inovine
Scientific Meetings

3rd World Congress on

RECYCLING & WASTE MANAGEMENT

April 13-15, 2026 | Singapore

Venue: Village Hotel Bugis
Golden Landmark, 390 Victoria Street, Singapore, 188061

Scientific Program

Day 1

April 13, 2026 | Singapore

Scientific Program

09:00–09:15: Registrations

09:15–09:30: Opening Ceremony

Meeting Hall: Quartz I

Keynote Presentations

09:30 – 10:10

Title: Designing Field-Deployable, Smartphone-Based Diagnostics for Scalable Global Detection

Melinda B. Chu

Ecotera Home, Inc., USA

10:10 –10:50

Title: To Prepare Ecological Facades to Enhance Carbon Capture and Net Primary Productivity with the Integration of Bioluminescent Genes

Bhupendra Kumar

Aeiforia Constructions Pvt Ltd, India

Group Photo | Networking & Refreshments 10:50-11:10 @Foyer

Session Introduction

Session Chair: Melinda B. Chu, Ecotera Home, Inc., USA

Session Co-Chair: Sitpayeva Gulnara, Institute of Botany and Phytointroduction, Kazakhstan

Tracks

Environmental Sustainability and Development | Climate Change and Health | Environmental Pollution and Ecotoxicology | AI for Environmental Monitoring and Prediction | Climate Change Challenges & Sustainability | Environmental Risk Assessment Sustainable community planning | Food Waste Recycling & Prevention

Exhibitor Demo

11:10–11:40

Title: Simplify and Automate Discrete Gas Sample Analysis

Sohom Roy, Naresh Kumar

Picarro Inc., USA

Special Workshop Session

11:40–12:40	**Title: Transforming Business: Redefining Profit-Driven Business Models for Sustainable Impact** **Adina-Iuliana Deacu** Tianmei World Academy, China / Research Institute for Sustainability at GFZ (RIFS), Germany

Lunch Break 12:40-13:40 @Foyer

Oral Presentations

13:40–14:10	**Title: Conservation of Endemic, Rare and Endangered Species of Kazakhstan Flora** **Sitpayeva Gulnara, Vesselova Polina** Institute of Botany and Phytointroduction, Kazakhstan
14:10–14:40	**Title: The Australian Example of Biofuels and Dealing with Problematic Tyre Waste** **Kim Glassborow** G&B Lawyers, Australia
14:40–15:10	**Title: The Social Return on Investment (SROI) of Container Deposit Schemes** **Bronwen Dalton** University of Technology Sydney, Australia

Refreshment | Coffee Break 15:10-15:30 @Foyer

Poster Presentations

15:30–16:00	**Title: Genus Tamarix L. in the flora of Kazakhstan** **Urazalina Alina** Institute of Botany and Phytointroduction, Kazakhstan
16:00–16:30	**Title: Application of Barley Shochu Lees to Mushroom Cultivation** **Masahito Yamauchi, Fumio Yagi** National Institute of Technology, Kagoshima College, Japan

Panel Discussion & Certificate Falicitation

Day –1 Ends

Day 2

Scientific Program

April 14, 2026 | Singapore

09:00–09:15: Registrations

09:15–09:30: Opening Ceremony

Meeting Hall: Quartz I

Session Introduction

Session Chair: Melinda B. Chu, Ecotera Home, Inc., USA

Session Co-Chair: Sitpayeva Gulnara, Institute of Botany and Phytointroduction, Kazakhstan

Tracks

Environmental Pollution and Ecotoxicology | Plant Science and Biotechnology | Climate Change Challenges & Sustainability | Bioenergy, Biofuels and Biorefineries | Climate Change Challenges & Sustainability | Environmental Risk Assessment Sustainable community planning

Oral Presentations

09:30–10:00	**Title: A Portable Smartphone-Based Microplastics Global Screening Platform for Saltwater and Coastal Environments** **Melinda B. Chu** Ecotera Home, Inc., USA
10:00–10:30	**Title: Transforming Business: Redefining Profit-Driven Business Models for Sustainable Impact** **Adina-Iuliana Deacu** Tianmei World Academy, China / Research Institute for Sustainability at GFZ (RIFS), Germany

Group Photo | Networking & Refreshments 10:30-10:50 @Foyer

10:50–11:20	**Title: Climatic Traumas and Affects on Tribal People of Tripura: Challenges and Mitigation** **Queen Sarma** Indo German Creflat Project Tripura, India
11:20–11:50	**Title: Ammonia Monitoring: Meeting regional air quality directives with Picarro CRDS Ammonia Analyzers and LNI Permacal System** **Sohom Roy** Picarro Inc., USA

11:50–12:20	**Title: Analysis of Household Inorganic Waste Management Based on Circular Economy to Maintain a Healthy Environment as a Climate Change Mitigation Action** **R. Azizah** Universitas Airlangga, Indonesia

Lunch Break 12:20-13:30 @Foyer

Poster Presentations

13:30–14:00	**Title: Tropical and Subtropical Plants in the Introduction Program of the Main Botanical Garden of Kazakhstan** **Massalimova Sholpan** Institute of Botany and Phytointroduction, Kazakhstan
14:00–14:30	**Title: Assessment of Spatial Variability of Polycyclic Aromatic Hydrocarbons (PAHs) in Urban Soils and Fungal Disease Status of Trees Grown in Hong Kong Areas** **Sung Ka Chun, Jacky** Hong Kong Baptist University, HKSAR, Hong Kong

Networking & Refreshments

Panel Discussion & Certificate Falicitation

Day –2 Ends

Day 3

Scientific Program

April 15, 2026 | Virtual

Virtual Mode Zoom Meeting
(GMT+8) Time in Singapore

Virtual Presentations

12:00–12:20	**Title: Biodiversity of Macroinvertebrate Assemblages as Indicators of Water Quality in Pagbanganan River, Baybay City, Leyte, Philippines** **Francia Marie D. Jose** City College of Ormoc, Philippines
12:20–12:40	**Title: Use of Piper Betle L. Extract for the Treatment of Catfish (Clarias gariepinus) Infected with Aeromonas Hydrophila** **Annisa Bheta Berliana Ferdinandus** Sriwijaya University, Indonesia
12:40–13:00	**Title: Circular Economy and Fintech in Asia: Do Responsible Production, Finance Merged with Technology Matters to lowers Climate Change?** **Zia Ur Rahman** School of Economics and Management, Chang'an University, Xian, Shaanxi, China
13:00–13:20	**Title: Design and Development of an Automated and Isolated Chemotherapy Drug Injection and Disposal System to Enhance Safety and Reduce Environmental Contamination** **Zeinab Arvaneh** International Inventor & Research Scientist, Biomedical Engineering and Environmental Health Innovations, Iran
13:20–13:40	**Title: Smart Multifunctional LED System Integrating Artificial Photosynthesis, Environmental Gas Monitoring, and Cellular Proliferation Control** **Mostafa Tahmasbi** Independent Scientist and Inventor, Artificial Photosynthesis & Industrial Pollution Mitigation, Iran
13:40–14:00	**Title: Sustainable Biofuel Production using CaO-Sulphated Alumina Catalyst** **Amal Salim Al Rahbi** University of Technology and Applied Sciences, Oman
14:00–14:20	**Title: Biochar derived from agricultural wastes for remediation of salt-affected soils in Sultanate of Oman** **Amira Al Zadjali** University of Technology and Applied sciences, Oman
14:20–14:40	**Title: Integrating Chemical and Microbial Exposure Assessment of Informal Waste Burning in a Peri-Urban South African Township** **Boitemogelo Okopilwe Mapue Kwakwa** University of Johannesburg, South Africa

