

**THIRD INTERNATIONAL CONFERENCE
ON ELECTRON MICROSCOPY OF
NANOSTRUCTURES**

ELMINA 2024

Serbian Academy of Sciences and Arts, Belgrade, Serbia
September 9th -13th, 2024
<http://www.elmina.rs>

Program

Organized by:
Serbian Academy of Sciences and Arts
and
**Faculty of Technology and Metallurgy, University of
Belgrade**

Endorsed by:
European Microscopy Society

ELMINA2024 Welcome Address

Serbian Academy of Sciences and Arts and the Faculty of Technology and Metallurgy, University of Belgrade, warmly welcome you to the Conference on Electron Microscopy of Nanostructures ELMINA 2024, the 3rd biennial meeting in the great city of Belgrade.

As the capital of Serbia, Belgrade stands as a city rich in history, culture, and scientific heritage. Nestled at the confluence of the Sava and Danube rivers, it has served as a crossroads of civilizations for millennia, from the ancient Celts and Romans to the Ottomans and Austro-Hungarians. Today, Belgrade is a vibrant metropolis that harmoniously blends its storied past with a dynamic present, making it an ideal setting for our scientific gathering.

As we convene in this remarkable city, we are reminded of Belgrade's long-standing tradition of intellectual pursuit and innovation. University of Belgrade has been at the forefront of scientific progress, contributing significantly to various fields including physics, medicine, and engineering. The spirit of inquiry and discovery that permeates Belgrade's academic community mirrors our own commitment to advancing knowledge and fostering collaboration.

Our gathering in Belgrade is not just an opportunity to share research and ideas; it is also a chance to draw inspiration from the city's unique environment. The blend of historic landmarks such as the Belgrade Fortress and the modern architectural marvels like the Ada Bridge symbolizes the fusion of tradition and innovation that is at the heart of scientific progress.

Furthermore, the hospitality and warmth of the Serbian people, renowned for their generosity and conviviality, provide a welcoming atmosphere for fruitful discussions. The city's rich cultural tapestry, evident in its music, cuisine, and arts, offers a vibrant backdrop that will undoubtedly enrich our experience and stimulate creative thinking.

As we embark on this journey of exploration and exchange in Belgrade, let us embrace the opportunity to not only advance our scientific endeavors but also to immerse ourselves in the cultural and historical richness of this extraordinary city.

ELMINA2024 conference features platform and poster presentations, and opportunities to connect with old friends and colleagues and expand your network. It continues to be the premier small conference for scientists and students who use electron microscopy in their research and a strictly in-person meeting, as we are convinced that nothing can substitute this kind of scientific exchange. The program committee has developed a program spanning advances in instrumentation and technique development, as well as applications in the analytical, biological, and physical sciences. Building on the success of previous two ELMINA conferences, the program also contains interdisciplinary presentations as well as the introduction of artificial intelligence in the field of electron microscopy. It will feature outstanding plenary speakers, graduate and post-doctoral students, and, of course, a range of social events to enhance Belgrade experience. As with previous two ELMINA conferences,

this year's gathering will be the premier place to attend for staying abreast with the latest technologies, hear about new developments in applications across all areas of electron microscopy and microanalysis, and most importantly spend time with colleagues.

Our gathering takes place in the esteemed Solemn Hall of the Serbian Academy of Sciences and Arts, a venue that epitomizes the nation's dedication to intellectual excellence and the pursuit of scientific and cultural achievements. Welcome to Belgrade, a city where the past and the future converge, and where the spirit of scientific inquiry thrives. May our time here be productive, inspiring, and memorable.

ORGANIZERS AND GENERAL INFORMATION

SERBIAN ACADEMY OF SCIENCES AND ARTS

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Velimir R. Radmilović

Conference Manager

Vuk V. Radmilović

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DATE AND VENUE: The conference will be held September 9th-13th, 2024 at the Serbian Academy of Sciences and Arts, Knez Mihailova 35, 11000 Belgrade, Serbia, beginning at 8:30 AM on September 9th, in the Solemn hall.

