

## 5<sup>th</sup> International Conference on Materials Science & Nanotechnology

# FUTURE MATERIALS 2024

October 21-23, 2024 | Athens, Greece

October 24-25, 2024 | Online, Zoom

### Partners & Supporters

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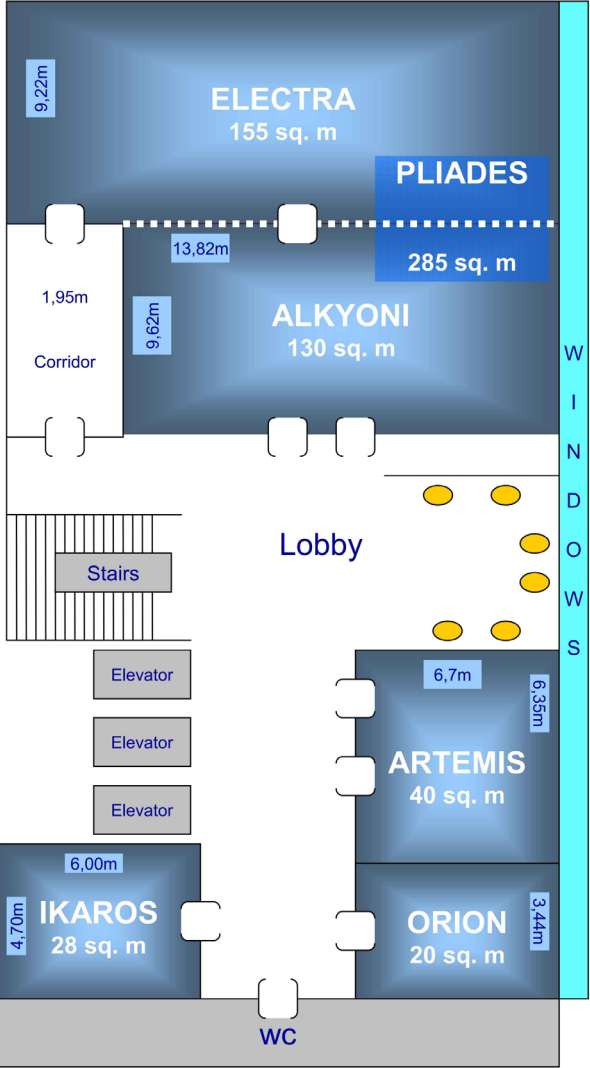
 **NOVOTEL ATHENES**  
4-6 Michail Voda, 104 39 Athens, Greece

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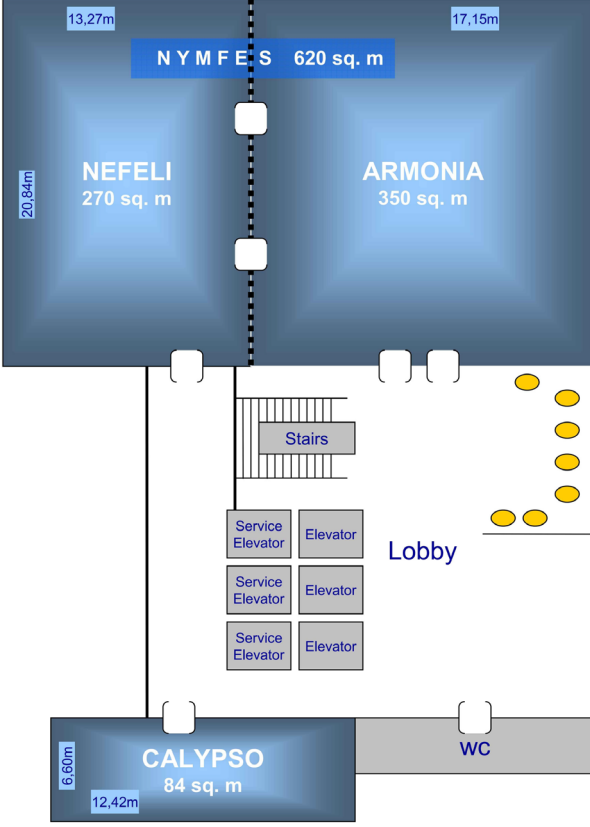


# Floor Plan

## NOVOTEL ATHENS Mezzanine Level Meeting Rooms



## NOVOTEL ATHENS -1 Level Meeting Rooms



# In-Person Program Outline

## Day-1

October 21, 2024, Monday

### ROOM ARMONIA

08:45 Introduction and Opening Remarks

09:00 Keynote Session

Networking Coffee Break @FOYER

### PARALLEL SYMPOSIA

#### ROOM ARMONIA

**Symposium I:**  
Future Biomaterials-Biomedical, Medicine and Other Applications (I)

**Session 1:**  
Biomaterials for Cancer Treatments

Lunch Break

#### ROOM ARMONIA

**Session 2:**  
Engineering Biomaterials

**Session 3:**  
NanoSafety

#### ROOM ALKYONI

**Symposium II:**  
Materials for Electronics,  
Optics and Photonics

**Session 1:**  
Advances in Optoelectronics

**Session 2:**  
Detection Frontiers

Coffee Break @FOYER

Session 3 Continues

Session 2 Continues

**Session 3:**  
Heterostructures in Electronics

Poster Presentations & Drinks @FOYER

### Zoom Links

#### Room ARMONIA and Online Program

<https://us06web.zoom.us/j/89460930346?pwd=E24fhBQe77BNgZ4o0L4DOq45YcNn.1>

Meeting ID: **894 6093 0346**

Passcode: **246069**

#### Room ALKYONI

<https://us06web.zoom.us/j/82018518727?pwd=QBf84JSYefYcfTo7CUtg80vDtHMmbm.1>

Meeting ID: **820 1851 8727**

Passcode: **010220**

## Day-2

October 22, 2024, Tuesday

### ROOM ARMONIA

08:45 Day 2 Opening Remarks

09:00 Keynote Session

Coffee Break @FOYER

### PARALLEL SYMPOSIA

#### ROOM ARMONIA

**Symposium I:**  
Future Biomaterials-Bio-  
medical, Medicine and  
Other Applications (II)

**Session 4:**  
Innovations in Sensing and  
Recognition

#### ROOM ALKYONI

**Symposium IV:**  
Nanotechnology and  
Nanomaterials (I)

**Session 1:**  
Synthesis and Manufacture I

Lunch Break

Biomaterials Young  
Researchers Presentations

(Session Break)