14:40–15:00	**Title: Individual and Combined Effects of Atrazine and Glyphosate on Mussel Physiology: An Ecotoxicological Assessment** **Davide Di Paola** University of Messina, Italy
15:00–15:20	**Title: Destruction of fluorine-based Aqueous Film Forming Foams (AFFF) with Supercritical Water Oxidation** **David Garb** 374Water, United States

Panel Discussion

inovine
Scientific Meetings

3rd World Congress on

Recycling, Environmental Science & Climate Change

13-15
APRIL 2026

SINGAPORE

DAY 1
KEYNOTE PRESENTATIONS

HYBRID EVENT

Melinda B. Chu
Ecotera Home, Inc, USA

Designing Field-Deployable, Smartphone-Based Diagnostics for Scalable Global Detection

Environmental monitoring systems remain heavily dependent on centralized laboratory infrastructure, high-cost instrumentation, and specialized personnel. While such approaches provide analytical precision, they limit geographic coverage, delay response times, and restrict access in island, coastal, and resource-limited regions where environmental pressures are often greatest. Climate change, urbanization, and expanding coastal populations amplify the need for scalable, field-deployable monitoring tools that can function outside traditional laboratory settings.

This presentation explores a design framework for distributed environmental screening systems built around portability, cost accessibility, and real-world deployability. Rather than miniaturizing laboratory spectroscopy, the approach emphasizes bulk-scale optical and interfacial signal changes measurable using widely available smartphone imaging and computer vision analysis. By leveraging consumer-grade hardware combined with structured image processing algorithms, field-ready tools can differentiate background from elevated contaminant levels under both freshwater and saline conditions.

Microplastics detection in coastal and saltwater environments is presented as a case study demonstrating stress-tested performance in high-ionic-strength matrices. Additional modular extensions, including turbidity and metal screening, illustrate the adaptability of the underlying optical architecture.

The broader objective is not laboratory replacement, but rapid environmental triage, enabling distributed mapping, decentralized data collection, and prioritization of confirmatory testing. Field-oriented, smartphone-based screening platforms may support coastal monitoring programs, aquaculture management, island communities, and climate-resilient infrastructure planning.

This work highlights a shift from centralized diagnostics toward scalable environmental intelligence networks suited to the geographic and climatic realities of the modern era.

Keywords: Smartphone-based / Mobile diagnostics, Water Diagnostics, Computer vision / AI monitoring, Saltwater, Coastal monitoring

Biography:

Dr. Melinda B. Chu is CEO and Founder of ecotera home, where she personally invented EcoExposure™, including its proprietary AI-driven cell phone computer vision analysis, chemical assay (biodegradable reagents), and physics-based optical detection system, creating the first portable field-ready / consumer-ready microplastics test and environmental contaminant kit validated for saltwater environments. A Princeton University alumna, she holds an M.D. from Saint Louis University and an Executive M.B.A. from Washington University Olin Business School. With expertise in innovation, digital diagnostics, computer vision, chemistry, and sustainability, Dr. Chu advances solutions at the intersection of health, technology, and environmental policy.

Bhupendra Kumar, Pratiyaksha Sharma
Aeiforia Constructions Pvt Ltd, India

To Prepare Ecological Facades to Enhance Carbon Capture and Net Primary Productivity with the Integration of Bioluminescent Genes

In August 2022, the US-based Health Effects Institute surveyed 7,000 locations worldwide and determined that Delhi, the capital of India, has the worst air pollution of any large city. The neighboring districts are also impacted by Delhi's air pollution. Air pollution is the sixth leading cause of death in India, with an estimated 2 million deaths annually. According to the WHO, asthma and chronic respiratory disorders are the leading causes of death in India. Therefore, we have developed a technology of making ecological facades filled with green bioluminescent algae.

This project presents the development of an ecological façade system composed of green microalgae cultivated within photobioreactor modules, engineered to include bioluminescent genes. The design addresses severe air pollution challenges in Delhi by utilizing the photosynthetic capacity of algae to capture atmospheric carbon dioxide and reduce particulate matter, thereby improving urban air quality. The bioluminescent trait provides sustainable, low-energy illumination, enhancing the visual and functional appeal of urban spaces. The photobioreactor architecture ensures optimal growth conditions, facilitating robust algal biomass production. Significantly, the system also promotes the synthesis of secondary metabolites, including antioxidants and bioactive compounds, which hold substantial industrial and pharmaceutical value. This dual-purpose approach combines pollution mitigation with bioresource generation, offering a scalable, nature-based solution for sustainable urban infrastructure. By integrating synthetic biology and architectural innovation, the façade serves as a self-sustaining "liquid tree," contributing both to air purification and the urban bioeconomy. The project highlights the feasibility of deploying living building skins in densely populated mega-cities to combat environmental degradation while fostering circular bioeconomy opportunities through secondary metabolite harvesting.

Biography 1:

Ar. Bhupendra Kumar is a distinguished architect, sustainability advocate and Founder & Managing Director of Aeiforia Group of Companies, with over a decade of experience in corporate interior design, green building construction and turnkey project execution. A gold medalist in Master of Architecture from Jamia Millia Islamia, he further strengthened his multidisciplinary expertise with a Bachelor of Law from Uttarakhand University and advanced programs at IIM Kolkata and IIT Delhi. Driven by a passion for sustainable design, he established Aeiforia with a vision to create environmentally responsible and future-ready spaces, making it one of the first architecture firms in North India to achieve IGBC Platinum certification for green interiors.

Under his leadership, the firm has successfully delivered over 425 projects and is actively working towards net-zero solutions in water, energy and waste management. He is also the promoter of the “Right to Breathe Right" campaign, focusing on improving indoor air quality. Recognized with numerous national and international awards, including the Asian Leadership Award and multiple Architecture & Interior Design Excellence Awards, Ar. Bhupendra Kumar continues to contribute significantly to sustainable architecture while expanding global collaborations, including opportunities in Singapore.

Biography 2:

Pratiyaksha Sharma is pursuing her joint PhD from Indian Institute of Science, Bengaluru and Amity University, Noida in plant sciences. She is also an entrepreneur, working in Aeiforia Buildcon and group.

inovine
Scientific Meetings

3rd World Congress on

Recycling, Environmental Science & Climate Change

13-15
APRIL 2026

SINGAPORE

EXHIBITOR

inovine
Scientific Meetings

3rd World Congress on

Recycling, Environmental Science & Climate Change

13-15
APRIL 2026

SINGAPORE

DAY 1

SPEAKER PRESENTATIONS

HYBRID EVENT

Adina-Iuliana Deacu

Tianmei World Academy, China / Research Institute for Sustainability at GFZ (RIFS), Germany

Transforming Business: Redefining Profit-Driven Business Models for Sustainable Impact

As the global climate crisis intensifies and social inequalities widen, the need to redefine the role of business in society has never been more urgent. Traditional profit-maximizing models often overlook long-term environmental and societal consequences, reinforcing systems that are unsustainable. This presentation proposes a transformative framework for business that integrates sustainability as a core value positioning companies not only as economic actors but also as stewards of ecological and social well-being. Drawing from environmental psychology, systems thinking, and sustainability research, the framework addresses the structural and behavioral barriers that currently inhibit meaningful business transformation. By spotlighting real-world case studies and pioneering models, the presentation will explore how enterprises can transition toward regenerative economies, circular value chains, and stakeholder-centered decision-making processes.

Participants will gain practical strategies for designing and implementing business models that create value beyond profit, supporting the achievement of the UN Sustainable Development Goals. Key themes include integrating sustainability into governance structures, aligning internal culture with long-term impact, and fostering cross-sector collaborations that amplify systemic change. By reframing business success through a sustainability lens, this talk invites participants to become active contributors to a new economic paradigm one where profitability and planetary health go hand in hand.

