



## Addressing Africa's challenges through materials development

<https://amrsbotswana.org> • <http://www.bitri.co.bw/cms>

The African Materials Research Society (AMRS) held its 9th International Conference this past December in Gaborone, Botswana. The meeting was largely organized by the Botswana Institute for Technology Research and Innovation (BITRI). Thanks to the tireless efforts of Samuel Chigome, secretary of the local organizing committee, and the leadership of Nelson Torto, chair of the committee, AMRS2017 was a resounding success.

AMRS was conceived in 2000 at a USA-Africa Materials workshop held in South Africa. The US National Science Foundation (NSF) and the South African National Research Foundation (NRF) co-organized and co-sponsored the workshop. Participants explored opportunities for collaboration between the United States and Africa, with the overarching objective of developing the materials research capacity in Africa. Building on this initiative, AMRS was officially launched two years later in 2002 in Senegal, home to the first AMRS International Conference. Students and professionals from around the world, with expertise in the many facets of materials science, engineering, and research, attended the conference.

Since 2003, AMRS has held biannual international conferences. The meeting has moved among locations across the African continent, including Victoria Falls, Zimbabwe; Addis Ababa, Ethiopia; and Accra, Ghana. Symposia themes have broadly covered the areas of energy, environment, health, nanotechnology, computational materials science, mineral processing, construction, and materials education, usually with a focus on areas



AMRS dignitaries, including the vice president of Botswana, government officials, BITRI board members, invited speakers, and conference organizers, at the opening reception.

that are relevant to African development. At the most recent Gaborone meeting, a theme focused on materials for agriculture was introduced. Enthusiasm for this new direction was high, as evidenced by the high quality of speakers.

The AMRS meetings have maintained an upward trajectory in both attendance and excellence, as exemplified by the outstanding plenary speakers at AMRS 2017. The meeting was kicked off by inspirational words from the Vice President of Botswana, Mokgweetsi Masisi, who discussed the importance of technological innovation in materials for the nation's and indeed continent's development. Nobel Laureate Jean-Marie Lehn (Chemistry, 1987) then described the path of his research career and challenged the audience members to engage each other with broad, encompassing questions. The other four plenary speakers were Tobin Jay Marks (Northwestern University), Sossina M. Haile (Northwestern Univer-

sity), Paul Weiss (University of California, Los Angeles), and Nelson Torto (African Academy of Sciences). In all, approximately 315 oral presentations and 150 poster presentations were delivered, with an attendance of more than 500 from 45 different countries and representation from five continents. This large number of registrants translated into successful attendance in the meetings rooms, and lively discussions could be heard at both the oral and poster sessions.

Prior to the main conference, eight pre-conference workshops, covering topics ranging from electrospinning and light microscopy to crystallography and scanning electron microscopy, were held at the BITRI Centre for Materials Science (CMS). The workshop facilitators were a mix of university faculty members, who had come to Gaborone for the AMRS conference, and representatives from equipment suppliers for the institute. Almost 200 people attended the

workshops, the large majority of whom were graduate students. The workshop participants not only benefited from advanced training in the practical aspects of performing their research, but also gained an appreciation for the top-quality facilities available at BITRI CMS. The institute boasts, for example, a high-resolution Zeiss GeminiSEM 500 Field Emission Gun Electron Microscope, as well as a Kratos Axis Supra X-ray Photoelectron Spectrometer. The institute is a hub of electrospinning, as evidenced by two electrospinning labs with state-of-the-art electrospinning units. Two of the seven units are pilot scale: the Elmarco Nanospider NS1WS500U and Bioincia LE500. Many workshop attendees expressed their interest in returning to the institute as visiting researchers as part of their future work.

Student participation was a key focus of AMRS2017. At least 80 students received sponsorships to attend the pre-conference workshops and conference from the Royal Society of Chemistry, American Chemical Society, Microscopy Society of America,

MRS, AMRS, African Network of Analytical Chemists, Institute of Development Management, NSF via the Joint Undertaking for an African Materials Institute, and Elmarco. For many of the student participants, it was their first time attending a scientific conference, and the international representation made the event even more significant.

The papers presented at AMRS2017 are invited for inclusion in a dedicated issue of *MRS Advances*, which will serve as the official depository for the Proceedings of the 9th International Conference. *MRS Advances*, published jointly by MRS and Cambridge University Press, is a peer-reviewed online journal that reports snapshots of work in progress on key materials topics, focusing, in particular, on the proceedings of conferences in materials research. AMRS participants are enthusiastic for this new partnership.



