



2022 MRS Spring Meeting & Exhibit share events with Japan, South Korea, and Singapore

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In an effort to share and discuss research across the Pacific Rim, provide networking opportunities across communities, and grow a higher level of support and awareness for materials research and innovation, the Materials Research Society (MRS) is planning several collaborative events with sister societies at the 2022 MRS Spring Meeting & Exhibit. This year's Spring Meeting—a hybrid event—is being held in Honolulu, Hawai'i on May 8–13, 2022 and as a virtual experience on May 23–25, 2022.

Meeting Chairs **Manish Chhowalla** (University of Cambridge), **Eunjoo Jang** (Samsung Electronics), **Prineha Narang** (Harvard University), **Tsuyoshi Sekitani** (Osaka University), and **Vanessa Wood** (ETH Zürich) offer a program with nine topical clusters, including joint symposia—and other events—with scientific societies from Japan, South Korea, and Singapore.

Technical sessions

The 71 symposia are grouped into nine topical clusters. The **Characterization** cluster features three symposia related to developing *in situ* methods for materials design, ultrafast probes for emergent materials, and development of *operando* techniques in transmission electron microscopy (TEM) for studying dynamic processes in materials. The symposium on *in situ* and *operando* methods is held jointly with MRS-Singapore.

The cluster on **Materials Theory, Computation and Data** features four symposia that will cover machine

learning for materials modeling and development, innovative simulations and modeling concepts for advanced manufactured materials, computational approaches for addressing challenges in phonon modeling in complex materials, and recent advances in data-driven discovery in energy storage and conversion.

The cluster on **Energy and Sustainability** includes seven symposia on topics such as silicon and organic photovoltaics, III–V materials for energy conversion, emerging inorganic materials for solar energy and fuels (held jointly with MRS-Singapore), next generation organic photovoltaics (held jointly with The Polymer Society of Korea), electrochemical energy storage devices, solid-state batteries, and sustainable polymers by green chemistry. The symposia will in particular cover fundamental materials science related to interfaces in energy devices and degradation mechanisms as well as novel applications.

Featuring 11 symposia, the cluster on **Electronics, Optics and Photonics** covers a variety of areas in electronics, optics, and photonics. These include symposia focusing on fundamentals and advances in electronic, optic, and photonic materials such as organic semiconductors, hybrid perovskites, quantum dots, low-dimensional materials, opto-magnetic materials, and ultrawide bandgap materials. Also included are symposia on neuromorphic hybrid systems, meta-surfaces, deformable displays, surfaces/interfaces, and functional defects. This cluster includes symposia held jointly with The Japan

Society of Applied Physics, The Polymer Society of Korea, MRS-Korea, and MRS-Singapore.

The cluster on **Manufacturing** consists of three symposia covering the latest manufacturing and processing technologies. The symposia in this cluster will focus on the fundamentals and application of advanced plasma processing technologies that will contribute to the United Nations' sustainable development goals (held jointly with The Japan Society of Applied Physics), three-dimensional (3D) printing technologies enabling the formation of complex structures, and processing technologies enabling flexible and large-area electronics. A highlight is a strategy to integrate multiple functional materials and functional layer structures into a single high-performance material system through innovative manufacturing schemes focusing on a precise surface/interface control approach, a multi-material approach, and a 3D modeling approach. In particular, emphasis will be placed on the development of sustainable systems and processes, including a green chemistry approach and environmental-related technologies, such as carbon neutrality, which is currently attracting worldwide attention.

Six symposia in the cluster on **Nanomaterials** are dedicated to low-dimensional nanoscale materials including MXenes, nanotubes, nanodiamonds, and graphenes, and their various applications. The symposia cover topics ranging from their synthesis, basic properties, and device performances, including structure–property



relationships formulated through integrated and iterative experimentation, advanced characterization, and theory and simulations.

The 11 symposia within the cluster on **Quantum Materials** cover a broad range of topics, from topological materials and structures to group IV quantum engineering to superconducting materials and applications.

