



12th International Conference on Materials Science & Smart Materials

MSSM2026

**Hybrid Venue: National and Kapodistrian University of Athens, [Main Building](#), Athens
Greece
September, 2-4 2026**

Day-1 2nd September 2026

Opening Session

Opening Session		
09:00 9:10	Welcome Talk by: Prof. Ef. Efsthathopoulos Vice Rector etc of the National and Kapodistrian University of Athens	
09:10 9:20	Welcome Talk by: Prof. Stamatis Voliotis Dean of the School of Agricultural Development, Nutrition & Sustainability	
09:20 9:30	Welcome Talk by: Prof. Vassilis Stathopoulos Conference Chair	
09:30 -10:15	Keynote Prof. Hussam Jouhara Brunel University London	Decarbonising the Oil and Gas Sector through Advanced Waste Heat Recovery: Real-World Case Studies
10:15 – 10:30	Coffee Break	
Workshop on: on Functionalised Bio-derived Material Chairman Prof. Lorna Anguilano		
10:30 – 11:00	Keynote Prof. Lorna Anguilano Brunel University London	Phytofloc: Hyper-Local Biopolymer Insulation from Phytomined Biomass and Recycled Mineral Additives for Circular Housing Retrofit
11:00 – 11:15	Uche Onwukwe	Life Cycle Driven Design of Dag Wool Reinforced Biocomposites for Agricultural and Horticultural Applications



11:15 -11:30	Sara Fernando	Protein content of Saccharina latissima cultivated on PLA-based biocomposite substrata in a natural marine environment
11:30 – 11:45	Sunja Winter	Functionalised Biopolymer Materials for Fishing Nets: A Review and Experimental Framework for Reducing Dolphin Bycatch through Enhanced Acoustic Detectability
11:45 – 12:00	Ashok Rao	Enhancement of Thermoelectric Power Factor via Samarium-Doped Bi1.5Sb0.5Te3 alloys
12:00 – 12:15	Katarzyna Wilpiszewska	The waste PLA/chaff composite materials
12:15 – 12:30	Yerin Yang	Comparative Analysis of Growth Kinetics and Process Challenges in Atomic Layer Deposition of Nitride thin films for DRAM capacitor applications
12:30 – 12:45	Qaisar Maqbool	Upcycling Spent Batteries into High-Performance Catalysts for CO2 Conversion to fuel
12:45 – 13:00	Mikel Duran	Solid-solid Electrothermal Phase Change Materials
13:00-14:00	Lunch	
Symposium on Advancing Hydrogen Production and Fuel Cell Technologies for a Decarbonised Energy Future Chaired by: Prof. Luca Montorsi, Prof. Abdul Ghani Olabi, & Prof. Vassilis Stathopoulos		
14:00 – 14:00	Keynote Talk Prof. Prof. Luca Montorsi University of Modena and Reggio Emilia	Aluminium as an Energy Carrier for Green Hydrogen Production: from Lab-Scale Prototype to Industrial System
14:30 – 15:00	Keynote Talk Prof. Abdul Ghani Olabi University of Sharjah	Advanced Materials for Next-Generation Energy Storage Systems
15.15 – 15:30	Norah Alwadai	Enhancing Hydrogen Production from Dry Reforming of Methane



		over LaPromoted Ni/CeO ₂ Catalysts
15:30 – 15:45	Yara Alwadei	Black TiO ₂ nanotube arrays: Bifunctional electrocatalytic performance for alkaline water splitting
15:45 – 16:00	Yunkyoung Choi	Highly uniform resistive switching performance in conductive-bridge random access memory via two-dimensional electron gas at oxide interfaces
16:00-16:30	Coffee Break	
16:30 – 16:45	Tae Huyn Kim	Advanced Reaction Pathway for Niobium Nitride Thin Film ALD: Theoretical Insights and Experimental Results
16:45-17:00	Prasad Lokhande	Sustainable Biomass-Derived Activated Carbon for High-Performance Energy Storage Applications
17:00 – 17:15	Ahmed Al-Fatesh	Optimising Ni/Co ratio in Ni-Co catalyst Supported on Tungsten-Modified Zirconia for enhanced hydrogen production through dry reforming of methane
17:15 -17:30	Dhanya Sunil	Carbazole-Thiophene Schiff Base Fluorophore for Security Printing and Latent Fingerprint Visualization
17:30 – 17:45	Abdul Ghani Olabi	Material And Structural Advancements In Solid Oxide Electrolyzer Components For Enhanced Thermal Durability And Hydrogen Yield



