

XIX International Conference on Surfaces, Materials and Vacuum



International Conference

on Surfaces, Materials and Vacuum

MÉRIDA • YUCATÁN • MÉXICO

September 21-25, 2026

Monday, September 21, 2026 - Friday, September 25, 2026

Merida, México

Scientific Program

Advanced and Quantitative Materials Characterization

The Symposium on Advanced and Quantitative Materials Characterization offers an interdisciplinary platform focused on developing and applying cutting-edge experimental techniques for materials research.

Modern materials science demands not only innovative synthesis and design but also rigorous, quantitative, and reproducible characterization strategies. This symposium highlights multi-scale and multimodal approaches, uncertainty quantification, statistical validation, and the integration of artificial intelligence for advanced materials analysis. The symposium functions as a transversal methodological pillar within the conference, supporting diverse materials domains through high-precision experimental validation and intelligent data interpretation.

Graduate students, early-career researchers, and senior scientists are highly encouraged to participate.

Biomaterials and Polymers

The XIX International Conference on Surface Materials and Vacuum takes immense pleasure & feel honored in inviting the contributors across the globe to attend in the symposium on Biomaterials and Polymers during September 21-September 25th, 2026 at Merida, Mexico.

Conference will be organized on themes related with: 'Emerging Technologies and Scientific Advancements in polymers and Biomaterials Engineering.

The scientific event offers a best platform with its well organized scientific program to the audience which includes interactive panel discussions, plenary talks, short presentations, short courses, invited sessions and poster sessions.

Topics of Interest

Polymer science

Engineering and technologies from the latest innovations in synthesis

Processing and modeling to the advanced applications of polymers in health

Advanced Biomaterials

Biomaterials and Nanotechnology Applications in Biomedicine

Use in Therapeutic and Investigative Delivery

Biomaterials in Biological Engineering

Biodegradable Biomaterials

Utility Based Biomaterials

Energy and sustainability

Future materials and devices

Atomic-Scale Processing, Plasma, and Vacuum

Vacuum science and plasma based technologies have historically been at the core of surface science and thin film growth. Controlled vacuum environments enable precise manipulation of matter, while plasmas and energetic species provide highly reactive and non-equilibrium conditions that drive atomic scale processing, advanced materials synthesis and surface modification.

Modern materials research increasingly demands atomic level precision, controlled energy delivery and engineered interfaces. Techniques such as Pulsed Laser Deposition (PLD), Atomic Layer Deposition (ALD), plasma-enhanced processes and other vapor phase methods rely on vacuum and reactive environments to achieve control over thickness, stoichiometry, microstructure and functional properties. These approaches span equilibrium and non-equilibrium growth regimes, enabling the fabrication of complex thin films, heterostructures, functional surfaces and nanoparticles.

This symposium aims to provide a forum for discussion of current research and technological developments in vacuum and plasma based materials processing, from fundamental principles to advanced technological applications.

Fundamentals of vacuum science and plasma physics
Pulsed Laser Deposition and laser–matter interactions
Atomic Layer Deposition and sequential surface chemistry
Plasma-enhanced and plasma-assisted growth techniques
Vapor phase deposition methods (PVD, CVD and related processes)
Growth mechanisms, nucleation and kinetic control
Atomic scale, ultra thin film and nanoparticles engineering
Plasma-surface interactions and energetic species dynamics
Surface functionalization, interface control and nanoparticles synthesis
In situ diagnostics and process monitoring under vacuum
Modeling and simulation of vacuum and plasma based processes
Emerging applications in advanced materials and devices

Luminescence Phenomena: Materials and Applications

This symposium centers on the science and technology of luminescence, in its broader sense, including photo-, thermo-, electro- and mechano-luminescence. The aim is to gather international experts as well as students to discuss the recent progresses in this highly inter- and multi-disciplinary area, with particular attention to the synthesis characterization, and applications of materials exhibiting advanced luminescence properties.

