providers can streamline supply chains, reduce waste, and improve traceability. Additionally, collaborations with research institutions and NGOs can accelerate the development and deployment of sustainable innovations.

In conclusion, the future of food security in Asia Pacific hinges on integrated, multi-stakeholder approaches that prioritize sustainability, inclusivity, and resilience. ESG principles provide a robust framework for guiding these efforts, while innovation and entrepreneurship inject the dynamism needed to adapt to rapidly changing conditions. Brand collaboration, in turn, amplifies impact by fostering synergy across sectors. Together, these strategies form a cohesive pathway toward a more secure and sustainable food future for the region.

Biography

Stephen is a social creative catalyst with a unique worldview, shaped by a rich multicultural background and extensive experience across Europe. Actively in research, his work spans in current issues and debates on SCHEI area (Sustainability, Creativity, Human Factors, Entrepreneurship & Innovation), discourse across a wide range of disciplinarities in intra, cross, multi, inter and trans practices. His insights and versatile approach to social change and environmental stewardship bring valuable perspectives to the field of circularity and sustainability. He holds the lectureship for contextualising practice, integrated sustainability, entrepreneurship, design thinking, innovation process, media marketplace and industry. Current affiliation with MILA University.

Dr. Subhas Chandra Datta

PhD, Department of Zoology, Visva-Bharati, Santiniketan-731235, and Headmaster & Secretary, Kanchannagar D. N. Das High School (HS), Burdwan-713102, West Bengal, India

Barn owl used as natural-biomedicine-booster-vaccine focusing public-health-ecology environment-biodiversity-migration food-security?

The public health sector of America says 20 public health wins in 2025. But still now the world is facing many infectious diseases affecting public health, epidemiology, microbiology, and vaccine and drug development, ultimately causing morbidity and mortality. It is also linked to poverty, sanitation, and climate, addressing unique health challenges from vector-borne illnesses to malnutrition, often involving complex organisms and environmental factors. Recent studies have estimated the probability of another pandemic of the magnitude of COVID-19 occurring in the coming 25 years to be about 50. There is no magical way to solve the problem. But a barn owl can solve the problem. The barn owl (*Tyto alba L.*) populations in the campus of Kanchannagar D. N. Das High School (HS), Burdwan-713102, West Bengal, India, from the year of 2015 to 2026 update control the corona viruses cusing COVID 19 pandemic, avian influenza (bird flu) A(H5N1) pandemic wide spreading among birds and poultry with transmission to mammals including humans also by direct offering or using their own flesh, fats, flesh, eggs, blood, feathers, bones, etc. or by consuming infected animals as a top most carnivores directly or indirectly improving their natural immunity as well as boosting immunity of all animals including humanbeing. Owls regulate the public health, environment, biodiversity, migration, climate, poverty, sanitation, and food security, also by exploring their bioactive compound. By focusing on nature-based observed-clinical study, scientists and policymakers alike recognise the dual benefits for both environment and human well-being through its holistic lens. Biodiversity, Ecology & Nature-Based Innovative Solutions embodies a footprint shift toward symbiotic coexistence and long-term sustainability. So, in the observation-based natural clinical study, the Barn owl was used as a natural-biomedicine-booster-vaccine, focusing on public-health environment-biodiversity-migration food-security? It will fulfil the International Conference on Environmental Science,

Sustainability & Global Innovation (EnviWorld 2026), focusing on the central theme: "Next-Generation Environmental Science: From Research to Real-World Impact", bringing together professionals committed to environmental advancement. More research is needed for the direct application of this family and community biomedicine vaccine to humans.)

Keywords: Barn-Owl, Natural-Biomedicine-Booster-Vaccine, Focusing, Public-Health, Environment-Biodiversity-Migration, Food-Security.

Biography

Dr. Subhas Chandra Datta, M.Sc., PhD, President Awardee, has been an Innovative Researcher in Dr. Subhas Chandra Datta, M.Sc., PhD, President Awardee, as an Innovative Researcher in various fields since 1993, Assistant Teacher and Headmaster of Kanchannagar at D.N. Das High School (HS) from 1996 to 2007 to date. Dr. Datta has expertise in evaluation and a passion for improving health and wellbeing ecology. His research interests are in Environment, Food Sciences, Plant Protection, Agriculture, Pathology, Healthcare, Biomedicine, Physiology, Education, Allelopathy, Homeopathy, Biodiversity, and Ecology & Nature-Based ecotoxicological Solutions. His open and contextual evaluation model based on responsive constructivism creates new pathways for improving healthcare. His 1st-plant-based biomedicines in homoeopathic forms 'Cina' achieve the 'World's Top Most Articles' in the 'Public Medical Health of WHO'. His valuable work received a Patent under the Central Silk Board (CSB) in 2005. Various Articles and Publications 145 numbers have been published on He is the honorary Member of different prestigious organisations. He has published more than 145 papers in reputed journals and has been serving as an editorial board member of repute.

Prof. Dr. Supriya Santosh Patil[1*],
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Design and development of optical sensor for measurement of purity of ethanol

Pure alcohol (ethanol) has number of applications in automobile, chemical and pharmaceutical industries. Fiber optic sensor has widespread use due to its noncontact type measurement in retro reflective configuration. This paper proposes noncontact type refractometric fiber optic sensor for measurement of purity of alcohol manufactured in distilleries. This refractometric based sensor shows variation in the received light intensity with variation in water content of ethanol i.e. purity of alcohol. The sensor is studied and analyzed by performing simulation based on mathematical model developed using ray tracing technique. The sensor is fabricated and tested by preparing samples in the laboratory. The refractive indices are later measured using Abbe's refractometer having the resolution of 0.001 in white light. Field tests are also carried out at the local distilleries. Experimental results show good agreement with the simulated results as well as with the conventional methods used in industry for measurement of the purity of alcohol. The sensor shows linear variation in the output voltage with the variation in alcohol purity of alcohol from 90% to 99%. The repeatability of the sensor is checked by repeating the experiment 60 times for each value of purity.

Biography

Prof. Dr. Supriya Santosh Patil M.Sc., Ph.D. (Electronic Science), M.A. (Sanskrit), is serving as Professor and Head of the Department of Electronic Science at MES Abasaheb Garware College, Karve Road, Pune 411004. She has been working in this position since 18th August 2003, making it a tenure of 23 years. She has taught at the undergraduate level for 20 years and at the postgraduate level for 13 years in the PG Department of Electronic Science. She completed her Ph.D. in Electronic Science in 2014 from the Department of Electronic Science, Savitribai Phule Pune University, Pune, with a research focus on the design and

development of fiber optic sensors for industrial applications. Her research interests include optoelectronics, sensor development, mathematical modeling, and the Internet of Things. She has published more than 40 papers in international journals and conferences and holds one Indian patent and one U.S. copyright. Currently, she is supervising four Ph.D. students, and one student has already been awarded a Ph.D. She has also completed various research projects. Her work has been recognized with multiple awards, including five Best Oral Presentation Awards, two Best Industry-Oriented Project Awards, the Outstanding Educator Award, the Best College Project Teacher Award, and the prestigious Best Teacher Award by Savitribai Phule Pune University, Pune.

Prof. Dr. Supriya Santosh Patil[1*],
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Refractometric fiber optic sensor for in-situ monitoring the state-of-charge of lead acid battery

In-situ monitoring of the state of charge (SOC) of lead acid battery is important to understand the residual electrical energy. Usage of battery reduces the charge content of the active electrolyte which in turn changes its refractive index. This paper reports refract metric fiber optic sensor developed for on-line monitoring of SOC. The sensor is designed in such a way that it can be easily fitted in any cell of lead acid battery. The SOC of battery is estimated from sensor output. The battery performance parameters of the battery such as terminal voltage, discharge current, ampere-hour, battery temperature, SOC and Depth of discharge using fiber optic sensor output of battery are monitored for given electric load. The data is recorded continuously by data acquisition card USB 6009 using Lab VIEW Platform. Concurrently specific gravity of active electrolyte is measured using suck type of acidic hydrometer. The set of experiments are carried out for different discharge current by varying electrical load and SOC of the battery is monitored. After comparing the results for SOC of the battery with the conventional methods such as coulomb counting, terminal voltage and acidic hydrometer, it is concluded that developed sensor output is direct measure of SOC of battery.

