UNITED RESEARCH FORUM
(CONNECT WITH RESEARCH WORLD)

3RD GLOBAL SUMMIT ON RENEWABLE AND SUSTAINABLE ENERGY

SEPTEMBER 10-11, 2025
BARCELONA, SPAIN

GSRSE-2025
September 10–11, 2025 | Spain

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Venue:
Hotel SB BCN Events,
Barcelona, Spain

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Day -1 Wednesday

International Conference

September 10-11, 2025 | Barcelona, Spain

Registrations & Opening Cermony (09:00-10:00)

Technical Session-I (10:00-11:00)

(Keynote) 10:00-10:30	**Advancing Microalgae Biotechnology: Integrating Food Waste for Sustainable Bioenergy Production** **Abdelfatah Abomohra,** University of Hamburg, Germany
10:30-11:00	**Transforming small holder irrigation systems from dysfunctional to functional climate smart agricultural systems and integration into circular food systems** **Henning Bjornlund,** Australian National University, Australia

Refreshment Break & Group Photo (11:00 - 11:30)

Poster Presentation (11:30-12:30)

Poster-I	**Studying the affinity of pharmaceutical substances to accumulate in the Danube River sediments** **Valentina Andreea Calmuc,** Dunarea de Jos University Galati, Romania
Poster-II	**Evidence of microplastic contamination in Alosa immaculata fish from the Lower Danube River** **Madalina Calmuc,** Dunarea de Jos University Galati, Romania
Poster-III	**Individual and Combined Behaviors of Persistent and Emerging Pollutants in Sediments** **Stefania-Adelina Milea,** Dunarea de Jos University of Galati, Romania
Poster-IV	**Comparative Study of Acid Mixtures for Sediment Digestion in TXRF: Focus on Heavy Metal Recovery and Accuracy** **Nina-Nicoleta Lazar,** Dunarea de Jos University of Galati, Romania
Poster-V	**Removal of Phenol Red Dye from Polluted Water Using Sustainable Low-Cost Sewage Sludge Activated Carbon: Adsorption and Reusability Studies** **Eid Hamed Alosaimi,** University of Bisha, Saudi Arabia

Day -1 Wednesday

International Conference

September 10-11, 2025 | Barcelona, Spain

Lunch @ Restaurant (12:30 -13:30)

Technical Session-II (13:30-18:20)

13:30-14:00	**Sustainable Finance: Shaping a Better World** **Diana George,** University of Surrey, UK
14:00-14:30	**Responses of tropical forest soil organic matter pools to shifts in precipitation patterns** **Feng Sun**, South China Normal University, China
14:30-15:00	**Predicting changes in wetland vegetation by 2100 in the context of climate change: the case of the brière marshes (France, Loire-Atlantique)** **Thomas LAFITTE,** University of Nantes, France
15:00-15:30	**Soil biotic diversity response to precipitation changes with implications for soil function recovery** **Rentao Liu,** Ningxia University, China

Refreshment Break (15:30-15:50)

15:50-16:20	**Preliminary Study on PCC-Chitosan's Ability to Enhance Microplastic Excretion in Human Stools from Healthy Volunteers** **Claudio Casella,** University of Oviedo, Spain
16:20-16:50	**Therapeutic potential of siRNA PMP22-SQ nanoparticles for Charcot-Marie-Tooth 1A neuropathy in rodents and non-human primates** **Liliane Massade,** Université Paris-Saclay, France
16:50-17:20	**The EU's Green Deal and Challenges in Croatia: A Study of Air Quality Deterioration and the Role of Renewable Energy in Driving Sustainable Development** **Mirsada Cehic,** University of Applied Sciences in Security and Safety, Croatia
17:20-17:50	**The challenge of predicting energy demand in the Charging Stations Control Center (CSCC)** **Victor Fernandez,** Department of Applied Economics, Universitat de Valencia, Spain

17:50-18:20

Towards Sustainable Management of Small Tuna Fisheries: Atlantic Bonito in Senegalese Waters

Ousmane Sarr, Shanghai Ocean University, China

Pannel Discussions

Day-1 Concludes

Virtual Scientific Program

Central European Time

Join Zoom Meeting

Meeting ID: 854 2132 7198

Passcode: Urf@2025

Day -2
Thursday

International Conference

September 10-11, 2025 | Barcelona, Spain

09:00-09:30

Harnessing AI for ESG Integration in strategic Decision-Making

Ibrahim Abddalah, Torrens University, Australia

09:30-10:00

Simulation Study on Reservoir Stimulation of Multi-horizontal Wells for Gas Hydrate Production in Low-permeability Reservoirs