Energy Young  
Researchers Presentations

**Session 2:**  
Synthesis and  
Manufacture II

Nano Young Researchers  
Presentations

17:00 \*VISIT followed by  
19:00 Informal Dinner (Ticket Required)

## Day-3

October 23, 2024, Wednesday

### ROOM ARMONIA

08:45 Day 3 Opening Remarks

09:00 Keynote Talk

**Symposium IV:** Nanotechnology and  
Nanomaterials (II)

**Session 3:** Nanomaterials for Bioapplications

Coffee Break @FOYER

**Symposium III:** Future Materials for Energy,  
Environment and Sustainability (II)

**Session 1:**  
Materials for Environmental Sustainability

Awards Distribution

Lunch Break

**Session 2:**  
Energy Production

**Session 3:**  
Energy Harvesting

In-Person Closing Remarks

**Join Zoom Meeting:**

<https://us06web.zoom.us/j/89460930346?pwd=E24fhBQe77BNgZ4o0L4DOq45YCnln.1>

Meeting ID: **894 6093 0346**

Passcode: **246069**

08:00 On-site Registrations

08:45 Introduction and Opening Remarks

**Moderator:** **Ester Vazquez**, University of Castilla-La Mancha, Spain

## Keynote Session

09:00 Strategies for Regeneration of Hard Tissues

**Jonathan Knowles**, University College London, United Kingdom

09:35 Health Impacts Assessment of Graphene Related Materials a Prerequisite for a Safe and Sustainable Biomedical Use

**Peter Wick**, Empa- Swiss Federal Laboratories for Materials Science and Technology, Switzerland

10:10 Networking Coffee Break

@ Foyer

## Symposium I: Future Biomaterials-Biomedical, Medicine and Other Applications (I)

### Session 1: Biomaterials for Cancer Treatments

**Chair:** **Cristina Martín Jiménez**, UC3M & UCLM, Spain

10:40 Tumor Eradication by Boron Neutron Capture Therapy Using 10-boron Enriched Nanoparticles

**Naoki Komatsu**, Kyoto University, Japan

11:00 Investigating the Complexation Propensity of Self-assembling Dipeptides with the Anticancer Peptide-drug Bortezomib: A Computational Study

**Rissanou Anastassia**, National Hellenic Research Foundation, Greece

11:20 Assessment of Minimal Residual Disease in Acute Myeloid Leukemia Using Microfluidics, Nanosensors, Next Generation Sequencing and Artificial Intelligence Algorithms

**Lorena Dieguez**, International Iberian Nanotechnology Laboratory, Portugal

11:40 Pt-based Nanostructured Coordination Polymers for Glioblastoma Treatment. The Resurgence of Platinum Drugs

**Fernando Novio**, Autonomous University of Barcelona (UAB), Spain

12:00 Exploring the Impact of Nanoparticle Stealth Coatings in Cancer Models: From PEGylation to Cell Membrane Coating Nanotechnology

**Paola Sánchez Moreno**, University of Granada, Spain

12:20 Iridium(III) Complexes as Potential Photosensitizers for Photodynamic Therapy

**Wenfang Sun**, The University of Alabama, United States

12:40 Group Photo followed by Lunch Break

### Session 2: Engineering Biomaterials

**Chair:** **Alejandro Criado**, University of A Coruña, Spain

13:40 Graphene-based Hydrogels and Electrospinning: 3D Printing Techniques for Advanced Antibacterial Therapy

**Cristina Martín Jiménez**, University Carlos III of Madrid & University of Castilla-La Mancha, Spain

- 14:00 **Biomedical Applications of Amorphous Calcium Carbonate Nanoparticles**  
**Susana Carregal Romero**, CIC biomaGUNE, Spain
- 14:20 **Development of Warping-free Polypropylene-based Elastomer Filament for 3D Printing of Medical Prosthesis**  
**Abdulhakim Almajid**, Prince Sultan University, Saudi Arabia
- 14:40 **Advanced Magnetic Nanomaterials at the Frontier of the Wireless Neuromodulation**  
**Danijela Gregurec**, Friedrich Alexander University, Germany

### Session 3: NanoSafety

Chair: **Marco Pelin**, University of Trieste, Italy

- 15:00 **Neural Nanotechnology: Advancing Safe Applications of Nanomaterials within the Central Nervous System**  
**Mattia Bramini**, University of Granada, Spain
- 15:20 **Advanced Graphene Biomaterials for Cardiovascular and Antimicrobial Applications**  
**Inês C. Gonçalves**, i3S/INEB, Portugal
- 15:40 **New Approach Methodologies (NAMs) Based on *In vitro* Ecotoxicity Models to Support the Development of Safe and Sustainable by Design (SSbD) Advanced Materials**  
**Alberto Katsumiti**, GAIKER Technology Centre, Spain

16:00 **Coffee Break** @ Foyer

- 16:20 **Sources of Biases in the *In vitro* Testing of Nanomaterials: The Role of Biomolecular Corona**  
**Andrea Armirotti**, Italian Institute of Technology, Italy
- 16:40 **Hazard Characterization of Hexagonal Boron Nitride at the Skin Level**  
**Marco Pelin**, University of Trieste, Italy