REGISTRATION: At the registration desk, located next to the entrance to the Solemn hall. Registration desk working hours are: Monday, September 9th, from 8:00h to 13:00h, Tuesday, September 10th, from 08:30h to 14:00h, Wednesday, September 11th, from 08:30h to 14:00h, and Thursday, September 12th, from 08:30h to 14:00h. Registration can also be done at the welcome party on Sunday, September 8th at the party venue. Registered participants will receive a nametag and the conference program, while the book of abstract will be available online at www.elmina.rs.

INSTRUCTIONS FOR AUTHORS: The conference will feature plenary sessions, oral sessions and poster sessions as well as vendor presentations during lunch breaks. Presentations during plenary sessions will last 30 minutes each while oral presentations will last 15 minutes, including discussion. Standard and hands-free microphones will be on site. No A-V equipment will be provided for any poster presentations. Poster presenters must remain at their poster during their allocated poster session. Each poster will be allocated a 130 cm high and 100 cm wide (130X100) display area.

CONFERENCE AWARDS: Poster presentations will be reviewed according to the following criteria: (a) relevance to a specific symposium, (b) scientific content, quality and innovative proposals, (c) clarity of the text, and (d) compliance with the format. During the conference, the best three (3) posters, selected by a poster award committee, will receive awards.

ELMINA2024 Conference Program

September 9th – 13th, Belgrade, Serbia

Sunday, September 8th, Mama Shelter Rooftop	
18:30- 20:30	Welcome Reception for Conference Participants
Monday, September 9th, Solemn Hall	
8:30- 9:00	Opening Ceremony * Velimir Radmilović, Conference Chair * Robert Sinclair, Chair of ELMINA International Advisory Board * Zoran Knežević, President of Serbian Academy of Sciences and Arts
9:00- 10:30	Plenary Session 1 Chair: <i>Eva Olsson & Sarah Haigh</i>
9:00- 9:30	Eric Stach: <i>"Characterization of the Solid Electrolyte Interphase with Cryogenic Ion and Electron Microscopy"</i>
9:30- 10:00	Jordi Arbiol: <i>"Quantum Nanostructures at Atomic Scale: From Vertical Hybrid Nanowires to Planar Nanowire Networks and 2DEG/2DHG Systems"</i>
10:00- 10:30	Sarah Haigh: <i>"Dynamic Behavior of Single Atom and Nanoparticle Catalysts Revealed by In Situ Electron Microscopy"</i>
10:30- 11:00	Coffee Break, SASA Club
11:00- 12:30	Plenary Session 2 Chair: <i>Eric Stach & Jordi Arbiol</i>
11:00- 11:30	Eva Olsson: <i>"In situ Electron Microscopy of 2D Materials for Site-specific Correlation Between Atomic Structure and Properties"</i>

11:30-12:00	Rolf Erni: <i>"In-situ STEM Studies of Catalytic Nanoparticles and Battery Materials"</i>
12:00-12:30	Kazu Suenaga: <i>"Electron Microscopy and Spectroscopy of 2D Hybrid Nano-structures "</i>
12:30-13:00	Oral Session 1 Chair: <i>Rolf Erni</i>
12:30-12:45	Polina Lavrik: <i>"Investigating the Nano-Scale Chemistry of Manganese During NOx Selective Catalytic Reduction with NH3 via In-Situ Electron Energy Loss Spectroscopy"</i>
12:45-13:00	Gareth Tainton: <i>"Nanoscale Disorder and Deintercalation Evolution in K-doped MoS2 Via In Situ TEM"</i>
13:00-15:30	Lunch Break
15:30-16:30	Plenary Session 3 Chair: <i>Hamish Fraser</i>
15:30-16:00	Rafal Dunin-Borkowski: <i>"Electron Wavefront Shaping and Measurement in the Transmission Electron Microscope"</i>
16:00-16:30	Florian Banhart: <i>"Ultrafast Transmission Electron Microscopy: Materials Under Laser Pulses"</i>
16:30-18:00	Poster Session 1, SASA Club
Tuesday, September 10th, Solemn Hall	
9:00-10:30	Plenary Session 4 Chair: <i>Sandra Van Aert & Lewys Jones</i>

