



2017 MRS® FALL MEETING & EXHIBIT

November 26–December 1, 2017 | Boston, Massachusetts

CALL FOR PAPERS

Abstract Submission Opens

May 15, 2017

Abstract Submission Deadline

June 15, 2017

BROADER IMPACT

- BI1 Community College and University Partnerships as Catalysts for Promoting Materials Science Education
- BI2 Materials Innovation for Sustainable Agriculture and Energy

BIOMATERIALS AND SOFT MATERIALS

- BM1 Multiscale Mechanobiology and Biomechanics—Theory, Experiments, Computations
- BM2 Multiphase Fluids for Materials Science—Droplets, Bubbles and Emulsions
- BM3 Biological and Bioinspired Materials for Photonics and Electronics—From Living Organisms to Devices
- BM4 Biomaterials for Regenerative Engineering
- BM5 Polymer Gels in Materials Science—3D/4D Printing, Fundamentals and Applications
- BM6 2D Nanomaterials in Health Care
- BM7 Emerging Materials and Devices for Engineering Biological Function and Dynamics
- BM8 Materials Design for Neural Interfaces
- BM9 Stretchable Bioelectronics—From Sensor Skins to Implants and Soft Robots
- BM10 Bioinspired Interfacial Materials with Superwettability
- BM11 Modeling, Characterization, Fabrication and Applications of Advanced Biopolymers—Where Form Meets Function
- BM12 Biomolecular Self-Assembly for Materials Design

ELECTRONICS, MAGNETICS AND PHOTONICS

- EM1 Organic Semiconductors—Surface, Interface, Bulk Doping and Charge Transport
- EM2 Multiferroics and Magnetolectrics
- EM3 Novel Materials and Architectures for Plasmonics—From the Ultraviolet to the Terahertz
- EM4 Wide- and Ultra-Wide-Bandgap Materials and Devices
- EM5 Oxide Interfaces—Lattice and Electronic Defect Interactions
- EM6 Diamond Electronics, Sensors and Biotechnology—Fundamentals to Applications
- EM7 Materials, Devices and Architectures for Neuromorphic Engineering and Brain-Inspired Computing
- EM8 Emerging Materials for Quantum Information
- EM9 Electronic and Ionic Dynamics at Solid-Liquid Interfaces
- EM10 Solution-Processed Inorganics for Electronic and Photonic Device Applications

ENERGY AND SUSTAINABILITY

- ES1 Perovskite Materials and Devices—Progress and Challenges
- ES2 On the Way to Sustainable Solar Fuels—New Concepts, Materials and System Integration
- ES3 Earth Abundant Metal Oxides, Sulphides and Selenides for Energy Systems and Devices
- ES4 Interfaces in Electrochemical Energy Storage
- ES5 Materials and Design for Resilient Energy Storage
- ES6 Alkali Solid Electrolytes and Solid-State Batteries
- ES7 Chromogenic Materials and Devices
- ES8 Advanced Nuclear Materials—Design, Development and Deployment
- ES9 Thermal Energy—Transfer, Conversion and Storage
- ES10 Materials Efficiency to Enable a Circular Materials Economy
- ES11 Silicon for Photovoltaics

NANOMATERIALS

- NM1 Carbon Quantum Dots—Emerging Science and Technology
- NM2 Anisotropic Carbon Nanomaterials—Frontiers in Basic and Applied Research
- NM3 Progress in Developing and Applications of Functional One-Dimensional Nanostructures
- NM4 Atomically Thin, Layered and 2D Non-Carbon Materials and Systems
- NM5 Nanomaterials, Nanoparticles and Nanostructures Produced by Plasmas—Synthesis, Characterization and Applications
- NM6 Semiconductor Nanocrystals, Plasmonic Nanoparticles and Metal-Hybrid Structures
- NM7 Nanostructure-Based Optical Bioprobes—Advances, Trends and Challenges in Optical and Multimodal Bioimaging and Sensing
- NM8 Defect-Induced Phenomena and New States of Matter at the Nanoscale

PROCESSING AND MANUFACTURING

- PM1 Explore New Frontiers in Materials Design Using Plasmas—Synthesis, Processing and Characterization
- PM2 Advances and Upcoming Research Strategies in Reactive Materials
- PM3 Interfaces and Interface Engineering in Inorganic Materials
- PM4 Micro-Assembly Technologies—Fundamentals to Applications

THEORY, CHARACTERIZATION AND MODELING

- TC1 Multifunctional and Multifrequency Scanning Probe Microscopy
- TC2 *In Situ* Studies of Materials Transformations
- TC3 Emerging Prospect and Capabilities in Ion Beam Technology and Applications
- TC4 Advanced Atomistic Algorithms in Materials Science
- TC5 Uncertainty Quantification in Multiscale Materials Simulation
- TC6 Mechanical Behavior at the Micro and Nanoscale—Bridging Between Computer Simulations and Experiments
- TC7 Design, Control and Advanced Characterization of Functional Defects in Materials

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2017 iMatSci Innovator Showcase

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Submission Deadline—July 1, 2017



Architected Materials: Synthesis, Characterization, Modeling and Optimal Design

Architected materials are multi-phase and cellular materials in which the topological distribution of the phases is carefully controlled and optimized. Nearly two decades of research has resulted in the identification of a number of topologically simple, easy to fabricate, well established topologies, which have been optimized for specific stiffness and strength, impact and blast protection, sound absorption, wave dispersion, active cooling and combinations thereof.