Day-2 3rd September 2026 Parallel Session 6th symposium on decarbonisation of the ceramics sector: advances in functional ceramics Chairman: Prof. Ian M. Reaney		
09:00 - 09:30	Keynote Prof. Ian M. Reaney University of Sheffield	The role of chemical, polar and octahedral tilt disorder in high voltage/energy density ceramics
09:30 – 9:50	Xuyao Tang	Suppression of Thermal Hysteresis in NaNbO ₃ -based Quasi-Linear Dielectrics by Tantalum Substitution
09:50 – 10:10	Yubo Zhu	Sodium niobate based temperature-stable ceramic capacitors for power electronics
10:10 – 10:30	Sanghyeok Lee	Development of 2DEG-based Memtransistor using Al ₂ O ₃ /TiO ₂ Heterostructures for Neuromorphic Computing
10:30 – 11:00	Coffee Break	
11:00 – 11:30	Keynote Prof. Derek Sinclair University of Sheffield	The influence of A-site deficiency on the functionality of Niobate-based perovskites
11:30 – 11:50	Alina ZABNIENSKA- Gora	Implementation of a Reduced Order Model (ROM) for the iron ore roasting process in an indirect rotary kiln using COMSOL Multiphysics
11:50 – 12:10	Kyung Joon Lee	In-situ Crystallization of SrTiO ₃ Thin Films on SrVO ₃ Electrodes by Atomic Layer Deposition for DRAM Capacitors
12:10 – 12:30	Chae Hyun Lee	Epitaxial HCP NiCo Thin Films with a Reduced Resistivity Size Effect for Nanoscale Interconnects
12:30 – 12:50	Keynote Prof. David Hall University of Manchester	Aerosol deposition of ceramic coatings for high performance machine insulation
12:50 – 14:00	Lunch	



14:00 – 14:30	Keynote Per Kjellgren FLOWPHYS	SimuLingua: An AI Foundation Model for Materials Science
14:30 -14:50	Gyorgy Thalmaier	Cold sintered porous ceramics from recycled brick waste

Early Stage Researchers Symposium Parallel Session Co-Chair: Prof. Paola Calza, In2Aguas Project Coordinator, Co-Chair: Dr Victor Manuel Candelario, UP2MEM Project coordinator		
 		
09:00 – 09:30	Keynote Prof. Paola Calza, In2Aguas Project Coordinator	From Emerging Contaminants to Advanced Materials for Sustainable Water Treatment: Insights from the In2AQUAS Project
09:30 – 10:00	Keynote Dr Victor Manuel Candelario, UP2MEM Project coordinator	Closing the Loop: Transforming Industrial Waste into Next-Generation Ceramic Membranes
10:00 -10:15	Federico Cristaudo	P- and P/In-Doped Graphitic Carbon Nitride for Water Treatment: From Dopant Design To Self-Photo-Fenton and Membrane-Integrated Applications
10:15 -10:30	Manuel A. Andino Enríquez	Influence of Aquaculture Water Constituents on The Photodegradation of Geosmin and 2-Methylisoborneol And Implications For UV-C AOPS Treatment
10:30 – 11:00	Coffee Break	
11:00 -11:15	Fhebe Angus	Engineering MXene-Based Heterojunction Photocatalysts



