



## PROGRAM

4<sup>th</sup> International Conference on

# MATERIALS SCIENCE & NANOTECHNOLOGY

October 23-25, 2023

Barcelo Valencia HOTEL | Valencia, Spain

October 26-27, 2023

Online, Zoom

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# In-Person Program Outline

## Day-1

October 23, 2023, Monday

### ROOM CELESTE I

8:35-8:45 Introduction and Opening Remarks  
8:45-10:30 Keynote Session

Coffee Break @FOYER

### PARALLEL SYMPOSIA

#### ROOM CELESTE I

**Symposium I:**  
Nanotechnology and  
Nanomaterials

**Session 1:**

Nanomaterials: Synthesis,  
Characterization and  
Modeling

#### ROOM BURDEOS

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

**Session 1:**

Biomaterials for  
Nanomedicine, Drug Delivery  
and Tissue Engineering

Lunch Break @Restaurant

**Session 2:**

Nanotechnology for Energy,  
Electronics, and Materials  
Advancements

Young Researchers  
Presentations

**Session 2:**

Materials for Advanced  
Biomedical Applications

Young Researchers  
Presentations

Coffee Break @FOYER

Symposium I Continues

Symposium II Continues  
-----End of Symposium II-----

Poster Presentations & Drinks @FOYER

## Day-3

October 25, 2023, Wednesday

### ROOM CELESTE I

8:40-8:45 Day 3 Opening Remarks  
8:45-10:30 Keynote Session

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

**Session 3:** Experimental Models and Strategies for  
Efficient Materials Research, Design and Development

Coffee Break @FOYER

Young Researchers Presentations

**Future Materials 2023 Closing Remarks**

Lunch Break & Departure @Restaurant

## Day-2

October 24, 2023, Tuesday

### ROOM CELESTE I

8:40-8:45 Day 2 Opening Remarks  
8:45-10:30 Keynote Session

Coffee Break @FOYER

### PARALLEL SYMPOSIA

#### ROOM CELESTE I

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

**Session 3:**

Nanotechnology  
Advancements,  
Applications and Safety  
Assessment

#### ROOM BURDEOS

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

**Session 1:**

Materials and Techniques  
for Electronics and Memory  
Devices

**Session 2:**

Materials for High-  
Performance Photonic,  
Opto-Electronics, Conductive  
Films & Wearable Devices

Lunch Break @Restaurant

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

**Session 1:**

Materials Research &  
Innovation for Sustainable  
Energy Solutions

**Session 2:**

Materials Research for  
Environment Sustainability:  
Recycling, Energy, and  
Efficiency

**Symposium IV**

**Session 2:**  
Continues

Young Researchers  
Presentations

Coffee Break @FOYER

Symposium III Continues

Symposium IV Continues  
-----End of Symposium IV-----

19:00 Onwards \*Networking Dinner  
(Ticket Required) @Restaurant

### Zoom Links

#### Room Celeste I and Online Program

<https://us06web.zoom.us/j/87623169635?pwd=YB-9MHW4pbowRH6SjXLbyWAgqImW8Dr.1>

#### Room Burdeos

<https://zoom.us/j/93302479739?pwd=MOJtaVhxN-HVOZ2JKb0xWVUVVUTJmQT09>

**Join Zoom Meeting:**<https://us06web.zoom.us/j/87623169635?pwd=YB9MHW4pbowRH6SjXLbyWAqImW8Dr.1>Meeting ID: **876 2316 9635**Passcode: **945488**

08:00-08:35 On-site Registrations

08:35-08:45 Introduction and Opening Remarks

**Moderator:** Ester Vazquez, University of Castilla-La Mancha, Spain**Keynote Session (30+5 Mins)**08:45-09:20 **Graphene for Molecular Electronics**  
Eugenio Coronado, University of Valencia, Spain09:20-09:55 **Multifunctional Carbon Materials Meet Biomedicine**  
Alberto Bianco, CNRS - IBMC, France09:55-10:30 **Peripheral and Central Nerve Repair: Understanding the Clinical Problem and Strategies for Improved Outcomes**  
Jonathan Knowles, University College London, United Kingdom10:30-10:45 **Conference Supporter Talk: Sustainable Construction: Nanotech's Role in Building Durability**  
Jonathan Duquette, GoNano LLC, Canada10:45-11:05 **Coffee Break**

@Foyer

**Symposium I: Nanotechnology and Nanomaterials****Featured Presentations (15+5 Mins)****Session 1: Nanomaterials: Synthesis, Characterization and Modeling****Chair:** Francisco Miguel Morales Sanchez, University of Cadiz, Spain11:05-11:25 **Modeling Elasticity and Plasticity with the Complex Amplitude Formulation of the Phase Field Crystal Model**  
Ken Elder, Oakland University, United States11:25-11:45 **Mechanical Characterization of 1D Nanostructures: Inconsistency of Results**  
Sergei Vlassov, University of Tartu, Estonia11:45-12:05 **Impact on Optical and Structural Properties of InAs/GaSb Type-II Superlattices as Consequence of Modifications in the Configurations of Their Interfaces**  
J. J. Jimenez, University of Cadiz, Spain12:05-12:25 **Secondary Porosity as a Regulator of Hydrophobicity of Nanoporous Particles**  
Yuriy Bushuev, University of Silesia, Poland12:25-12:45 **Controlling the Crystallization and Hydration State of Crystalline Porous Organic Salts**  
Megan O'Shaughnessy, University of Liverpool, United Kingdom12:45-13:45 **Lunch Break**

