

Submission Deadline—June 1, 2016



Early Career Scholars in Materials Science Annual Issue

This second Annual Issue invites full length research and review articles by materials researchers, who have not yet achieved full professorship at the time of submission, for peer review and publication in the January 2017 issue. 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 be listed as the first and lead author and 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 Also, the manuscript must report new and previously unpublished results.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 Editor-in-Chief before submission. Manuscripts must be submitted via the *JMR* electronic submission system by **June 1, 2016**. 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 "**Special Issue: Early Career Scholars in Materials Science**" as the manuscript type. **Note our manuscript submission minimum length of 6000 words**. 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 will be accompanied by a photo and short bio of the lead author only. These materials must be submitted along with the original submission of the paper.

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

CALL FOR PAPERS

Submission Deadline—April 1, 2016



Aberration Corrected Transmission Electron Microscopy

Spherical and chromatic aberration correctors in transmission and in scanning transmission electron microscopes (TEM/STEM) have become commercially available in recent years. They are comprised of electromagnetic multipoles driven by ultra-stable power supplies in conjunction with faster and more efficient hard- and software for image acquisition, analysis, and alignment. This technology has significantly improved the spatial resolution, down to the size of the Bohr radius under certain conditions so that the atomic scattering in the sample can limit the resolution, rather than the microscope.

Focus now needs to shift towards new scientific areas that can be addressed with this novel equipment, taking into account the improved resolution, reduced thermal drift, novel electron detectors, and larger pole-piece gaps, due directly or indirectly to the advent of aberration correction. The parameter space for operation has become much more complex, so operators need to carefully plan experiments to find the best way to extract meaningful data. In particular, the high voltage should be optimized to minimize radiation damage. Better resolution may involve higher electron doses but imply more beam damage. Increased stability allows fast experiments with highly focused electron probes. More sensitive detectors can be used to test new data acquisition schemes as well as to reduce the electron dose. Consideration must be given as to whether the fascinating *in-situ* studies of the kinetics of atomic growth mechanisms now possible will allow meaningful inference to be drawn on thermodynamic properties representative of the bulk. *In-operando* studies of specimens in their engineered application environment (i.e. in gaseous or liquid atmosphere, under electrical bias, strain, illumination, etc.) can be conducted at nano-scale resolution.

This Focus Issue will include imaging, spectroscopy, and diffraction based (S)TEM applications to materials science problems with planar or focused illumination.

Contributed articles are particularly sought in the following areas:

- ◆ Resolution vs. quantification issues in quantitative high-resolution imaging
- ◆ Quantitative spectroscopy for local measurements of chemistry or electronic properties
- ◆ Limitations due to radiation damage
- ◆ Comparing studies by planar and focused illumination: evaluating dose vs. dose rate effects
- ◆ Applications of chromatic aberration correction, monochromation, and low energy studies
- ◆ Applications of improved electron detectors and novel acquisition schemes
- ◆ *In-situ* strain measurements and *in-operando* catalysis studies

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MANUSCRIPT SUBMISSION

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 **April 1, 2016**. 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: Aberration Corrected Transmission Electron Microscopy" as the manuscript type. **Note our manuscript submission minimum length of 6000 words**. 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*.

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- CM1 New Frontiers in Aberration Corrected Transmission Electron Microscopy
- CM2 Quantitative Tomography for Materials Research
- CM3 Mechanics and Tribology at the Nanoscale—*In Situ* and *In Silico* Investigations
- CM4 Verification, Validation and Uncertainty Quantification in Multiscale Materials Simulation