9:00-9:30	Robert Sinclair: <i>"Twisted Epitaxy of Gold Nanodiscs Annealed Within Twisted Molybdenum Disulphide Bilayers"</i>
9:30-10:00	Yuichi Ikuhara: <i>"Atomic-level Dynamics of Interfaces and Dislocations in Oxides"</i>
10:00-10:30	Andrew Minor: <i>"Imaging of Short Range Order with Electron Microscopy: From High Performance Alloys to Semiconductor Thin Films"</i>
10:30-11:00	Coffee Break, SASA Club
11:00-12:00	Plenary Session 5 Chair: <i>Andrew Minor</i>
11:00-11:30	Lewys Jones: <i>"Lens Designs and Scanning Strategies for the (S)TEM"</i>
11:30-12:00	Sandra Van Aert: <i>"3D Atomic Structures of Nanoparticles Estimated from Single Projection STEM Data"</i>
12:00-13:15	Oral Session 2 Chair: <i>Rostislav Kralik & Gabriel Sanchez-Santolino</i>
12:00-12:15	Gabriel Sanchez-Santolino: <i>"Revealing Topological Polar Structures in Freestanding Ferroelectric Membranes by Scanning Transmission Electron Microscopy"</i>
12:15-12:30	Rostislav Kralik: <i>"Phase Transformations in Rapidly Solidified Al-Cu-Li-Mg-Zr-based alloys Studied by In-situ (S)TEM"</i>
12:30-12:45	Lukas Schretter: <i>"Extending 4D-STEM based Strain Mapping to Polycrystalline Materials"</i>
12:45-13:00	Vasily Lebedev: <i>"Chemical Solution Processed PbZrO₃ Thin Films: High Resolution (S)TEM Analysis of the Archetypal Antiferroelectric"</i>
13:00-13:30	Vendor Presentation

	Thermo Fisher Scientific (Reza Zamani): <i>"Tackling the Challenges of Novel Materials Analysis: Recent Conceptual and Technological Advances in Transmission Electron Microscopy"</i>
13:30-13:45	Vendor Presentation DENS Solutions (Luca Carnevale): <i>"Advanced MEMS-Based In Situ Systems: Introducing Our Cutting-Edge Cooling-Heating-Biasing Solutions and Environmental Systems for Cross-Platform Research"</i>
18:30-21:30	Plenary Speaker Dinner
Wednesday, September 11th, Solemn Hall	
09:00-10:30	Plenary Session 6 Chair: <i>Peter Denes & Quentin Ramasse</i>
9:00-9:30	Wah Chiu: <i>"CryoEM of Macromolecules in their Native States"</i>
9:30-10:00	Thomas Burg: <i>"Microsystems for Cryomicroscopy"</i>
10:00-10:30	Moritz Helmstaedter: <i>"Cerebral Cortex Connectomics"</i>
10:30-11:00	Coffee Break, SASA Club
11:30-13:00	Plenary Session 7 Chair: <i>Robert Sinclair & Wah Chiu</i>
11:30-13:00	Quentin Ramasse: <i>"Beyond Vibrational Spectroscopy: Hunting the Signature of Elusive Quasiparticles with Monochromated STEM-EELS"</i>
11:30-12:00	Peter Denes: <i>"Recent Developments in Direct Electron Detectors"</i>