17:40 **Poster Presentation and Networking Drinks** @ Foyer

Join Zoom Meeting:

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Meeting ID: **820 1851 8727**

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**Symposium II: Materials for Electronics, Optics and Photonics**

**Chairs:** **Juan P. Martínez-Pastor**, University of Valencia, Spain  
**Jesus Mosquera Mosquera**, University of A Coruña, Spain

**Session 1: Advances in Optoelectronics**

- 13:40 **Perovskite Photodetectors**  
**Liang Li**, Soochow University, China
- 14:00 **Photonic Metasurfaces Enhanced with 2D Materials for Nonlinear Applications and Optoelectronics**  
**Odysseas Tsilipakos**, National Hellenic Research Foundation, Greece
- 14:20 **Tin Halide Perovskites for Photonics and Optoelectronics**  
**Juan P. Martínez-Pastor**, University of Valencia, Spain
- 14:40 **Fabricating Air-stable Copper Films with Exceptional Electrical Conductivity without Conventional Sintering**  
**Jessica Pereira**, University of Southampton, United Kingdom

**Session 2: Detection Frontiers**

- 15:00 **Synthetic Methodologies for the Preparation of Plasmonic Nanoparticles with Chiral Morphology at the Single-particle Level**  
**Jesus Mosquera Mosquera**, University of A Coruña, Spain
- 15:20 **Exploring Anisotropic Ultra-high Frequency Thermal and Electromagnetic Properties of Structured Carbon Metastructures with Thermoelastic Optical Indicator Microscope**  
**Arsen Babajanyan**, Yerevan State University, Armenia
- 15:40 **Towards High-performance Photoactivated Organic Materials for Spin-based Quantum Sensors**  
**Max Attwood**, Imperial College London, United Kingdom

16:00 **Coffee Break** @ Foyer

- 16:20 **Design Rules for Structural Colors in All-dielectric Metasurfaces: From Individual Resonators to Collective Resonances and Color Multiplexing**  
**Thomas Wood**, INSA Lyon, ECL, CNRS, University Claude Bernard Lyon 1, France
- 16:40 **Assessment of Surface Preparation Methods for Mercury (Hg) Probe Schottky Capacitance-Voltage (MCV) on Epitaxial Silicon**  
**Cristina Sanna**, GlobalWafers Co. Ltd, Italy

**Session 3: Heterostructures in Electronics**

- 17:00 **Switching of Perpendicular Magnetization by Magnon Torque in All Oxide Heterostructures**  
**Xixiang Zhang**, King Abdullah University of Science & Technology, Saudi Arabia
- 17:20 **Manipulation of the Polarization of THz Waves by Woven Metal Mesh Structures**  
**Tigran Abrahamyan**, Yerevan State University, Armenia
- 17:40 **Poster Presentation and Networking Drinks** @ Foyer

## List of Poster Presentations

**Judges:** **Ester Vazquez**, University of Castilla-La Mancha, Spain  
**Gabriel A. Lopez**, University of the Basque Country, Spain  
**Philippe Poulin**, Paul Pascal Research Center (CRPP) - CNRS, France

- FMN-1 **Ideal Metal Organic Frameworks' (MOFs)-platforms for the Development of Multifunctional MOF-Nanocarbon Hybrids**  
**Giasemi K. Angeli**, National Hellenic Research Foundation, Greece
- FMN-2 **A New Dual Emitting System Resulting from the Encapsulation of Rhodamine B Molecules within MOF-808 Cavities**  
**Gianpiero Buscarino**, University of Palermo, Italy
- FMN-3 **Preparation of High-entropy Sulfides for Energy Conversion and Storage**  
**Elena Miliutina**, University of Chemistry and Technology Prague, Czech Republic
- FMN-4 **Automated Characterization of Metal Organic Polyhedra**  
**Andrea Oyarzún-Aravena**, University of Cambridge, United Kingdom & University of Magallanes, Chile
- FMN-5 **On the Potential of Spatial Abstractions to Enhance Chemical Descriptions**  
**Andrea Oyarzún-Aravena**, University of Cambridge, United Kingdom & University of Magallanes, Chile
- FMN-6 ***In situ* Electrosynthesis of MOF-type Nanomaterials of Zn-BTC, Cu-BTC and Zn/Cu-BTC on ITO Electrode for the Study of the Hydrogen Evolution Reaction**  
**Carmen Castro Castillo**, University of Chile, Chile
- FMN-7 **Synthesis and Characterization of Cobalt Nanoparticles for Enhanced Oxygen Evolution Reaction in Alkaline Environments**  
**Borislava Mladenova**, Institute of Electrochemistry and Energy Systems, BAS, Bulgaria
- FMN-8 **Investigating the Effect of pH on the Growth of Coprecipitated Ni(OH)<sub>2</sub> Agglomerates as Precursors of Cathode Materials for Li-ion Batteries**  
**Jong-Tae Son**, Korea National University of Transportation, South Korea
- FMN-9 **Inner/Outer Side Chain Engineering of Non-fullerene Acceptors for Efficient Large-area Organic Solar Modules Based on Non-halogenated Solution Processing in Air**  
**Sabeen Zahra**, University of Science and Technology, South Korea
- FMN-10 **ZnS-Ag in Form of Janus Nanoparticles and Multi-headed Structures for Hydrogen Evolution in Visible Light**  
**Hanna Głowienke**, University of Gdansk, Poland
- FMN-11 **Edge-sharing Octahedrally Coordinated Ni-Fe Dual Active Sites on ZnFe<sub>2</sub>O<sub>4</sub> for Photoelectrochemical Water Oxidation**  
**Zhiyong Jiang**, University of Science and Technology of China, China
- FMN-12 **New Organic Cathodes based on Polyperylene-diimides and Graphene-type Structures for Ca-multivalent Secondary Batteries**  
**Belén Martínez Moral**, University of Jaén, Spain
- FMN-13 **A Study on the Processing and Microstructure of High Strength Ti Alloy with Solute Element by Metal 3D Printing**  
**Choon-Man Lee**, Changwon National University, South Korea
- FMN-14 **On the High Photodarkening Values of Some Amorphous Thin Films of the Ge-As-S System**  
**Petr Kutálek**, University of Pardubice, Czech Republic
- FMN-15 **Effect of Incorporation of Nickel/Cobalt Ions on the Structure and Physical Properties of Zinc-Phosphate Glasses**  
**Jana Holubová**, University of Pardubice, Czech Republic