Biography:

Adina-Iuliana Deacu is a social entrepreneur, systems thinker, and environmental psychology researcher committed to transforming business into a catalyst for sustainable development. As a Klaus Töpfer Sustainability Fellow at the Research Institute for Sustainability (RIFS) in Potsdam, she is developing a framework to align profit-driven business models with long-term ecological and social value. She is also the founder of Tianmei's World Academy, a cross-cultural learning platform that integrates environmental psychology and systems thinking to support regenerative and inclusive approaches to business development.

Sitpayeva Gulnara, Vesselova Polina
Institute of Botany and Phytointroduction, Kazakhstan

Conservation of Endemic, Rare and Endangered Species of Kazakhstan Flora

Among total number of species of higher plants of Kazakhstan flora 14% of the species are endemic. The endemism level is not high as a whole; the quantitative distribution of endemics in the floristic regions of Kazakhstan demonstrates significant differences. Some of districts contain only 10-15 species, while others contain up to 150 species. The south and southeast of Kazakhstan contain over 41% of the total number of species of the republic characterized by the largest percentage of species endemism. More than 130 species of wild-fruit plants grow in mountain fruit forests, among them there are lots of relict and endemic species such as wild apple tree and common apricot which are of global importance.

For conservation of unique gene pool of Kazakhstan natural flora Seed Bank was organized. More than 1200 species of natural flora were laid for long-term storage, including 88 rare, endemic species included in the Red Book of the Republic of Kazakhstan (2014).

Identification of key botanical territories ensures the conservation of natural resources. Currently, 38 KBT have been identified, it is necessary to increase such territories to 100. Development of Green Book of Plant Communities is an important tool for conservation of rare plant communities in Kazakhstan.

For conservation and sustainable management of biodiversity at genetic, species and ecosystem levels an integrated approach involving inventory, cadastral assessment and monitoring of flora, vegetation and plant resources are required.

Biography 1 :

General Director of "Institute of Botany and Phytointroduction" of the Committee of Forestry and Wildlife of the Ministry of Ecology and Natural Resources of the Republic of Kazakhstan, Doctor of Biological Sciences, Honorary Academician of the National Academy of Natural Sciences of Kazakhstan. The main directions of scientific research are flora and plant resources of the steppe regions of Kazakhstan. 5 monographs and more than 250 articles have been published. She is the scientific director of projects and experience exchange programs with international organizations: Washington State University, the Botanical Society of France, Singapore Botanic Gardens, Kongju National University, Osnabrück University etc.

Biography 2 :

Veselova Polina Vasilyevna - Candidate of Biological Sciences, specialty "03.00.05 – Botany". The total work experience, including at the Institute, is 33 years. He is the author of over 150 articles, 2 copyright certificates, and 13 monographs. From 2022 to the present, she has been the head of the Laboratory of the Flora of Higher Plants at the Institute of Botany and Phytointroduction. Polina Vasilyevna participated and participates in the implementation of all budget programs and many grants of the Institute, and in the last 10 years has been their responsible executor. Veselova P.V. She has also been a performer of international scientific projects, in particular the innovative project "Development and creation of an exhibition of plants of Kazakhstan in the Bogatel Botanical Garden (France), as a prototype for the introduction of plants of Kazakhstan into the green construction of Europe" (2012-2013). She participated in research on the topic: "Pilot project on the formation of an electronic database of Herbarium (AA)" (Greifswald, Germany. 2019). Polina Vasilyevna was the responsible executor of an international project under an agreement with the University of South Korea (Changwon National University) within the framework of the Flora of Tien Shan program. The Green Way of Central Asia", which was implemented during 2015-2023.

Kim Glassborow

Australian Environmental Lawyer
Bachelor of Arts (Hons) / Bachelor of Laws University of New South Wales, Australia

The Australian Example of Biofuels and Dealing with Problematic Tyre Waste

This paper will focus upon the emerging trend of developing biofuels in the Australian context, which is well known to be a jurisdiction that is layered in complex State and Federal legislation, detailed environmental assessments and difficult inconsistent government policy.

Problem tyres is a huge silent issue in Australia and government policy has been traditionally reactive rather than proactive in addressing the issue. With the 2021 Council of Australia Governments (COAG) ban on waste exports, the issue of problem tyres has intensified, as there are so few facilities geared to tackle this issue.

I will discuss a case in point example of a new facility on the east coast which anticipates increasing tyre distillation, converting them into an engineered fuel, carbon and steel. This case example will provide a comprehensive breakdown of what is involved in obtaining the requisite legal and environmental scientific approvals and assessments to see more of these types of facilities scale up operations.

Biography:

Kim is an Australian lawyer with 20 years' experience in resource recovery and environmental law, dealing with State and Federal jurisdictions. She has deep experience in the renewable / environmental energy sector and is also an accomplished litigator, at the State and Commonwealth level. She obtained her qualifications from the University of New South Wales Law School, graduating in 2005 with her Bachelor of Arts (Hons) / Bachelor of Laws degree and is also a published author with a national Australian legal publisher (LexisNexis).

Bronwen Dalton
University of Technology Sydney, Australia

The Social Return on Investment (SROI) of Container Deposit Schemes

Container Deposit Schemes (CDS), also known as recycling-for-cash programs, have emerged as a significant source of income for the working poor worldwide. When governments introduce monetary incentives for recycling, evidence shows that participation rates rise markedly in lower-income communities. This trend has been observed in various countries, where such programs offer direct economic benefits to individuals who might otherwise have limited means of earning an income. Similarly, Australia's container deposit initiatives have provided important income earning opportunities, particularly in areas with lower socio-economic status.

This study develops a social return on-investment (SROI) methodology to evaluate the economic and social benefits from participation in CDS. It identifies the range of social, economic and environmental outcomes created and the costs of creating them, thereby quantifying the social and economic value of the scheme to low-income earners.

Biography:

Professor Bronwen Dalton is the Head, Department of Management and Director of the Masters of Not-for-Profit and Social Enterprise Program at the University of Technology, Sydney.

inovine
Scientific Meetings

3rd World Congress on

Recycling, Environmental Science & Climate Change

13-15
APRIL 2026

SINGAPORE

DAY 1

POSTER PRESENTATIONS

HYBRID EVENT

Urazalina Alina, Sitpayeva Gulnara
Institute of Botany and Phytointroduction, Kazakhstan

Genus *Tamarix* L. in the Flora of Kazakhstan

A significant part of the arid territory of Central Asia belongs to the Turan Lowland. In the flora of the arid regions of Central Asia, dense thickets of shrubs from the genus *Tamarix* L. are found along rivers in tugai forests, on saline soils, and along the edges of takyrs.

At the global level, different sources report varying numbers of *Tamarix* L. species, ranging from 57 to 90. Baytenov M.S. (2001), in the two-volume Flora of Kazakhstan, indicates around 60 species in the desert regions of Europe, Asia, and Africa. According to The Plant List, the genus comprises 57 species. Based on current POWO data, the genus includes 73 taxa. Gorshkova S.G., in the Flora of the USSR (1949), reported 90 species.

Due to the insufficiently studied taxonomy of *Tamarix* L. taxa and their current distribution across the territory of Kazakhstan, further research is needed on their species diversity within the republic and their rational use for economic purposes.

In Kazakhstan, we have initiated systematic morphological-anatomical and phylogenetic studies of the genus *Tamarix* L. in the central part of Northern Turan. The research area includes four floristic regions: Betpak-Dala, Moiynkum, the northern part of Kyzylkum, and the southern part of the Balkhash region.