ENERGY AND ENVIRONMENT

- EE1 Emerging Materials and Phenomena for Solar Energy Conversion
- EE2 Advancements in Solar Fuels Generation—Materials, Devices and Systems
- EE3 Materials and Devices for Full Spectrum Solar Energy Harvesting
- EE4 Electrode Materials and Electrolytes for Lithium and Sodium Ion Batteries
- EE5 Next-Generation Electrical Energy Storage Chemistries
- EE6 Research Frontiers on Liquid-Solid Interfaces in Electrochemical Energy Storage and Conversion Systems
- EE7 Mechanics of Energy Storage and Conversion—Batteries, Thermoelectrics and Fuel Cells
- EE8 Grid-Scale Energy Storage
- EE9 Hydrogen and Fuel Cell Technologies for Transportation—Materials, Systems and Infrastructure
- EE10 Recent Advances in Materials for Carbon Capture
- EE11 Caloric Materials for Renewable Energy Applications
- EE12 Radiation Damage in Materials—A Grand Multiscale Challenge
- EE13 Actinides—Fundamental Science, Applications and Technology
- EE14 Titanium Oxides—From Fundamental Understanding to Applications
- EE15 Materials for Sustainable Development—Integrated Approaches

ELECTRONICS AND PHOTONICS

- EP1 Organic Excitonic Systems and Devices
- EP2 Silicon Carbide—Substrates, Epitaxy, Devices, Circuits and Graphene
- EP3 Perovskite-Based Photovoltaics and Optoelectronic Devices
- EP4 Emerging Silicon Science and Technology
- EP5 Metal Oxide Hetero-Interfaces in Hybrid Electronic Platforms
- EP6 Integration of Heterovalent Semiconductors and Devices
- EP7 Material and Device Frontiers for Integrated Photonics
- EP8 Resonant Optics—Fundamentals and Applications
- EP9 Materials and Processes for Nonlinear Optics
- EP10 Optoelectronic Devices of Two-Dimensional (2D) Materials
- EP11 Novel Materials for End-of-Roadmap Devices in Logic, Power and Memory
- EP12 Materials Frontiers in Semiconductor Advanced Packaging
- EP13 Tailoring Superconductors—Materials and Devices from Basic Science to Applications
- EP14 Materials for Next-Generation Displays
- EP15 Diamond Power Electronic Devices

MATERIALS DESIGN

- MD1 Materials, Interfaces and Devices by Design
- MD2 Tuning Properties by Elastic Strain Engineering—From Modeling to Making and Measuring
- MD3 Functional Oxide Heterostructures by Design
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- MD5 Fundamentals of Organic Semiconductors—Synthesis, Morphology, Devices and Theory
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- MD8 Multiscale Behavior of Materials in Extreme Environments
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- MD10 Micro-Assembly Technologies

NANOTECHNOLOGY

- NT1 Functional Nanostructures and Metamaterials for Solar Energy and Novel Optical Phenomena
- NT2 Oxide and Chalcogenide-Based Thin Films and Nanostructures for Electronics and Energy Applications
- NT3 Carbon Nanofluidics
- NT4 Emerging Non-Graphene 2D Materials
- NT5 Nanodiamonds—Fundamentals and Applications
- NT6 Colloidal Nanoparticles—From Synthesis to Applications
- NT7 Nanoparticle Characterization and Removal
- NT8 Silicon Nanostructures—Doping, Interface Effects and Sensing

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- SM1 Liquid Crystalline Materials—Displays and Beyond
- SM2 Bioinspired Dynamic Materials—Synthesis, Engineering and Applications
- SM3 Soft Materials for Compliant and Bioinspired Electronics
- SM4 Engineering Biointerfaces with Nanomaterials
- SM5 Surfaces and Interfaces for Biomaterials
- SM6 Transient and Biologically-Inspired Electronics
- SM7 Future Healthcare Needs through Biomaterials, Bioengineering and the Cellular Building Block
- SM8 Bioinspired Metal Nanoparticles—Synthesis, Properties and Application
- SM9 Structure and Properties of Biological Materials and Bioinspired Designs
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The Society's interdisciplinary approach to the exchange of technical information is qualitatively different from that provided by single-discipline professional societies because it promotes technical exchange across the various fields of science affecting materials development. MRS sponsors two major international annual meetings encompassing many topical symposia, as well as numerous single-topic scientific meetings each year. It recognizes professional and technical excellence, conducts tutorials, and fosters technical exchange in various local geographical regions through Section activities and Student Chapters on university campuses.

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