## Session 2: Nanotechnology for Energy, Electronics, and Materials Advancements

**Chairs:** [Sergei Vlassov](#), University of Tartu, Estonia

[Florian Part](#), University of Natural Resources and Life Sciences, Austria

- 13:45-14:05 **A New Route to Achieve VO<sub>2</sub> Nanoparticles for Thermochromic Applications**  
[Francisco Miguel Morales Sanchez](#), University of Cadiz, Spain
- 14:05-14:25 **Metal-semiconductor-metal Heterostructures for Electrical, Optical and Plasmonic Applications**  
[Alois Lugstein](#), Technical University of Vienna, Austria
- 14:25-14:45 **Spike Propagation in a Nanolaser-based Optoelectronic Neuron**  
[Ignacio Ortega-Piwonka](#), King Juan Carlos University, Spain
- 14:45-15:05 **Correlation Between Charge Density Wave Phase Transition and Hydrogen Adsorption in 1T-TaS<sub>2</sub> Thin Film Devices**  
[Yasushi Ishiguro](#), Tokyo Denki University, Japan
- 15:05-15:25 **Graphene/TiO<sub>2</sub> as Electron Transport Layer to Enhance Energy Efficiency of Perovskite Solar Cells**  
[Thembinkosi Malevu](#), Sefako Makgatho Health Science University, South Africa

### Young Researchers Presentations (10+5 Mins)

- 15:25-15:40 **Structural Unit Determination in Silica Nanoparticles Using Infrared Micro-reflectance Spectroscopy**  
[Mireia Sainz-Menchon](#), University of the Basque Country (UPV/EHU), Spain
- 15:40-15:55 **Atomic Movement Mechanisms of Plasticity-induced Phase Transitions in Gradient Nanostructured High-entropy Alloys**  
[Wenqing Yang](#), The Hong Kong Polytechnic University, Hong Kong
- 15:55-16:10 **Nanostructures and Strengthening Mechanisms in Additive Manufactured Coherent Nano-precipitation Containing High Entropy Alloys**  
[Wang Yilin](#), The Hong Kong Polytechnic University, Hong Kong
- 
- 16:10-16:30 Coffee Break** @Foyer
- 16:30-16:45 **Time-scale Investigation with Modified Phase Field Crystal Method**  
[Duncan Burns](#), McGill University, Canada
- 16:45-17:00 **Study on the Adsorption Properties of Hydrochloric Acid Doped Microporous Conjugated Polyaniline for Hg<sup>2+</sup>**  
[Yubing Wang](#), University of Bristol, United Kingdom
- 17:00-17:15 **Targeted Chemical Modification for Controlled Supramolecular Assembly**  
[Maximilian JL Hagemann](#), University of Bristol, United Kingdom

## Join Zoom Meeting:

<https://zoom.us/j/93302479739?pwd=M0JtaVhxNHVOZ2JKb0xWVUVVUTJmQT09>

Meeting ID: 933 0247 9739

Passcode: 907880

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

## Featured Presentations (15+5 Mins)

## Session 1: Biomaterials for Nanomedicine, Drug Delivery and Tissue Engineering

Chairs: **Alberto Bianco**, CNRS - IBMC, France**Roman A. Perez**, International University of Catalonia (UIC), Spain

- 11:05-11:25 **Magnetoplasmonic Nanocapsules as Wirelessly Controlled Nanotherapies**  
**Josep Nogués**, Catalan Institute of Nanoscience and Nanotechnology (ICN2), Spain
- 11:25-11:45 **Magnetic Nanomotors to Navigate in Complex Environments**  
**Miguel A. Ramos Docampo**, Aarhus University, Denmark
- 11:45-12:05 **Multifactorial Drug Delivery System Comprising Gold-nanoparticles Assembled with  $\alpha$ -Synuclein**  
**Seung R. Paik**, Seoul National University, South Korea
- 12:05-12:25 **Polymeric-based Nanomedicines Targeting Brain Lipid Metabolism: A Next Generation Therapy for Neuron-related Diseases**  
**Rosalía Rodríguez-Rodríguez**, International University of Catalonia (UIC), Spain
- 12:25-12:45 **Using Core Shell Extrusion to Achieve Functional Tissue Engineering Blood Vessels**  
**Roman A. Perez**, International University of Catalonia (UIC), Spain
- 12:45-13:05 **Carbon Nanostructure Derivatives as Fillers in Scaffolds for Tissue Engineering and Regenerative Medicine**  
**Enzo Menna**, University of Padova, Italy

**13:05-14:00 Lunch Break**

## Session 2: Materials for Advanced Biomedical Applications

Chair: **Enzo Menna**, University of Padova, Italy

- 14:00-14:20 **3D Printable Nanocomposite for Bioinspired and Functionalized Microneedles**  
**Petrus A. Santa-Cruz**, Federal University of Pernambuco/UFPE, Brazil
- 14:20-14:40 **[1]Benzothieno[3,2-b][1]-benzothiophene (BTBT)-peptide Hybrid Hydrogels for Bioelectronics**  
**Miriam Mba**, University of Padova, Italy
- 14:40-15:00 **Suitability of Microwave Radiation for the Synthesis of Bioactive Glasses**  
**Eugeni Canas**, Jaume I University, Spain
- 15:00-15:20 **Two-photon Fluorescent (nano)probes for a Versatile Intracellular Detection and Quantification of Nitric Oxide**  
**Maria J. Marin**, University of East Anglia, United Kingdom
- 15:20-15:40 **A Facile Approach for Producing Polypyrrole Microcapsules and Their Application in Bioelectrochemical Sensing**  
**Piyanut Pinyou**, Suranaree University of Technology, Thailand

15:40-16:00 **Safety Assessment of 2D Materials at the Skin Level**  
**Marco Pelin**, University of Trieste, Italy

16:00-16:20 **Coffee Break**

@Foyer

### Young Researchers Presentations (10+5 Mins)

16:20-16:35 **Bilayer Hydrogels for Improved Oocyte Maturation**  
**Carlos Martín Andreu**, University of Castilla-La Mancha, Spain

16:35-16:50 **Surface-enhanced Raman Spectroscopy (SERS) and Artificial Intelligence in Biomedical Research**  
**Anastasiia Skvortsova**, University of Chemistry and Technology Prague, Czech Republic