Biography

Prof. Dr. Supriya Santosh Patil M.Sc., Ph.D. (Electronic Science), M.A. (Sanskrit), is serving as Professor and Head of the Department of Electronic Science at MES Abasaheb Garware College, Karve Road, Pune 411004. She has been working in this position since 18th August 2003, making it a tenure of 23 years. She has taught at the undergraduate level for 20 years and at the postgraduate level for 13 years in the PG Department of Electronic Science. She completed her Ph.D. in Electronic Science in 2014 from the Department of Electronic Science, Savitribai Phule Pune University, Pune, with a research focus on the design and development of fiber optic sensors for industrial applications. Her research interests include

optoelectronics, sensor development, mathematical modeling, and the Internet of Things. She has published more than 40 papers in international journals and conferences and holds one Indian patent and one U.S. copyright. Currently, she is supervising four Ph.D. students, and one student has already been awarded a Ph.D. She has also completed various research projects. Her work has been recognized with multiple awards, including five Best Oral Presentation Awards, two Best Industry-Oriented Project Awards, the Outstanding Educator Award, the Best College Project Teacher Award, and the prestigious Best Teacher Award by Savitribai Phule Pune University, Pune.

Prof. Dr. S Nawazish Mehdi[1*],
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[1]Sr. Professor (Retd.)-MJCET, Principal Investigator AICTE Research Project, Ex. R&D Director, Hyderabad, Telangana, India

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Improvement in combustion characteristics by the use of hydrogen fuel in IC engine

With growing emphasis on clean and sustainable energy globally, the investigation into alternative fuels for internal combustion engines has intensified. Hydrogen is considered a promising alternative to conventional hydrocarbon fuel due to its high calorific value, wide flammability range, and almost negligible carbon emissions. This article investigates the minor but essential modifications that need to be made to standard spark-ignition engines to run efficiently on hydrogen-petrol dual-fuel modes to achieve better performance with reduced environmental impact.

The present work comprehensively analyses combustion behaviour, performance characteristics, and emission characteristics of a 4-stroke spark-ignition engine running on different blends of hydrogen. For smooth and efficient operation of hydrogen, a number of specific modifications were carried out: Introduction of hydrogen through carburettor or injector ports, raising the compression ratio to accommodate the enhanced combustion characteristics of hydrogen, and enhancement in the cooling system of the engine to maintain the high flame temperature under controlled condition. Experimental investigations showed a great improvement in all-around engine performance, marked by an increased brake thermal efficiency, along with an improved volumetric efficiency, especially at low and medium loads. A considerable reduction in specific fuel consumption was also achieved. Emission testing showed a drastic reduction in CO and UBHC and only traces of NOx emissions due to the clean combustion characteristics of hydrogen.

Results of this research indicate that conventional spark-ignition engines can operate efficiently on hydrogen-petrol blends in the range of 20-50% hydrogen with minimal design changes. These results point out the flexibility of current engine platforms and confirm hydrogen as a feasible, efficient, and clean fuel for future transportation systems.

Keywords: IC Engine, Hydrogen Fuel, Carbon Monoxide, Unburnt Hydro Carbons (UBHC), Nox, 4- Stoke Engine.

Biography

Dr. S Nawazish Mehdi is a distinguished Academician and researcher with over 40 years of teaching experience. He has held various key positions, including Principal Investigator for AICTE Research Projects, Ex-DEAN, Ex-HOD, and Ex-Director of RSD. Currently, he serves as a Ph.D. supervisor at Osmania University, JNTUH, Mewar University, and Singhania University. His expertise and influence extend beyond academia as a Member of the Board of Studies for JNTUH (Energy Studies), LIET (A), and several other institutions. Dr. Mehdi's contributions to research are significant, particularly in the field of IC engines and renewable energy & sustainable engineering and automobiles. He was awarded many funded research projects from Central and State Government, Ex: A ₹6 Lakhs research grant by AICTE under the R&D Scheme (2002-03) for his project on "Design Modifications in IC Engines to Use Hydrogen Fuel," with the completion report submitted in April 2006. He has also led various innovative projects funded by the A.P. State Council of Science & Technology, including Solar Electric Cars, Hybrid Vehicles, Regenerative Braking Systems, and Variable Compression Ratio (VCR) Engines. A prolific researcher, Dr. Mehdi has guided more than 14 Ph.D. candidates and is currently mentoring 7 others. His academic contributions include over 95 publications in international and national journals and conferences. Additionally, he has authored five textbooks, had 3 patents granted, and one patent recently published. He has also served as a reviewer for numerous Scopus and Web of Science-indexed journals, further solidifying his position as a thought leader in engineering research. Dr. Mehdi's dedication and achievements have earned him several prestigious awards, including the Outstanding Researcher Award (2024) from IEOM Society International, the Engineering Seva Ratna Award from ECIF, a Gold Medal from the Madina Education Society, and the Life Achievement Award etc. His other accolades include the Man of the Year Award (2002), Best Faculty Counselor Award (2022), and Recognition as one of the Leading Engineers of the World (2007) etc. He has actively contributed to knowledge dissemination by attending over 52 conferences, workshops, seminars, training programs, and FDPs. He has delivered impactful sessions at National and International Events as Guest Lecture. Currently serving as Vice-President of QCT, Dr. Mehdi continues to Inspire and Shape the future of Engineering Education and Research.

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Green NADES pretreatment for enhanced microbial lipid production and high-quality lignin recovery from *Miscanthus*

The development of sustainable biorefineries requires green, economically viable strategies that simultaneously maximize carbohydrate valorization and lignin utilization. Here, we report a Natural Deep Eutectic Solvent (NADES)-based pretreatment platform for integrated production of microbial lipids and high-quality lignin from *Miscanthus×giganteus*, a high-yield perennial bioenergy crop. Two aqueous NADES systems—Choline Chloride: Lactic Acid (ChCl:LA) and Choline Chloride:Glycerol (ChCl:Gly)—were evaluated against hydrothermal processing. Pretreatment at 140°C (2h) significantly enhanced biomass fractionation, with ChCl: LA removing ~76% lignin and enriching glucan content to ~60%. Enzymatic hydrolysis of pretreated biomass achieved glucose conversions up to 83.5%, generating hydrolysates suitable for direct microbial fermentation without detoxification. Using a two-stage cultivation strategy, the oleaginous yeast Rhodotorula toruloides efficiently converted NADES-derived hydrolysates into microbial lipids, achieving lipid titers of 19.36g/L and lipid contents of 34–45% (w/w). Notably, NADES hydrolysates supported ~51% higher biomass production compared to refined sugar controls, demonstrating reduced reliance on purified substrates. Beyond carbohydrate valorization, ChCl: LA enabled a lignin-first recovery approach, producing high-purity lignin (>89%) with enriched phenolic hydroxyl functionality (0.91mmol/g). Structural characterization via 2D-HSQC and ^{31}P NMR confirmed favorable syringyl-rich composition and enhanced depolymerization potential, supporting downstream production of renewable aromatics and Sustainable Aviation Fuel (SAF) precursors.