Biography:

Master of Science, PhD student at Al-Farabi Kazakh National University, Junior Researcher of the Plant World (Institute of botany and phytointroduction, Almaty)

Masahito Yamauchi, Fumio Yagi
National Institute of Technology, Kagoshima College, Japan

Application of Barley Shochu Lees to Mushroom Cultivation

In Japan, 457000 kl/year of shochu(spirits) was produced from cereals, sweet potato, etc. Barley shochu lees is at a rate of 178000 kl/year and in the process, 230000 t of barley shochu Lees were generated. Currently, barley shochu lees is used as a fertilizer and feed ingredient, and is processed through methane fermentation to recover energy, but there are few efforts to use it for food production.

In this study, we focused on oyster mushrooms, which are easily affected by nutrients, and wood ear mushrooms, which have an extremely low domestic production volume (880 t) compared to domestic consumption (26,000 t). We conducted cultivation tests using a medium containing barley shochu lees as a nutrient. Furthermore, because we investigated production of low-K mushrooms combining barley shochu lees and beer lees, which has an extremely low potassium content.

Barley shochu lees were separated into solid and liquid fractions after screw pressing. The liquid fraction was further centrifuged to separate it into cake and concentrated liquid.

Although the medium compositions were different for the two mushrooms, in both cases the mycelium grew faster in the medium containing the solid matter after screw pressing than in the control medium of rice bran, and their fruiting body yields were comparable to control media.

Furthermore, analysis of the fruiting bodies revealed that fruiting bodies of oyster mushroom grown on barley shochu lees medium contained extremely high amounts of free amino acids, especially arginine.

It was found that cultivating oyster mushrooms using a combination of barley shochu lees and beer lees reduced the amount of potassium in the fruiting bodies by 40% compared to the control group. It was revealed that barley shochu lees can be used as a good mushroom culture medium.

Keywords: Shochu lees, Oyster mushroom, Wood ear mushroom, Effective utilization, High value added fruit body

inovine
Scientific Meetings

3rd World Congress on

Recycling, Environmental Science & Climate Change

13-15
APRIL 2026

SINGAPORE

DAY 2

SPEAKER PRESENTATIONS

HYBRID EVENT

Melinda B. Chu
Ecotera Home, Inc, USA

A Portable Smartphone-Based Microplastics Global Screening Platform for Saltwater and Coastal Environments

Microplastics are now widely detected in coastal, estuarine, and marine environments across Asia and globally. However, most analytical methods rely on laboratory-based spectroscopy (e.g., FTIR or Raman), which can take days or weeks to process a single sample and cost $400–$2,000 or more, making them prohibitively expensive even in the United States and far more so in resource-limited regions worldwide. Additional techniques like fluorescence staining or refractive-index-dependent optical systems are often optimized for freshwater and centralized facilities, further limiting global geographic coverage, delaying response, and reducing accessibility in island and coastal areas.

We present a portable, field-deployable cell phone microplastics screening platform that integrates simplified sample preparation with smartphone imaging and computer vision analysis. The system is specifically designed to function in saline and brackish matrices, where conventional visual detection methods often struggle due to refractive distortion and ionic interference.

Rather than miniaturized hyperspectral assays, the platform leverages bulk-scale optical and interfacial changes observable at environmentally relevant concentrations. This enables rapid differentiation between background and elevated microplastic levels in both freshwater and salt-water conditions using widely available mobile devices.

The approach is intended as a scalable global environmental screening tool. By enabling rapid triage, distributed mapping, and decentralized data collection, smartphone-based screening systems may support coastal monitoring programs, aquaculture management, island communities, and regional cleanup prioritization efforts.

This work highlights the feasibility of accessible, mobile environmental diagnostics in saltwater environments, expanding monitoring capabilities beyond centralized laboratory infrastructure for portable global detection of microplastics and other environmental contaminants worldwide.

Keywords: Smartphone-based / Mobile diagnostics, Microplastics, Computer vision / AI monitoring, Saltwater, Coastal monitoring

Biography:

Dr. Melinda B. Chu is CEO and Founder of ecotera home, where she personally invented EcoExposure™, including its proprietary AI-driven cell phone computer vision analysis, chemical assay (biodegradable reagents), and physics-based optical detection system, creating the first portable field-ready / consumer-ready microplastics test kit validated for saltwater environments. A Princeton University alumna, she holds an M.D. from Saint Louis University and an Executive M.B.A. from Washington University Olin Business School. With expertise in innovation, digital diagnostics, computer vision, chemistry, and sustainability, Dr. Chu advances solutions at the intersection of health, technology, and environmental policy.

Queen Sarma
Indo German Creflat Project Tripura, India

Climatic Traumas and Affects on Tribal People of Tripura: Challenges and Mitigation

Agriculture remains the principal source of livelihood in most North Eastern states of India, including Tripura. However, climate change has emerged as significant factor affecting livelihoods particularly agriculture-based. The majority of tribal households depend on farming, which makes them highly vulnerable to changing rainfall patterns, water scarcity, and increased pest infestations. Rising temperatures, growing water stress, and erratic monsoon behavior have led to declining agricultural productivity, resulting in food insecurity and loss of livelihoods among these vulnerable communities of Dhalai, Khowai, Gomati and South Tripura districts. The present paper thus attempts to highlight some of the major impacts on livelihood pattern along with other cultural and traditional aspects of communities in Dhalai and Gomati districts. The methodology applied are document survey, scheduled questionnaire along with personal interviews. Some effective mitigation measures are also suggested for the sustainability of the tribal communities as a source of alternative livelihood.

Key words: Climate change, Agriculture, Livelihood, Mitigation

Biography:

Dr. Queen Sarma is a distinguished environmental scientist with over 15 years of experience spanning academic teaching, research, capacity building and environmental project implementation. She holds a Ph.D. in Environmental Sciences from Krishna Kanta Handiqui State Open University, Guwahati and is a gold medalist in her Master's degree in Environmental Sciences from Gauhati University, where she also secured first-class positions at both undergraduate and postgraduate levels. Her academic foundation is further strengthened by formal training in GIS and GPS, pesticide toxicology, biodiversity conservation and science communication.

Dr. Sarma is currently serving as a Technical Officer (Environmental and Social Safeguards) under an Indo-German Project with the Tripura Forest Department, where she is responsible for ESS compliance reporting, monitoring and evaluation, checklist preparation and implementation of safeguard activities related to project interventions. Previously, she has held academic and research positions including Assistant Professor, Senior Research Fellow, Program Coordinator, Research & Teaching Assistant and Guest Lecturer at reputed universities, colleges and government-funded institutions. Her work experience covers teaching, curriculum development, project coordination, biodiversity conservation programs, wetland development, ex-situ conservation and community-based capacity-building initiatives.

As an accomplished researcher and author, Dr. Sarma has published a book on the estrogenic effects of Endosulfan and multiple peer-reviewed research articles in national and international journals, focusing on environmental education, toxicology, urban environmental issues, traditional knowledge, biodiversity conservation and sustainability. She has actively participated in and presented papers at numerous national and international conferences, workshops and

seminars, including those organized by IIT Guwahati, Gauhati University, IGNOU, DST and UGC-sponsored forums.

Dr. Sarma is a recipient of the NEC Merit Scholarship and a Research & Teaching Assistant Fellowship from KKHSOU. Beyond her academic and professional pursuits, she has a deep-rooted passion for nature conservation and environmental protection, driven by a commitment to integrating scientific research, education and community engagement to promote sustainable development and ecological stewardship.