16:50-17:05 **Development of Washable Antifungal Textiles Through Chemical Reaction of Fluconazole and Trichlorotriazine**  
**Juan Diego Henao Cuervo**, Pontifical Bolivarian University, Colombia

17:05-17:20 **Formulation of Eugenol Based Wound Healing Gauze Nanocomposites Towards Enhanced Vasculogenesis for the Treatment of Diabetic Wounds**  
**Lakshimipriya Sethuram**, Vellore Institute of Technology, India

17:30 Onwards

### Poster Presentations and Drinks

@Foyer

**Judges:** **Ester Vazquez**, University of Castilla-La Mancha, Spain  
**Gabriel A. Lopez**, University of the Basque Country, Spain  
**Roman A. Perez**, International University of Catalonia (UIC), Spain

FMN-1 **Effect of RF Magnetron Growth Conditions on Bismuth Ferrite Based Thin Film**  
**Georgiana Bulai**, Alexandru Ioan Cuza University of Iasi, Romania

FMN-2 **ZnO Nanoparticles Loaded with Essential Oils as Antimicrobial Agent for Food Packaging**  
**Ovidiu Oprea**, University Politehnica of Bucharest, Romania

FMN-3 **2D Materials Modified with Metal-containing Ionic Liquid**  
**Petra Ecorchard**, Institute of Inorganic Chemistry of the Czech Academy of Sciences, Czech Republic

FMN-4 **Solid-state Alkoxides - Synthesis, Properties, Applications**  
**Darina Smrzova**, Institute of Inorganic Chemistry of the Czech Academy of Sciences, Czech Republic

FMN-5 **Green Synthesis of New Biomaterials Based on Gold Nanoparticles and Phytocompounds from *Lycium barbarum* L. Fruits with Potential Antidiabetic Activity**  
**Moldovan Bianca**, Babes-Bolyai University, Romania

FMN-6 **Catalytic Activity Against Harmful Azoic Dyes of Green Synthesized Silver Nanoparticles Using the Antioxidant Goji Berry Extract**  
**Luminita David**, Babes-Bolyai University, Romania

FMN-7 **Effect of ZnO Thickness on Gas Sensing Behavior of WS<sub>2</sub>-ZnO p-n Heterojunction Nanosheets Towards Reducing Gases**  
**Jae-Hun Kim**, Inha University, South Korea

FMN-8 **Synthesis of Chitosan-based Graphene Filter for Bioaerosols and Volatile Organic Compounds Removal**  
**Jie-Ting Liu**, Soochow University, Taiwan

FMN-9 **Surface Modified Ceria Nanoparticles with Amine-based Accelerator and its Influence on Chemical-mechanical Polishing Process**  
**Minjeong Kim**, Hannam University, South Korea

- FMN-10 **ZnFe<sub>2</sub>O<sub>4</sub> Nanoparticles for Gas-sensing Applications: Monitoring of Structural Parameters While Exposing the Ferrite in Gas Atmospheres**  
**Zeyad M. Abdulhamid**, Khalifa University for Science and Technology, United Arab Emirates
- FMN-11 **Detecting Low Dose of Glucose in the Microwave Range by Using Thermoelastic Optical Indicator Microscope**  
**Tigran Abrahamyan**, Yerevan State University, Armenia
- FMN-12 **Enhancement of Biological Properties of Endodontic Filling Material by Organic–inorganic Hybrid Material**  
**Hyun-Jung Kim**, Kyung Hee University, South Korea
- FMN-13 **Preparation of Anticancer Metal–organic Frameworks Composed of Copper, Cobalt, and Zinc: Their Biocompatibility and Apoptosis Mechanism**  
**Do Nam Lee**, Kwangwoon University, South Korea
- FMN-14 **Modulating Corneal Endothelial Cell Response with Corneal Mimicking Substrates**  
**Begona Bosch Canals**, International University of Catalonia (UIC), Spain
- FMN-15 **Improved Biophysical Properties and Controllable Gelation in Silk Fibroin/Collagen Hydrogels for Cell Encapsulation**  
**Jenifer Olmos Buitrago**, International University of Catalonia (UIC), Spain
- FMN-16 **Increasing the Bioavailability and Preserving the Antioxidant Capacity of *Aronia melanocarpa* Extract by Encapsulation in Mesoporous Silica**  
**Ludmila MOTELICA**, University Politehnica of Bucharest, Romania
- FMN-17 **High Durability Virucidal Coatings Based on Microcapsulated Active Agents**  
**Saad Rabbani**, McGill University, Canada
- FMN-18 **Future Hybrid Materials Based on CsPbX<sub>3</sub> Perovskites and Ce-UiO(66)-Y MOFs for Photocatalytic Applications**  
**Hanna Głowienke**, University of Gdansk, Poland
- FMN-19 **Pt/Perovskite/TNTs Photoanodes in Photoelectrocatalytic Processes**  
**Jakub Sowik**, University of Gdansk, Poland
- FMN-20 **Carbon-based Composites with NaFeV(PO<sub>4</sub>)(SO<sub>4</sub>)<sub>2</sub> and Na<sub>4</sub>Fe<sub>3</sub>(PO<sub>4</sub>)<sub>2</sub>P<sub>2</sub>O<sub>7</sub> for Improving their Electrochemical Performance**  
**Trajche Tushev**, Institute of General and Inorganic Chemistry, Bulgarian Academy of Sciences, Bulgaria
- FMN-21 **Development of Desalination Membrane Based on Ionic Hydrogel for Solar Vapor Generator System and their Salt Ion Activated Effect**  
**Yoon Kim**, Hannam University, South Korea
- FMN-22 **Bio-carbons as Sustainable Electrodes for Sodium-ion Batteries**  
**Mariya Kalapsazova**, Institute of General and Inorganic Chemistry, Bulgarian Academy of Sciences, Bulgaria
- FMN-23 **Walnut Shell-derived Hard Carbons with Enhanced Na-storage Properties**  
**Sonya Harizanova**, Institute of General and Inorganic Chemistry, Bulgarian Academy of Sciences, Bulgaria
- FMN-24 **Heating Films having the Characteristics of Positive Temperature Coefficient as well as Electromagnetic Wave Shielding Effectiveness Using Carbon-based Composite Paste**  
**Sung-Hoon Kim**, Silla University, South Korea