This integrated NADES platform aligns with the principles of green chemistry by employing biodegradable solvents, enabling solvent recyclability, minimizing inhibitor formation, and promoting full biomass valorization. The strategy advances closed-loop biorefinery concepts for simultaneous production of renewable diesel-range lipids and value-added lignin intermediates from lignocellulosic feedstocks.

Keywords: Bioenergy Crops, Biofuels, Fermentation, Lignin, Green Solvents, Eutectic Solvents.

Biography

Dr. Tirath received his PhD in Chemistry from the Indian University of Petroleum and Energy Studies. He has more than 15 years of expertise in the field of green chemistry synthesis and their application for environmentally friendly biomass processing for the generation of fuels and chemicals at the laboratory and pilot scale while working at the greatest laboratories in the world in India, South Korea, and the United States. Presently, he is working as a post-doctoral research associate at the University of Illinois in Urbana-Champaign, Illinois, USA, where in the majority he is involved in the development of efficient bioprocess for the conversion of bioenergy crops for chemicals, biofuels, and other bioproducts at CABBI, the fourth Bioenergy Research Center supported by the US Department of Energy. Scientifically, he has contributed >50 publications in peer-reviewed international review journals, co-invented 3 international patents, coauthored 3 books, and served as an editorial board member of three reputed Journals.

Tony Arison Ramihangihajason[1*], Bruno Smets[2], Paul Ralison[3], Solofo Rakotondraompiana[1]

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Using natural capital accounting to support the implementation of ecovillages in Madagascar

Natural Capital Accounting (NCA) offers a strategic framework to align ecological conservation with local development planning. In Madagascar, the Ecovillage Project (PECOV) applied ecosystem accounting to guide the implementation of 18 ecovillages across nine communes in the Haute Matsiatra and Amoron'i Mania regions by integrating biophysical data into decision-making processes.

The project employed the Ecosystem Natural Capital Accounting (ENCA) methodology, which includes biophysical accounts—carbon, water, and ecosystem infrastructure—built upon a harmonized land cover base. Land cover changes were analysed diachronically (2018–2023) using high-resolution satellite data (NICFI, Sentinel-1 & 2, SRTM), providing insights into landscape dynamics.

Ecosystem accounts were generated with the Sys4ENCA tool, developed by VITO and IUCN, enabling partial automation and the production of composite indicators such as resource use indices and the Total Ecosystem Capacity (TEC).

Between 2018 and 2023, village areas grew by +112 hectares, and agricultural land expanded by +385 hectares. Conversely, natural forests declined by −642 hectares, mainly near watershed areas. The carbon account showed a negative Net Ecosystem Carbon Balance (NECB), averaging -2.8 tonnes of carbon per hectare, in spite of community reforestation initiatives. Water accounts indicated an -18% reduction in effective precipitation during the dry season. The TEC fell from 2.05 million to 1.82 million Ecosystem Capability Units (-11.2%).

By cross-referencing these indicators, the project identified resilient zones, guiding site selection and prioritizing restoration. NCA proved an operational tool for aligning conservation, local development, and territorial planning. This case study underscores the value of integrated ecosystem accounting for sustainable development, paving the way for scaling this approach to other ecologically valuable regions, aligned with the Sustainable Development Goals (SDGs) and post-2020 CBD commitments.

Biography

Dr. Tony Arison Ramihangihajason is a specialist in ecosystem natural capital accounting, with a PhD from the University of Antananarivo. He is the lead author of one international publication and has contributed to numerous studies and conferences across Africa, Asia, and the Indian Ocean. He has worked with WWF, ONF-International, and the Ministry of Environment and sustainable Development of Madagascar, notably coordinating the natural capital accounting component of the PECOV project. His expertise includes remote sensing, GIS, and the use of Sys4ENCA to support sustainable land planning and environmental decision-making.

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Study on approximate analytical techniques with its applications for engineers & scientists

The study deals with combined form of elzaki transform and adomian decomposition method. Nonlinear terms can be defined by adomian polynomials. The elzaki transform is known for its advantage in solving linear ODE & PDE and integral equations and the adomian's decomposition method is a well-known method for solving linear and nonlinear, homogeneous and nonhomogeneous differential and partial differential equations, integro-differential and fractional differential equations that gives exact solutions in form of a convergent series. The convection-diffusion equation is a combination of diffusion and convection equation. In applied sciences and engineering field, these kind of problems appears regularly. This approach gives approximate analytical solution of linear and non-linear convection-diffusion equations. The convection-diffusion equation is describing flows or stochastically-changing system. In biology, the reaction-diffusion-advection equation is used to model chemotaxis observed in bacteria, population migration and evolutionary adaptation to changing environments, etc. To test the proficiency and effectiveness of the method, we discuss here some cases. The primary goal of the paper is to apply an elzaki transform decomposition method to remove disadvantage of existing methods. So that we are applying Elzaki Transform Decomposition (EDM) method for solving these kind of equations. Using EDM we get rapidly the exact solution of the considered equations. In this paper, the elzaki transform and adomian decomposition method have been applied to solve convection diffusion equations. The proposed method is powerful and efficient in finding the approximate analytical solutions and is applied without using linear approximation, discretization or restrictive hypothesis. By comparison with other methods like DTM, HPTM, VIM, solutions are matched which justified the implementation of the proposed method.

Biography

Dr. Twinkle R. Singh is an Associate professor in the Department of Mathematics, Area of her research is related to Fluid Dynamics, Mathematical Modeling, Approximate analytical method for real world problems, Biomathematics. She has nearly 91 research papers published in Scopus and Elsevier peer reviewed Q1, Q2, Q3 level journals. She believes in continuity.

Valentina Svalova B

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Geodynamics and seismicity of the Anatolian-Caucasian-Arabian region and the earthquake in Turkey on February 6, 2023

A magnitude 7.8 earthquake occurred in southeastern Turkey on February 6, 2023. The earthquake's location is associated with the triple junction of the Anatolian, Arabian, and African plates and is confined to the East Anatolian Fault, which forms the boundary between the Anatolian and Arabian plates.

The North Anatolian Fault separates the Eurasian and Anatolian tectonic plates, which slide relative to each other at a rate of 2cm per year. Earthquakes occur regularly along this fault, and activity is gradually shifting further west, into the Sea of Marmara, toward Istanbul. The segment of this zone adjacent to the city has not been active for 250 years. The development of geodynamic models of the deep structure of disaster-prone areas is an important contribution to the study of active continental margins, which is necessary for earthquake prevention, prediction, and forecasting, geoecological risk assessment, and disaster preparedness.

The geodynamic model of the Anatolian-Caucasian-Arabian region is determined by mantle flow rising from the core surface and propagating beneath the lithosphere, creating complex surface velocities in Anatolia to the west, in the Arabian Plate to the east, and in the Caucasus to the north. This flow will continue to transport material along the North Anatolian and East Anatolian Faults.

The frequency of strong earthquakes varies along the faults, due to the varying crustal thickness and rheology of the fault environment. The Moho depth of the East Anatolian Fault is approximately 40km, while that of the North Anatolian Fault is approximately 50km. Along the North Anatolian Fault, strong earthquakes occur every 1-10 years (1939, 1942, 1943,

1944, 1953, 1957, 1966, 1967, 1971, 1992, 1999) with hypocenters spaced approximately 100 km apart and pointing west. Since the 1999 Izmit earthquake occurred 80km east of Istanbul, an earthquake in the Istanbul area can be expected within a few years (1-10 years).

Because the East Anatolian Fault produced strong earthquakes in 1789 (M 7.2), 1795 (M 7.0), 1872 (M 7.2), 1874 (M 7.1), 1875 (M 6.7), 1893 (M 7.1), 2020 (M 6.8), and 2023 (M 7.8, M 7.7). Therefore, the recurrence interval of these groups (1790–1880–2020) is approximately 100 years. However, within these groups, there are typically 2–4 strong earthquakes occurring close in time. It can be predicted that a strong earthquake on the East Anatolian Fault, if not occurring within 1–2 years, will occur only in 100 years.