12:00-12:30	Gerald Kothleitner: <i>"Exploring Contemporary Materials through Multi-modal STEM Techniques"</i>
12:30-13:00	Oral Session 3 Chair: <i>Gerald Kothleitner</i>
12:30-12:45	Roberto dos Reis: <i>"Enhancing Strain Analysis in 4D-STEM Datasets Using Physics-Informed Neural Networks"</i>
12:45-13:00	Jasna Janković: <i>"Advanced 2D and 3D Electron Microscopy and Spectroscopy in Clean Energy Electrochemical Systems: Correlating Microstructural Parameters to Performance and Degradation"</i>
13:00-13:15	Group Photo, Solemn Hall
13:15-15:30	Lunch Break
13:15-13:30	Vendor Presentation vitroTEM (Hans Radhoe): <i>"Streamlining Graphene Liquid Cell Preparation: VitroTEM's Naiad System"</i>
13:30-13:45	Vendor Presentation TESCAN (Martin Suchanek): <i>"Enabling Fast and Intuitive Characterization of Materials by Advanced Methods of Precession-Assisted Electron Diffraction"</i>
13:45-14:00	Vendor Presentation JEOL (Nicolas Ravier): <i>"JEOL/IDES Products: Cutting Edge Products for Time Resolved Microscopy"</i>
15:30-17:00	Poster Session 2, SASA Club
17:30	Belgrade Walking Tour

	Thursday, September 12th, Solemn Hall
09:00-10:30	Plenary Session 8 Chair: <i>Gerhard Dehm & Yuichi Ikuhara</i>
09:00-09:30	Randi Holmestad: <i>"Advanced Electron Microscopy – SPED and HAADF-STEM – of Age Hardenable Aluminium Alloys"</i>
09:30-10:00	Jian-Min Zuo: <i>"Advanced Electron Microscopy for High-Entropy Alloys Research, from Atomic Resolution to 4D-STEM"</i>
10:00-10:30	Gerhard Dehm: <i>"Microstructure Evolution of CoCrFeNi Produced by Laser Powder Bed fusion: From Powder to Particle-reinforced Alloys"</i>
10:30-11:00	Coffee Break, SASA Club
11:00-13:30	Oral Session 4 Chair: <i>Ivan Lazić & Marko Spasenović</i>
11:00-11:15	Matthew Lindley: <i>"Tuning the Size of Supported Co Nanoparticle Catalysts with Mn Additions"</i>
11:15-11:30	Lazar Bijelić: <i>"Probing the Charge Density Distribution at Nanocatalyst-Support Interfaces by 4D STEM"</i>
11:30-11:45	Ivan Lazić: <i>"Fast STEM Imaging with Central Symmetrical Electron Detection for Beam Sensitive Materials and Thick Samples"</i>
11:45-12:00	Deepak Kumar Dinkar: <i>" Investigating MOCVD Monolayer Graphene Based Heterostructures under TEM"</i>
12:00-12:15	Marko Spasenović: <i>"Fabrication and Characterization of Laser-Induced Graphene on Cross-Linked Polymer Substrates for Monitoring Physiological Parameters"</i>
12:15-12:30	Leon Ploszczanski: <i>"Mechanical and Ultra-structural Investigations of Spider Silks or Why are Schwann Cells Like Spider Silk?"</i>

12:30-12:45	Milica Labudović-Borović: <i>"Transmission Electron Microscopy as a Part of Protocols in the Diagnostic Assessment of Intestinal Myopathies and Liver Diseases in Pediatric Gastroenterohepatology"</i>
12:45-13:00	Miloš Velojić: <i>"The Use of Scanning Electron Microscopy for In-situ Identification of Gold and Palladium Minerals from Čukaru Peki Deposit, Eastern Serbia"</i>
13:00-15:30	Lunch Break
15:30-17:00	Poster Session 3, SASA Club
Friday, September 13th, Solemn Hall	
09:00-10:30	Plenary Session 9 Chair: <i>Velimir Radmilović</i>
09:00-09:30	Hamish Fraser: <i>"Coupled Characterization and Modeling Aimed at Understanding Deformation Mechanisms and Ductility in Compositionally Complex Alloys"</i>
09:30-10:00	Joachim Mayer: <i>"The TOMO Project – Integrating a Fully Functional Atom Probe in an Aberration-Corrected TEM"</i>
10:00-10:30	Wouter Van Den Broek: <i>"Reducing User-interaction and Improving Precision in Model-Based EELS through Fine Structure Fitting with Linear Equality Constraints"</i>
10:30-11:00	Awards & Closing Ceremony
11:00	Farewell Cocktail, SASA Club