The scope of the conference will cover the following areas:

Photoluminescence
Cathodoluminescence
Ionoluminescence
Bioluminescence
Thermoluminescence
Electroluminescence
Mechano-, Sono- and Chemi-Luminescence
Theoretical aspects of luminescence
Nanophosphors: Physics and materials
Crystalline, amorphous and glass-ceramic materials
Polymeric and hybrid materials

Novel Synthesis
Materials Characterization
Quantum cutting and up-conversion
Combination of luminescent and plasmonic effects
Light emitting devices
Displays
Solar cells

Microelectronics and MEMS

The Internet of Things (IoT) exemplifies how silicon-based technologies are transforming the world for human benefit. Through remote monitoring and control via internet-connected sensors, these advancements underscore the growing influence of microelectronics and microsystems in our daily lives. At the heart of this technological shift are semiconductors and microelectromechanical systems (MEMS), which serve as critical enablers across sectors such as health, automotive, and consumer electronics. In this context, the mission of the Microelectronics and MEMS Symposium is to bring together scientists, technologists, and industry stakeholders interested in the design, simulation, modeling, fabrication, assembly, testing and packaging of micro- and nano-scale devices and circuits. The symposium will highlight advances in integrated circuits (ICs), Microelectronics Technology, Materials Science for Micro and Nanoelectromechanical Systems (MEMS/NEMS), and strategies for MEMS/NEMS packaging and integration. These developments are essential to support innovation in critical application areas, including flexible electronics, sensors, and IoT devices.

The Microelectronics and MEMS Symposium is focused on the integration of materials, processes, and design methodologies for the development of MEMS/NEMS devices and microelectronic systems. The symposium aims to promote innovation, interdisciplinary collaboration, and the creation of accessible technology platforms to support research, education, and technological sovereignty in emerging semiconductor regions.

Internet of Things (IoT) and Smart Systems Integration
Design, Characterization, and Modeling of Integrated Circuits (ICs)
CMOS and Thin-Film Technologies for Prototyping and Flexible Electronics
Amorphous Materials and Compound Semiconductors
Circuit-Sensor/Actuator Co-Design and Integration
Microsystems Design: MEMS and NEMS
Bulk and Surface Micromachining Techniques
RF CMOS-MEMS and Wireless Microsystems
Integrated Photonics and Optical Microsystems
BioMEMS, Lab-on-a-Chip, and Point-of-Care Devices
Aerospace and Defense Applications
Chemical and Environmental Sensing
Automotive and Industrial Applications
Semiconductor Ecosystems: MPW Access, Prototyping, and Technology Transfer
Education and Workforce Development for IC and MEMS Design

Nanostructures

We take pleasure to invite you to participate in the Nanostructures symposium of the XIX International Conference on Surfaces, Materials and Vacuum. Participants interested in presenting

an oral or poster contribution are invited to submit an abstract.

The symposium scientific program will cover a wide spectrum of topics including physical phenomena, materials sciences, and applications of nanostructures. The diversity of topics provides an opportunity to broaden the knowledge on latest developments and future perspectives in nanostructures research. Current development in the nanostructured materials includes:

Synthesis, functionalization, processing and self-assembly of nanoparticles,
Nanotubes, nanowires, quantum dots and other low dimensional structures,
Bio-active nanomaterials and nanostructured materials for bio-medical applications,
Carbon nanostructured materials, Nano-structured membranes, nano-porous materials, functional coatings,
Nanomaterials for photo-catalysis, solar hydrogen and thermoelectric,
Nano-fabrication, characterization and manipulation techniques for nanostructures,
Magnetic and nano-semiconductor materials,
Industrial development and application of nanomaterials and
Theoretical studies of nanostructured materials.

Renewable Energy: Materials and Devices

The symposium Renewable Energy: Materials and Devices, has the aim to provide a forum to present and discuss the research relating to the science and technology of energy generation, storage, and managements. An important theme is the research concerning to first generation solar cells, based on mono and poly-crystalline silicon; second generation cells, including CdTe, CIGS, CZTS, amorphous silicon, micro-crystalline and polymorphous silicon; third generation cells, based on the use of quantum dots, nanowires, carbon nanotubes, photo-electrochemical cells, polymer solar cells, nano-crystalline cells, dye-sensitized cells, perovskite solar cells, etc.