- FMN-25 **Dielectric/ $\text{TiN}_x\text{O}_y$  Thin Films for Solar Driven Photoelectrochemical Water Splitting**  
**Nark-Eon Sung**, Pohang University of Science and Technology, South Korea
- FMN-26 **Polymer Blends for Energy-efficient Construction Materials: Simulation Studies**  
**Olga Bernaldo Perez**, European University of Madrid, Spain
- FMN-27 **Exploring the Properties of High-entropy Alloys for Hydrogen Storage**  
**Katarina Nigutova**, Institute of Materials Research, Slovak Academy of Sciences, Slovak Republic
- FMN-28 **Hydrogen Storage in Metal Hydrides**  
**Lenka Oroszova**, Institute of Materials Research, Slovak Academy of Sciences, Slovak Republic
- FMN-29 **Redox Activity of New Peri-dichalogenosubstituted Naphthalimides**  
**Delyana Marinova**, Institute of General and Inorganic Chemistry, Bulgarian Academy of Sciences, Bulgaria
- FMN-30 **Synthesis of 1,8-Naphthalimide Derivatives of Peri-substituted Dichalcogenides**  
**Silva Stanchovska**, Institute of General and Inorganic Chemistry, Bulgarian Academy of Sciences, Bulgaria
- FMN-31 **Ce-modified  $\text{NaFePO}_4$  as Electrode Material for Sodium Ion Batteries**  
**Violeta Koleva**, Institute of General and Inorganic Chemistry, Bulgarian Academy of Sciences, Bulgaria
- FMN-32 **3D-Printing of Sugarcane-bagasse Ash-derived Zeolite Monoliths as Adsorbents**  
**Antonio Pedro Novaes de Oliveira**, Federal University of Santa Catarina (UFSC), Brazil
- FMN-33 **Functional Materials Based on  $\text{TiO}_2$  and  $\text{Cs}_3\text{Bi}_2\text{X}_9$  for Photocatalytic Hydrogen Evolution**  
**Anna Pancielejko**, University of Gdansk, Poland
- FMN-34 **Carbon Nanotubes-metal Oxide Nanowire Networks for Energy-efficient Buildings**  
**Raimonds Meija**, 3D Strong Ltd., Latvia
- FMN-35 **Mach-Zehnder Interferometer with Distinct Layer Structures in Optical Isolator Employing Nonreciprocal Phase Shift**  
**Hideki Yokoi**, Shibaura Institute of Technology, Japan
- FMN-36 **Enhancing the Conductivity of Copper Oxide Nanolayers by Alkali Metals**  
**Katarzyna Gawlinska-Necek**, Polish Academy of Sciences, Poland
- FMN-37 **Ge-rich GeSbTe Phase-change Materials for Non-volatile Memory Applications in Flexible Electronics**  
**Joe Pady**, University of Exeter, United Kingdom
- FMN-38 **Synthesis and Characterization of Environmentally Friendly Blue-emitting Quantum Dots with Functional Ligands**  
**Do-Hyun Lee**, Hannam University, South Korea

**Join Zoom Meeting:**

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Meeting ID: **876 2316 9635**

Passcode: **945488**

08:40-08:45 Day 2 Opening Remarks

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

### Keynote Session (30+5 Mins)

08:45-09:20 **Advances in Kinetics Processes of Halide Perovskite Solar Cells for Memory, Neuromorphic and Optoelectronic Applications**

**Juan Bisquert**, Institute of Advanced Materials, Jaume I University, Spain

09:20-09:55 **Nanostructures at Atomic Scale: From Energy and Environmental Applications to Quantum Devices**

**Jordi Arbiol**, ICREA & Catalan Institute of Nanoscience and Nanotechnology (ICN2), Spain

09:55-10:30 **Chemical Tailoring of Graphene Materials for Water Remediation, Sensing and Carbocatalysis**

**Manuela Melucci**, ISOF- CNR, Italy

10:30-10:50 **Coffee Break**

@Foyer

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

#### Featured Presentations (15+5 Mins)

#### Session 3: Nanotechnology Advancements, Applications and Safety Assessment

**Chair:** Manuela Melucci, ISOF- CNR, Italy

10:50-11:10 **Unveiling Near-field Interactions of Metal Nanoparticles in Aqueous Solutions: Visualization Through Thermoelastic Optical Microscopy and X-Band Microwaves Response of Structural Clusters**

**Arsen Babajanyan**, Yerevan State University, Armenia

11:10-11:30 **Single-molecule Force Studies of Chemical Revolution Processes**

**Masahiko Hara**, Tokyo Institute of Technology, Japan

11:30-11:50 **Photoresponsivity of Carbon-dots/Graphene Hybrids on Flexible Substrates**

**Lucia Monica Veca**, IMT-Bucharest, Romania

11:50-12:10 **Pt/TiO<sub>2</sub> Single Atom and Small Cluster Catalysts Exposed to Chemical Warfare Agent, Sarin**

**Erin M. Durke**, CCDC Chem Bio Center - R&T - CBR Filtration, United States

12:10-12:30 **Defect Nanopatterning in Low Dimensional Materials: An Approach to Impart Material Functionalities**

**Massimiliano Cavallini**, CNR-Institute for the Study of Nanostructured Materials, Italy

12:30-12:50 **Quercetin Mediated Synthesis of Au/TiO<sub>2</sub> Nanocomposite for the Photocatalytic Degradation of Antibiotics**

**Noelia González Ballesteros**, University of Vigo, Spain

12:50-13:50 **Lunch Break**

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

Chair: **Gabriel A. Lopez**, University of the Basque Country, Spain  
**Abdessamad Faik**, Mohammed VI Polytechnic University, Morocco