Sohom Roy
Picarro Inc, USA

Ammonia Monitoring: Meeting regional air quality directives with Picarro CRDS Ammonia Analyzers and LNI Permacal System

Ammonia (NH_3) is a hazardous air pollutant with well-documented impacts on human health, ecosystem functioning, and the formation of secondary particulate matter. Major atmospheric NH_3 emissions originate primarily from agricultural activities, including fertilizer application, organic matter decomposition, and livestock waste management, with additional contributions from industrial and refrigeration sources in urban environments. As a result, air-quality regulatory frameworks worldwide—including the US Clean Air Act (CAA), the EU Air Quality Directive (EU) 2024/288, Singapore's Environmental Protection and Management Act administered by the National Environment Agency, and Japan's Air Pollution Control Act—increasingly emphasize the need for accurate, traceable, and spatially representative NH_3 measurements across both rural and urban settings.

Despite this growing regulatory focus, reliable ammonia monitoring remains technically challenging due to NH_3 reactivity, strong surface adsorption, and the limited availability of stable calibration standards. In this study, we present performance data for the next-generation Picarro PI2103 and G2509 Cavity Ring-Down Spectroscopy (CRDS) analyzers, designed to address these challenges in both regulatory and research contexts. The PI2103 is optimized for high-sensitivity ambient air monitoring and near-source measurements, while the G2509 enables simultaneous measurement of NH_3 alongside CO_2, CH_4, and N_2O, supporting integrated assessments in agricultural, fertilizer, and urban air-quality studies. Both analyzers demonstrate fast response times, low drift, minimal spectral interference, and stable performance during long-term unattended field deployment.

We further describe a calibration and validation approach developed jointly with LNI Swissgas, based on the Permacal permeation system. The system enables traceable generation of NH_3 from sub-ppb to low-ppm concentrations without the use of compressed gas cylinders. By employing ammonia itself as the calibration species, this approach supports measurement traceability and defensibility, reduces uncertainty in NH_3 observations, and strengthens exposure assessment, source attribution, and environmental risk characterization within regional and global air-quality frameworks.

Biography:

Sohom Roy is an isotope and organic geochemist from Kolkata, India, with expertise in paleoclimate and paleoecology. He holds a Ph.D. from IISER Kolkata and has worked as a postdoctoral researcher at Flinders University and the University of Queensland. His research focused on environmental impacts of major geological events and involved extensive use of geochemical proxies using high-precision analytical instrumentation. He currently serves as the Application Scientist for the APAC region at Picarro.

R. Azizah, SH., M.Kes
Universitas Airlangga, Indonesia

Analysis of Household Inorganic Waste Management Based on Circular Economy to Maintain a Healthy Environment as a Climate Change Mitigation Action

Household inorganic waste has the potential to cause environmental health problems if not managed properly. The application of circular economy practices and inorganic waste processing serves as an essential strategy in supporting the creation of a healthy environment. This study employed a quantitative approach using the Structural Equation Modeling–Partial Least Squares (SEM-PLS) method. A total sample of 374 respondents was determined using stratified sampling based on the Lemeshow formula. Data were collected through structured questionnaires and field observations, then analyzed using SmartPLS version 4 with bootstrapping to examine both direct and indirect effects among variables. The SEM-PLS analysis showed that education (β = –0.113; p = 0.024) and age (β = –0.109; p = 0.038) had significant effects on household circular economy practices. Inorganic waste processing (β = 0.126; p = 0.018) and household circular economy practices (β = 0.303; p = 0.000) significantly influenced the healthy environment variable. For indirect effects, education had a significant impact on a healthy environment (β = –0.043; p = 0.044). Specifically, education influenced a healthy environment through household circular economy practices (β = –0.034; p = 0.045). The R-square value indicated that the model explained 15.6% of the variance in the healthy environment variable. Education and age significantly shape household circular economy practices. Inorganic waste processing and these practices contribute to a healthier environment and support climate change mitigation. Moreover, circular economy practices mediate the relationship between education and environmental health conditions.

Keywords: Household inorganic waste management, Circular economy, Healthy Environment, Climate Change Mitigation.

Biography:

Assoc. Prof. Dr. R. Azizah, SH., M.Kes. is an Associate Professor at the Department of Environmental Health, Faculty of Public Health, Universitas Airlangga, Indonesia. By now, she is the Head of Research Group Environmental Health and Climate, Universitas Airlangga. Her research focuses on environmental health, waste management, and climate-related diseases, with numerous publications indexed in Scopus and active involvement as a speaker in international conferences.

Massalimova Sholpan
Institute of Botany and Phytointroduction, Kazakhstan

Tropical and Subtropical Plants in the Introduction Program of the Main Botanical Garden of Kazakhstan

Historically, the greenhouse has performed four specialized functions: collection, exhibition, production, and experimentation. The first scientific research on the introduction of tropical and subtropical plants at the Institute of Botany and Plant Introduction began immediately after the establishment of the Department of Floriculture in 1934. A major impetus to the development of greenhouse cultivation was the completion of the exhibition greenhouse in 1969, which is currently undergoing reconstruction.

At present, particular concern is raised over the fate of the unique flora of the tropics, where the largest number of rare and endangered botanical taxa of various ranks are concentrated. The collection of indoor plants includes a rich species diversity 520 species. These plants represent the flora of various natural zones. Among them is a vast and unique genetic resource of both scientific and practical value for humanity. The greenhouse hosts life forms from different ecological niches. Tropical and subtropical plants were obtained from leading botanical gardens around the world.

The indoor plant collection is of great scientific value and serves as a foundation for museum and educational activities, showcasing the richness and diversity of the tropics and subtropics. It enables the organization of scientific and educational excursions in the greenhouse.

Considering the significance of tropical and subtropical plants for humankind, the staff of our laboratory conducts research aimed at enriching the gene pool, developing cultivation technologies, and introducing tropical and subtropical plants into culture. Scientific and popular science books have been published, methodological guidelines printed, PhD dissertations defended, and more are in preparation. Guidebooks for the greenhouse have been issued, along with research articles.

Work is also being carried out on the testing and introduction of new plants for commercialization. One of the main objectives of the laboratory after the completion of reconstruction is to expand the collection of tropical and subtropical plants.

Biography:

Massalimova Sholpan Kuanyshbaevna holds a Master's degree in Plant Protection and Quarantine. She currently serves as the Head of the Laboratory of Tropical and Subtropical Plants at the Institute of Botany and Phytointroduction. She has also completed three courses of Ph.D. doctoral studies in the specialty "Protection and Quarantine of Plants." Her primary scientific research focuses on the introduction of tropical and subtropical plants, as well as the study of pests and plant diseases. Over the years, she has actively participated in the implementation of numerous budget programs and scientific grants of the Institute of Botany and Phytointroduction, contributing significantly to advancements in her field.

Sung Ka Chun, Jacky
Hong Kong Baptist University, HKSAR, Hong Kong

Assessment of Spatial Variability of Polycyclic Aromatic Hydrocarbons (PAHs) in Urban Soils and Fungal Disease Status of Trees Grown in Hong Kong Areas

This research investigates the relationship between the chemical parameters and pollutant concentration of soil and the extent of infection of wood decay fungi across various tree species in urban areas of Hong Kong. Notably, this research uncovered significant differences ($p < 0.05$) in fungal infection rates among different tree species (0.78–24.3%). The total concentration of PAHs in the soil samples collected ranged from 0.47 to 3.33 mg/kg (dry weight), with 13 out of the 18 sampling sites exceeding the Dutch Target Values (DTVs) of 1 mg/kg (dry weight). Principal components analysis (PCA) results revealed the influence of two principal components on the fungal infection rates among tree species. In particular, the first component was associated with electrical conductivity (EC) (PC1: 99.7%), while the second component involved redox potential and nitrate concentration (PC2: 0.2%). Furthermore, high concentrations of naphthalene were observed in soils at all sites across five major tree species, namely *Spathodea campanulata, Ficus* microcarpa, *Acacia confusa, Cinnamomum camphora*, and *Lagerstroemia speciosa*. The PCA results suggested that PAHs significantly contributed to fungal infection in these tree species. Such valuable baseline information can aid in the further development of effective urban tree management strategies in Hong Kong, mitigating the adverse impacts of soil quality on urban tree health, particularly in the face of global warming and extreme weather conditions.