POSTER SESSION 1

Monday, September 9th, 16:30-18:00h

• **PO1.1**

Non-contact Temperature Measurement Using Fluorescent Microparticles for In situ Monitoring in Cryomicroscopy

Alexander H.N. Betz

• **PO1.2**

Cryo-iCLEM: A Workflow for Cryoimmersion Correlative Light and Electron Microscopy

Niko Faul

• **PO1.3**

Automation in Four-Dimensional Scanning Transmission Electron Microscopy

Vincenz-Maria Steiner

• **PO1.4**

Structural Study of High-strength Al Alloy Using Nanomill

Sandra Drev

• **PO1.5**

Streamlining Scanning Electron Microscopy (SEM) Sample Preparation Protocols for Analyzing the Mechanisms of Heavy Metal Bioremediation by Microalgae

Jelena Danilović Luković

• **PO1.6**

Comprehensive Analysis of Size and Morphology of Immunocomplexes isolated from Patients with Rheumatoid Arthritis Using Scanning Electron Microscopy, Atomic Force Microscopy and Dynamic Light Scattering

Tamara Djukić

• **PO1.7**

Optimization of Synthesis Parameters for Obtaining Multi-ion-doped Mesoporous Bioactive Glass Particles

Teodora Jakovljevic

• **PO1.8**

Ultrastructure Analysis of Erythrocytes in Early Stage Parkinson's Patients by Scanning Electron Microscopy

Mortaş Tülay

• **PO1.9**

Visualization of Extracellular Vesicles Derived from Dental Mesenchymal Stem/Stromal Cells Using SEM and Immunogold TEM Analyses

Marija Milivojević

• **PO1.10**

Insulin and Glucagon Colocalization in Rat Langerhans Islets: Hormone Detection by Immunogold Method

Marija Ilić

• **PO1.11**

Transmission Electron Microscopy of Crude Hemolysate of Rat Erythrocytes as a Basis for Fast Protein Content Screening

Aleksandra Korać

• **PO1.12**

Eveslogite Structure by 3D ED and Other TEM Techniques

Mariana Klementova

• **PO1.13**

Fast 4D STEM with ARINA Hybrid-Pixel Detector

Daniel Stroppa

• **PO1.14**

Streamlining Graphene Liquid Cell Preparation: VitroTEM's Naiad System

Sina Sadighikia

• **PO1.15**

Advanced MEMS-Based *In Situ* Systems: Introducing Our Cutting-Edge Cooling-Heating-Biasing Solutions and Environmental Systems for Cross-Platform Research

Luca Carnevale

POSTER SESSION 2

Wednesday, September 11th, 15:30-17:00h

• **PO2.1**

Enhancing the Understanding of Gold Nanoparticle Formation in Ionic Liquids through Variable Temperature In Situ Liquid Phase Scanning Transmission Electron Microscopy

Rachele Butti

• **PO2.2**

Quantitative Low-Voltage EDS and WDS Electron-Probe Microanalysis of the Perovskite PMNT Ceramic Thin Films

Zoran Samardžija

• **PO2.3**

Interface Engineering in Perovskite Solar Cells: The Role of Halogen Bonding

Jovan Lukić

• **PO2.4**

Influence of (Poly)ionic Liquid Additives on Electronic Structure, Optical Properties and Morphology of FAPbI₃ Perovskite Thin Films for High Performance Solar Cells

Vladimir Rajić

• **PO2.5**

Atomic-resolution investigation of 2D hematene

Jana Dzibelová

• **PO2.6**

The Influence of the Synthesis Route On the Morphology and Structure of Gd-doped SnO₂ for Gas Sensing Applications

Catalina G. Mihalcea

• **PO2.7**

Cellulose-Based Nanocomposite Materials: Synthesis, Characterization and Sensing Performance