### Featured Presentations (15+5 Mins)

#### Session 1: Materials Research & Innovation for Sustainable Energy Solutions

- 13:50-14:10 **Green Hydrogen and Innovative Materials for a Sustainable Future**  
**Abdessamad Faik**, Mohammed VI Polytechnic University, Morocco
- 14:10-14:30 **Accurate Characterization of Thermal Radiative Properties for Solar Energy Materials**  
**Gabriel A. Lopez**, University of the Basque Country, Spain
- 14:30-14:50 **Hybrid Materials Based on Conjugated Porous Polymers & Covalent Organic Frameworks for Artificial Photosynthesis**  
**Marta Liras**, IMDEA Energy, Spain

#### Session 2: Materials Research for Environment Sustainability: Recycling, Energy, and Efficiency

- 14:50-15:10 **Static and Dynamic Models of Electrode Coatings in Solid-state Lithium Anode Batteries with Superionic Conductors: Development of a Specifically Tailored Reactive Force Field for Multiscale Simulations**  
**Maddalena D'Amore**, University of Turin, Italy
- 15:10-15:30 **Advanced Materials for Tracer-based Sorting to Improve Recyclability of Thermoplastics**  
**Florian Part**, University of Natural Resources and Life Sciences, Austria
- 15:30-15:50 **New Concepts for the Fabrication of More Efficient and Durable VO<sub>2</sub>-based Smart Glazing - Online**  
**A. J. Santos**, University Burgundy Franche-Comte, France
- 15:50-16:10 **Cellulose Nanocrystal-based Sustainable Inks for Packaging**  
**Matteo Hirsch**, Swiss Federal Institute of Technology Lausanne (EPFL), Switzerland

**16:10-16:30 Coffee Break** **@Foyer**

- 16:30-16:50 **Zr-based Metal-organic Framework Loaded with Highly Dispersed Small Size Ni Nanoparticles for CO<sub>2</sub> Methanation**  
**Hongmei CHEN**, PSL Research University, France
- 16:50-17:10 **Electrochemically-prepared Nano-pillar Cuprous Oxide Photoactive Layer**  
**Pei Loon Khoo**, Toyohashi University of Technology, Japan
- 17:10-17:30 **Application of High-strength, High-density, Isotropic Si/C Composites in Commercial Lithium-ion Batteries**  
**Mingcai Zhao**, BCMaterials, Spain

### Join Zoom Meeting:

<https://zoom.us/j/93302479739?pwd=M0JtaVhxNHVOZ2JKb0xWVUVVUTJmQT09>

Meeting ID: **933 0247 9739**

Passcode: **907880**

## Symposium IV: Materials for Electronics, Optics and Photonics

**Chairs:** **Jose Marques-Hueso**, Heriot-Watt University, United Kingdom  
**Kirill Monakhov**, Leibniz Institute of Surface Engineering, Germany

### Featured Presentations (15+5 Mins)

#### Session 1: Materials and Techniques for Electronics and Memory Devices

- 10:50-11:10 **Low-power Laser Manufacturing of Circuitry**  
**Jose Marques-Hueso**, Heriot-Watt University, United Kingdom
- 11:10-11:30 **Solution-processed Polyoxometalate-based Memory Materials**  
**Kirill Monakhov**, Leibniz Institute of Surface Engineering, Germany
- 11:30-11:50 **Localized Plasmon Resonance (LSPR) Biosensing Efficiency Improvement by Different Arrangements of Nanoparticles**  
**Hovhannes Haroyan**, Yerevan State University, Armenia

#### Session 2: Materials for High-Performance Photonic, Opto-Electronics, Conductive Films & Wearable Devices

- 11:50-12:10 **Molecular Design on Semiconductive Polymers for Opto-electronics with High Device Performance: Single Polymer Approach**  
**Show-An Chen**, National Tsing Hua University, Taiwan
- 12:10-12:30 **Oligomer Conductors Modelled on the Doped PEDOT Family**  
**Hatsumi Mori**, The University of Tokyo, Japan
- 12:30-12:50 **Characterization of Cu-Sn-In System in Pb-free TLP Bonding**  
**Silvana Sommadossi**, IITCI CONICET-UNCo, Argentina
- 12:50-13:40 Lunch Break**
- 13:40-14:00 **Photopolymerizable Luminescent Resin for Dosimetry Nanodevices**  
**Petrus A. Santa-Cruz**, Federal University of Pernambuco/UFPE, Brazil
- 14:00-14:20 **Towards Large-scale Fabrication of Piezoelectric Thin Films for Stretchable and Wearable Devices**  
**Monica Acuautla**, University of Groningen, The Netherlands
- 14:20-14:40 **A Room-temperature Approach to Preparing Copper Films with Exceptional Conductivity**  
**Jessica Pereira**, University of Nottingham, United Kingdom

### Young Researchers Presentations (10+5 Mins)

- 14:40-14:55 **Oxide Thin Films for Next-generation DRAM Capacitor Electrodes via Atomic Layer Deposition**  
**Se Eun Kim**, Ajou University, South Korea
- 14:55-15:10 **Enhanced Resistive Switching in Conductive Bridge Random Access Memory Using Two-dimensional Electron Gas at the Interface of Oxide Heterostructure**  
**Chae Hyun Lee**, Ajou University, South Korea