- FMN-16 **Advanced SiOC 3D Microstructures: Fabrication via Laser Lithography and Pyrolysis**  
**Greta Merkininkaitė**, Center for Physical Sciences and Technology, Lithuania
- FMN-17 **Detecting Drugs on the Air an SERS and Artificial Neural Network**  
**Vasilii Burtsev**, University of Chemistry and Technology Prague, Czech Republic
- FMN-18 **Detection of Microplastics in Water Using SERS and Machine Learning**  
**Karolina Kukralova**, University of Chemistry and Technology Prague, Czech Republic
- FMN-19 **Low-temperature Reactions and Interface Formation Between Ga and Electrode Materials Used in Microelectronic System**  
**Yoonchul Sohn**, Chosun University, South Korea
- FMN-20 **Integrating Flexible Optical Waveguides into Soft Robotics: Advancing Multimodal Sensing for Enhanced Control and Operational Precision**  
**Xiang Zhang**, Defense Innovation Institute, Academy of Military Science, China
- FMN-21 **Characterizing Scaled Integrated Quantum Photonic Devices Based on Machine Learning Approaches**  
**Teng Yi**, Defense Innovation Institute, Academy of Military Science, China
- FMN-22 **Plasmonic Anisotropy of Ordered Subwavelength Metal Nanostructures Deposited on Corrugated Sapphire Templates**  
**Ephraim Mathew**, Adam Mickiewicz University, Poland
- FMN-23 **Novel Synthetic Bio-architectures Configured with S-layer Technology**  
**Andreas Breitwieser**, BOKU, Austria
- FMN-24 **Boosting the Acetone Gas Sensing of WS<sub>2</sub>-ZnO Nanosheets by Codecoration of Pt/Pd Nanoparticles**  
**Jae-Hun Kim**, Inha University, South Korea
- FMN-25 **Adaptation of the Electronic Properties of Bi<sub>2</sub>O<sub>2</sub>Se Through Surface Modification and Magnetic Doping**  
**Jose Mejia**, Pontifical Catholic University of Chile, Chile
- FMN-26 **Superheating Nature of REBCO Nanofilms and their Applications in the Growth of REBCO Superconductors**  
**Xin Yao**, Shanghai Jiao Tong University, China
- FMN-27 **Plasmon-produced Solvated Electrons: A New Approach with Utilization of Hybrid Structures**  
**Vera Shilenko**, University of Chemistry and Technology Prague, Czech Republic
- FMN-28 **High-fluence Nitrogen Ion Implantation into Titanium and its Effects on Surface Saturation**  
**Vojtěch Smola**, Czech Technical University in Prague, Czech Republic
- FMN-29 **A Novel N-doped Porous Carbon/g-C<sub>3</sub>N<sub>4</sub> Composite for Enhanced Photocatalytic Reduction of CO<sub>2</sub>**  
**Roopesh Mekkat**, University of Chemistry and Technology Prague, Czech Republic
- FMN-30 **Regrowth-free InGaN/GaN Super Lattice Capped GaN CMOS and Ring Oscillator with InGaN Back Barrier**  
**Mahalaxmi**, Indian Institute of Technology Bombay, India
- FMN-31 **Efficient Microfluidic-based Synthesis of Polymer Brushes**  
**Markéta Vrabcová**, Charles University, Czech Republic
- FMN-32 **Peptide/Graphene Nanocomposites: An in Silico Investigation**  
**Elena Markopoulou**, University of Crete, Greece
- FMN-33 **Factor Analysis of ssNMR Spectroscopy Data of Alginate-pectin Based Systems Crosslinked by Ca<sup>2+</sup> vs. Zn<sup>2+</sup> vs. Cu<sup>2+</sup>**  
**Martina Urbanova**, Institute of Macromolecular Chemistry, CAS, Czech Republic



- FMN-34 **Architecture of Multicomponent Polycrystalline Materials at Atomic Resolution**  
**Jiri Brus**, Institute of Macromolecular Chemistry, CAS, Czech Republic
- FMN-35 **Self-assembled Capsid: Synthesis and Characterization**  
**Anca Aldea**, CIFRA, Romania
- FMN-36 **Optical and Morphological Characterization of Gold Nanoparticles Synthesized Using Tannic Acid**  
**Jinga Maria-Lorena**, CIFRA, Romania
- FMN-37 **A Small-diameter Vascular Graft Promotes Rapid and Benign Remodeling of the Neointima Through Dual Release of Nitric Oxide and Hydrogen Sulfide**  
**Fubang Liang**, Shanghai Jiao Tong University, China

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Meeting ID: **894 6093 0346**

Passcode: **246069**

8:45 Introduction and Day 2 Opening Remarks

**Moderator:** Ester Vazquez, University of Castilla-La Mancha, Spain

**Keynote Session**

9:00 **3D Interconnected Carbon Nanostructures for Filter Capacitor Applications**