Funding: The work was carried out within the framework of state assignment No. 122022400105-9 on the topic "Forecast, modeling and monitoring of endogenous and exogenous geological processes to reduce the level of their negative consequences."

Biography

Dr. Svalova is a distinguished scientist holding a Ph.D. in Physical and Mathematical Sciences and a Doctor of Sciences in Geology and Mineralogy. She serves as a Main Scientist and Leading Scientist at the Laboratory of Endogenous Geodynamics and Modern Tectonics, Sergeev Institute of Environmental Geoscience, Russian Academy of Sciences (IEG RAS), Moscow, and is also affiliated with the Geophysical Institute, Vladikavkaz Scientific Center, Russian Academy of Sciences, Russia. She completed her Ph.D. at Moscow State University with a thesis on Mechanical-Mathematical Modeling of the Lithosphere Geodynamics. Her research focuses on geodynamics modeling, geothermal studies, geothermal energy utilization, paleoclimate reconstruction, environmental sustainability, natural hazards, landslides, and risk management. Dr. Svalova has presented her work at over 100 international conferences in more than 50 countries and has published over 300 scientific papers, including two monographs and six edited books. She is an active member of several international scientific organizations, including the International Geothermal Association, and currently serves as President of the Russian Geothermal Association.

Vasileios Vasilakopoulos*,
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Air pollution and atrial fibrillation: A regional epidemiological study in Western Macedonia, Greece

Air pollution is a major environmental determinant of cardiovascular morbidity and mortality worldwide. Fine Particulate Matter (PM10), nitrogen oxides (NO, NO_2, NOx), and sulfur dioxide (SO_2) have been consistently associated with increased hospital admissions for cardiovascular and respiratory diseases. Atrial Fibrillation (AF) represents the most common sustained cardiac arrhythmia and is strongly linked with environmental triggers, including air pollution. This study investigates the association between short-term exposure to major air pollutants and hospital admissions related to cardiac arrhythmias, with an emphasis on atrial fibrillation, in Western Macedonia, Greece. Daily air pollution data (PM10, SO_2, NO, NO_2, NOx) and hospital admission records were analyzed for the regions of Kozani, Ptolemaida, Florina, and Grevena over the period 2011–2021. Descriptive statistical analysis assessed the temporal trends of pollutants, while Spearman correlation analysis examined the association between three-day average pollutant concentrations and hospital admissions. Regional comparisons of pollution levels and hospitalization rates were also performed. PM10 levels demonstrated a clear declining trend after 2014, particularly in 2021, while NO_2 and NOx exhibited significant interannual variability. Statistically significant positive correlations were identified between NO_2 and hospitalizations in Kozani (Rho=0.115, p=0.045) and between SO_2 and hospitalizations in Ptolemaida (Rho=0.122, p=0.034). In Florina, PM10 showed a statistically significant positive association with admissions (Rho=0.138, p=0.017). Furthermore, increased pollutant exposure in Ptolemaida was associated with a higher probability of arrhythmia episodes, including atrial fibrillation. Significant regional differences in hospitalization rates were also observed, with Grevena presenting consistently lower admissions. The findings indicate that short-term exposure to specific air pollutants, particularly NO_2, SO_2, and PM10, is associated with increased hospital admissions for cardiac arrhythmias, including atrial fibrillation. These results highlight the critical need for

targeted air quality interventions and continuous monitoring in industrial and urban areas of Western Macedonia.

Biography

Vasileios Vasilakopoulos is a consultant cardiologist and Director of the Cardiology Department at the General Hospital of Zakynthos, Greece. He is also a PhD candidate at the Department of Electrical and Computer Engineering, University of Western Macedonia. His doctoral research focuses on the evolution and forecasting of cardiovascular diseases in the environmentally burdened region of the Kozani basin, using existing and novel physicomathematical models for the strategic planning of disease prevention and management.

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Energy use and carbon emission along the tomato supply chain based soilless farming technologies

Greenhouse tomato cultivation provides substantial advantages in terms of yield stability, input control, and the optimization of environmental conditions compared to open-field production systems. However, greenhouse production with soilless farming technology is characterized by intensive energy use and considerable Greenhouse Gas (GHG) emissions. Increasing concerns regarding climate change, resource scarcity, and the environmental sustainability of agri-food systems have therefore intensified the need to evaluate energy consumption patterns and Carbon Emissions (CE) along agricultural supply chains. In this context, the present study aims to estimate energy efficiency indicators and quantify carbon emissions along the greenhouse tomato supply chain in Antalya province, Türkiye.

Primary research data were collected through face-to-face questionnaires from 33 greenhouse tomato producers using soilless farming technology, 15 wholesalers, 15 exporters, and 15 retailers operating along the tomato supply chain. A Life Cycle Assessment (LCA) framework was employed to estimate CE generated along the supply chain. The system boundary was defined from cradle to consumer, covering production, transportation, handling, storage, distribution, and retailing stages. Energy equivalents of production inputs and outputs were calculated using established energy conversion coefficients. In addition, key energy use indicators such as energy ratio, energy productivity, specific energy, and net energy were calculated to measure the resource use efficiency.

The results revealed that total energy consumption for one kilogram greenhouse tomato production with soilless farming technology along the overseas and domestic supply chain reached approximately 88.11 MJ and 16.61 MJ, respectively. Coal, chemical fertilizers, electricity, human labor, pesticides, growing media, and diesel fuel were identified as the most energy-intensive inputs. The findings further indicated that non-renewable and

fossil-based energy sources dominated total energy use in greenhousetomato production systems. CE analysis showed that greenhouse tomato production under soilless farming technology generated substantially higher CE compared to open-field tomato cultivation systems. Approximately 13.42 kg CO2-equivalent emissions were generated per kilogram of tomato delivered to consumers in overseas tomato supply chain, while that of domestic one was 7.25 kg CO2-equivalent.

The distribution of carbon emissions along the supply chain also showed that coal accounted for the largest share of emissions (77%) from cradle to farm gate, followed by chemical fertilizers (12%) and electricity consumption (3%). Moreover, approximately 88% of total CE occurred after post production stages including transportation, storage, marketing, and retailing activities in overseas chain, while that of domestic one was 76%. These findings indicate that environmental impacts are not limited to production activities alone but are significantly influenced by downstream supply chain operations.

The study highlights the importance of transitioning toward low-carbon and energy-efficient production systems in greenhouse agriculture. The adoption of renewable energy sources, energy-efficient lighting systems, improved greenhouse covering materials, optimized heating schedules, and more efficient input management practices may substantially reduce both energy consumption and carbon emissions. In particular, reducing dependency on chemical fertilizers, coal, pesticides, and electricity appears critical for improving the environmental sustainability of greenhouse tomato supply chains. The findings provide important policy implications for sustainable greenhouse production, climate-smart agriculture, and low-carbon agri-food supply chain management.

Biography

Prof. Dr. Vedat Ceyhan is a faculty member in the Department of Agricultural Economics at Ondokuz Mayıs University. His research focuses on agricultural economics, sustainability, environmental management, energy use, carbon emissions, agricultural policy, and rural development. He has authored numerous national and international scientific publications on sustainable agriculture, environmental efficiency, agricultural insurance, and green economy practices. Prof. Dr. Ceyhan has also participated in various interdisciplinary research projects related to climate change, agricultural sustainability, and resource management in Türkiye.

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Environmental science, sustainability and global innovation for prevention of contamination and pollution control in seed-cotton (or kapas) development

Step 1: Identification of quantity and quality characteristics of concerned environmental health of proposed project.

Step 2: Preparation of description of existing environmental health conditions.

