

Submission Deadline—August 14, 2020



Advanced Nanomechanical Testing

Small-scale mechanical characterization is essential for ensuring the service performance and lifetime of small components, such as thin films and coatings, electronic sensors, and MEMS. The first mechanical measurements on the submicrometer scale were enabled by the development of nanoindentation in the 1980s. *JMR* has long been the flagship journal for this field. In addition to countless contributed articles, previous Focus Issues published over the past two decades have disseminated the latest in method developments and trends in the field.

In addition to providing a long-expected update, this Focus Issue will expand the scope of nanomechanical testing methods beyond classical nanoindentation. Recent years have seen numerous attempts to access specific materials parameters and to better account for the typical operational conditions of the sample of interest. We therefore welcome contributions related to, but not limited to, focused ion beam (FIB) enabled methods, complex loading conditions, *in-situ* testing, and testing in extreme environments. Application of nanomechanical testing methods to new types of materials are also encouraged. This Focus Issue is a unique opportunity to highlight and share recent significant developments and achievements with the greater nanomechanics community.

Contributing papers are solicited in the following areas:

- ◆ Nanoindentation, micromechanical, and nanomechanical testing
- ◆ New developments, e.g., for the acquisition of the full stress-strain response
- ◆ Application to new types of materials
- ◆ Complex loading conditions (cyclic fatigue, fracture testing)
- ◆ Extreme testing environments (high and low temperatures, irradiation, high strain rates)
- ◆ *In-situ* testing (in scanning electron microscope, transmission electron microscope, or synchrotron)

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To be considered for this issue, new and previously unpublished results or review articles significant to the development of this field should be presented. The manuscripts must be submitted via the *JMR* electronic submission system by August 14, 2020. Manuscripts submitted after this deadline will not be considered for the issue due to time constraints on the review process. Please select "Advanced Nanomechanical Testing" as the Focus Issue designation. **Note our manuscript submission minimum length of 3250 words, excluding figures, captions, and references, with at least 6 and no more than 10 figures and tables combined. Review articles may be longer but must be pre-approved by proposal to the Guest Editors via jmr@mrs.org. The proposal form and author instructions may be found at www.mrs.org/jmr-instructions.** All manuscripts will be reviewed in a normal but expedited fashion. Papers submitted by the deadline and subsequently accepted will be published in the Focus Issue. Other manuscripts that are acceptable but cannot be included in the issue will be scheduled for publication in a subsequent issue.

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CALL FOR PAPERS

Submission Deadline—September 1, 2020



Surfaces and Interfaces in Electronics and Photonics

Surfaces and interfaces have become increasingly important factors for the integration of emerging materials and the implementation of the latest fabrication processes into new generations of electronic and photonic devices. When interfaces are formed at the junction between materials' surfaces with dissimilar properties, surprising new properties not present in either parent phase emerge at the intersection. These intriguing interfacial properties play key roles in organizing the multilayered device structures and modulating the charge-transfer dynamics across connecting layers.

As system dimensions are scaled downward for future electronic device applications, and heterogeneous integration of inorganic and organic surfaces become prevalent in wearable devices, the nature and complexity of materials interfaces bring tremendous challenges to scientists and engineers, resulting in slowed progress towards emerging applications. Advanced characterization techniques to study these complex interfaces accurately are also rare. Methods of film and surface preparation and interface formation are often coupled, and they significantly affect the operation of devices. This Focus Issue will compile submissions from experts in the different aspects of materials surfaces and interfaces, ranging from advanced characterization to unconventional film-growth, patterning, and device-level integration. Both experimental and theoretical papers are welcome.

Manuscripts are solicited in the following areas:

- ◆ Interfaces in area-selective ALD enabled nanopatterns
- ◆ Self-assembled monolayers (SAM) growth and *in-situ* characterization
- ◆ Next generation interconnects-interfacial challenges
- ◆ Surface activation, deactivation, patterning, and spectroscopic studies
- ◆ Mechanistic understanding of interface defect formation and mitigation
- ◆ Surface characterization techniques and metrology innovation
- ◆ Hybrid (inorganic/organic) interfaces in flexible electronics and additive manufacturing
- ◆ Interfacial challenges in printed hybrid electronics
- ◆ Emerging deposition equipments
- ◆ Control of surfaces, interfaces and grain-boundaries to tailor properties and functionalities
- ◆ Surfaces of emerging electronic and photonic materials
- ◆ Interface engineering in emerging photovoltaics

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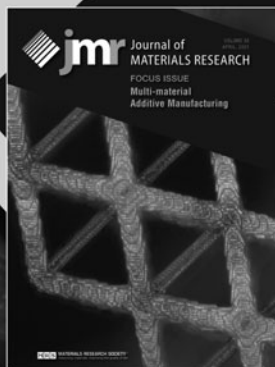
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Submission Deadline—September 15, 2020



Multi-material Additive Manufacturing

Additive Manufacturing has seen rapid growth in industrial, healthcare and defense applications. However, the lack of processable materials has stymied its further adoption. Most additive manufacturing approaches deal with single, homogenous materials, including plastics, metals and ceramics. Moving beyond homogenous materials, adding multi-materials, gradient, functional/responsive materials, and materials with heterogenous and graded properties is compelling. Expanding the material pallets and assembling of a variety of different materials may open up a new paradigm in product design, prototyping and manufacturing, significantly reducing the design-to-product cycle. Multi-material additive manufacturing is one enabler for 4D printing through the printing of tunable, responsive materials. It may also enable new materials, products and engineered systems with unprecedented functionalities and properties.

New challenges and opportunities arise in multi-material additive manufacturing, which calls for new research in the science of new additive manufacturing processes, material design and characterizations, computational design and optimization methodologies needed to advance the state of art of realizing multi-functional products composed of multiple- and stimuli-responsive materials.

Contributing papers are solicited in the following areas:

- ◆ Multi-material additive manufacturing processes and apparatus
- ◆ Hybrid Manufacturing
- ◆ 4D printing of responsive materials
- ◆ Mechanics and characterizations of dissimilar material interface and joining
- ◆ Multi-material topology optimizations and design automation methodologies for multi-material components
- ◆ Multi-material architected materials and metamaterials
- ◆ 3D printed soft robotics and responsive materials

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