		for Efficient Degradation of Organic Water Contaminants
11:15 -11:30	Sabeen Arshad	Upcycling sunscreen waste into bifunctional perovskite-oxidenanocarbon membrane coatings for laundry wastewater remediation
11:30 -11:45	Shakeel Abbas	Upcycling Waste Glass into Silica-Based Feedstocksfor Vat Photopolymerization Additive Manufacturing
11:45 -12:00	Javad Ahmadi	From End-of-Life Solid Oxide Cells to 3D-Printed Ceramic Membranes: Circular Pathways for YSZ Recovery and Valorization
12:15 -12:30	Lucas Rioyo Baylin	Design of Membrane Filtration Systems for Wastewater Treatment: A Review of Architecture and Operation
12:30 -12:45	Marina Anastasiou	Giving value to waste: Sewage-sludge-derived sonochemical CQDs as a sustainable carbon component for TiO ₂ -based photocatalysis of organic pollutants
12:45 -13:00	Maryam Zahid	The role of Deep Eutectic Solvents in Greener Hydrometallurgy For Sustainable Metal Recovery From Waste: Opportunities and Challenges
13:00 – 14:00	Lunch	



6th IMechE Young Researchers Symposium 2026
Chairman Mr Martin Robinson, IMechE
Online Presentation



10:30 – 11:00	Welcome and Invited Talk by Mr Martin Robinson	Overview on the 6th IMechE Young Researchers Symposium
	Welcome and Invited Talk by TBC	TBC
11:00 – 11:15	Muhammad Adil Abbasi	MXene-TMOs composites for robust energy storage solutions
11:15 – 11:30	Enas Taha Sayed	Copper sulfide @ Molybdenum sulfide as an effective anode of low temperature fuel cells
11:30 – 11:45	Alevtina Kodresko	An Experimental Approach for Evaluating Heat and Mass Transfer in Cryogenic Freezing of Plant-Based Meat Alternatives
11:45 – 12:00	Bertrand Delpech	An Investigation of Cascade Heat Pump Systems for Domestic Heating
12:00 – 12:15	Jae Yeong Park	A MXene @MWCNTs Hybrid Nanomaterials for Multimodal Patch: Real time Sweat Glucose and Ketones Monitoring
12:15 – 12:30	Abdelrahman Gasmelseed	Enhancing Electric Vehicle Battery Performance Through Intercooled Liquid Thermal Management
12:30 -12:45	Halima Ali Alnaqbi	Composition-Driven Synergy in Co–Ni- Modified Fe-MOF Electrocatalysts for Methanol Oxidation
12:45 – 13:00	Khaled Albaiti	Techno economic analysis and process modeling of glycerol aqueous phase reforming
13:00 – 13:15	Tamer M. M. Abdellatief	Production of biodiesel from used cooking oil and its blends: an experimental study on engine performance and exhaust emission properties



13:15 – 14:00	Lunch	
14:00 – 14:15	A. K. Pathak	In-line Optical Fiber-Based Mach-Zehnder Interferometer for Lead ion Detection in Drinking Water
14:15 – 14:30	Rabeya Suman	Designing High Energy/Power Supercapacitors for Sustainable Developments Applications
14:30 – 14:45	Sean Flangan	Surface Modification and Analysis to Enable EV Battery Recyclability
14:45 – 15:00	Alevtina Kodresko	An Experimental Approach for Evaluating Heat and Mass Transfer in Cryogenic Freezing of Plant-Based Meat Alternatives
15:00 – 15:15	Bertrand Delpech	Investigation of Building-Integrated Photovoltaic Thermal panel for net zero building emissions using TRNSYS
15:15 – 15:30	Mohamad Khaled Aljoumaa	Impact of Solar-Hydrolytic Ageing on polyethylene terephthalate: Crystallization Dynamics and Thermal Kinetics
15:30 – 15:45	Adnan Alashkar	Advancing Solar Hydrogen Generation with Third-Generation Solar Cells: Performance and Economic Perspectives
15:45 – 16:00	Ahmed Abdelwahab	Experimental Investigation of Waste Cooking Oil Biodiesel Produced by Sodium Hydroxide-Catalyzed Transesterification
16:00 – 16:15`	Coffee Break	
16:15 – 16:30	Ali Nassar	Digital Twin Design for Hydrogen Fuel Cell
16:30 – 16:45	Bertrand Delpech	Energy performance assessment of building retrofit heat pumps in apartments
16:45 – 17:00	Montaser Mahmoud	Hydrogen Safety in the Energy Transition: Risks, Advances, and Mitigation
17:00 – 17:15	Atif Ali	A Validated Digital Twin Framework for Synthetic Multi Fault Data Generation