Li Xiaoyang, Chinese Academy of Geological Sciences, China

10:00-10:30

Turning Plastic Waste into Standard Automobile Fuel: A Techno-Economic Assessment

Md Jahirul Islam, Central Queensland University, Australia

Refreshment Break (10:30-10:50)

10:50-11:20

Insights into the relationship between nitrogen assimilation and lipid accumulation in algae

Huiying Zhang, Fujian Agriculture and Forestry University, China

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11:20-11:50

Study on the Thermal-Seepage-Chemical Coupling Mechanism during the Oxidation and Spontaneous Combustion of Gas-Containing Coal

Tan Zhang, China Jiliang University, China

11:50-12:20

Chemical-Soil-Biological Engineering and Biogeosystem Technique Methodology in Ecosphere Sustainability

Valery P. Kalinichenko, Institute of Fertility of Soils of South Russia, Russia

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12:20-12:50

Understanding desiccation tolerance as a tool for climate smart agriculture

Jill M. Farrant, Universitiy of Cape Town, South Africa

Lunch @ Restaurant (12:50-13:30)

13:30-14:00

A Techno-Economic Study of Biomass Gasification in Microgrids for Small Islands Energy Supply using HOMER

Lina Montuori, Universitat Politècnica de València, Spain

Day -2
Thursday

International Conference

September 10-11, 2025 | Barcelona, Spain

14:00-14:30

Alternative method to achieve full density in a short time for hard stainless-steel powdered materials

Mohammed Qasim Kareem, Miskolc University, Hungary

(Keynote)
14:30-15:00

AI-Powered Renewable Energy Forecasting and Optimising PV Systems for the Next Generation: Unparalleled Precision

Manoharan Madhiarasn, Aarhus University, Denmark

15:00-15:30

Modelling mercury risks in the Amazon with new evidence for policy action

Vitor Sousa Domingues, Brazilian Institute of Environment and Renewable Natural Resources, Brazil

Refreshment Break (15:30-15:50)

15:50-16:20

Monitoring threats to wildlife using predictive analyses and visualizations from remote sensing data

Kristen Bellisario, Purdue University, USA

16:20-16:50

Sustainable Energy Generation from Plastic Waste: A Pyrolysis Approach for Industry

Dimitrios-Aristotelis Koumpakis, Aristotle University of Thessaloniki, Greece

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16:50-17:20

Towards AI-Driven Discovery of Renewable Energy Materials: Thermoelectrics, Semiconductors, Catalysts, and More

Ankit Agrawal, Northwestern University, USA

17:20-17:50

Simulation of Residual Agroforestry Biomass Supply Chains: A Digital Dynamic Mapping

Bernardine Chigozie Chidozie, University of Aveiro, Portugal

17:50-18:20

Sustainable Energy Generation from Plastic Waste: A Pyrolysis Approach for Industry

Dimitrios-Aristotelis Koumpakis, Aristotle University of Thessaloniki, Greece

Closing Remarks

Day-02 Concludes

UNITED RESEARCH FORUM
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3rd Global Summit on Climate Changes and Sustainability

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Eid Hamed Alosaimi

University of Bisha, Saudi Arabia

Removal of Phenol Red Dye from Polluted Water Using Sustainable Low-Cost Sewage Sludge Activated Carbon: Adsorption and Reusability Studies

The use of sewage sludge activated carbon (thickened samples ACS1 and non-thickened samples ACS2) in a variety of applications and simple environmentally friendly production techniques are attracting more and more attention. We offer here a novel environmentally friendly method based on the green synthesis of activated carbons (ACS1/ACS2) using sewage sludge (SS). These activated carbons are then used to effectively remove the water-based reactive dye phenol red (PR). The ACS1 and ACS2 produced are porous materials with an average diameter of 20.72–13.30 and 6.20–7.34 nm, respectively. These ACS1/ACS2 were analyzed using a range of characterization techniques including X-ray diffraction (XRD), Fourier transform infrared spectroscopy (FT-IR), scanning electron microscopy (SEM), transmission electron microscopy (TEM) and Brunauer–Emmett–Teller (BET) analysis. Elimination of toxic PR dye was investigated using several operational factors, including ACS1/ACS2 dose, initial PR dye concentration, pH and temperature. Under the best experimental conditions, the ACS1 and ACS2 adsorbents absorbed nearly 89.58% and 97.69% of the PR dye, respectively. It was found that both ACS1 and ACS2 adsorption corresponded to pseudo-first-order kinetics (R = 0.996 and 0.980) and fulfilled Langmuir's (ACS1) and Freundlich's (ACS2) models well, with maximum adsorption capacities of 65.35 and 122.72 mg/g, respectively. It was found that the adsorption processes are basically exothermic. The results suggest that sewage sludge can be effective as a low-cost and environmentally beneficial synthesis of ACS1 and ACS2 in the purification of water sources contaminated with hazardous dyes.