Step 3: Procurement of relevant environmental health quantity and quality standards.

Step 4: Environmental health impact predictions,

Step 5: Assessment of environmental health impact significance,

Step 6: Identification and incorporation environmental health mitigation measures

Lint Cotton Obtained from Roller Ginning Industries

Conduct of Environmental Health Impact Assessment (EHIA) study and check;

1. Prediction and assessment of impacts on surface water environmental health,
2. Prediction and assessment of impacts on soil and ground environment,
3. Prediction and assessment of impacts on the air environment,
4. Prediction and assessment of impacts on the noise environment,
5. Prediction and assessment of impacts on the biochemical environment,
6. Prediction and assessment of impacts on the biophysical chemical environment,
7. Prediction and assessment of impacts on the radioactive environment,
8. Prediction and assessment of impacts on the ecological environment,
9. Prediction and assessment of impacts on the visual environment,
10. Prediction and assessment of impacts on cultural environment,
11. Prediction and assessment of impacts on archaeological environment,
12. Prediction and assessment of impacts on architectural environment,
13. Prediction and assessment of impacts on historical environment,
14. Prediction and assessment of impacts on anthropological environment,
15. Prediction and assessment of impacts on socio-economic environment.

Environmental pollution prevention safe methods

- The pollution should be prevented or reduced at the source in an environmentally safe manner whenever feasible;
- The Pollution that cannot be prevented or reduced should be recycled in an environmentally safe manner whenever feasible;
- Pollution that cannot be prevented or reduced or recycled or composted should be treated in an environmentally safe manner whenever feasible; and
- Pollution that cannot be prevented or reduced or recycled or treated should be disposed or released into the environment in an environmentally safe manner and should be employed as a last resort.

Biography

Dr. Vijayan Gurumurthy Iyer (b. 10 June 1964, Mayuram, India) is a distinguished engineer, academic, and consultant with over 40 years of experience in mechanical engineering, environmental science, and higher education. He is Director of Techno-Economic-Environmental Study and Check Consultancy Services in Chennai. He holds multiple

qualifications, including AMIE (Mechanical), BGL, PhD (Environmental Science & Engineering), and several honorary doctorates. He has served as Professor, Dean, and Principal at premier institutions such as KLEF University, CRPF Technical Institute, and Narasaraopeta Engineering College, and was a postdoctoral researcher at WSEAS, Greece. Dr. Iyer has authored 360+SCI/ISI-indexed papers, 60 eBooks, and has over 2,000 citations (h-index: 50). He serves on editorial boards for leading journals and has been recognized with national and international awards including Bharat Jyothi and Rashtriya Gaurav. A Fellow of IEI and member of several global bodies, he remains active in research, policy, and professional consultancy.

Prof. Dr. Virendra Goswami

Indian Institute of Technology & Environment and Peace Foundation, India

Role of artificial intelligence and remote sensing to study chemical processes and breakthroughs in catalytic oxidation to develop technologies for 'Chemical Remediation of the Aquatic Pollution' (CART)

Artificial Intelligence and Remote Sensing would be employed to explore the deep seas to understand of the impacts of Ocean Systems Interactions, Risks, Instabilities, and Synergies, ocean-cryosphere interactions and sea-based pollutants on the ocean ecosystem.

The Oxidation process would be employed to treat Groundwater contaminants by making use of the chemical oxidants viz. hydrogen peroxide, persulfate, permanganate & ozone. These oxidants have been able to cause the rapid and complete chemical destruction of many toxic organic chemicals; other organics are amenable to partial degradation as an aid to subsequent bioremediation. Water gets polluted due to toxins & toxic gases. There are generally four toxic entities: chemical, biological, physical, and radiation. Chemical toxicants include inorganic substances such as lead, mercury, hydrofluoric acid, and chlorine gas, and organic compounds such as methyl alcohol. Hence, the focus is to develop innovative methods to entrap toxins, by developing High-Affinity Toxin Receptors, converting GHG (Methane) to ethanol by catalytic processes developing hybrid fuels like bioethanol and biodiesel, and going for electricity from biomass.

It's presumed that catalytic oxides of first-row transition metal oxides e.g. Cobalt oxide should optimize the process of subsurface remediation and above-ground water treatment systems depending on a variety of site-specific conditions e.g. reaction rate kinetics. Chemical oxidation be applied in subsurface systems and in above-ground water treatment systems involving chemical oxidation regeneration of granular activated carbon).

To correlate the Physicochemical properties of these catalytic oxides of first-row transition metal oxides, to discuss strategies to control Global Warming and remediation of Water pollution resulting due to toxins, toxic gases, (Green House Gases), to save marine life (underwater). Next, to evaluate the correlation of chemical oxidants with chemical species associated with soil, aquifer materials, and contaminants during water treatment processes to develop Technologies for 'Chemical Remediation of the Aquatic pollution.

Keywords: HART, GAC, Reaction Rate Kinetics, Catalytic Oxides, Reaction Rate Kinetics, Catalytic Oxides, GW, Aquatic Pollution, Chemical Remediation Technologies, Chemical Remediation of the Aquatic Pollution (CART).

Biography

Dr. Virendra Goswami, Ph.D. Indian Institute of Technology, Kharagpur, MS from the University of Wisconsin, M. Sc (Dr. Hari Singh Gaur University Sagar) and Post Doctorate Fellow at the University of Illinois, Chicago, USA. 'Visiting Scientist': NASA, WMO, NCAR, ICAO, (UNIDO- ICTP-Italy). Founder President of 'Environment and Peace Foundation' & Wing Commander (Retd.) with more than 550 hours of flying as a supernumerary Aircrew. 'Distinguished Alumnus Awardee-2023', IIT Kharagpur & Member: Peer Review Committee for the selection of the Distinguished Alumnus Award-2024 & 2025. He worked at the Space Science Engineering Centre (NASA/NOAA), at the University of Wisconsin. Former Vice Chancellor: Sangam & Sunrise Universities. I have been Director of Engineering Institutes, and a Special Invitee by the WMO-UN. Geneva in 2001 & 2016. He has been a Ph.D & M.Tech Examiner at Centre of Energy Studies, IIT Delhi since 2001. More than 44 years of Teaching, Research, and Governance experience at Home and Abroad. Lately, appointed Reviewer of the Royal Meteorological Society (R. Met. S), Atmospheric-Science Letters. Presented Research Papers (more than 275), Authored-Edited 14 Books, 6 Patents, in the fields of Chemical Technology, Atmospheric, Space, Health Sciences. (AI) and Remote sensing in control of Global Warming, Climate Change, Green Energy, and Quality Higher Education at International/National Conferences held in India, the USA, the UK Latin America, South Africa, Canada, and Europe (32 countries) besides, headed various delegations at the Natl. & International Levels.

Vladimir G. Chigrinov

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Photoaligned azodye nanolayers: New trends for liquid crystal devices

Photoalignment and photopatterning has been proposed and studied for a long time. Light is responsible for the delivery of energy as well as phase and polarization information to materials systems. It was shown that photoalignment liquid crystals by azodye nanolayers could provide high quality alignment of molecules in a Liquid Crystal (LC) cell. Over the past years, a lot of improvements and variations of the photoalignment and photopatterning technology has been made for photonics applications. In particular, the application of this technology to active optical elements in optical signal processing and communications is currently a hot topic in photonics research. Sensors of external electric field, pressure and water and air velocity based on liquid crystal photonics devices can be very helpful for the indicators of the climate change.