The cluster on **Biomaterials and Soft Materials** consists of 10 symposia, focusing on soft biomaterials and multifunctional materials as well as devices and systems realized using these materials. The focus will be on soft and highly functional materials used in regenerative therapy, medical devices, drug delivery control systems, and healthcare technologies as well as organic electronics and materials systems realized by highly integrating these functional materials. Focus areas include advanced soft robotics achieved by integrating flexible sensors and actuators, high-performance biomimetics that can mimic biological activities, interfaces and nanotheranostics for direct interaction with living cells and microbial tissues, and energy sources enabling autonomous activities. These comprehensive symposia will serve as a bridge among different fields from applied fields related to medical care, nursing care, and health care to fundamental technologies related to materials, devices, and systems. Two of the symposia are held jointly with The Japan Society of Applied Physics and one with The Polymer Society of Korea.



Featuring 16 symposia, the cluster on **Structural and Functional Materials** covers a broad range of topics including materials for nuclear applications, polymers, high-entropy alloys, emerging oxides, heteroanionic materials, as well as bioinspired and antiviral materials. The symposia will cover synthesis using novel methods such as 3D and four-dimensional (4D) multi-photon fabrication as well as far from equilibrium processing. State-of-the-art *in situ* characterization methods for real-time dynamic probing of materials properties and structure along with understanding how materials behave under extreme conditions will also be covered. Furthermore, the cluster contains symposia focusing on interesting applications of advanced materials for thermal management as well as for paper-based devices. The experimental topics will be complemented by symposia on artificial intelligence (AI)-based design, progress on materials genomics, and theory of novel materials. The symposium on structural materials from bulk to nanoscale will be held jointly with The Korean Institute of Metals and Materials.

Special events

The Ribbon Cutting and Opening Ceremony will commence on May 9 in the Exhibit Hall. The celebration will include traditional Hawaiian entertainment and a reception.

Sossina M. Haile of Northwestern University will present The Fred Kavli Distinguished Lecture in Materials Science in the Plenary Session on May 9. Haile's talk, "Vignettes in Solid State Electrochemistry for Sustainable Energy Technologies," will also be livestreamed for the Virtual Experience.

The traditional lunch-time event, Symposium X on Frontiers of Materials Research, being held as part of the

Honolulu Experience (In Person), will be livestreamed for the Virtual Experience. Speakers will be **Jennifer Dionne** of Stanford University (May 9), **Donhee Ham** of Harvard University (May 10), **Aditya D. Mohite** of Rice University (May 11), **Y. Shirley Meng** of The University of Chicago (May 12), and during the Virtual Experience, **Benjamin Tee** of the National University of Singapore and Institute of Materials Research and Engineering will present on Tuesday, May 24.

Materials Needs for Energy Sustainability by 2050 has become a staple of the MRS meetings. This year's forum asks, "Is Hydrogen the Fuel of the Future?" The panel discussion will look at both the big picture of where H₂ can and cannot play a role on paths to net zero, explore the practical aspects of deploying H₂ technologies at scale, and drill down into specific technologies expected to be important over the next decades.

Another panel will discuss the field of semiconductors from industry and academia in the event titled, "40 Years of Semiconductor Research Corporation and 2030 Decadal Plan for Semiconductors Panel Discussion and Student Poster Showcase."

Also students awarded by the Sociedad Mexicana de Materiales (SMM) for their outstanding poster presentation will display their work at the Poster Session on May 9. This is part of the MRS/SMM student exchange program.

The week of science presentations and special events will culminate in an authentic Hawaiian luau on Thursday night, May 12. The celebration includes amazing hula kahiko performers, acrobatic fire dancers, and authentic dining. Attendees and guests are welcomed. Tickets are \$120 per person and may be purchased during Meeting registration.

Stay up-to-date!

To keep up-to-date on the symposium sessions, special events, registration, and visa and travel resources, visit mrs.org/spring2022. The website includes links for up-to-date information on traveling during COVID-19.