Biography

Dr. Eid Alosaimi earned his Ph.D. in 2018, focusing on the preparation of complexes for compounds with medicinal effects and investigating ways to enhance their efficacy as antibiotics and anticancer agents. He is currently an Associate Professor of Analytical Chemistry at the University of Bisha. His ongoing research involves converting wastewater residues into activated carbon to purify irrigation water. Dr. Eid has published more than 45 research papers.

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UNITED RESEARCH FORUM
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3rd Global Summit on Climate Changes and Sustainability

September 10-11, 2025 | Barcelona, Spain

Victor Fernandez

Department of Applied Economics, Universitat de Valencia, Spain

The challenge of predicting energy demand in the Charging Stations Control Center (CSCC)

The global adoption of electric vehicles (EVs) presents a pivotal opportunity for sustainable 1 mobility, yet it also poses significant challenges for urban energy systems. Accurate forecasting 2 of energy demand at EV charging stations is critical to maintaining grid stability and optimizing 3 resource allocation. This study proposes a novel framework combining advanced traffic simulations 4 using MATSim and Artificial Neural Network (ANN)-based predictive modeling to address this 5 challenge. By leveraging Ljubljana as a case study, the framework demonstrates the ability to predict 6 energy demand across varying scenarios, including different numbers of EVs, trip patterns, and 7 charging strategies. The ANN model, coupled with orthogonal least-squares approximation, achieved 8 high predictive accuracy with minimal mean squared error, highlighting its reliability and scalability 9 to other urban contexts. The simulations also provide insights into the impacts of charging behaviors 10 on energy demand, offering practical guidance for grid optimization and policymaking. While 11 the results are promising, further research is needed to validate the model in diverse settings and 12 integrate long-term trends and renewable energy sources. This work provides a robust foundation 13 for sustainable urban energy planning, supporting the transition to cleaner and more electrified 14 transportation systems.

Biography

Víctor Fernández is Assistant Professor in Quantitative Methods at the University of Valencia. He holds a PhD in Telecommunications Engineering, an MSc in Mathematics, and an Executive MBA (Accenture, USA). He has led EU projects such as INTEROP, SMARTV2G, and MOBINCITY, and holds a patent for CAPPD. Formerly Strategy Manager at Accenture, he later led innovation at Stratesys and CIT Group. He has taught at Universitat Jaume I and Zaragoza. His current work focuses on e-voting, ecological inference, and quantitative methods applied to smart mobility, cybersecurity, and public decision systems.

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3rd Global Summit on Climate Changes and Sustainability

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Dr. Claudio Casella Ph.D

University of Oviedo, Department of Chemical and Environmental Engineering, C/Julian Clavería s/n, 33006 Oviedo, SPAIN

Preliminary Study on PCC-Chitosan's Ability to Enhance Microplastic Excretion in Human Stools from Healthy Volunteers

Recent studies have indicated that microplastics (MPs) may accumulate in the human body, potentially posing health risks. This preliminary study aimed to investigate the effect of a food supplement (FS: 0.8 g of chitosan derived from Procambarus clarkii, PCC, PLASTIKDREN®) on thefecal excretion of MPs (20–500 µm size) following ingestion of a standardized meal (SM). Ten healthy volunteers (non-smokers, non-drinkers, non-drug users) participated in a two- phase, crossover design conducted one week apart. In both phases, participants consumed an SM after overnight fasting, and fecal samples were collected the following morning (7–10 am). Phase 1 served as baseline (no PCC), while in Phase 2, PCC was administered immediately before the SM. Sixteen types of MPs were analyzed. A modest increase (5%)in fecal mass was observed after PCC intake. MP counts were 356 in the SM, 656 ±110 in Phase 1 feces, and 965 ±165 in Phase 2 feces. The excretion of nine MPs—PA, PAN, PAM, PE, PES, PET, PP, PS, and RA—was enhanced by PCC. These preliminary findings suggest that PCC promotes the fecal elimination of MPs. Further controlled studies are needed tovalidate these results and assess their potential relevance for dietary interventions.

