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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MANUSCRIPT SUBMISSION
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 Also, the manuscript must report new and previously unpublished results.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.
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 acceleration damage. Better resolution may involve higher electron doses but imply more beam damage.

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/STEM 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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The Materials Research Society (MRS®) is a not-for-profit scientific association founded in 1973 to promote interdisciplinary goal-oriented basic research on materials of technological importance. Membership in the Society includes over 16,000 scientists from industrial, government, and university research laboratories in the United States and abroad.

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.

MRS journals maintain a proud tradition of editorial excellence in scientific literature. The Journal of Materials Research, the archival journal spanning fundamental developments in materials science, is published twenty-four times a year by MRS and Cambridge University Press. MRS Bulletin is a premier source for comprehensive research trends and a timely scan of professional activities. MRS Communications is a full-color letters and perspectives journal focused on groundbreaking work across the spectrum of materials research. MRS Energy & Sustainability–A Review Journal publishes reviews on key topics in materials research and development as they relate to energy and sustainability. MRS Advances is a peer-reviewed online-only journal featuring impactful and emerging research, designed to reflect the way materials researchers work, write, publish and share their results.

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MRS is an Affiliated Society of the American Institute of Physics and participates in the international arena of materials research through associations with professional organizations.

For further information on the Society’s activities, contact MRS Headquarters, 506 Keystone Drive, Warrendale, PA 15086-7573; telephone (724) 779-3003; fax (724) 779-8313.