We will demonstrate a physical model of photoalignment and photopatterning based on rotational diffusion in solid azodye nanolayers. We will also highlight the new applications of photoalignment and photopatterning in display and photonics such as: (i) Fast high resolution LC display devices, such as field sequential color ferroelectric LCD; (ii) LC sensors; (iii) LC lenses; (iv) LC E-paper devices, including electrically and optically rewritable LC E-paper; (v) Photo induced semiconductor quantum rods alignment for new LC display applications; (vi) 100% polarizers based on photoalignment; (vii) LC smart windows based on photopatterned diffraction structures; (vii) LC antenna elements with a voltage controllable frequency.

Biography

Professor Vladimir G. Chigrinov is Professor of Hong Kong University of Science and Technology since 1999. He is an Expert in Flat Panel Technology in Russia, recognized by

the World Technology Evaluation Centre, 1994, and SID Fellow since 2008. He is an author of 6 books, 31 reviews and book chapters, about 333 journal papers, more than 718 Conference presentations, and 121 patents and patent applications including 50 US patents in the field of liquid crystals since 1974. He got Excellent Research Award of HKUST School of Engineering in 2012. He obtained Gold Medal and The Best Award in the Invention & Innovation Awards 2014 held at the, which was hosted in Kuala Lumpur, Malaysia, on 20-22 Feb 2014. He is a Member of EU Academy of Sciences (EUAS) since July 2017. He got A Slottow Owaki Prize of SID in 2018. Since 2018 until 2020 he works as Professor in the School of Physics and Optoelectronics Engineering in Foshan University, Foshan, China. 2020-2024 Vice President of Fellow of Institute of Data Science and Artificial Intelligence (IDSAI) Since 2021 distinguished Fellow of Institute of Data Science and Artificial Intelligence. He is IETI Fellow since 2019. He is a Editor in Chief of Liquid Crystal section in Crystals journal since 2023.

Wenying Shi

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Engineering out-of-equilibrium molecular assemblies via confinement for efficient solar hydrogen production

Photocatalytic Hydrogen Evolution (PHE) via solar energy represents a key pathway towards sustainable energy, yet the energy conversion efficiency of the symmetric organic photocatalyst 2,6-Naphthalene Dicarboxylic Acid (NDA) is constrained by its elevated exciton binding Energy (E_b). This study employs NDA as a model molecule and proposes a confinement-deconfinement strategy to address this issue. Confinement of NDA within the interlayer space of Layered Double Hydroxides (LDHs) induces a 65° tilted stacking arrangement due to geometric mismatch, forcing NDA into a metastable state (deviating from thermodynamic equilibrium). Following delocalisation treatment, this metastable structure is preserved, leading to the formation of NDA-based Supramolecular Assemblies (SSA). The NDA tetramers within the SSA exhibit a dipole moment exceeding 20 Debye and an Internal Electric Field (IEF) intensity tenfold that of crystalline NDA. This property reduces the activation Energy (E_b) to 42.6meV and enhances charge separation efficiency to 65.29%, representing a 6.38-fold increase over the crystal. Concurrently, interfacial water molecules stabilise the SSA structure via hydrogen bonding, reducing the water contact angle to 28.5° and accelerating surface reaction kinetics. Under visible light irradiation ($\lambda \geq 420$nm), the optimised SSA achieves a hydrogen evolution rate of 63.18mmol·g^{-1}·h^{-1}, outperforming most reported organic photocatalysts. This strategy transforms NDA's molecular symmetry from a limiting factor into a tunable parameter, establishing a universal paradigm for organic photocatalyst design.

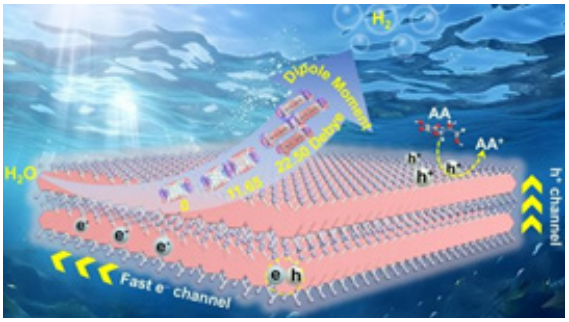

Fig. 1. Schematic diagram of photocatalytic hydrogen production by SSA.

Keywords: Layered Double Hydroxides, Supramolecular, Photocatalysis, Hydrogen Evolution.

Biography

Wenying Shi received her Ph.D. from Beijing University of Chemical Technology in 2010. She is a professor in the State Key Laboratory of Chemical Resource Engineering and the College of Chemistry in Beijing University of Chemical Technology. Her main research interests are in the fabrication and application of the organic–inorganic photocatalysis materials. She has published more than 80 papers in international peer-reviewed journals.

Xavier Koenig
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Improved ecosystem condition but reduced services? Modelling corporate land use effects on a watershed in mauritius

Land-use change is a leading driver of climate change and biodiversity loss. In this context, Natural Capital Accounting (NCA) is emerging as a tool for assessing impacts on- and dependencies from-nature at various levels, including businesses in their direct operations and along value chains. NCA can thus contribute to discussions of sustainability on how investments contribute to public and private value creation. While such analyses have been undertaken in resource extraction industries such as mining and forestry, real estate applications are scarce, and prospective modelling is increasingly required in order to inform future land use decisions that will reverse biodiversity loss alignment with the Kunming-Montreal Global Biodiversity Framework. In this study, we applied NCA methods to three land-use scenarios for a private estate in Mauritius, an island state which has consistently attracted between half and two-thirds of its foreign direct investment in the real estate sector over the recent years. Notably, a financially maximising urban scenario developed over 25 years (2025-2049) would marginally improve ecosystem condition (calculated as per the UN System of Environmental Economic Accounting, Ecosystem Accounting-SEEA-EA), but halve societal value via ecosystem services compared to a do-nothing scenario. Business value, on the other hand, would be increased 37-fold. In contrast, a low-density agro-residential development scenario would grow business value 20-fold and societal value 3-fold. The findings highlight the methodology's potential to complement existing environmental assessment tools and inform land use planning at both national and subnational levels, with promising implications for enlightening discussions around value creation for the public or common good from the perspective of sustainable land utilisation.

Biography

Xavier Koenig has over 15 years of experience across the engineering, sustainability, and project management, sectors. He holds an MSc in Strategic Leadership towards Sustainability from the Blekinge Institute of Technology (Sweden), and is currently a PhD candidate in Natural Capital Accounting at Universite des Mascareignes (Mauritius). Having evolved primarily in the private sector in Australia and Mauritius, his work has centered on corporate assets, projects and sustainability strategies, including stakeholder engagement, carbon accounting, and conservation management. Now turning towards the land use - biodiversity nexus, his research addresses governance, remote sensing, geospatial data analysis and valuation of ecosystem services, aimed at informing policy and decision making at both national and subnational levels for nature-positive development.

Yuan Zusheng
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New-quality productive forces leadership, national ecological well-being supremacy, and economic-social sustainable development: Chinese experience and its worldwide significance

Against the backdrop of global ecological crisis and unbalanced economic development, China has explored a path of sustainable development integrating New-Quality Productive Forces (NQPF), national ecological well-being supremacy, and economic-social coordination, forming distinctive Chinese experience. This paper first clarifies the theoretical connotation and logical relationship of the three core concepts, then systematically sorts out the practice path of Chinese sustainable development from four dimensions: Institutional guarantee, industrial transformation, regional coordination, and people¡¯s livelihood improvement. Further, it analyzes the realistic effects of this path in ecological governance, economic growth quality, and people¡¯s well-being enhancement through empirical data and typical cases. Finally, it explores the worldwide significance of Chinese experience for developing countries to break the "ecological poverty trap" and for the global construction of a community with a shared future for mankind. The research shows that the organic combination of NQPF leadership, ecological well-being orientation, and systematic institutional design is the core of Chinese experience, which provides a feasible reference for global sustainable development and enriches the theoretical system of ecological economics and sustainable development.