Biography

He holds a Ph.D. in Chemical Sciences from University of Pavia (Italy) and is almost finishing his second doctorate at the University of Oviedo (Spain)., specializing in environmental chemistry and the impact of micro-nanoplastics on human and environmental health. Currently, he collaborates in research at Loyola University's School of Medicine in Chicago alongside Dr. Umberto Cornelli. With over twelve years of experience, he has published more than 16 indexed articles in the last 18 months, and lectured in postgraduate programs internationally. His leadership extends to supervising master's theses, fostering cooperation projects, and guiding scientific and peer-review committees.

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Abdelfatah Abomohra

Institute of Plant Science and Microbiology, University of Hamburg, 22609 Hamburg, Germany

Advancing Microalgae Biotechnology: Integrating Food Waste for Sustainable Bioenergy Production

During the extraordinary global sustainability challenges, algae have been discussed as versatile and potent resources for sustainable and eco-friendly solutions. Their adaptability and diverse applications across various sectors confirm their pivotal role in innovation. They have high potential in biofuel production, wastewater treatment, emission reduction, nutrition, and sustainable agriculture. Biotechnology-driven strategies, including bioprocess engineering, innovative photobioreactor designs, molecular engineering, and integrated approaches, are maximizing the algae potential for sustainability. Their unique characteristics, such as high photosynthetic efficiency, rapid growth, carbon sequestration capabilities, and efficiency in nutrient cycling, prompted recent research and developments across biotechnology, biochemistry, and environmental science. The distinct metabolic pathways of algae to synthesize many bioactive compounds with potential biotechnological applications is a new avenue for sustainable development. This talk aims to highlight recent advancements and explore new applications of microalgae, emphasizing the potential application of food waste to improve their economic feasibility towards clean energy production.

Biography

Dr. Abdelfatah Abomohra, PhD, is currently a Habilitant at Aquatic Ecophysiology and Phycology, Institute of Plant Science and Microbiology, MIN Faculty, University of Hamburg, Germany. He received his PhD in "Phycology" through Deutscher Akademischer Austauschdienst (DAAD) in 2012. He performed postdoctoral research at University of Hamburg, Harbin Institute of Technology, and Alfred-Wegener-Institute. Before joining University of Hamburg, he was a professor and head of New Energy and Environmental Laboratory (NEEL) at Chengdu University, China. He was awarded Alexander-von-Humboldt fellowship for experienced researchers in 2022. His major is interdisciplinary of phycology and environmental engineering. He has stupendous research experiences and finite vision in algal biotechnology and value-added products through circular bioeconomy. According to Web of Science, he has published 179 articles, with 7 papers as "Highly Cited Paper" per August 2024. In 2020-2022, his name was mentioned among the World's Top 2% of Scientists published by Stanford University.

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3rd Global Summit on Climate Changes and Sustainability

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Liliane MASSADE

U1195 Diseases and Hormones of the Nervous System, University Paris-Saclay and Inserm 94276, Le Kremlin-Bicêtre, France

Therapeutic potential of siRNA PMP22-SQ nanoparticles for Charcot-Marie-Tooth 1A neuropathy in rodents and non-human primates

Small interfering RNA (siRNA) has shown promising results for the treatment of Charcot-Marie-Tooth disease 1A (CMT1A) caused by overexpression of peripheral myelin protein (PMP22), leading to myelin dysfunction and axonal damage. Recently, we developed siRNA PMP22-squalene (SQ) nanoparticles (NPs) for intravenous use. Three consecutive injections of siRNA PMP22-SQ NPs at a cumulative dose of 1.5 mg/kg restored motor function in C61 transgenic mouse models. Pharmacokinetic studies showed a long half-life of antisense siRNA PMP22 in the sciatic nerve, and spinal cord, indicating targeted release potential. We further assessed the efficiency and safety of siRNA PMP22-SQ NPs in two healthy male non-human primates (Macaca fascicularis) after administering four escalating doses (0.1, 0.5, 2.5 and 4.5 mg/kg at one week interval). Interestingly, the siRNA PMP22-SQ NPs reduced PMP22 mRNA expression by approximately 70 % and probably induced an early-stage hereditary neuropathy with pressure palsies (HNPP)-like condition in two normal NHP. No preliminary toxicity was observed in organs or blood parameters of the two NHPs. Interestingly, the nerve conduction velocity decreased after the third injection of siRNA PMP22-SQ NPS. These results demonstrate the therapeutic potential of siRNA PMP22-SQ NPs, supporting advancement to further pre-clinical testing.