- 15:10-15:25 **Epitaxial Growth of  $V_2AlC$  Thin Films to Overcome Resistivity Increase for Next-generation Interconnects**  
**Ju Young Sung**, Ajou University, South Korea
- 15:25-15:40 **Design and Fabrication of Efficient n-MoS<sub>2</sub>/c-Si(p) Heterojunction Solar Cells**  
**Anterdipan Singh**, Indian Institute of Technology Guwahati, India
- 15:40-15:55 **A Novel, Greener Semiconductor – PEDOT: Carrageenan**  
**Zhongnan Duan**, University of Nottingham, United Kingdom
- 15:55-16:10 **Synthesis and Characterisation of Asymmetric Perylene-based Supramolecular Polymers**  
**Helal Alharbi**, University of Bristol, United Kingdom
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- 16:10-16:30 Coffee Break** **@Foyer**
- 16:30-16:45 **Atomic Layer Deposition of Nickel Thin Film for Low Resistivity Metal Application**  
**Sang Mo Moon**, Ajou University, South Korea
- 16:45-17:00 **Growth of Epitaxial NbN Thin Films Using Atomic Layer Deposition on Cubic MgO Substrate**  
**Byeongjun Jeon**, Ajou University, South Korea
- 17:00-17:15 **Alternative Surface Reaction Pathways in Atomic Layer Deposited NbN Thin Films for Reduced Resistivity**  
**Ye Won Yun**, Ajou University, South Korea
- 17:15-17:30 **Functional Materials Based on Lanthanide(III) Monoporphyrinates Complexes with Potential Applications in Optoelectronic and Nanoscale Rotors**  
**Pablo Castro-Tamay**, University of Concepcion, Chile
- 17:30-17:45 **Self-powered Thermistor Based on Semiconducting Ferroelectric SbSI Nanowire**  
**Heewon Song**, Daegu Gyeongbuk Institute of Science and Technology, South Korea

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Meeting ID: **876 2316 9635**

Passcode: **945488**

08:40-08:45 Day 3 Opening Remarks

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

### Keynote Session (30+5 Mins)

08:45-09:20 **Self-healing Soft Robotics Using Reprocessable Polymer Networks**  
Guy Van Assche, Vrije Universiteit Brussel, Belgium

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

#### Featured Presentations (15+5 Mins)

#### Session 3: Experimental Models and Strategies for Efficient Materials Research, Design and Development

**Chairs:** Silvana Sommadossi, IITCI CONICET-UNCo, Argentina  
Gabriel A. Lopez, University of the Basque Country, Spain

09:20-09:40 **Strategies to Accelerate the Design, Discovery, Development and Deployment of Materials in the Era of the Digital Transformation**  
Eric Breitbarth, German Aerospace Centre (DLR), Germany

09:40-10:00 **An Experimental Study on Measurement of Tensile Strength for Envelope Material FV1160 and Structural Strength for Airship Envelope**  
Lin Song, Aerospace Information Research Institute, CAS, China

10:00-10:20 **Grain Boundary Phenomena in High Entropy Alloys**  
Boris Straumal, Osipyan Institute of Solid State Physics RAS, Russian Federation

10:20-10:40 **Synthesis, Characterization and Crystal Structure of New Bis[hexakis(N-methylimidazole) Zinc (II)] Nitrate Complex for Dye-sensitized Solar Cells (DSSCs) Application**  
Nomampondo P. Magwa, University of South Africa, South Africa

10:40-11:00 **Coffee Break**

@Foyer

#### Young Researchers Presentations (10+5 Mins)

**Chair:** Guy Van Assche, Vrije Universiteit Brussel, Belgium

11:00-11:15 **Computational Investigation of  $\text{YSr}_2\text{Cu}_2\text{FeO}_{7.56}$  for SOEC Applications**  
Mariana Gomez Toledo, Complutense University of Madrid, Spain

11:15-11:30 **Sustainable and Smart Polyethylene Oxide/Sodium Alginate-based Electrospun Nanofibrous Superabsorbent Mats as Controlled Release Fertilizer Systems**  
Krishna Priyadarshini Das, Indian Institute of Technology Delhi, India

11:30-11:45 **Low Temperature Synthesis of High Entropy and Entropy-stabilised Metal Sulfides and Evaluation in Hydrogen Evolution Electrocatalysis**  
Weichen Xiao, University of Manchester, United Kingdom

- 11:45-12:00 **Sulfur Infiltration Study on a Palm Kernel Shell Derived Activated Carbon to Improve the Performance of Li-S Cells - Online**  
**Julian Acevedo Moncada**, University of Antioquia, Colombia
- 12:00-12:15 **Adiabatic Solid-state Hydrogen Storage - Online**  
**Abdechafik Elharrak**, Mohammed VI Polytechnic University, Morocco
- 12:15-12:30 **Functionalised Porous Materials for CO<sub>2</sub> Capture and Conversion**  
**Ulzhalgas Karatayeva**, University of Bristol, United Kingdom
- 12:30-12:45 **Novel Class of Metalorganic Fluorine-free Solutions for the Transient Liquid Assisted Growth of High-performance Superconducting YBa<sub>2</sub>Cu<sub>3</sub>O<sub>7-x</sub> Films**  
**Lavinia Saltarelli**, ICMAB-CSIC, Spain
- 12:45-13:00 **Structure Activity Relationship of La<sub>1-x</sub>Nd<sub>x</sub>CoO<sub>3</sub> Nanostructures Toward Oxygen Electrocatalysis**  
**Sami M. Alharbi**, University of Bristol, United Kingdom
- 13:00-13:15 **Yttrium Doped Hexagonal Boron Nitride (h-BN) Nanomaterial Enhancement for Hydrogen Storage**  
**Kabelo Ledwaba**, University of South Africa, South Africa

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**13:15-14:15 Lunch & In-Person Departures**

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Meeting ID: **876 2316 9635**

Passcode: **945488**

08:40-08:50 AV Check

08:50-09:00 Introduction and Day 4 Opening Remarks

### Keynote Session (30+5 Mins)

09:00-09:35 **Graphene Coatings for Remarkable Corrosion Resistance: Challenges and Circumvention**  
**Raman Singh**, Monash University, Australia

09:35-10:10 **Materials at the Nanoscale and Beyond**  
**Ben Zhong TANG**, The Chinese University of Hong Kong, Shenzhen, China