Keywords: New-Quality Productive Forces, Ecological Well-being, Sustainable Development, Chinese Experience, Worldwide Significance.

Biography

Yuan Zushe was born in 1963, holds a Ph.D. in philosophy and is the dean of the Institute of Philosophy and Social Sciences at Shaanxi Normal University, China. He is a professor and doctoral supervisor. He has presided over six projects funded by the National Philosophy and Social Sciences Fund (including major, key, and general), and has published more than 80 academic papers in professional journals such as "Chinese Social Sciences", "Philosophy Research", and "Journal of Peking University". He has also published 8 academic monographs in China Social Sciences Press and other publications.

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Gordana Jovanovic

University of Montenegro, Faculty of Science and Mathematics, Montenegro

Top-down solar forcing and the downward control mechanism: Toward an integrated view of atmosphere–climate coupling

Solar variability represents an important natural driver of the Earth's climate system, yet the mechanisms by which relatively small variations in solar irradiance produce detectable atmospheric and climatic responses remain an open question. Two key conceptual frameworks have been developed to address this problem: the top-down mechanism and the downward control mechanism. The former emphasizes radiative–chemical processes in the stratosphere induced by solar ultraviolet variability, while the latter describes the dynamical coupling between atmospheric layers through wave–mean flow interactions. During periods of enhanced solar activity, increased UV flux results in higher ozone concentrations and localized heating in the upper stratosphere. These changes alter the meridional temperature gradient, which, through thermal wind balance, leads to modifications in zonal wind structures. Such changes in the mean state of the stratosphere are crucial, as they set the stage for dynamical coupling with the troposphere. This paper argues that Top-Down and Downward Control Mechanism are not independent but form a continuous physical chain linking solar forcing to tropospheric climate response. An integrated framework is proposed in which top-down forcing initiates stratospheric changes that are subsequently transmitted downward through dynamical processes consistent with the downward control principle. Solar forcing is estimated to produce global temperature variations on the order of ~0.1 K over the solar cycle. However, regional and seasonal responses can be significantly larger, particularly in the Northern Hemisphere winter, where stratosphere–troposphere coupling is strongest. Moreover, internal variability of the climate system can either amplify or obscure solar signals. It is therefore essential to interpret solar influences within the broader context of natural variability and anthropogenic forcing, which dominates recent climate trends.

Biography

Dr. Gordana Jovanović is physicist- special science topic is Physics of ionized gases and plasma. Using Magnetohydrodynamics (MHD) theory it is possible to study successfully various wave modes which arise in these plasmas as a response to the plasma disturbation. MHD waves transport the energy through different plasma layers and may affect on its heating as far as the change in the charged particles concentration in plasma. These processes are important because they can influence on climate changes and also on the radio waves propagation which is important in telecommunications.

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Zirconium-modified terephthalic acid recovered from recycled pet for fluoride and lead removal from water

The presence of fluoride and lead in water poses a significant public health concern due to their toxic effects, even at low concentrations. Both contaminants have been associated with severe health disorders, including dental and skeletal fluorosis in the case of fluoride, and neurological and renal damage in the case of lead. Given the strict drinking water guidelines established by the World Health Organization, the development of efficient and sustainable treatment strategies is essential. In this context, this study evaluates the synthesis and application of a sorbent material derived from recycled PET waste for the removal of these contaminants from water.

The sorbent was obtained through the alkaline hydrolysis of PET to produce Terephthalic Acid (TPA), which was subsequently modified with Zirconium (Zr) to enhance its sorption capacity.

FTIR and XRD analyses confirmed successful zirconium incorporation into the material structure, supporting the formation of a functional sorbent derived from recycled PET waste as a sustainable precursor. Batch sorption experiments were conducted to evaluate the influence of pH, sorbent dose, and contact time on the removal efficiency of both contaminants. The results indicated that pH was the most influential variable for fluoride and lead removal. For fluoride, the highest removal efficiency (98.3±1.0%) was achieved at pH 5, whereas for lead, removal efficiency decreased with increasing pH values, reaching 90% at pH 3. Sorbent dose and contact time did not significantly affect removal performance within the studied range, indicating rapid sorption kinetics and efficient contaminant uptake even at low sorbent

dosages. These findings suggest that the material reaches equilibrium rapidly under the evaluated experimental conditions, which is advantageous from a practical water treatment perspective.

Equilibrium analysis suggested distinct sorption mechanisms for each contaminant, with physisorption predominating for fluoride and ion exchange for lead. The difference in sorption behavior between both contaminants reflects the influence of surface chemistry and the nature of the interaction between the zirconium-modified material and each ionic species in solution. These findings highlight the potential of zirconium-modified TPA derived from recycled PET as an efficient and sustainable material for water treatment applications, while also contributing to the valorization of plastic waste as a functional raw material.

Biography

Javier Hernández-Alba holds a degree in Chemical Engineering from the Durango Institute of Technology (ITD), where Javier completed his undergraduate thesis on the resizing of a sorption column for water treatment applications. Javier is currently pursuing a Master's degree in Environmental Science and Technology at the Center for Research in Advanced Materials (CIMAV), where his thesis focuses on the use of recycled PET-based materials for the removal of lead and fluoride from water. Javier's research interests lie at the intersection of sustainability and water treatment, particularly in the valorization of waste materials as low-cost sorbents. In addition to his research activities, Javier has contributed to science education as an instructor in mathematics and chemistry.

Jose Antonio Aceituno Mederos[1,2*], U. Jauregui Haza[1,2], M. Manduca Artiles[3], A. Machín Garriga[3], Y. Álvarez Galvan[4,5], S. Gaspard[4]

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Activated carbon from *Sargassum*: Adsorption of diazepam and midazolam in wastewater

Since 2011, massive influxes of *Sargassum* on Caribbean coasts have become a serious environmental problem, generating ecological damage and significant management challenges. At the same time, the presence of pharmaceutical compounds and their metabolites in aquatic environments have emerged as a major concern due to their persistence, toxicity, and potential for bioaccumulation. Among these contaminants, benzodiazepines such as Diazepam (DZP) and Midazolam (MDZ) are frequently detected in wastewater, where conventional treatment processes are largely ineffective. In this context, this work aims to valorize *Sargassum* biomass through its transformation into activated carbon and to evaluate its performance for the removal of DZP and MDZ from water via adsorption processes. In addition, the adsorption behavior under single and competitive conditions, the adsorbate–adsorbent interactions, and the potential for adsorbent reuse are investigated.

Activated carbon was produced from *Sargassum* by thermochemical activation using phosphoric acid as the activating agent. The physicochemical properties of the resulting material were characterized using nitrogen adsorption–desorption isotherms, determination of the point of zero charge (pH_{PZC}), Boehm titration, Fourier-Transform Infrared Spectroscopy (FTIR), and X-ray Photoelectron Spectroscopy (XPS). The activated carbon exhibited a well-developed porous structure, composed mainly of micropores and mesopores (39.6% and 60.4%, respectively), and a high specific surface area of 1695m^2/g, indicating its suitability as an adsorbent material.

Adsorption experiments were conducted in batch systems to obtain adsorption kinetics and equilibrium isotherms for DZP and MDZ under single and competitive conditions. The influence of pH, initial drug concentration, and contact time was systematically evaluated. Drug concentrations were quantified by UV spectrophotometry and High-Performance Liquid Chromatography (HPLC). In addition, dynamic adsorption studies were carried out in fixed-bed columns to obtain individual and competitive breakthrough curves, which were modeled using the Thomas model.