Biography:

Sung Ka Chun, Jacky, is a third-year PhD student at the School of Chinese Medicine, Hong Kong Baptist University, Hong Kong. His research focuses on environmental science, particularly the relationship between soil pollution and indigenous plant growth. He has published several papers in peer-reviewed SCI journals.

inovine
Scientific Meetings

3rd World Congress on

Recycling, Environmental Science & Climate Change

13-15
APRIL 2026

SINGAPORE

DAY 3

VIRTUAL PRESENTATIONS

Zoom Meeting (GMT+8) Time Singapore

Annisa Bheta Berliana Ferdinandus
Sriwijaya University, Indonesia

Use of Piper betle L. Extract for the Treatment of Catfish (Clarias gariepinus) Infected with Aeromonas hydrophila

Motile Aeromonas Septicemia (MAS) caused by Aeromonas hydrophila is a major bacterial disease in intensive catfish (Clarias gariepinus) culture and often leads to high mortality and economic losses. The excessive use of antibiotics has resulted in bacterial resistance, environmental pollution, and potential risks to consumers. Therefore, the use of natural and environmentally friendly alternatives is highly encouraged. This study aimed to evaluate the effectiveness of betel leaf (Piper betle L.) extract incorporated into commercial feed as a treatment for A. hydrophila infection in African catfish. The experiment was conducted using a Completely Randomized Design with six treatments and three replications, consisting of different doses of betel leaf extract at 0, 45, 55, 65, 75, and 85 ml per 100 g of feed. Fish were experimentally infected with A. hydrophila and reared for 45 days. Observed parameters included bacterial population in the kidney, total leukocyte count, wound size reduction, percentage of fish recovery, survival rate, and absolute growth in length and weight. The results showed that higher doses of betel leaf extract accelerated the reduction of bacterial populations, enhanced immune responses, and promoted faster wound healing. The highest dose of 85 ml per 100 g of feed resulted in the fastest bacterial decline, complete wound closure by day 34, the highest recovery rate of 97.50%, and a survival rate of 97.50%. In addition, fish in this treatment exhibited better growth performance compared to the control. These findings indicate that Piper betle leaf extract can be used as a natural, safe, and environmentally friendly alternative to antibiotics for controlling Aeromonas hydrophila infections in African catfish aquaculture.

Keywords: Piper betle extract; African catfish; Aeromonas hydrophila; fish health

Biography:

Annisa Bheta Berliana Ferdinandus is a master's student in Fisheries Science at the Faculty of Agriculture, Universitas Gadjah Mada, Indonesia. Her current research focuses on the ecosystem approach to aquaculture, with particular emphasis on sustainability, ecosystem-based management, and responsible aquaculture development. During her undergraduate studies, she conducted experimental research on fish health management and aquaculture disease control. Her academic background includes experimental aquaculture research, basic fish health assessment, and applied disease management in cultured fish. Her research interests align with global initiatives promoting environmentally responsible aquaculture and the integration of ecosystem considerations into production systems. Annisa is committed to advancing research in aquaculture sustainability and is highly motivated to pursue doctoral studies, with the long-term goal of contributing to scientific research and higher education in fisheries and aquaculture at the international level.

Davide Di Paola
University of Messina, Italy

Individual and Combined Effects of Atrazine and Glyphosate on Mussel Physiology: An Ecotoxicological Assessment

This study investigated the physiological, biochemical, molecular, and histopathological impacts of glyphosate, atrazine, and their combination on the marine mussel *Mytilus galloprovincialis*. Mussels were exposed to environmentally relevant concentrations of these herbicides, and a suite of biomarkers was analyzed to assess oxidative stress, metabolic alterations, and tissue damage. Results revealed that both single and combined exposures induced significant oxidative imbalance, as evidenced by elevated lipid peroxidation and enhanced electron transport system activity, reflecting overproduction of reactive oxygen species and heightened metabolic demand. Combined exposure caused the most pronounced effects, including substantial upregulation of glycogen and protein reserves, suggesting a stress-related metabolic shift. Antioxidant enzyme responses exhibited a complex pattern, with superoxide dismutase activity increasing under single exposures but being suppressed in the combined treatment, indicating exhaustion of the antioxidant system. Catalase activity was inhibited, while glutathione peroxidase and glutathione S-transferase were overactivated, reflecting an overburdened detoxification system. Histopathological examination revealed collagen deposition and fibrotic remodeling in gills, mucocyte proliferation, and hepatopancreatic tubule degeneration, corroborating biochemical evidence of oxidative damage. At the molecular level, both intrinsic and extrinsic apoptosis pathways were activated via upregulation of caspase-2 and caspase-8. At the same time, acetylcholinesterase inhibition suggested neurotoxic potential, potentially impairing feeding, valve movement, and stress behaviors. The integration of biochemical, molecular, and histological findings provides a coherent toxicological profile, demonstrating that herbicide mixtures can exert stronger sub-lethal yet ecologically significant effects than single compounds, potentially undermining the health and resilience of mussel populations in contaminated environments.

Biography:

Dr. Davide Di Paola earned his Ph.D. in Applied Biology and Experimental Medicine with a thesis on the embryotoxic effects of emerging environmental pollutants using fish embryo toxicity assays.His research focuses on marine ecotoxicology and environmental monitoring, with a special emphasis on contaminants of emerging concern such as microplastics, pesticides, pharmaceuticals, and mycotoxins. He has authored over 30 peer-reviewed publications and has played leading roles in national and international projects on offshore windfarm environmental assessments and biodiversity conservation, serving as team leader for oceanographic surveys and ecotoxicological analyses.

Francia Marie D. Jose
City College of Ormoc, Philippines

Biodiversity of Macroinvertebrate Assemblages as Indicators of Water Quality in Pagbanganan River, Baybay City, Leyte, Philippines

Threats to aquatic ecosystems, especially rivers, have spurred the development of biological monitoring practices to address environmental issues. This study which was conducted in the three sites of Pagbanganan River aimed to identify macroinvertebrate faunal groups, determine the macroinvertebrate biodiversity, measure the physico-chemical parameters, and evaluate the water quality of the river using the SIGNAL 2 scoring system. Macroinvertebrates were collected using the Hess sampler and a total of 29 macroinvertebrate families were identified belonging to five classes (Acarina, Bivalvia, Gastropoda, Insecta and Polychaeta) and 11 orders. The top two most abundant macroinvertebrate groups (71% combined) in the river were Orders Ephemeroptera and Trichoptera. Results showed that station 2 (Brgy. Imelda) of the Pagbanganan River had the highest diversity and evenness values but had the lowest richness and dominance values compared with the other two stations. Average water temperature, pH, and dissolved oxygen were all within the acceptable range and standards. However, total dissolved solids concentration in station 3 (Brgys. Kan-ipa and Hibunawan) had unacceptable value for drinking water but still was within the normal range for rivers which may be attributed to anthropogenic disturbances found to be more concentrated on the lower part of the river. SIGNAL 2 scoring system showed that the water quality of station 1 and 2 were affected by a pollution source or there were habitats exposed to harsh physical conditions while site 3 indicated that the water quality was affected by urban, industrial or agricultural pollution.