Attendees at one of the AMRS2017 presentations.

Complete information about the conference is available at <https://amrsbotswana.org>. Information about BITRI CMS is available at [www.bitri.co.bw/cms](http://www.bitri.co.bw/cms).

The activities of AMRS have been strongly supported since its inception by the US NSF and, in recent years, by MRS. All participants gratefully acknowledge this support.

**Sossina M. Haile**

(with input from Samuel Chigome and Eric Garfunkel)

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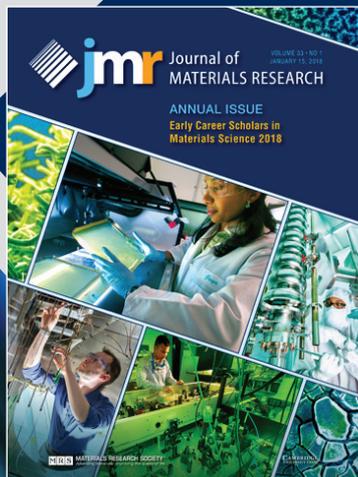
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**Submission Deadline—June 1, 2018**



CALL FOR PAPERS

## Early Career Scholars in Materials Science 2019

### The Fourth Annual *JMR* Issue to promote outstanding research by future leaders in materials science

This fourth Annual Issue invites full length research and review articles by materials researchers, who have completed their PhD degree but not yet achieved full professorship at the time of submission, for peer review and publication in the January 2019 issue. PhD 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/](http://www.mrs.org/jmr-manuscript-types/) regarding review articles). Manuscripts must be submitted via the *JMR* electronic submission system by **June 1, 2018**. 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](http://www.mrs.org/jmr-instructions). Please select "ANNUAL ISSUE: *Early Career Scholars in Materials Science 2019*" as the manuscript type. **Note our manuscript submission minimum length of 3250 words, with at least 6 and no more than 10 figures and tables.** (Additional figures and tables may be submitted as supplemental material.) 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.**

**[jmr@mrs.org](mailto:jmr@mrs.org)**  
Please contact [jmr@mrs.org](mailto:jmr@mrs.org) with questions.

# 2017 YEAR-END REVIEW

## MATERIALS RESEARCH SOCIETY

Over the course of 2017, the Materials Research Society conducted a number of initiatives critical to our future, including strategic planning, assessing the viability of our meeting locations, and starting the process of differentiating the Fall and Spring Meeting content. Many of you contributed to the process. **Based on this input, we have emerged with a renewed focus for MRS to engage members across all generations to advance their careers and promote materials research and innovation.** Strategically, this means that the Society will advance member careers by creation of high-quality forums to present and publish research. Our meetings are best-in-class; as the Society evolves, we need to ensure that they remain a must-attend venue to network with colleagues and present cutting-edge content. To forward this agenda, we will place renewed emphasis on capturing new topical areas nimbly, while retaining core content.

A second goal is to catalyze member career development from students through to seasoned professionals. As a Society, we choose to engage and inspire members 1) by ensuring that our Fall and Spring Meetings are vibrant, 2) by utilizing the *MRS Bulletin* and the Webinar Series to connect members throughout the year, and 3) by refreshing our governance to respond quickly and thoughtfully to opportunities. All of these require that we are inclusive and responsive.

Looking back on this past year as MRS President, there are a number of people to thank: the members who drive the science and commercialization of materials research, the dedicated volunteers who bring their time and talents to the service of the community, the amazing staff at headquarters, and the family who supported and put up with me. Thank you all!

Sincerely yours,



**Susan Trolier-McKinstry**  
2017 MRS President



# 2017 BY THE NUMBERS

Looking back on 2017, we are delighted to see all the **Materials Research Society** has accomplished. Our members, volunteers, exhibitors, sponsors, partners and headquarters staff are all to thank for the tremendous success of our Society. We are pleased to present this year-end review, outlining some of our biggest achievements of the past year ... by the numbers!