10:10-10:45 **Chameleon Nanocarriers for Delivery of RNA Nanomedicines**  
**Ernst Wagner**, Ludwig Maximilian University of Munich, Germany

10:45-11:20 **Designing the Fluid Architecture of Biomembranes**  
**Reinhard Lipowsky**, Max Planck Institute of Colloids and Interfaces, Germany

### Online Symposium I: Nanotechnology and Nanomaterials

#### Featured Presentations (15+5 Mins)

11:20-11:40 **Fabrication and Applications of Nano-structured Graphene with Zigzag Edges**  
**Tomohiro Matsui**, Advanced Research Lab., Anritsu Corporation, Japan

11:40-12:00 **Effective Photoconductivity Modulation for Multifunctional Graphene Photodetectors by Quantum Dots**  
**Wei-Chen Tu**, National Cheng Kung University, Taiwan

12:00-12:20 **Re-examination for Nonlinear Behavior of Porous Sandwich Structures Reinforced by Graphene Platelets**  
**Chong Li**, Shanghai Jiao Tong University, China

12:20-12:40 **The Berry Benefit - Grape Seed Extract Containing Dentifrice**  
**Aditi Rao**, Ramaiah University of Applied Sciences, India

12:40-13:00 **Wavelength-dependent Tuning of Thermal and Thermo-plasmonic Response in Aggregates of Porphyrins**  
**Claudia Triolo**, Mediterranean University of Reggio Calabria, Italy

13:00-13:20 **Post-acceleration of Electron Bunches from Laser-irradiated Nano Clusters**  
**Laura Di Lucchio**, Free University of Bozen-Bolzano, Italy

13:20-13:40 **Synthesis and Characterization of Photoluminescent Properties, Shape and Size of Gold, Silicon, Copper and Silver Nanoparticles Synthesized via High Energy Ball Milling**  
**Julie P. Vanegas**, University of Texas Rio Grande Valley, United States



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

- 13:40-14:00 **Preclinical Development and Evaluation of Formulated Fish Peptides to Support Management of Hypertension**  
**Sinead Ryan**, University College Dublin, Ireland
- 14:00-14:20 **Biomimetic Multifunctional Materials**  
**Carlos Mas-Moruno**, Polytechnic University of Catalonia (UPC), Spain
- 14:20-14:40 **Nanoactuators for Therapy and Diagnosis**  
**Jesus M de la Fuente**, INMA, CSIC-University of Zaragoza, Spain
- 14:40-15:00 **Promoting Effect of a Calcium-responsive Self-assembly  $\beta$ -sheet Peptide on Collagen Intrafibrillar Mineralization**  
**Zhongcheng Li**, Sichuan University, China
- 15:00-15:20 **New Approaches to Inhibit miRNAs in an Atherosclerosis Pre-clinical Model**  
**Noemi Rotllan Vila**, IIB Sant Pau & CIBERDEM, Spain
- 15:20-15:40 **Crystalline Titania Formation on Ti-based Dental Implants and its Role in Biocompatibility**  
**Benedetta Albini**, University of Pavia, Italy

### Young Researchers Presentations (10+5 Mins)

- 15:40-15:55 **On the Way to Improve Eco-friendly Silver Bismuth Iodide Photovoltaic Cells. Challenges and Prospectives**  
**Natalia Belen Correa Guerrero**, TOIN University of Yokohama, Japan
- 15:55-16:10 **Concentrating Electron and Activating H-OH Bond of Absorbed Water on Metallic  $\text{NiCo}_2\text{S}_4$  Boosting Photocatalytic Hydrogen Evolution**  
**Yuchen Guo**, Tianjin University, China
- 16:10-16:25 **Formulation and Performance of Bioactive Hydrogel Scaffold Carrying Chlorhexidine and Bone Morphogenetic Protein**  
**Zhou Dongyang**, The Affiliated Hospital of Qingdao University, China
- 16:25-16:40 **Effect of Rare Earth ( $\text{RE}^{3+}$ ) Ionic Radii on Transparent Lanthanide-tellurite Glass-ceramics: Correlation Between 'Hole-Formalism' and Crystallization**  
**Pritha Patra**, CSIR-Central Glass and Ceramic Research Institute, India
- 16:40-16:55 **Generation and Enhancement of Currents and Magnetic Fields in a Two Dimensional Quantum Ring Using Short Electromagnetic Pulses**  
**Varsha**, University of Delhi, India
- 16:55-17:10 **Spin Teorientation to a  $\Gamma_3(\text{C}_x, \text{F}_y, \text{A}_z)$  Configuration and Anisotropic Spin-phonon Coupling in a  $\text{Sm}_{0.5}\text{Y}_{0.5}\text{FeO}_3$  Single Crystal**  
**Janaky Sunil**, Jawaharlal Nehru Centre for Advanced Scientific Research, India
- 17:10-17:25 **High-resolution Study of Changes in Morphology and Chemistry of Microphase Separated PS-b-PMMA Thin Films After Selective Removal of PMMA**  
**Harikrishnan Venugopal**, University of Paderborn, Germany
- 17:25-17:40 **Solid Phase Synthesis of Molecularly Imprinted Polymers Using Different Rigid Substrates**  
**Shiva Samhitha Saireddy**, University of Concepcion, Chile
- 17:40-17:55 **Coherent Phonon Dynamics in Non-centrosymmetric Potassium Titanyl Phosphate Crystal**  
**Helani Singhapurage**, University of Rhode Island, United States
- 17:55-18:10 **Luminescent and Electrical Properties of Silver Nanoparticles Embedded in Thiourea-grafted Pectin**  
**Araceli Granja Alvear**, Yachay Tech, Ecuador

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Meeting ID: **876 2316 9635**

Passcode: **945488**

10:00-10:10 AV Check

10:10-10:20 Introduction and Day 5 Opening Remarks

## Online Symposium III: Future Materials for Energy, Environment and Sustainability Materials for Electronics, Optics and Photonics