Biography

Dr. Liliane Massade is a Senior Director of Research CNRS and leader of Team 2 « Targeted Therapy for Peripheral Neuropathies" team at INSERM UMR 1195, also part of LaBEX Nanosaclay. With extensive expertise in cellular and molecular biology and siRNA pharmacology, her research is bolstered by prestigious grants from ANR, Nanosaclay, ARC, ERC, and SATT Paris Saclay. Dr. Massade has authored over 80 Scientific publications in top journals like Comm. Biol, Cancer Res., Oncogene, J Control Release, and PNAS, and holds two patents. She is one of the four founders of MAAsiRNA (https://www.maasirna.com/) a startup based on her research work.

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3rd Global Summit on Climate Changes and Sustainability

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Dr. MANOHARAN MADHIARASN

Department of Business Development and Technology, Aarhus School of Business and Social Sciences (BSS), Aarhus University, Birk Centerpark 15, 7400 Herning, Denmark

Towards AI-Driven Discovery of Renewable Energy Materials: Thermoelectrics, Semiconductors, Catalysts, and More

A new era of optimisation and accurate forecasting has begun by incorporating artificial intelligence (AI), optimisation algorithms and hybrid models into renewable energy systems. The presentation explores state-of-the-art hybrid models and various optimisation algorithms that make solar energy more predictable and efficient in parameter extraction and maintaining sustainable renewable resources. Forecasting, parameter extraction, and energy management are essential components of sustainable energy systems undergoing a fundamental transformation due to advanced AI applications. Additionally, dive into how advancements in AI, hybrid forecasting models, and optimisation algorithms tackle renewable energy generation's inherent unpredictability and inefficiency, maximising efficiency, and minimising losses.

Biography

Dr. MANOHARAN MADHIARASAN completed his Bachelor of Engineering degree in Electrical and Electronics Engineering in the year 2010 from Jaya Engineering College, Thiruninravur, under Anna University, Tamil Nadu, India; his Master of Engineering degree in Electrical Drives and Embedded Control (Electrical Engineering) in the year 2013 from Anna University, Regional Centre, Coimbatore, under Anna University, Tamil Nadu, India and his Ph. D. (Electrical Engineering) in the year 2018 from Anna University, Tamil Nadu, India.

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3rd Global Summit on Climate Changes and Sustainability

September 10-11, 2025 | Barcelona, Spain

Tan Zhang[1,2], Rongkun Pan[2], Peng Xu[1]

1 China Jiliang University, Hangzhou, China; 2 Henan Polytechnic University, Jiaozuo, China

Study on the Thermal-Seepage-Chemical Coupling Mechanism during the Oxidation and Spontaneous Combustion of Gas-Containing Coal

As a primary component of the global energy mix, coal remains crucial for energy security worldwide. With the gradual increase of coal seam mining depth and strength, the coal seam environment is becoming more and more complex and changeable, and the risk of coal spontaneous combustion and gas compound disaster in goaf is intensified. The goaf serves as a critical "ignition source" for gas combustion, explosions, and related disasters. The thermal effect of coal is a key indicator for assessing its spontaneous combustion propensity. The physicochemical properties of gas-containing coal and the migration behavior of gas molecules significantly influence the spontaneous combustion process. This study combines theoretical research with experimental analysis, employing Differential Scanning Calorimetry (DSC), Fourier Transform Infrared Spectroscopy (FTIR), and Mercury Intrusion Porosimetry (MIP) to systematically investigate the heat release patterns during the oxidation of gas-containing coal under varying coal qualities and gas pressures.

The distribution of functional groups and pore fractal characteristics of coal after oxidation under different pressures were analyzed. A fractal network model of dual (adsorption-seepage) pores and fractures in coal, accounting for gas occurrence and migration, was established. The mechanism by which gas desorption and migration influence heat and mass transfer during coal spontaneous combustion was elucidated. The thermal effects and gas evolution rules during the process were revealed. The impact of the physicochemical properties of gas-containing coal on the spontaneous combustion process was clarified. Quantitative relationships between coal particle size and heat release were explored. Furthermore, the influences of gas phase transformation and migration on the oxidation and spontaneous combustion processes under different gas pressures were investigated.

By comprehensively analyzing the distributions and evolution of heat release characteristics, gas evolution behavior, pore structure, and functional group features during gas-containing coal oxidation, this study clarifies the cross-coupling attributes between thermal effects, the seepage field, and chemical reactions. The findings provide a theoretical foundation for a deeper understanding of the spontaneous combustion mechanism of gas-containing coal and the prevention of associated hazards.

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3rd Global Summit on Climate Changes and Sustainability

September 10-11, 2025 | Barcelona, Spain

Biography

Zhang Tan is a doctoral student in China Jiliang University. He has published more than 3 papers in reputed journals and has been an expert reviewer.