Domagoj Belić

• **PO2.8**

Morphological Characterization of Green Synthesized ZnO Nanoparticles using *Citrus reticulata* Blanco Peel or Extract

Milena P. Dojcinović

• **PO2.9**

Comparison of Two Different Synthesis Pathways and Their Influence on the Morphological Characteristics of ZnO Nanostructures

Zorica Novaković

• **PO2.10**

The Influence of Ion Beam Irradiation on Nanoscale Properties of Graphene Oxide-Based Nanocomposites

Željko Mravik

• **PO2.11**

Laser-Induced Graphene on Novel Polyurethane Networks for Wearable Sensors

Teodora Vićentić

• **PO2.12**

Laser-induced Graphene Transfer on Cross-linked Polyurethanes

Vanja Vojnović

• **PO2.13**

Poly(dimethylsiloxane)/Poly(ethylene glycol) Composite as an Elastomeric Substrate for Laser-Induced Graphene

Andela Gavran

• **PO2.14**

Morphology of the Polyurethane Networks Based on Polycaprolactone

Ivan S. Stefanović

• **PO2.15**

Flexible Polyurethane/Ferrite Nanocomposites for Biomedical Applications: Properties, Biocompatibility and Antioxidative Activity

Marija V. Pergal

• **PO2.16**

Characterization of MXene-Reinforced Polyurethane Nanocomposites

Ivan Pešić

POSTER SESSION 3

Thursday, September 12th, 15:30-17:00h

PO3.1

Pt and Ir Nanoparticles Supported by Graphene Nanoplatelets as Advanced Catalysts for Hydrogen Evolution Reaction

Lazar Rakočević

• **PO3.2**

Optimization of RuIr-Based Nanocatalyst for Superior Hydrogen Evolution Reaction Performance

Aleksandra Popović

• **PO3.3**

In situ TEM Investigation of NMC/LLTO/LTO Thin Film Solid State Battery

Gregor Kapun

• **PO3.4**

S/TEM Studies of Interfacial Phenomena in Thin Film All-Solid-State Batteries

Vittorio Montanelli

• **PO3.5**

***Ex Situ* Transmission Electron Microscopy Observation of Electrochemical Li-ion Intercalation into TiO₂ Nanotubes**

Nemanja Latas

• **PO3.6**

Enhancing Supercapacitor Performance: Adenine-Derived Nitrogen-Doped Carbon Nanofibers for Aqueous Energy Storage Systems

Daniel M. Mijailović

• **PO3.7**

Electrical Stability of Silver Nanowire/Zinc Oxide Transparent Electrodes

Jovan Lukić

• **PO3.8**

The Structural and Microstructural Properties of Indium Doped Barium Stannate Ceramics

Jelena Mitrović

• **PO2.9**

Transmission Electron Microscopy Structural Characterization of Nb, Fe Doped Epitaxial Pb(Zr_{0.2}Ti_{0.8})O₃ Thin Films

Cristian Radu

• **PO3.10**

Biocompatible Up-converting Yb/Er Doped Ln-fluoride Mesocrystals for Cell Labeling

Ivana Dinić

• **PO3.11**

Resulting Changes in Structural and Optical Properties After Bi³⁺ Co-doping of SrGd₂O₄:Ho,Yb Nanoparticles

Tijana Stamenković

• **PO3.12**

Structural and Photo(Electro)-Catalytic Properties of ZnO/RuO₂ Composites depending on ZnO to RuO₂ Mass Ratio

Smilja Marković

• **PO3.13**

Exploring the Impact of Oxygen Functional Groups on Copper Nanoparticles Deposition on Graphitic Carbon Nitride for Enhanced Photocatalytic Reduction of Cr(VI)

Jana Petrović

• **PO2.14**

Investigating the Possibility to Anchor Copper Single Atoms on Graphitic Carbon Nitride via Ion Adsorption and Subsequent Chemical or Thermal Reduction

Sofija Petković

ACKNOWLEDGEMENTS

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