**Bingqing (B.Q.) Wei**, University of Delaware, United States

9:35 **Additive Manufacturing of Carbon Based Materials**

**Philippe Poulin**, Paul Pascal Research Center (CRPP) - CNRS, France

10:10 **Coffee Break**

@ Foyer

**Symposium I: Future Biomaterials-Biomedical, Medicine and Other Applications (II)**

**Session 4: Innovations in Sensing and Recognition**

**Chairs:** Alejandro Criado, University of A Coruña, Spain

Antonio Maffucci, University of Cassino and Southern Lazio, Italy

10:30 **Towards Discovering Aggregation Inhibitors Against Light Chain Amyloidosis**

**Z. Faidon Brotzakis**, Institute for Bioinnovation, BSRC Alexander Fleming, Greece

10:50 **PCR-free Sensing of Pathogen Nucleic Acid for Biomedical Applications**

**Emanuele Luigi Sciuto**, University of Messina, Italy

11:10 **Novel Materials for an Emotion Recognition System Embedded in Fashion Items**

**Antonio Maffucci**, University of Cassino and Southern Lazio, Italy

11:30 **Chemically Programmable Bacterial Probes for the Recognition of Cell Surface Proteins**

**Leila Motiei**, Weizmann Institute of Science, Israel

11:50 **Insights into Molecular Details of Lipid-based Drug Delivery Systems from Liposomes to Lipid Nanoparticles**

**Mahmoud Moradi**, University of Arkansas, United States

12:10 **Wicking Prediction in Lateral Flow Assays: Establishing a Data-driven Structure-wicking Relationship for Porous Membranes**

**Willfried Kunz**, Karlsruhe University of Applied Sciences, Germany

12:50 **Lunch Break**

**Young Researchers Presentations**

**Judges:** Ester Vazquez, University of Castilla-La Mancha, Spain

Peter Wick, Empa- Swiss Federal Laboratories for Materials Science and Technology, Switzerland

13:50 **Dissolvable Multistage Drug Release Microneedles for Skin Biofilm Treatment: Light Activate Killing, Anti-inflammation, and Healing**

**Haihan Chen**, Empa- Swiss Federal Laboratories for Materials Science and Technology, Switzerland

14:05 **Reactive Molecular Dynamics Simulations to Investigate Drug Delivery by Functionalized Nanoparticle**

**Cheherazade Trouki**, CNR-IPCF & University of Pisa, Italy

- 14:20 **Improving Serotonin Detection: The Power of Molecular Imprinted Polymers**  
**Adrián Martínez Abelairas**, University of A Coruña, Spain
- 14:35 **Development of Decellularized Magnet-driven Stem Cell Carriers for Cartilage Regeneration Therapy**  
**Hanjin Huang**, City University of Hong Kong, Hong Kong
- 14:50 **Enhancing Lateral Flow Assay Sensitivity Through Computational Modeling**  
**Farshid Jamshidi**, Karlsruhe University of Applied Sciences, Germany
- 15:05 **Blood Plasma Protein Interactions with Low-fouling Zwitterionic Polymer Brushes**  
**Monika Spasovová**, Charles University, Czech Republic
- 
- 15:20 **Session Break**

## Symposium III: Future Materials for Energy, Environment and Sustainability (I)

### Young Researchers Presentations

**Judges:** **Gabriel A. Lopez**, University of the Basque Country, Spain  
**Juan Carlos Sánchez-López**, The Institute of Materials Science (CSIC-US), Spain

- 15:25 **Coarse-grained Ferritic Fe-10Al-4Cr-4Y<sub>2</sub>O<sub>3</sub> Nanocomposite as a Top Material for the Green Energetics**  
**Denisa Bártková**, Institute of Physics of Materials CAS, Czech Republic
- 15:40 **Effect of Cationic Impurities in Recycled Active Materials for Lithium-ion Batteries**  
**Elie Fayad**, Chimie Paristech, PSL Research University, CNRS, IRCP, France
- 15:55 **Composite Organic Ionic Plastic Crystal Membranes: The Effect of Etherfunctionalized Cations on Light-gas Separation Performance**  
**Muhammad Shaharyar**, Deakin University, Australia
- 16:10 **Exploration and Development of Repairable Sulfur-based Polymer Composites**  
**Y. Athulya Wickramasingha**, Deakin University, Australia
- 17:00 **VISIT followed by Informal Dinner (19:00)** (Ticket Required)

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**Symposium IV: Nanotechnology and Nanomaterials (I)**

**Session 1: Synthesis and Manufacture I**

**Chair:** **Wei Li**, The University of Texas at Austin, United States

- 10:30 **Pulsed Laser Ablation Synthesis of Nanoparticles in Spectral Methods**  
**Karel Novotný**, Masaryk University, Czech Republic
- 10:50 **Roll-to-roll Dry Transfer of Large-scale Chemical Vapor Deposition Graphene**  
**Wei Li**, The University of Texas at Austin, United States
- 11:10 **Tunable Covalent Micropatterning of Graphene by Emulsions**  
**Marina Garrido**, IMDEA Nanociencia, Spain
- 11:30 **Synthesis of Butterfly-like Shaped Gold Nanomaterial: Toward the Regulation of Liquid-Liquid Phase Separated Droplets as a Small Reaction Field**  
**Tomohiro Nobeyama**, Tsukuba University, Japan
- 11:50 **Mechanochemical Approach for the Fabrication of Carbon Based (nano)composites: From Environmental Remediation to Piezoresistive Devices**  
**Antonio Turco**, Institute of Nanotechnology National Research Council, Italy
- 12:10 **Multifunctional PEO Coatings**  
**Pawel Gluchowski**, Graphene Energy Ltd., Poland
- 12:30 **Opening the Bandgap of Graphene**  
**Bin Chen**, Shanghai Advanced Research in Physical Sciences, China