Over the past few years, dramatic advances in processing techniques, including polymer-based templating (e.g., stereolithography, photopolymer waveguide prototyping, two-photon polymerization) and direct single- or multi-material formation (e.g., direct laser sintering, deformed metal lattices, 3D weaving and knitting), have enabled fabrication of new architected materials with arbitrarily complex architectures and remarkably precise control over the geometric arrangement of solid phases and voids from the nanometer to the centimeter scale.

The ordered, topologically complex nature of these materials and the degree of precision with which their features can now be defined suggests the development of new multi-physics multi-scale modeling tools that can enable optimal design. The result is efficient multi-scale cellular materials with unprecedented ranges of density, stiffness, strength, energy absorption, porosity/permeability, chemical reactivity, wave/matter interaction and other multifunctional properties, which promise dramatic advances across important technology areas such as lightweight structures, functional coatings, bio-scaffolds, catalyst supports, photonic/phononic systems and other applications.

Topics addressed in this focus issue will include (but not be limited to):

- ◆ Advances in solid free-form manufacturing (e.g., stereolithography, SLS, SLA, new direct write techniques, etc.)
- ◆ Novel parallel and batch processing techniques for scalable manufacturing
- ◆ 3D weaving, knitting and other fiber forms/preforms
- ◆ Scalable self-assembly techniques
- ◆ Optimization of architectural topology (structure-to-property relations)
- ◆ Inverse methods (function-to-structure)
- ◆ Multi-scale testing (e.g., linking constituent, topological and bulk properties)
- ◆ 3D tomography and related techniques
- ◆ Modeling of non-linear mechanical/physical response
- ◆ Applications of optimal architected materials

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To be considered for this issue, new and previously unpublished results significant to the development of this field should be presented. The manuscripts must be submitted via the *JMR* electronic submission system by **July 1, 2017**. Manuscripts submitted after this deadline will not be considered for the issue due to time constraints on the review process. **Submission instructions may be found at www.mrs.org/jmr-instructions**. Please select "Focus issue: *Architected Materials: Synthesis, Characterization, Modeling and Optimal Design*" as the manuscript type. **Note our manuscript submission minimum length of 6000 words, with a maximum of 6-8 figures**. 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 of *JMR*.

jmr@mrs.org
Please contact jmr@mrs.org with questions.

CALL FOR PAPERS

Submission Deadline—June 1, 2017



Early Career Scholars in Materials Science 2018

**The third annual *JMR* Issue to promote outstanding research
by future leaders in materials science**

This third special issue invites full length research and review articles by materials researchers, who have completed their Ph.D but not yet achieved the level of full professor or senior scientist at the time of submission, for peer review and publication in the January 2018 issue. Ph.D students are not eligible to submit. The Annual Issue provides a unique opportunity to be highlighted and promoted early in one's research career. To increase attention to these papers, this issue will be published on an **open access** basis. Although some papers may have multiple authors, only the Early Career Scholar submitting the paper will be identified with a photo and brief bio when the paper is published. Authors from around the world are invited to submit papers that span the topical coverage of *JMR* including advanced ceramics, metals, polymers, composites, and combinations thereof related to energy, electrical, magnetic, optical, and structural properties and related applications, and reporting on:

- ◆ Advanced characterization methods and techniques
- ◆ Computational materials science when coupled with experimentation
- ◆ Fundamental materials science
- ◆ Interfacial science as relates to material process understanding and improvements
- ◆ Material property enhancements through advances in materials processing
- ◆ Material property enhancements through material design (especially Materials Genome-related)
- ◆ Material combinations and design that improve system performance
- ◆ Nanoscience and nanotechnology

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To be considered for the issue, the Early Career Scholar must not yet be a full professor at the time of submission. Also, the manuscript must report new and previously unpublished results. Review articles are invited but must be approved by the issue editors before submission (see www.mrs.org/jmr-manuscript-types/ regarding review articles). Manuscripts must be submitted via the *JMR* electronic submission system by **June 1, 2017**. Manuscripts submitted after this deadline will not be considered for the issue due to time constraints on the review process. Submission instructions can be found at www.mrs.org/jmr-instructions. Please select "ANNUAL ISSUE: 2018 *Early Career Scholars in Materials Science*" as the manuscript type. **Note our manuscript submission minimum length of 6000 words, with a maximum of 6-8 figures.** All manuscripts will be reviewed in a normal but expedited fashion. Papers submitted by the deadline and subsequently accepted will be published in the Special Issue. Other manuscripts that are acceptable but cannot be included in the issue will be scheduled for publication in a subsequent issue of *JMR*.

Papers must be accompanied by a photo (uploaded separately as a high resolution TIF or EPS file) and 200-300 word bio of the Early Career Scholar only. These materials must be submitted along with the original submission of the paper.

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