## SOCIETY

Membership of almost **14,000** students and professionals from **77** countries; **47%** reside outside the United States

**9** new MRS University Chapters, bringing current total to **117**; **19%** located outside the United States

**20** MRS Corporate Partners

Record-breaking **97** members honored through the MRS Awards Program

Over **1000** volunteers from around the world help to advance **1 MISSION**—to promote communication for the advancement of interdisciplinary materials research and technology to improve the quality of life

## PUBLICATIONS

With 2017 Impact Factor of **5.199**, *MRS Bulletin* ranked in top **15%** of materials science journals

*Journal of Materials Research (JMR)* sustained impressive cited half-life of **>10 YEARS**

2017 Impact Factor for *MRS Communications* increased by **68%** to **3.01**

In **1<sup>ST</sup>** year of eligibility, *MRS Advances* indexed in Web of Science, Emerging Sources Citation Index (ESCI)

Based on Altmetric Attention Score, *MRS Energy & Sustainability* ranked **3<sup>RD</sup>** among competing journals

MRS Book Collection grew to **19** books/textbooks

MRS OnDemand® Webinar Series produced **13** live webinars, reaching over **2500** participants in **50** countries

# MEETINGS & EVENTS

**107** topical symposia and **346** international exhibitors featured at 2017 MRS Spring and Fall Meetings; total on-site attendance topped **12,250**

2017 MRS Spring and Fall Meetings offered **6194** oral presentations, **3852** poster presentations and **21** tutorial sessions

**17** teams selected for **4<sup>TH</sup>** iMatSci Innovation Showcase; over **550** attended the iMatSci events

Record **1866** from **46** countries attended the XXVI International Materials Research Congress (IMRC), held in partnership with the Sociedad Mexicana de Materiales (SMM)

**3** conference events, with **58** exhibitors and over **1260** attendees, managed through the MRS Conference Services Program



# SERVING THE PROFESSION

In **14<sup>TH</sup>** year of travel, Strange Matter museum attendance hit **5.5** million over **3** continents

**3789** letters sent to U.S. Congress via MRS Materials Voice platform

MRS Job Board traffic increased by **300%** with almost **700,000** views; over **600** job seekers participated on-site in MRS Spring and Fall Meeting Career Fairs

**38** professional development events served over **2050** MRS Members

**2** implementation workshops—in Mexico and Africa—hosted for Impact of Materials on Society (IMOS) course





# MATERIALS RESEARCH SOCIETY FOUNDATION

Your donations to the **Materials Research Society Foundation** support a wide range of initiatives that support our members and the materials community. Citing just a few highlights of 2017, the Foundation:

Introduced the newly endowed

## MRS NELSON "BUCK" ROBINSON SCIENCE AND TECHNOLOGY AWARD FOR RENEWABLE ENERGY

Application is open to students, postdocs or other young professionals engaged in novel sustainable solutions for renewable energy technology. The inaugural Award will be presented at the 2018 MRS Fall Meeting.

Supported **117 MRS UNIVERSITY CHAPTERS WORLDWIDE**,

funded seven University Chapter Special Projects, and hosted a two-day *International Summit of the MRS University Chapters on Sustainability and Nanotechnology*

Expanded our **PROFESSIONAL DEVELOPMENT AND  
CAREER SERVICES PORTFOLIO** with seminars and workshops

that include *Essentials of Getting Your Work Published*, *Preparing for Your Next Job Interview*, *Negotiating a Job Offer*, *Green Cards for Scientific Researchers*, *Using Improv for Communications*, and more.

**"Every donor is important. Every gift makes an impact."**

Visit [www.mrs.org/foundation](http://www.mrs.org/foundation) to learn more about the good work the Foundation is doing and to make a donation.

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# 2018 **MRS**® FALL MEETING & EXHIBIT

November 25–30, 2018 | Boston, Massachusetts

# CALL FOR PAPERS

**Abstract Submission Opens**  
May 14, 2018

**Abstract Submission Deadline**  
June 14, 2018

**Fall Meeting registrations include MRS Membership January – December 2019**

## **BROADER IMPACT**

- BI01 Sustainable Development in Materials Science and Related Societal Aspects
- BI02 The Future of Materials Science Academia—Preparing for a Career in Higher Education

## **BIOMATERIALS AND SOFT MATERIALS**

- BM01 3D Printing of Passive and Active Medical Devices
- BM02 Electronic and Coupled Transport in Biology
- BM03 Multiscale Modeling of Soft Materials and Interfaces
- BM04 Biomaterials for Regenerative Engineering
- BM05 Advanced Manufacturing Technologies for Emulating Biological Tissues
- BM06 Plasma Processing and Monitoring for Bioengineering and Biomedical Engineering
- BM07 Bioelectronics—Fundamentals, Materials and Devices
- BM08 Materials-to-Devices for Integrated Wearable Systems—Energy Harvesting and Storage, Sensors/Actuators and Integration
- BM09 Bioinspired Macromolecular Assembly and Inorganic Crystallization—From Tissue Scaffolds to Nanostructured Materials