12:50 **Lunch Break**

**Session 2: Synthesis and Manufacture II**

**Chairs:** **Karel Novotný**, Masaryk University, Czech Republic  
**Antonio Turco**, Institute of Nanotechnology National Research Council, Italy

- 13:50 **Scaling Up Excellence: Advanced Exfoliation Techniques for Industrial Nanomaterial Production**  
**Antonio Esau Del Rio Castillo**, BeDimensional S.p.A., Italy
- 14:10 **Vanadium-sulfide Layers Prepared with Atomic Layer Deposition**  
**Zsofia Baji**, HUN-REN Centre for Energy Research, Hungary
- 14:30 **Influence of Sintering Modes During Hot Pressing of Partially Stabilized ZrO<sub>2</sub> Nano Powders on Reproducibility of Mechanical Properties**  
**Edvin Hevorkian**, University of Life Sciences in Lublin, Poland
- 14:50 **Generation of Paper Substrates Modified with Metallic Nanoparticles and Potential Applications in Remediation and Packaging**  
**Nataly Roxana Silva González**, University of Desarrollo, Chile
- 15:10 **Cobalt-Nitrogen Bonding for Triggering Low-power Dual Detection of NO<sub>2</sub> and NH<sub>3</sub> by Mixed Valence Co<sup>2+</sup> and Co<sup>3+</sup>**  
**Mokhotjwa Simon Dhlamini**, University of South Africa, South Africa

15:30 **Advanced Self-cleaning Paints: Sustainable Solutions with PNC-Doped TiO<sub>2</sub> Nanoparticles**  
**Qaisar Maqbool**, Vienna University of Technology, Austria

### Young Researchers Presentations

**Judges:** **Bingqing (B.Q.) Wei**, University of Delaware, United States  
**Wei Li**, The University of Texas at Austin, United States

15:50 **UV Sensors Based on Vertically Aligned Carbon Nanotubes (VA-CNTs)**  
**Ravi Prakash Yadav**, Sapienza University of Rome, Italy

16:05 **Iron Oxide Nanoparticles Modified with Cannabinoids and Anti-cancer Drugs**  
**Jan Taudul**, University of Warsaw, Poland

16:20 **Si Nanowire-based Schottky Sensors for Selective Sensing of NH<sub>3</sub> and HCl via Impedance Spectroscopy**  
**Valerii Kondratev**, Alferov University, Russia

16:35 **Deuterium Interaction with Carbon Nanotube Surfaces: Atomic-scale Insights and Hydrogen Storage Implications**  
**Sammar Tayyab**, Sapienza University Rome, Italy

17:00 **VISIT followed by Informal Dinner (19:00)** (Ticket Required)

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8:45 Introduction and Day 3 Opening Remarks

**Moderator:** Ester Vazquez, University of Castilla-La Mancha, Spain

### Keynote Talk

9:00 **Macromolecular Hybrid Materials and Nanostructures Based on Polysaccharides**

**Stergios Pispas**, National Hellenic Research Foundation, Greece

### Symposium IV: Nanotechnology and Nanomaterials (II)

#### Session 3: Nanomaterials for Bioapplications

**Chair:** Rissanou Anastassia, National Hellenic Research Foundation, Greece

9:35 **Biosensing with Graphene Transistors: Advantages and Challenges**

**Pedro Alpuim**, International Iberian Nanotechnology Laboratory, Portugal

9:55 **Essential Role of Chemistry in Shaping Graphene FETs for Biosensing**

**Alejandro Criado**, University of A Coruña, Spain

10:15 **2D Carbon Nanomaterials as Photoactive Antiviral and Antibacterial Agent**

**Giacomo Reina**, Empa- Swiss Federal Laboratories for Materials Science and Technology, Switzerland

10:35 **Describing the Mechanism of Interaction in the PAMAM Dendrimer and Doxorubicin**

**Conjugated System by Ab Initio Calculations**

**Ernesto Osvaldo Wrasse**, Technological Federal University of Paraná, Brazil

10:55 **Coffee Break**

@ Foyer

### Symposium III: Future Materials for Energy, Environment and Sustainability (II)

#### Session 1: Materials for Environmental Sustainability

**Chair:** Juan Carlos Sánchez-López, The Institute of Materials Science (CSIC-US), Spain

11:15 **Nanoplastics Retention and Transport in Filtration Systems**

**Serge Stoll**, University of Geneva, Switzerland

11:35 **Selenium Nanoparticle Impacts on Microorganisms: Effect of Coating, Dissolution and Aggregation**

**Wei Liu**, University of Geneva, Switzerland

11:55 **Utilizing Reticular Chemistry: Designing Functional Materials for Environmental Solutions**

**Giasemi K. Angeli**, National Hellenic Research Foundation, Greece

12:15 **Nanocarbons for Sustainability Solutions and CO<sub>2</sub> Capture**

**Wala Algozeeb**, Saudi Aramco, Saudi Arabia

12:35 **Awards Distribution followed by Lunch Break**

## Session 2: Energy Production

Chair: **Gabriel A. Lopez**, University of the Basque Country, Spain

- 13:30 **Selective Absorber Coatings for Solar-thermal Energy Conversion**  
**Juan Carlos Sánchez-López**, The Institute of Materials Science (CSIC-US), Spain
- 13:50 **Solid Polymer Electrolytes Based on Nitrogen Groups as a New Generation of Electrolytes for Ca-multivalent Secondary Batteries**  
**Antonio Peñas Sanjuán**, University of Jaén, Spain
- 14:10 **Towards Tailored Radiative Properties for High-temperature Materials via Multi-scale Geometry Engineering**  
**Charles-Alexis Asselineau**, ANU-SoE, Australia & UPM-ETSII, Spain
- 14:30 **Design of Electrode Materials for Na-S Batteries**  
**Yan Yu**, University of Science and Technology of China, China
- 14:50 **Electrochemical Hydrogen Pump/compressor - Gas Diffusion Electrodes, Membrane Electrode Assembly and Possibility for Two Stage Compression**  
**Galin Borisov**, Institute of Electrochemistry and Energy Systems, BAS, Bulgaria
- 15:10 **What are the Challenges and Opportunities of  $ZnFe_2O_4$  Photoanodes for PEC Water Splitting Applications?**  
**Xiaodi Zhu**, University of Science and Technology of China, China