Biography:

Francia Marie Jose has completed her Master of Science in Tropical Ecology with minor in Entomology at the Visayas State University in Baybay City, Leyte, Philippines. She is currently working as a full time Instructor at the City College of Ormoc in Ormoc City Leyte, Philippines and is also designated as the current research coordinator.

Zeinab Arvaneh
International Inventor & Research Scientist, Biomedical Engineering and Environmental Health Innovations, Iran

Design and Development of an Automated and Isolated Chemotherapy Drug Injection and Disposal System to Enhance Safety and Reduce Environmental Contamination

Occupational exposure to chemotherapy drugs poses significant health risks to healthcare workers and contributes to environmental contamination in clinical settings. This project presents the design and development of an automated and fully isolated chemotherapy drug injection and disposal system aimed at improving safety, precision, and environmental protection during the preparation and administration of cytotoxic medications.

The proposed system integrates sealed drug transfer mechanisms, automated dosing control, and a closed-loop disposal unit to prevent direct human contact with hazardous drugs. By minimizing aerosolization, leakage, and manual handling, the system significantly reduces the risk of exposure for medical staff and limits the release of toxic pharmaceutical residues into the environment.

Advanced sensors and microcontroller-based control units ensure accurate dosage delivery, real-time monitoring, and error detection throughout the injection process. Additionally, the integrated waste neutralization and containment module allows for safe isolation and disposal of residual drugs, aligning with international environmental and biomedical safety standards.

This innovation offers a sustainable and scalable solution for oncology centers by enhancing occupational safety, improving treatment accuracy, and reducing pharmaceutical pollution. The system represents a meaningful advancement in medical device engineering, environmental health, and sustainable healthcare infrastructure, with potential applications in hospitals, oncology clinics, and pharmaceutical preparation units worldwide.

Biography:

Dr. Zeinab Arvaneh is a scientist in the field of Research and Technology, specializing in inventions related to Biomedical Engineering. She holds a PhD in Electrical Engineering and is an international inventor with several global inventions in the fields of Environmental Protection, Environmental Health, Biomedical Engineering, and Pharmaceutical Sciences.

Mostafa Tahmasbi
Independent Scientist and Inventor, Artificial Photosynthesis & Industrial Pollution Mitigation, Iran

Smart Multifunctional LED System Integrating Artificial Photosynthesis, Environmental Gas Monitoring, and Cellular Proliferation Control

Indoor air pollution, gas leakage, and chronic exposure to harmful environmental factors represent major challenges to public health, energy sustainability, and cancer prevention. This study presents the design and development of a smart multifunctional household LED lighting system that integrates environmental safety monitoring, artificial photosynthesis technology, and therapeutic light spectrum engineering to enhance indoor environmental quality and support human health.

The proposed system incorporates advanced gas and fire detection sensors, including MQ-7 and MQ-9, enabling real-time monitoring of carbon monoxide (CO), carbon dioxide (CO_2), natural gas leakage, and fire-related emissions. Upon detecting abnormal or hazardous levels, the system activates immediate visual and acoustic alerts, contributing to early risk mitigation and accident prevention in residential environments.

Beyond safety monitoring, the LED light spectrum is precisely engineered using specific wavelength combinations shown in prior photobiological studies to influence cellular signaling pathways. The emitted light is designed to modulate excessive cellular proliferation, with a focus on reducing uncontrolled cell growth associated with cancer-related processes, while remaining safe for continuous household use.

A novel aspect of this system is the integration of artificial photosynthesis mechanisms, enabling partial conversion of indoor CO_2 into oxygen and energy-efficient byproducts. This function contributes to carbon footprint reduction, improved indoor air composition, and alignment with climate change mitigation strategies.

The proposed smart LED system represents a cross-disciplinary innovation at the intersection of environmental science, biomedical engineering, energy efficiency, and preventive healthcare. By combining lighting, air quality management, early warning systems, and bio-inspired energy conversion, this technology offers a scalable and sustainable solution for healthier indoor living environments. The system has potential applications in homes, healthcare facilities, and smart buildings, supporting global goals for climate resilience, public health protection, and sustainable innovation.

Biography:

Dr. Mostafa Tahmasbi is a full member of the Iranian and Asian Inventors Association, as well as an associate member of the Iranian Biology Society. He holds 15 international patents and has won the Gold Medal at the World Invention Awards three times. His most important inventions include a hospital waste disposal device, artificial photosynthesis, and modified poultry feed to reduce excessive cellular proliferation. He is also the author of the scientific book The Golden Path.

Amal Salim Al Rahbi
University of Technology and Applied Sciences, Muscat, Oman

Sustainable Biofuel Production using CaO-Sulphated Alumina Catalyst

Diesel fuel, derived from crude oil, significantly contributes to greenhouse gas emissions and global warming, emphasizing the critical need for sustainable energy sources. Furthermore, waste accumulation represents one of the most pressing environmental challenges facing contemporary society. This research project aimed to address the issue of waste accumulation while simultaneously generating a renewable and sustainable energy source. The research focuses on converting animal waste into sustainable fuel production using a green catalyst derived from waste. A solid catalyst, calcium oxide (CaO), was produced from calcined animal bones and modified using an impregnation method to create a bifunctional catalyst known as CaO-Sulphated alumina. The effectiveness of these catalysts for biofuel production was assessed against traditional homogenous base catalysts, yielding 90.4%, 88%, 81%, and 58% for CaO-Sulphated alumina, CaO, MgO-CaO, and KOH, respectively. CaO-Sulphated alumina showed the highest efficiency, followed by alkaline-treated CaO. A parametric study identified the optimal conditions for the highest biodiesel production which were found to be 2 g catalyst loading, a 1:12 oil-to-methanol molar ratio, and a reaction time of 2 hours. The formed methyl esters were analyzed using FTIR and GC-MS, and the obtained biodiesel was found to consists mainly of 9-Octadecadienoic acid, hexadecanoic and methyl stearate with 28.7, 23.3 and 20.2 % respectively. Catalyst characterization via SEM and XRD showed distinct morphologies and elemental compositions, with XRD revealing peaks for CaO. SEM images displayed a mixture of cubic, spheric, and hexagonal shapes. Stability tests were conducted and indicated a yield drop for CaO-Sulphated alumina from 90.4% to 74.2% after seven cycles. Converting animal waste into sustainable fuel production is an innovative approach to address both waste management and renewable energy challenges.

Biography:

Dr. Amal Salem Al-Rahbi is a leading researcher in sustainable energy and waste-to-energy technologies and a faculty member in Applied Chemistry at the University of Technology and Applied Sciences (UTAS), Oman. She holds a PhD in Chemical Engineering from the University of Leeds, UK, and has extensive experience in teaching and research in waste management, renewable energy, and industrial catalysis. Her research focuses on converting waste into value-added products, including hydrogen, syngas, biofuels, and green catalysts.

Dr. Al-Rahbi has published widely in high-impact international journals and has received international recognition through multiple awards and invited presentations. She has represented the Sultanate of Oman at major scientific forums across Europe and Asia and continues to play a key role in advancing sustainable energy solutions at both national and global levels.

Amira Al Zadjali
University of Technology and Applied sciences, Muscat, Oman

Biochar derived from agricultural wastes for remediation of salt-affected soils in Sultanate of Oman

Anaerobic pyrolysis of biomass results in the production of biochar (BC), a substance rich in carbon. Utilizing plant wastes to create biochar can be a useful method for enhancing plant growth in salt-stressed environments because it can lower the bulk density of the soil and facilitate the interchange of Na+ and Cl- ions in salinized soil. In this project, agricultural wastes from Omani nature will be used to produce a biochar, under 450-550 C temperature. The biochar was obtained by drying sugarcane wastes to sun drying method and then charring them in an anaerobic muffle furnace at elevated temperature to produce the Biochar. A commercially available biochar was also used for comparative studies. Two saline soil samples from Al Barkha, Barkha Al Haradi and Barkha Al Rumais were collected with the help of the personnel at the Agricultural service station located at Al Rumais and mixed with the prepared biochar and commercial biochar and were subjected to various physiochemical tests along with determination of total fatty acid methyl esters (FAME), urease activity and Phosphatase enzyme activity. The total organic carbon was also estimated.