		and Fault Diagnosis of Three Phase Induction Motor
17:15 – 17:30	Dana Salaas	Machine Learning in Biochar Property Prediction: Recent Advances and Emerging Trends
17:30 – 17:45	Abdeen Osman	Hybrid wavelet-bilateral filtering and Mamba state-space modelling for mission-aware battery temperature prediction
17:45 – 18:00	Nuha Albakri	Effects of Sustainable Aviation Fuel Blending Ratios on Fuel Properties, Performance, and Emissions
18:00 – 18:15	Ahmed Bahaa	Rationally Engineered FeMnCu-LTH Binder-Free Cathode Catalyst for Efficient Hydrogen Evolution in Microbial Electrolysis Cells
18:15 – 18:30	Mohammed Hussien	Designing Cylindrical Microbial Electrolysis Cells for Enhanced Hydrogen Recovery from High-Strength Wastewater
18:30 – 18:45	Mansha Ullah	The Use of Phosphoric Acid-Activated BioChar for the Removal of Trimethoprim from Water
19:15 -19:30	Winner Announcement	
20:00 – 22:00	Conference Dinner	



Day-3 4 th September 2026		
09:00 – 09:30	Keynote Prof. Simon Gaisford UCL	From Materials to Medicines: Sustainable Pharmaceutical Manufacturing through Hot-Melt Extrusion, 3D Printing and AI
Session on Advancing Sustainable Pharmaceutical Innovation: The i-GREENPHARM Initiative Chairman: Prof. Simon Gaisford		
09:30 - 09:50	Yazan Odeh	Hot-Melt Extrusion of PLA- Ciprofloxacin–supported by Process Analytical Technology for effective antibiotic filaments
09:50 – 10:10	Styliani Konstantinidi	Mapping the Environmental Landscape of Pharmaceutical Manufacturing: A Methodological Framework for Sustainable Process Assessment
10:10 – 10:30	Debleena Mitra	In-line Raman Spectroscopy for Real- Time Monitoring and Optimisation of HotMelt Extrusion to Produce Fully Amorphous Hydrochlorothiazide Filaments
10:30– 10:50	Ibrahim Lawan	Comparative Life Cycle Assessment of Bio-Based and Petro-Based Polymer Film Extrusion Techniques Using SimaPro Software Cum Eco-Invent Database
10:50 – 11:10	Maryam Karimi-Jafari	In-line Raman spectroscopy and chemometrics for monitoring cocrystallisation using hot melt extrusion
11:10-13:00	Poster Session & Lunch	
Poster Session	Dorota Chelminiak- Dudkiewicz	Functional Chitosan-Based Composite Sponge Incorporating Zinc Phthalocyanine: Toward Potential Wound Dressing Applications



	Manisha Chauhan	Zirconia-Coated Ti-6Al-4V Powders via Electrophoretic Deposition for Enhanced 3D Printed Orthopaedic Implants
	Muhammad Adil Abbasi	MXene-TMOs composites for robust energy storage solutions
	Ali Nassar	Digital Twin Design for Hydrogen Fuel Cell
	Bertrand Delpech	Energy performance assessment of building retrofit heat pumps in apartments
	Montaser Mahmoud	Hydrogen Safety in the Energy Transition: Risks, Advances, and Mitigation
13:00	Conference Closing	