## Session 3: Energy Harvesting

Chair: **Antonio Peñas Sanjuán**, University of Jaén, Spain

- 15:30 **Advanced Materials for Near Ambient Temperature Energy Harvesting**  
**Oscar J. Dura**, University of Castilla-La Mancha, Spain
- 15:50 **CO<sub>2</sub> Capture for Energy Harvesting: Atomistic Modelling of the Working Mechanism**  
**Federico Raffone**, Polytechnic University of Turin, Italy
- 16:10 **Electrocatalytic Nitrate to Ammonia**  
**Shuyan Gao**, Henan Normal University, China
- 
- 16:30 **In-Person Closing Remarks**
-

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Passcode: **246069**

09:40 AV Check

09:50 Introduction and Day 4 Opening Remarks

## Keynote Session

10:00 **Anisotropic Nano-MOFs**

**Chengzhong (Michael) Yu**, University of Queensland, Australia

10:35 **Nanoscale Carbon Materials for Emerging Battery Electrodes and Their *In Situ* Characterization**

**Jang-Kyo Kim**, Khalifa University, UAE & University of New South Wales, Australia

## Online Symposium I: Materials for Electronics, Optics and Photonics

**Chair: Kirill Monakhov**, Leibniz Institute of Surface Engineering, Germany

11:10 **Ultra-high Efficiency of SOT-MRAMs Using MTJs with Strain-induced Magnetic Anisotropy**

**Hiroaki Yoda**, Yoda-s, Inc., Japan

11:30 **Triboelectric Sensors for a Comprehensive Normal-shear Stress Perception**

**Songtao Hu**, Shanghai Jiao Tong University, China

11:50 **Long-range Supramolecular Assembly of a Pyrene-derivatized Polythiophene/MWCNTs Hybrid for Resilient Flexible Electrochromic Displays**

**Laura Maggini**, University of Vienna, Austria

12:10 **Measurement of Emissivity with a New IR Thermal Sensor Dubbed TMOS and a New Approach**

**Yael Nemirovsky**, Technion and TODOS Technologies, Israel

12:30 **YRP: Impedance Characteristics of Polycrystalline  $ZnGa_2O_4$  Thin Films Under Solar Blind UV Irradiation**

**Reiya Kase**, Tokyo Denki University, Japan

12:45 **YRP: Fiber-integrated Non-volatile Optical Modulator Based on  $Ge_2Sb_2Te_5$**

**Xiang Li**, Harbin Engineering University, China

13:00 **E-Poster: High Temperature Superconductivity - Exciton Mechanism**

**Junhui Cao**, Westlake University, China

13:10 **E-Poster: Enhancing Emission of Perovskite Films Using Soft Lithography**

**Mathias Bizimana**, African Leadership College, Mauritius

13:20 **Controllable Circular Polarization Lasing via Chiral Metamaterials**

**Maria Kafesaki**, FORTH & University of Crete, Greece

13:40 **Integration of Polyoxometalates into Redox-based Memory Applications: Challenges and Progress**

**Kirill Monakhov**, Leibniz Institute of Surface Engineering, Germany

14:00 **Experimental and Theoretical Study of Spontaneous Light Emission Enhancement in ZnO Nanowires Gratings**

**Emmanuel Centeno**, University of Clermont Auvergne, France

14:20 **Nanodevices Based on Carbon Nanotubes**

**Taher Ghomian**, University of Maine, United States



Session I

Chairs: **Fabian Meder**, Italian Institute of Technology, Italy  
**Sergio Carrasco**, IMDEA Energy, Spain

- 14:40 **Metal-organic Frameworks in Hydrogen Technologies: Proton Exchange Membrane Fuel Cells and Green Hydrogen Generation**  
**Sergio Carrasco**, IMDEA Energy, Spain
- 15:00 **Electrification Phenomena on Biological Surfaces and Potential Uses**  
**Fabian Meder**, Italian Institute of Technology, Italy
- 15:20 **Transforming Waste into Sustainable Construction Materials: Durable Geopolymers from Recycled Sources**  
**Ileana Ielo**, University of Messina, Italy
- 15:40 **Keynote Talk: Recent Progress in the Development of Materials for Reversible Solid Oxide Cells**  
**Meilin Liu**, Georgia Institute of Technology, United States
- 16:15 **Discovering Ion-electron Interactions at  $V_2O_5$ /LiPON Electrochemical Interfaces Using Depth-resolved Cathodoluminescence Spectroscopy**  
**Leonard Brillson**, The Ohio State University, United States
- 16:40 **Solid-state Lithium Batteries: Market Trends and Innovations**  
**Chad Lindner**, American Elements, United States
- 17:00 **Scanning Electrochemical Microscopy for Characterizing Electrode/electrolyte Interfacial Processes of Lithium-ion Batteries**  
**Rong He**, National Renewable Energy Laboratory, United States

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10:20 AV Check

10:40 Introduction and Day 5 Opening Remarks

## Online Symposium II: Future Materials for Energy, Environment and Sustainability

### Session II

**Chair:** **Janko Kreikemeier**, German Aerospace Center, Germany

10:50 **Recent Developments in Narrow Energy Gap Photoactive Absorbers for Wavelength-selective Transparent Photovoltaic Devices**