The application of both prepared and commercial biochar to saline soils from Al Barkha, Barkha Al Haradi, and Barkha Al Rumais resulted in specific improvements in key soil properties, including reduced bulk density, enhanced ion exchange, and increased total organic carbon. Furthermore, biochar amendments positively influenced soil enzymatic activities, such as urease and phosphatase, which are critical indicators of soil health and fertility.

Biography:

I received my PhD in Environmental Microbiology from the University of Aberdeen in 2023. In my PhD project, I worked on optimizing microbial biosensors to estimate heavy-metal bioavailability. I am currently working as a lecturer at the University of Technology and Applied Sciences, and I am conducting university-funded research on utilizing biochar to improve soil fertility.

Boitemogelo Okopilwe Mapue Kwakwa
Department of Geography, Environmental Management & Energy Studies,
University of Johannesburg, South Africa

Integrating Chemical and Microbial Exposure Assessment of Informal Waste Burning in a Peri-Urban South African Township

Informal waste burning remains a pervasive yet under-regulated source of air pollution in peri-urban settlements across the Global South. In South Africa, township communities such as Hammanskraal experience routine open burning of household waste due to inconsistent municipal waste services, spatial exclusion, and socio-economic constraints. While emissions from industrial and vehicular sources are routinely monitored, informal combustion remains largely invisible within regulatory frameworks and ambient monitoring systems.

This doctoral research introduces a multidimensional assessment of informal waste burning that integrates chemical pollutant monitoring with microbial risk profiling. The study will quantify concentrations of particulate matter ($PM_{2.5}$, PM_{10}), carbon monoxide (CO), hydrogen sulfide (H_2S), and oxygen (O_2) using portable real-time monitoring equipment. In parallel, airborne microbial communities will be characterised using Next-Generation Sequencing (NGS) to identify combustion-associated bioaerosols and assess potential respiratory health implications.

A convergent parallel mixed-methods case study design is employed, incorporating spatiotemporal emission mapping, household surveys, and a health risk assessment framework. Comparative sampling between identified burn hotspots and a control site will allow differentiation between background and combustion-derived exposures.

By merging atmospheric science, microbial ecology, and environmental governance analysis, this study addresses a critical policy blind spot: the exclusion of informal waste burning and bioaerosols from air quality management plans. The findings aim to support evidence-based municipal interventions, inform regulatory development, and contribute to sustainable waste management strategies in underserved urban contexts. This research has the potential to advance integrated environmental health assessment methodologies applicable to low-resource settings globally.

Keywords: Informal waste burning; Bioaerosols; Air quality; Township pollution; Environmental governance

Biography:

Boitemogelo Okopilwe Mapue Kwakwa is a PhD candidate in Environmental Management at the University of Johannesburg, South Africa. She holds an MSc in Geography and currently serves as Programme Manager for Air Quality and the Environment at the university's Process, Energy and Environmental Technology Station. Her research focuses on informal waste burning, air pollution exposure, environmental justice, and policy integration in underserved communities. She specialises in applied air quality monitoring, environmental governance, and emerging bioaerosol assessment using molecular techniques. Her work bridges science and policy to inform equitable urban environmental management.

Zia Ur Rahman
School of Economics and Management, Chang'an University, Xian, Shaanxi, China

Circular Economy and Fintech in Asia: Do Responsible Production, Finance Merged with Technology Matters to lowers Climate Change?

It is widely recognized that the reckless exploitation of natural resources in pursuit of long-term sustainability has significantly degraded environmental quality, leading to phenomena such as flooding, earthquakes, heavy rainfall, and rising temperatures. Consequently, the concepts of recycling, reuse, and refurbishment are gaining prominence alongside the responsible utilization of natural resources. To investigate this, a panel dataset comprising 29 Asian countries was compiled, drawing data from the WDI, IMF, and UNDP for the period 2000-2022. In terms of pre-diagnostics, the Fully Modified Ordinary Least Squares (FM-OLS) method is deemed most appropriate for assessing the active participation of the circular economy, fintech, and natural resources. The findings suggest that a 1% increase in the circular economy, fintech, and natural resources results in a deceleration of climate change by approximately 1.96%, 1.56%, and 0.16%, respectively. However, low-income Asian countries exhibit a positive integration of the circular economy with climate change, whereas medium- and high-income groups demonstrate a negative integration. Additionally, fintech and responsible natural resource utilization show a negative integration with climate change in high- and middle-income countries, while being positively cointegrated with low-income groups. Moreover, the MM-QR analysis indicates a stronger effect of the circular economy, fintech, and responsible natural consumption on climate change in higher quantiles. Thus, policymakers bear increased responsibility to promote fintech, implement regulations for the responsible extraction of natural resources, and encourage industries to advance the recycling, reuse, and refurbishment of their products.

Biography:

Zia Ur Rahman is currently a PHD student at Chang'an University, Xian, Chian. Earlier he is working as a lecturer in the Department of Economics, Ghazi University, Pakistan. He has published 25 papers in international and national journals.

David Garb
374water, Illinois, USA

Destruction of fluorine-based Aqueous Film Forming Foams (AFFF) with Supercritical Water Oxidation

Destruction of Fluorine-Based Firefighting Foams with Supercritical Water Oxidation

Fluorine-based firefighting foams, particularly aqueous film-forming foams (AFFFs), have been widely used for decades due to their exceptional fire suppression capabilities. However, these foams contain per- and polyfluoroalkyl substances (PFAS), which are highly persistent, bioaccumulative, and pose significant environmental and health risks. Conventional treatment methods often fail to completely degrade PFAS, leading to secondary contamination concerns. This study investigates the application of supercritical water oxidation (SCWO) as an advanced destruction technology for fluorinated compounds in firefighting foams.

SCWO operates at conditions above water's critical point (374 °C, 22.1 MPa), where water becomes a unique solvent enabling rapid oxidation of organic contaminants. Experimental trials were conducted using representative AFFF formulations under varying temperature, pressure, and oxidant concentrations. Results demonstrate near-complete mineralization of PFAS compounds, achieving >99% destruction efficiency within minutes. Fluoride ions were recovered as stable inorganic salts, confirming the breakdown of carbon-fluorine bonds. Process optimization revealed that higher temperatures and sufficient oxidant supply are critical for maximizing degradation while minimizing energy consumption.

The findings highlight SCWO as a promising, environmentally responsible solution for managing legacy PFAS contamination from firefighting foams. Its ability to achieve complete destruction without generating harmful byproducts positions SCWO as a viable technology for large-scale remediation efforts. Future work will focus on system scalability, energy recovery, and integration with existing waste management frameworks.

Biography:

David Garb is the Technical Solutions Manager for Industrial Applications & Emerging Contaminants at 374Water, a global cleantech, social impact company based in Durham, NC. With over a decade of experience in the water industry, David specializes in supercritical water oxidation (SCWO) and the destruction of PFAS and other emerging contaminants. He holds an engineering degree from the University of Illinois at Urbana-Champaign (UIUC).

Index

SEE YOU AT UPCOMING 2027

4th World Congress on

RECYCLING & WASTE MANAGEMENT

November 23-24, 2027 | Paris, France

https://recycling.inovineconferences.com

Email: contact@inovineconferences.com | Phone/WhatsApp: +1-408-648-2233/+44 7361 618033