### Session 1: Featured Presentations (15+5 Mins)

- 10:20-10:40 **Mesh Bias Controlled Synthesis of  $\text{TiO}_2$  and  $\text{Al}_{0.74}\text{Ti}_{0.26}\text{O}_3$  Thin Films by Mist Chemical Vapor Deposition and Applications as Gate Dielectric Layers for Field-effect Transistors**  
**Hajime Shirai**, Saitama University, Japan
- 10:40-11:00 **Electrochemical Growth of Optical Active Noble Metal Nanolayers**  
**Sarmiza-Elena STANCA**, Leibniz Institute of Photonic Technology, Germany
- 11:00-11:20 **Tunable Ferroelectric-to-antiferroelectric Phase Transition by Intercalated Buffer Domain Walls in 2D Bismuth Tellurite**  
**Mengjiao Han**, Songshan Lake Materials Laboratory, China
- 11:20-11:40 **Physics of Atmospheric-pressure Acetylene Radio-frequency Microdischarge: Effects of Dilution Gas and Gas Flow**  
**Shu-Xia Zhao**, Dalian University of Technology, China
- 11:40-12:00 **Recent Advances in Spectrally Selective Coatings for High Temperature Solar Thermal Applications**  
**Harish Barshilia**, CSIR-National Aerospace Laboratories, India
- 12:00-12:20 **Calculation Accuracy Improvement of Magnetic Hysteresis Based on Simplified LLG Equation for Electric Machines**  
**Yoshiki Hane**, Tohoku University, Japan
- 12:20-12:40 **Development of a Radon Adsorption Material Based on Activated Carbon Modified by Potassium Hydroxide**  
**Xiangyuan Deng**, University of South China, China
- 12:40-13:00 **New Perspectives on the Li, Na, and K Electrochemical Storage in Hard Carbon**  
**Alexandros Vasileiadis**, Delft University of Technology, The Netherlands
- 13:00-13:20 **Performance and Opportunities of an Air-to-PCM Heat Exchanger in Buildings**  
**Peter J.W. van den Engel**, Delft University of Technology, The Netherlands

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

- 13:20-13:30 **Understanding the Role of Zn Vacancy Induced by Sulfhydryl Coordination for Photocatalytic  $\text{CO}_2$  Reduction on  $\text{ZnIn}_2\text{S}_4$**   
**Yu Nie**, Tianjin University, China
- 13:30-13:40 **Development of the Alcohol Reduction Method for the Designed Synthesis of Bimetallic Nanomaterials**  
**Masanao Ishijima**, Tokyo Metropolitan University, Japan

- 13:40-13:50 **Structural Properties of Single-walled Carbon Nanotubes Under Extreme Dynamic Pressures**  
**Lei Liu**, Xi'an University of Technology, China
- 13:50-14:00 **Effects of AlN Addition into AISI 316L on Microstructural Evolution During Laser Powder Bed Fusion**  
**Seung-Hoon Lee**, Pohang University of Science and Technology, South Korea
- 14:00-14:10 **The Mechanical and Biological Characterisation of Avian Eggshell Membranes (ESM) and Their Novel Application in Regenerative Medicine**  
**Xiao-Yu Jiang**, University College London, United Kingdom
- 14:10-14:20 **Three-dimensional Graphene TiO<sub>2</sub> Hybrids for Sunlight-driven Dye Removal**  
**Elena Madalina Mihai**, IMT Bucharest, Romania
- 14:20-14:30 **Valorization of *Ravenala madagascariensis* Leaves into Sustainable, High Performance Nanocrystalline Cellulose**  
**Farrah Mathura**, University of the West Indies, Trinidad and Tobago
- 14:30-14:40 **Investigation of the Biochemical Content of Individual Exosomes for Diagnostic and Therapeutic Purposes Using SERS**  
**Jun Liu**, University of California Los Angeles, United States

**14:40-15:10 Break**

15:10-15:30 **Industry Talk: FEA Materials: Aluminum Scandium Master Alloy Production Technology**  
**Tim Grbavac**, FEA Materials, United States

## Session 2: Featured Presentations (15+5 Mins)

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

- 15:30-15:50 **Affordable Measurement of Heat Capacity and Thermal Conductivity of Composites**  
**Imane SALHI**, Chouaib Doukkali University, Morocco
- 15:50-16:10 **Effect of Oxygen Content in Cathodic Copper on the Ductility of Copper Wires**  
**Carlos Camurri Porro**, University of Concepcion, Chile
- 16:10-16:30 **A Study on the Temperature Sensitivity of Nanosensors Based on Single-walled Carbon Nanotubes in Ambient Conditions**  
**Taher Ghomian**, University of Maine, United States
- 16:30-16:50 **Magnetic Anisotropy Reversal Driven by Structural Symmetry-breaking in Monolayer  $\alpha$ -RuCl<sub>3</sub>**  
**Stephen Winter**, Wake Forest University, United States
- 16:50-17:10 **Future Materials for Clean Energy Generating Light Water Reactors**  
**Raul B Rebak**, GE Vernova Research, United States
- 17:10-17:30 **High-temperature Thermal Transport Processes and Materials for Solar-thermal Energy Conversion and Storage**  
**Renkun Chen**, University of California San Diego, United States
- 17:30-17:50 **Synthesis, Characterization, Conformational Switching and Photophysical Properties of BODIPY-Fullerene Resorcin[4]arene Cavitand**  
**Selina X. Yao**, Rivian Automotives, United States
- 17:50-18:10 **Degradation of Colorants in Water by Employing a Fe-based Metallic Glass**  
**John Dairo Henao Penenrey**, CONAHCYT-CIATEQ A.C., Mexico
- 18:10-18:30 **Hydrothermally Synthesized Hierarchical ZnO:Al Nanoscintillator Detector Material for Alpha Monitoring**  
**Murat Kurudirek**, Georgia Institute of Technology, United States

We wish to see you again @

# **FUTURE MATERIALS-2024**

Organising Partner

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