## **CHARACTERIZATION, MECHANICAL PROPERTIES AND STRUCTURE–PROPERTY RELATIONSHIPS**

- CM01 Solid-State Chemistry of Inorganic Materials
- CM02 Structure–Property Relations in Non-Crystalline Materials
- CM03 *In Situ/Operando* Analysis of Electrochemical Materials and Interfaces
- CM04 Ultrafast Optical Probes for Advanced Materials Characterization and Development
- CM05 Fundamentals of Materials Property Changes Under Irradiation

## **ELECTRONIC, PHOTONIC AND MAGNETIC MATERIALS**

- EP01 New Materials and Applications of Piezoelectric, Pyroelectric and Ferroelectric Materials
- EP02 Materials for Manipulating and Controlling Magnetic Skyrmions
- EP03 Beyond-Graphene 2D Materials—Synthesis, Properties and Device Applications
- EP04 Novel Photonic and Plasmonic Materials Enabling New Functionalities
- EP05 Excitons, Electrons and Ions in Organic Materials
- EP06 Coherent Electronic Spin Dynamics in Materials and Devices

- EP07 Tailored Disorder—Novel Materials for Advanced Optics and Photonics
- EP08 Ultra-Wide-Bandgap Materials and Devices
- EP09 Diamond Electronics, Sensors and Biotechnology—Fundamentals to Applications

## **ENERGY—TRANSFER, STORAGE AND CONVERSION**

- ET01 Solid-State Batteries—Materials, Interfaces and Performance
- ET02 Silicon for Photovoltaics
- ET03 Application of Nanoscale Phenomena and Materials to Practical Electrochemical Energy Storage and Conversion
- ET04 Perovskite Solar Cells—Challenges and Opportunities
- ET05 Fundamental Aspects of Halide Perovskite (Opto)electronics and Beyond
- ET06 Advanced Materials and Chemistries for High-Energy and Safe Rechargeable Batteries
- ET07 Advanced Processing and Manufacturing for Energy Conversion, Storage and Harvesting Devices
- ET08 Emerging Materials and Characterization for Selective Catalysis
- ET09 Materials for Chalcogen Electrochemistry in Energy Conversion and Storage
- ET10 Redox Active Materials and Flow Cells for Energy Applications
- ET11 Emerging Materials and Device Concepts for Flexible, Low-Cost Photovoltaic Technologies
- ET12 Harvesting Functional Defects in Energy Materials
- ET13 Materials for Multifunctional Windows
- ET14 Materials Science Facing Global Warming—Practical Solutions for Our Future
- ET15 Scientific Basis for Nuclear Waste Management

## **GENERAL INTEREST**

- GI01 Machine Learning and Data-Driven Materials Development and Design
- GI02 Materials for Next-Generation Robotics

## **NANOMATERIALS**

- NM01 Carbon Nanotubes, Graphenes and Related Nanostructures
- NM02 Nanometal—Synthesis, Properties and Applications
- NM03 Nanowires and Related 1D Nanostructures—New Opportunities and Grand Challenges
- NM04 Nanomaterials and Nanomanufacturing for Sustainability

## **PROCESSING AND MANUFACTURING**

- PM01 Architected Materials—Synthesis, Characterization, Modeling and Optimal Design
- PM02 Conductive Materials Reliability in Flexible Electronics
- PM03 Hierarchical, Hybrid and Roll-to-Roll Manufacturing for Device Applications
- PM04 High-Entropy Alloys
- PM05 Electromagnetic Fields in Materials Synthesis—Far from Equilibrium Effects
- PM06 Advances in Intermetallic-Based Alloys for Structural and Functional Applications
- PM07 Plasma-Based Synthesis, Processing and Characterization of Novel Materials for Advanced Applications

## **THERMAL PROPERTIES AND THERMOELECTRIC MATERIALS**

- TP01 Caloric Materials for Highly Efficient Cooling Applications
- TP02 Thermal Analysis—Materials, Measurements and Devices
- TP03 Emerging Low-Temperature Thermal Energy Conversion Technologies

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[www.mrs.org/fall2018](http://www.mrs.org/fall2018)

## **2018 iMatSci Innovator Showcase**

### **CALL FOR EARLY-STAGE STARTUPS**

Submission Site Opens: June 1, 2018

[www.mrs.org/imatsci](http://www.mrs.org/imatsci)

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