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3rd Global Summit on Climate Changes and Sustainability

September 10-11, 2025 | Barcelona, Spain

Dr. Md Jahirul Islam

Centre for Hydrogen and Renewable Energy
Central Queensland University, Rockhampton, Queensland 4701, Australia

Turning Plastic Waste into Standard Automobile Fuel: A Techno-Economic Assessment

Energy security and solid waste management are increasingly recognised as interconnected carbon management challenges. Municipal solid waste (MSW), particularly mixed plastic waste, poses a growing environmental problem that cannot be sustainably addressed through traditional methods such as landfill or incineration, which are costly and contribute to harmful emissions. To address this, the present study investigates the pilot-scale production of automobile-grade diesel from MSW plastics using an integrated three-step process: pyrolysis, distillation, and hydrotreatment. The process was experimentally optimised to maximise yield and fuel quality. The resulting product was comprehensively characterised, demonstrating compliance with commercial diesel standards. Key fuel properties—including energy content, viscosity, and cetane index—were verified, confirming its suitability for direct application in standard diesel engines. Performance trials on an automobile engine showed comparable efficiency to petroleum-derived diesel, with lower carbon intensity and reduced emissions, indicating strong potential as a sustainable transport fuel. In addition to technical validation, a techno-economic analysis was undertaken to evaluate production feasibility. Results suggest that the process can achieve competitive production costs, particularly when integrated into circular economy frameworks and supported by waste management incentives. The study highlights the dual benefits of reducing plastic pollution while producing a viable low-carbon fuel, offering a pathway towards both improved waste management and enhanced energy security. This work provides critical evidence for advancing waste-to-fuel technologies beyond the laboratory, demonstrating the scalability and real-world potential of converting mixed plastics into high-quality diesel. The findings are directly relevant to policymakers, researchers, and industry stakeholders seeking innovative, sustainable solutions to global energy and environmental challenges.

Biography

Dr. Md Jahirul Islam (Jahirul M I) is a clean energy researcher at Central Queensland University, Australia, recognised among the world's top 2% most-cited scientists (Elsevier & Stanford). He holds a PhD in Mechanical Engineering and has over 15 years' experience in waste-to-energy, renewable fuels, hydrogen, and sustainable technologies. He has published 90+ peer-reviewed papers, mostly in Q1 journals, with 6,300+ citations and an h-index of 31. Dr. Islam has secured $1.9 million in competitive research funding, including the prestigious Advance Queensland Industry Fellowship, and his work bridges academia and industry to deliver innovative solutions for energy security and the circular economy.

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Lina Montuori[*1]

1 Institute for Energy Engineering, Universitat Politècnica de València, Camino de Vera s/n, 46022 Valencia, Spain

A Techno-Economic Study of Biomass Gasification in Microgrids for Small Islands Energy Supply using HOMER

Bioenergy can be a strategic asset for developing areas to achieve a low-carbon energy security, clean energy access and promoting rural development. The present research study aims to assess the potential of biomass gasification microgrids in the deployment of rural areas with a special focus on small islands. As a matter of fact, bioenergy can be potentially used as a complementary energy source in grid-connected or non-interconnected areas to meet the peak energy demand. Among bioenergy sources, biomass gasification is one of the promising technologies for distributed power generation. However, logistics and technological challenges related to the lack of a reliable biomass supply chain, absence of technology specific policy and the high-energy demand for biomass pretreatments still act as the main barriers preventing the successful deployment of gasification. In this framework, the potential use of biomass-based technologies in small islands for energy supply has been assessed. The adoption of harvesting and transportation technologies and effective strategies such as the use of short-rotation plantations in unused land, early stakeholder engagement and attractive energy export tariffs can help to develop the biomass-based power sector. A techno-economic study of a biomass gasification plant has been carried out using HOMER Energy Simulator. Consequently, a biomass-based microgrid has been modeled and different scenarios have been simulated, considering both grid-connected and isolated configurations. Following, a techno-economic study of a gasification power plant fueled by lignocellulosic biomass has been performed taking into account such driven parameters as biomass feedstock availability and cost. Moreover, a sensitivity analysis has been done by comparting this green resource with conventional energy resources. This sensitivity analysis reveals as electricity export tariffs, availability of power plants, and feedstock costs are critical parameters affecting the net present cost of the biomass-based microgrid. The achieved results shown the feasibility and higher potential for biomass power production as a stand-alone system at short distance from production site. Moreover, the most favorable price of biomass resources for application isolated areas has been evaluated.

