



2017 **MRS**® SPRING MEETING & EXHIBIT

April 17–21, 2017 | Phoenix, Arizona

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CHARACTERIZATION, THEORY AND MODELING

- CM1 Emergent Material Properties and Phase Transitions Under Pressure
- CM2 Advanced Numerical Algorithms for Metallic Systems at the Mesoscale in Materials Science
- CM3 Computer-Based Modeling and Experiment for the Design of Soft Materials
- CM4 *In Situ* Electron Microscopy of Dynamic Materials Phenomena
- CM5 Mechanically Coupled Properties, Phenomena and Testing Methods in Small-Scale and Low-Dimensional Systems
- CM6 Dislocation Microstructures and Plasticity
- CM7 Genomic Approaches to Accelerated Materials Innovation

ELECTRONIC DEVICES AND MATERIALS

- ED1 Silicon-Carbide, Diamond and Related Materials for Quantum Technologies
- ED2 Materials and Devices for Neuromorphic-Engineering and Brain-Inspired Computing
- ED3 Physics, Chemistry and Materials for Beyond Silicon Electronics
- ED4 Luminescent Materials for Photon Upconversion
- ED5 Photoactive Nanoparticles and Nanostructures
- ED6 Nanostructured Quantum-Confined States for Advanced Optoelectronics
- ED7 Materials and Device Engineering for Beyond the Roadmap Devices in Logic, Memory and Power
- ED8 Development and Integration of Organic and Polymeric Materials for Thin-Film Electronic Devices
- ED9 Advanced Interconnects for Logic and Memory Applications—Materials, Processes and Integration
- ED10 Material Platforms for Plasmonics and Metamaterials—Novel Approaches Towards Practical Applications
- ED11 Phase-Change Materials and Their Applications—Memories, Photonics, Displays and Non-von Neumann Computing
- ED12 Quantum Sensing, Metrology and Devices
- ED13 Novel Photonic, Electronic and Plasmonic Phenomena in Materials
- ED14 Molecular and Colloidal Plasmonics—Synthesis and Applications

ENERGY STORAGE AND CONVERSION

- ES1 Perovskite Solar Cells—Towards Commercialization
- ES2 High-Capacity Electrode Materials for Rechargeable Energy Storage
- ES3 Materials for Multivalent Electrochemical Energy Storage
- ES4 Nanogenerators and Piezotronics
- ES5 Advances in Materials, Experiments and Modeling for Nuclear Energy
- ES6 Mechanics of Energy Storage and Conversion—Batteries, Thermoelectrics and Fuel Cells
- ES7 (Photo)electrocatalytic Materials and Integrated Assemblies for Solar Fuels Production—Discovery, Characterization and Performance
- ES8 Caloric Materials for Energy-Efficient Applications
- ES9 Surfaces, Coatings and Interfaces in Concentrated Solar Energy Applications
- ES10 Frontiers in Oxide Interface Spintronics—Magnetoelectrics, Multiferroics and Spin-Orbit Effects
- ES11 Advanced and Highly Efficient Photovoltaic Devices
- ES12 Soft Magnetic Materials for Next-Generation Power Electronics
- ES13 Interfaces and Interphases in Electrochemical Energy Storage and Conversion
- ES14 Thin-Film Chalcogenide Semiconductor Photovoltaics

NANOMATERIALS

- NM1 Emerging Non-Graphene 2D Materials
- NM2 Nanoscale Heat Transport—From Fundamentals to Devices
- NM3 Aerogels and Aerogel-Inspired Materials
- NM4 Novel Catalytic Materials for Energy and Environment
- NM5 Frontiers in Terahertz Materials and Technology
- NM6 Mechanical Behavior of Nanostructured Composites
- NM7 Semiconductor Nanowires for Energy Applications
- NM8 2D Materials—Macroscopic Perfection vs. Emerging Nanoscale Functionality
- NM9 High-Performance Metals and Alloys in Extreme Conditions
- NM10 Micro/Nano Assembling, Manufacturing and Manipulation for Biomolecular and Cellular Applications