The results demonstrated that the *Sargassum*-based activated carbon exhibits a high adsorption capacity for both pharmaceuticals. In single-component systems, maximum adsorption capacities of 659.4mg/gAC for diazepam at pH 7 and 583.3mg/gAC for midazolam at pH 9 were obtained at 25°C. The Langmuir model provided the best fit for equilibrium data, suggesting monolayer adsorption on a relatively homogeneous surface. In competitive adsorption systems, reduced adsorption capacities were observed due to competition for active sites, and the experimental data were satisfactorily described by the Jovanovic model with a random distribution of settling times.

Breakthrough experiments showed breakthrough times of 61 min for DZP and 15 min for MDZ under single-component conditions, which decreased to 40 and 10 min, respectively, in competitive systems. The Thomas model accurately described the dynamic behavior, with average relative errors below 1.5%. Theoretical analysis indicated that adsorption is dominated by dispersive π–π interactions, with secondary hydrogen bonding, pointing to a physisorption mechanism. Overall, the results highlight the potential of *Sargassum*-derived activated carbon as an effective and sustainable material for the removal of pharmaceutical contaminants from water.

Biography

José Antonio Aceituno Mederos was born on November 20, 1963, is a university professor and researcher at the Instituto Tecnológico de Santo Domingo (INTEC), Dominican Republic. He has a background in physical sciences and experience in applied research on water treatment and environmental remediation. His work focuses on adsorption processes, the development and characterization of activated carbons derived from *Sargassum*, and the removal of pharmaceutical contaminants in aqueous systems. He has participated in interdisciplinary research projects and scientific events related to environmental sustainability and the application of scientific and technological solutions to emerging environmental problems.

Lloyd Florens*, Dr. Prakash Deenapanray
Université des Mascareignes, Mauritius

Responsible application of artificial intelligence for Biodiversity (BD) conservation in Mauritius

Biodiversity is in decline globally, and the main causes are often habitat loss, climate change, invasive species and unmanaged human activity (Dasgupta, 2021, UN 2025). Invasive species have contributed to approximately 40% of animal extinctions since the 17th century, and its devasting effects have been intensified by climate change and habitat destruction (UNEP, 2022). Small Island Developing States (SIDS) face exceptional exposure to these drivers of biodiversity loss because they have high endemism rates and limited ecological buffers, resulting in significant impacts from minor environmental changes (Koenig & Deenapanray, 2024). The study done focuses on identifying Ravenala within a particular geographic area for its detection in The Valley Ferney, Mauritius. Remote sensing being the primary method in this study shows how invasive species have spread throughout the area thus endangering ecosystem services and creating long-term risks for wildlife and local communities. The exploratory analysis indicates that AI-based methods combining remote sensing and model for species detection can significantly enhance monitoring precision. The research demonstrates that emerging digital technologies can be applied with high degree of accuracy for identification of invasive species and lead biodiversity initiatives while providing a potential framework for other small islands dealing with comparable ecological threats.

Biography

Lloyd Florens is a Senior Software Engineer and a PhD candidate in Artificial Intelligence at the Université des Mascareignes, Mauritius. With a Master's degree in AI and Robotics, he combines extensive industry experience with academic research to develop practical AI solutions for environmental and biodiversity challenges. His work focuses on applying machine learning and remote sensing technologies to address ecological issues faced by Small Island Developing States. He is committed to advancing AI-driven innovations that support sustainability and create meaningful environmental impact.

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Removal of hydroxychloroquine from waters by the electrochemical treatment

In this work, we investigated the elimination of Hydroxychloroquine (HCQ) in a synthetic solution by electro-coagulation on iron electrodes, electro-oxidation on BDD anode and mineralization by electro-fenton (BDD, DSA) methods and their coupling. Parameters such as current density, electrolyte and iron concentrations and the nature of electrodes are investigated. We compared the efficiency of the methods on the mineralization of HCQ by calculating the rates of mineralization, the energy consumed and the Mineralization Current Efficiency (MCE). We ended this study by characterizing the sludge formed during electro-coagulation by SEM and DRX.

Keywords: Electrochemical Treatment, Mineralization, Hydroxychloroquine (HCQ).

Biography

Pape Abdoulaye Diaw earned his PhD in physical chemistry applied to energy and analysis in 2015 at Cheikh Anta Diop University, He recruited in 2016 by Alioune Diop University in Bambey to work in the chemistry department, where he has responsible for teaching atomic chemistry-Environmental chemistry–Residue analysis methods–Analytical photochemistry. He was awarded the prize for the best thesis in Senegal in 2015, He was also honoured twice at the 100th anniversary of the International Union of Pure and Applied Chemistry (IUPAC100) in Paris in 2019. Today, he also the director of the Richard Toll Higher Institute of Professional Education.

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The island nation as system and scale to examine the one health concept: The case of mauritius

Small oceanic islands are among the last landmasses to be colonised by humans. Their fragile habitats and ecosystems, unprepared for anthropogenic pressures such as land cover changes and invasion by exotic species, have experienced catastrophic declines while growing human populations increasingly relied on imported environmental goods, including for their very subsistence. This paper approaches the concept of One Health from the island perspective, taking the case of Mauritius as a country which continues to pursue economic growth at the expense of Nature, where environmental destruction has gone as far as to promote the legal culling of a native and endangered keystone animal species. We propose an integration of the mostly reinforcing dynamics affecting ecosystems and human health as determinants of subjective wellbeing, showing socio-ecological patterns that include the historical and current political ecology and its resulting equity aspects. The globally relevant lessons learned, i.e., emerging and potential balancing mechanisms, are then proposed for steering socioecological systems towards One Health and wellbeing.

Biography

Xavier Koenig has over 15 years of experience across the engineering, sustainability, and project management sectors. He holds an MSc in Strategic Leadership towards Sustainability from the Blekinge Institute of Technology (Sweden), and is currently a PhD

candidate in Natural Capital Accounting at Université des Mascareignes (Mauritius). Having evolved primarily in the private sector in Australia and Mauritius, his work has centered on corporate assets, projects and sustainability strategies, including stakeholder engagement, carbon accounting, and conservation management. Now turning towards the land use-biodiversity nexus, his research addresses governance, remote sensing, geospatial data analysis and natural capital accounting, aimed at informing policy and decision making at both national and subnational levels for nature-positive development.

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A review of artificial intelligence in chemistry education

Introduction: In the 21st century, Artificial Intelligence (AI) is arguably the driving technological force of this century, and will transform virtually every industry and have an impact on education. AI is the simulation of human intelligence processes by machines, especially computer systems. It includes learning, reasoning, and self-correction. Artificial Intelligence has emerged as one of the most influential forces shaping the future of learning and teaching. Chemists and chemistry educators have been exploring the possibilities of this new technology, essentially as soon as it was broadly released for use. The interplay between technology development and implementation in the classroom will always be important, but seldom more so than in the early stages of work. Chemistry education, which has traditionally faced challenges such as abstract concepts, laboratory safety concerns, and accessibility of resources, presents a ground for AI integration. The integration of Artificial Intelligence (AI) into chemistry education represents a transformative shift in education reform and sustainable scientific research. AI-driven innovations are poised to revolutionize chemistry education, including innovations in educational models and research methods. This paper explores the application of AI in chemistry education, challenges of AI Implementation, ethical issues, future directions in AI-Driven chemistry education.

Keywords: Generative AI Artificial Intelligence (AI), Chemistry Education, Application, Generative Tools, Challenges.

Biography

Prof. Xueli Su graduated from Nanjing University of Science and Technology, China with a B.E. in chemosynthesis and received MS in 2000 at Hubei University. She joined the research group of Prof. Wu Caiying at Wuhan University, did research in flavor compounds in beer and studied mtechniques in solid phase micro-extraction in 2003, and was supervised by Dr. Tom Brenna in 2014, studied polyunsaturated fatty acids at Cornell University as visiting scholar. Her research group has been funded by the local government and these grants have supported work in environmental and green chemistry and published more than 40 research articles.

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