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Biography

Lina Montuori obtained her Ph.D. in Industrial Engineering at the Polytechnic University of Valencia (UPV) in Spain. Previously, she received B.Sc. and M.Sc. degrees in Industrial Engineering at the University of Naples "Federico II" in Italy. Moreover, she holds an MBA by UPV and an Executive Master in Digital Marketing, Analytics and UX by the Catholic University of Avila (Spain). She is a dedicated professional with about than 15 years of experience in the energy sector with a demonstrated track of successful projects lead as Development Manager at international top brand companies such as Toshiba Mitsubishi-Electric Industrial Corporation, Solaer Group and ENEL Rete Gas. Moreover, she served as Guest Researcher at the Power Center for Utility Explorations at the State University of New York at Buffalo (USA). At present, she is a Professor at the Department of Applied Thermodynamics of the Polytechnic University of Valencia (Spain), where she is also a researcher at the Institute for Energy Engineering Institute (IIE). Moreover, she is an editor, reviewer and author of multiple and relevant publications in prestigious Q1 journals.

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September 10-11, 2025 | Barcelona, Spain

Mohammed Qasim Kareem[a,b,*], Tamás Mikó[a], Gréta Gergely[a], Zoltán Gácsi[a]

[a]Institute of Physical Metallurgy, Metalforming and Nanotechnology, University of Miskolc, Hungary.
[b]Civil Engineering Department, College of Engineering, Al-Qasim Green University, Babylon 51013, Iraq

Alternative method to achieve full density in a short time for hard stainless-steel powdered materials

The density, compressive strength, and microstructure of hard stainless steel powdered materials produced by cold pressing followed by induction sintering were investigated to evaluate the effects of various factors, including cold pressing pressure, induction sintering temperature, and time. The challenge lies in producing high-density hard stainless steel powdered materials with high strength properties using the shortest sintering time, rather than a long sintering time with electrical sintering. The evaluation procedures included Archimedes' density method, microstructure observations, Vickers hardness measurements, and compression strength tests. The results showed improved physical and mechanical properties using induction sintering.

Biography

Mohammed Qasim Kareem completed his master's degree at the age of 25 from South-Russian State Polytechnic University, Russia, and his PhD at the age of 34 from Miskolc University, Hungary. He has published more than 12 papers in reputed journals in the field of improving electromechanical properties of commercial aluminum alloys and developing new technology to enhance the densification properties of precipitation-hardened stainless steel materials.

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Ankit Agrawal

Northwestern University, Evanston IL 60208 USA

Towards AI-Driven Discovery of Renewable Energy Materials: Thermoelectrics, Semiconductors, Catalysts, and More

The increasing availability of data from the first three paradigms of science (experiments, theory, and simulations), along with advances in artificial intelligence and machine learning (AI/ML) techniques has offered unprecedented opportunities for data-driven science and discovery, which is the fourth paradigm of science. Within the arena of AI/ML, deep learning (DL) has emerged as a game-changing technique over the last decade with its ability to effectively work on raw big data, bypassing the (otherwise crucial) manual feature engineering step traditionally required for building accurate ML models, thus enabling numerous real-world applications, such as autonomous driving. In this talk, I will present our ongoing research in interdisciplinary AI, along with its real-world applications in science and engineering. In particular, we will see how AI/ML/DL can be used to learn the forward and inverse processingstructure-property-performance (PSPP) relationships in various materials systems, including for renewable energy materials, such as thermoelectrics and semiconductors, as well as to accelerate nanocombinatorics workflows to facilitate rapid structure characterization and discovery of catalysts. I will also demonstrate some of the software tools deploying AI for materials developed in our group.

Acknowledgement

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Biography

Dr. Ankit Agrawal (Ph.D. 2009, B.Tech. 2006) specializes in interdisciplinary AI and is a pioneer in materials informatics (AI for materials). He has co-authored 200+ publications with 15,000+ citations (h-index: 50+), co-developed 20+ software, delivered 75+ invited/keynote talks, and served as a PI/Co-PI on 20+ projects with a combined budget of over $100 million, funded by US federal agencies (e.g., NSF, DOE, AFOSR, NIST) as well as industry (Toyota Motor Corporation Japan). He has been featured in Stanford/Elsevier's list of top 2% scientists, as well as named a ScholarGPS Top Scholar for being in top 0.5% of scholars worldwide.