**Terence Wong**, Nanyang Technological University, Singapore

11:10 **Giant Piezoelectricity in Nanoporous (Ba,Ca)(Ti,Zr)O<sub>3</sub>**

**Yukana Terasawa**, Kumamoto University, Japan

11:30 **Stable Photoelectrochemical Oxidation Followed by Li<sup>+</sup>-deintercalation at Solid/solid Interfaces Toward Solar Energy and Conversion**

**Kenta Watanabe**, Tokyo Institute of Technology, Japan

11:50 **Integrating Numerical Assessment and Experimental Disassembly for Sustainable Evaluation of Bonded CFRP Structures: A Life Cycle Analysis Approach**

**Janko Kreikemeier**, German Aerospace Center, Germany

12:10 **Ligno-cellulosic Fiber Mediated Columnar-structure in Matrix Composite**

**Séverine A.E. BOYER**, CNRS MINES Paris PSL, France

12:30 **Dissecting the Core-shell Interface Effect on the Thermal Stability of Microencapsulated Phase Change Materials for Efficient Thermal Energy Storage Application**

**Melbert Jeem**, Hokkaido University, Japan

## Online Symposium III: Nanotechnology and Nanomaterials

**Chairs:** **Amalia Ruiz Estrada**, University of Bradford, United Kingdom

**Nathalie Steunou**, ILV- UVSQ, University of Paris-Saclay, France

12:50 **Keynote Talk: Nanozeolites with Controlled Defect Sites and Structural Flexibility: Future Materials for Selective Gas Separation and Biomedicine**

**Svetlana Mintova**, CNRS, ENSICAEN, Normandy University-Caen, France

13:25 **New Tricks for Old Drugs: Utilisation of Novel Drug Delivery Systems to Overcome Cisplatinresistant Malignant Pleural Mesothelioma**

**Amalia Ruiz Estrada**, University of Bradford, United Kingdom

13:45 **Morphological Effects in Metal Oxide Nanostructures: A Statistical Analysis of Ethanol Sensors Based on SnO<sub>2</sub>**

**Andrea Ponzoni**, CNR-INO, Italy

14:05 **Innovative Pyroelectric Implantable Sensors for Cardiovascular Complications Real-time Monitorization**

**Mariana Rocha**, IFIMUP/FCUP, Portugal

14:25 **Design of MOF/Gelatin Hydrogel Composites Mediated by Coacervation Process for the Capture of Volatile Organic Compounds**

**Nathalie Steunou**, ILV- UVSQ, University of Paris-Saclay, France

- 14:45 **Laser Patterned Polymer Graphene Composites for the Production of Sustainable Devices**  
**Alessandra Scidà**, National Research Council of Italy, Italy
- 15:05 **Enhance the Thermal Conductivity of Phase Change Materials PCM Using Nanocomposites**  
**Maha Alotaibi**, King Abdulaziz City for Science and Technology, Saudi Arabia

### E-Poster Presentations (7+3 Mins)

- E-FMN-1 **High-order Harmonic Generation in the Giant Fullerene Molecules**  
**Armenuhi Ghazaryan**, Yerevan State University, Armenia
- E-FMN-2 **Rheological Behavior of Polymer Materials Filled by Microwave-modified Bentonite**  
**Zuzana Micicova**, Alexander Dubček University of Trenčín, Slovak Republic
- E-FMN-3 **Modified Wood Flour and its Effect in Polymer Matrix**  
**Slavomira Bozekova**, Alexander Dubček University of Trenčín, Slovak Republic
- E-FMN-4 **The Effect of Temperature on the Parameters of the Mixing Process in the Preparation of Elastomeric Composites**  
**Ivan Labaj**, Alexander Dubček University of Trenčín, Slovak Republic
- E-FMN-5 **Design of a Sustainable System Based on Paper-Cyclodextrin Nanosponges-Copper Nanoparticles for the Remediation and Detection of Organic Pollutants**  
**Sebastián Salazar Sandoval**, University of Desarrollo, Chile
- E-FMN-6 **Potential Occupational Exposures to Nanoparticles by Aircraft Mechanics at A Flight Training Facility**  
**Cynthia T. Pugh**, Embry-Riddle Aeronautical University, United States

### Online Symposium IV: Future Biomaterials-Biomedical, Medicine and Other Applications

Chair: **António Salgado**, University of Minho, Portugal

- 16:25 **Hybrid Inorganic-organic Materials for 4D Printed Dynamic *In vitro* Models**  
**Dorleta Jimenez de Aberasturi**, CIC biomaGUNE, Spain
- 16:45 **Combinatory Use of Cell Secretome and Biodegradable Biomaterials for CNS Regenerative Medicine: Insights on Spinal Cord Injury and Parkinson's Disease**  
**António Salgado**, University of Minho, Portugal
- 17:05 **Assembly of Double-Hydrophilic Block Copolymers Triggered by Metal Ions: Applications in Catalysis and Biology**  
**Jean-Daniel Marty**, University of Toulouse, France
- 17:15 **Significance of Soft Tissue Viscoelasticity in Energy Dissipation by Tissues**  
**Frederick Silver**, Robert Wood Johnson Medical School, United States
- 17:35 **Utilization of Nanomaterials for Realization of Unconventional Wearables-wearables**  
**Shideh Kabiri Ameri**, Queen's University, Canada
- 17:55 **Water-soluble Dendritic Antioxidants**  
**Choon Lee**, Central Michigan University, United States
- 18:15 **YRP: Hydrolytically Degradable and Biocompatible Highly-entangled Hydrogels**  
**Alex Sunday**, Harvard University, United States
- 18:30 **Virtual Closing Remarks**

We wish to see you again @  
**FUTURE MATERIALS-2025**

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