Semiconductors

Research on semiconductors has been an extremely important research field for most of the past century and will continue to have a central role worldwide during the twenty first century. Current technology would not exist if silicon-based electronics had not been developed. This impressive progress has been extended to other semiconductors such as gallium arsenide, group-three nitrides and related materials. The pace at which technology advances is a direct consequence of the research efforts in growth, characterization, control of properties, development of novel devices, performance improvement, new materials such as alloys and solid solutions, theoretical approaches to predict and understand semiconductor properties, and so on. The Mexican Society for Science and Technology of Surfaces and Materials (SMCTSM) has had, since its beginnings, an important tradition among its members in pursuing research in the important field of semiconductors. This Symposium has been an important forum, for many years, for the generation, discussion and exchange of ideas where stimulating and fruitful collaborations has arisen among the participants.

Tribology, Surfaces and Interfaces

Various scientific initiatives focus on examining how surfaces interact within each other and their environment and how these interactions influence their functionalities. Some properties such as adhesion, hardness, surface energy and electrical conductivity are influenced by the contact parameters between two surfaces and the surrounding environment. Tribology is the discipline concerned with analyzing the friction and wear characteristics of surfaces that interact and move relative to each other. Wear, friction, and Lubrication are the main phenomena in tribological operations, and they are commonly studied to increase the efficiency, durability, and lifespan of components in mechanical systems.

Tribological phenomena—such as wear, friction, and lubrication—occur in a wide range of both biological and technological contexts. In the human body, these processes are evident during everyday activities like walking, where the surfaces of joints interact; while watching, as eyelids move across the eye's surface; and during chewing, which involves the movement of teeth and jaw surfaces against each other.

Beyond biological systems, tribological effects are also observed in mechanical and engineering applications. For instance, the rolling of wheels involves surface interactions that affect efficiency and durability. Similarly, the deployment of communications antennas relies on the movement and contact of surfaces to ensure proper function. In aerospace, tribological phenomena play a critical role during the landing operations of spacecraft, where the surfaces involved must withstand significant friction and wear to ensure safe and reliable performance.

This Symposium aims to cover the most relevant aspects of sciences that study, modify and apply the contact phenomena between two surfaces and their relationship with their work environment, focusing on some areas as for example:

Wear, friction and lubrication studies of surfaces and bulk materials.

Wear, friction and lubrication studies of coatings and thin films.

Lubrication: solid, grease, liquid, and additives.

Modeling of tribological phenomena.

Industrial applications of tribology, surfaces and interphases.

Novel techniques to study wear, friction and lubrication.

Surface energy: studies and applications.

Adhesion, fatigue, contact and interphase phenomena

Computational and Theoretical Design of Materials and Interfaces

The aim of this symposium is to bring together experts in the field of surfaces and interfaces to discuss recent developments in electronic and transport properties of bulk materials, surfaces, optical properties, physical properties of clusters, and 2D materials, Density Functional Theory and Time Dependent DFT.

Thin Films

The purpose of this symposium is to provide an international forum for discussion and exchange of ideas on the up-to-date research and developments of processing and characterization of advanced thin films. The physical properties of thin films are critically dependent on the deposition conditions and post-treatment details therefore discern the correlations between the experimental

conditions and film properties are of great interest for the field. The participants from various universities, industries and research laboratories are welcome to submit contributions for both oral and posters presentations to discuss recent advances, developments, field applications, and future challenges for the thin film technologies. The topics include, but are not limited to, every kind of thin films used in:

Energy applications

Protective coatings

Memory storage

Optoelectronic devices

Sensors and actuators

Biomedical applications.

Science Outreach

Una labor completa en investigación científica se cumple cuando se complementa con actividades de divulgación de la ciencia. La divulgación de la ciencia tiene como finalidad proporcionar un panorama general a toda la sociedad sobre los diferentes desarrollos científicos y tecnológicos que se realizan en el país. Para los investigadores, es una herramienta útil para promover sus investigaciones y alentar, principalmente a los jóvenes, a interesarse por el quehacer científico. A partir del 2005, la SMCTSM se propuso fomentar estas actividades a través del Simposio de Divulgación de la Ciencia y Tecnología que -cada año- tiene lugar dentro del marco del Congreso anual de esta sociedad científica.

Simposio Dr. Machorro

Simposio Dr. Muhl