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3rd Global Summit on Climate Changes and Sustainability

September 10-11, 2025 | Barcelona, Spain

Dimitrios-Aristotelis Koumpakis PhD

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Sustainable Energy Generation from Plastic Waste: A Pyrolysis Approach for Industry

The research presents an easy-to-implement unit system which industrial facilities can use to convert their large plastic waste amounts from discarded packaging into sustainable energy. The system allows industrial facilities to reach complete or partial energy independence through plastic residue conversion into synthetic pyrolysis oil which would generate 91,500 L of fuel. The generated fuel from the system can power a combined heat and power (CHP) generation unit to produce 800 MWh of electricity throughout six months of operation. The system design includes advanced thermal control systems and minimal oxygen contact to protect hydrocarbon molecules until they reach their valuable compound state. The core thermochemical process of pyrolysis creates a foundation for additional chemical reactions including gasification and combustion.

The research evaluates all variables affecting pyrolysis outcomes and provides complete analytical models, mathematical frameworks and engineering calculations needed for system expansion and deployment. The research shows that plastic waste-derived fuels can power standard industrial machinery to produce both heat and electricity. The research proves that this system works for facilities handling 568 tonnes of plastic waste per year because it requires substantial investment but delivers significant results.

The research makes two main contributions through its technical findings which demonstrate how these systems support circular economy development and resource optimization. The method enables the extraction of hidden energy from plastic waste which creates sustainable environmental benefits and decreases fossil fuel usage while showing a workable method for industrial facilities to transition to cleaner operations.

Biography

Dimitrios-Aristotelis Koumpakis is a PhD candidate in Mechanical Engineering at Aristotle University of Thessaloniki, specializing in sustainability engineering and energy recovery from plastic waste. He also holds an MSc in Applied Automation Engineering Systems and a Dipl.-Ing. in Production and Management Engineering. His research focuses on pyrolysis, biofuels, and sustainable waste-to-energy technologies, with several publications in international journals and conferences. Alongside academia, he has worked as an electrical and electromechanical design engineer on large-scale industrial and energy projects across Europe. He is a recipient of scholarships for academic excellence and actively contributes to teaching and research.

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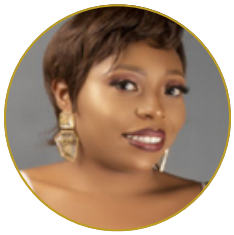

Bernardine Chigozie Chidozie

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Simulation of Residual Agroforestry Biomass Supply Chains: A Digital Dynamic Mapping

Agroforestry residues represent an important source of biomass with potential to reduce reliance on fossil fuels and lower greenhouse gas emissions. However, large-scale adoption faces major barriers, including logistical inefficiencies, high transport costs, and seasonal fluctuations in supply. These challenges are compounded by the need to align supply chain operations with sustainability goals, such as minimizing CO_2 emissions and embedding green logistics practices. While prior research has explored aspects such as cost or logistics efficiency, there has been limited integration of dynamic simulation methods with sustainability metrics in biomass supply chain analysis.

This study develops a comprehensive framework to enhance the efficiency and sustainability of residual biomass supply chains. It addresses existing gaps by incorporating digital technologies, dynamic simulation, and sustainability indicators into supply chain planning. Using a hybrid approach that combines Geographic Information Systems (GIS) with anyLogistix simulation software, the research focused on Portuguese companies involved in biomass utilization.

Scenario analyses revealed that digital modeling tools can significantly improve biomass logistics. Results showed potential cost reductions of up to 25% and CO_2 emission reductions of 90%, highlighting both economic and environmental benefits. These findings establish the importance of adopting sustainable logistics strategies to reduce costs, mitigate emissions, and improve productivity, while supporting renewable energy goals. The study contributes practical strategies and insights for academia, policymakers, and industry stakeholders, offering a holistic approach distinct from prior studies that often neglected sustainability integration.

Future research will extend this work by combining simulation models with optimization techniques, such as analytical models, machine learning, and multi-objective optimization frameworks. This will enhance adaptability, robustness, and sustainability in biomass supply chains under uncertainty. Additionally, applying the framework across different biomass types and regions could strengthen its universality and global relevance.

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Biography

Dr. Bernardine Chigozie Chidozie is a researcher and engineer passionate about building sustainable energy futures. With a PhD in Industrial Engineering and Management from the University of Aveiro, Portugal, she brings expertise in green logistics, supply chain optimization, and digital technologies for renewable energy systems. As a Research Engineer at Nigeria's National Space Research and Development Agency (NASRDA), she has worked on innovative projects bridging engineering and sustainability. An active contributor to international research, publications, and conferences, she is dedicated to advancing solutions that reduce emissions, optimize resources, and support global clean energy transitions.

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