SOFT MATERIALS AND BIOMATERIALS

- SM1 Bioelectronics—Materials, Processes and Applications
- SM2 Advanced Multifunctional Fibers and Textiles
- SM3 Advanced Biomaterials for Neural Interfaces
- SM4 A Soft Future—From Electronic Skin to Robotics and Energy Harvesting
- SM5 Aqueous Cytomimetic Materials
- SM6 Materials in Immunology—From Fundamental Material Design to Translational Applications
- SM7 Emerging Membrane Materials for Sustainable Separations
- SM8 Advanced Polymers

Meeting Chairs

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www.mrs.org/spring2017

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November 26 – December 1, 2017, Boston, Massachusetts

2018 MRS Spring Meeting & Exhibit
April 2 – 6, 2018, Phoenix, Arizona

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Submission Deadline—April 1, 2017



Jan van der Merwe: Epitaxy and the Computer Age

Fabrication of well-ordered semiconductor thin films by precise deposition control of atomic layers is known to semiconductor engineers and device physicists as epitaxy and Frank-van der Merwe growth. Understanding and mastering this process was the precondition for the modern computer technology and has led mankind into the digital era and information age. The theoretical foundations for this quantum leap in human and technological civilization were laid by the South African physicist Jan H. van der Merwe, who passed away on February 28, 2016, on his 94th birthday.

To honor the contributions of Dr. van der Merwe, the *Journal of Materials Research* will publish a Focus Issue in 2017 to present latest developments in epitaxy, with the focus on the fundamental materials science and the past (historic perspective), present, and future of the field.

Contributed papers are solicited in the following areas:

- ◆ Fundamental studies in epitaxy
- ◆ Semiconductor materials, advanced structures and systems
- ◆ Growth of single crystalline materials
- ◆ Surface and interface properties of semiconductor/electrolyte junctions
- ◆ Nanomaterials and heterostructures
- ◆ Overlayers, underlayers, and the like
- ◆ Modeling and simulation of semiconductors, interfaces and transport processes
- ◆ Short reviews of materials and structures

Application properties may be related, in particular, to wear-, corrosion-, thermal shock-resistance, structural integrity under mechanical and thermal loads, ballistic performance of armor ceramics, particular electrical properties related to fuel cells, insulators, supercapacitors, semiconductors, conductors and sputtering targets, optical transmittance, catalytic properties, permeation of porous structures, and biomedical applications. The papers on the proposed topic will be of interest and importance to specialists from academia, research centers, and industry.

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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. If you would prefer to write a review, please submit a short proposal to one of the Guest Editors outlining the review for approval. The manuscripts must be submitted via the *JMR* electronic submission system by **April 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: *Jan van der Merwe: Epitaxy and the Computer Age*" as the manuscript type. **Note our manuscript submission minimum length of 6,000 words, with a maximum of 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*.

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Please contact jmr@mrs.org with questions.

CALL FOR PAPERS



Submission Deadline—May 1, 2017

Mechanical properties and microstructure of advanced metallic alloys— in honor of Prof. Hael Mughrabi

Understanding the correlation between the microstructure and the mechanical behavior of materials has always been one of the key challenges in materials science. This is the case in particular for cyclic deformation behavior, creep properties, and high temperature behavior. Recent years have seen significant progress in these fields through the widespread use of new microscopic techniques such as focused ion beam, high resolution TEM, nanomechanical testing approaches, atom probe microscopy, *in-situ* testing, and multiscale simulations.

Contributions by Prof. Hael Mughrabi, who will turn 80 in 2017, have been key to the development of these fields. His seminal contributions in understanding fatigue mechanisms and to the new field of very high cycle fatigue are particularly well-known. The fatigue behavior of ultrafine-grained materials was another focus of his interests. Mughrabi also made significant advances in the field of high temperature materials, where his work led to an improved understanding of the influence of the lattice misfit and raft formation process. To honor Hael Mughrabi's long lasting contributions in materials research, manuscript submissions are invited particularly in the following fields:

- ◆ Cyclic deformation behavior and fatigue mechanisms including the VHCF regime
- ◆ Deformation behavior of high-temperature materials as for example TiAl alloys, Ni and Co-based superalloys and coatings
- ◆ Mechanical behavior of nano, ultrafine-grained, and nanolamellar materials

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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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MANUSCRIPT SUBMISSION

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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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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