Newsletter
December 2013

APS Topical Group on Shock Compression of Condensed Matter

Message from the Chair

As the year and my term as chair come to a close, it is worth taking a minute to reflect on the successes the GSCCM has achieved in recent years and challenges we face going forward. Our biennial conference was held in conjunction with the meeting of AIRAPT, the static high pressure organization, for the first time in 20 years. There are many common areas of interest for these two communities, and, though such things are difficult to quantify, the joint meeting seems to have achieved some cross-pollination effects. The student program continued to expand with a pre-conference student session and an early career award won by Rick Kraus. In the future, we will be working to formalize that award. This year's Duvall Award winner, Gennady Kanel, illustrates that we are an international organization that should seek to include all those working in the field around the world. In particular, we should continue our efforts to include researchers from China as more scientists from that country work at a high scientific level.

The field of shock physics itself continues to be a vibrant field even though the questions to be addressed have remained largely unchanged for many years. New computational capabilities allow first principals calculations of shock properties, while new platforms such as NIF and Z have allowed access to new regimes and advances in diagnostics provide new information about the states achieved experimentally. While these new developments are exciting, many researchers have been affected by reductions in funding due to budget issues in much of the world. Such funding issues led to reduced access for academic researchers to Z and NIF, thus leading GSCCM to its first foray into public advocacy. Although the access has been restored and some issues with the group and APS bylaws have kept us from making a statement on the issue, we are pursuing other avenues to provide our input. The group will also be working to update our bylaws in case we face similar situations in the future.

Despite the challenges we face, I am confident that shock physics will be a vibrant field for years to come and that GSCCM will continue to be the organization that brings together those in the field – our next meeting in Tampa is only a year and an half away.

I wish everyone a happy and prosperous 2014.

Tracy Vogler

Awards

Dana D. Dlott, Professor of Chemistry at the University of Illinois at Urbana-Champaign, received the **2013 Award in Experimental Physical Chemistry** from the Physical Chemistry Division of the American Chemical Society. The citation recognizes Dana "for experimental techniques and measurements that advance our understanding of vibrational energy in molecules and materials". Dana has been an active member of the SCCM Topical Group for many years, and is an APS Fellow.

Nominated by the Topical Group on Shock Compression of Condensed Matter, two members of the SCCM Topical Group were named **Fellows of the APS** in 2013. This honor is bestowed on no more than 1/2% of the membership of the APS in any given year. **Marcus Knudson**, Sandia National Laboratories, was recognized for pioneering experiments to understand matter at extreme dynamic compressions and having a broad impact on multiple areas of physics through exemplary equation of state results at high pressure. **Justin Wark**, Professor of Physics at the University of Oxford, was recognized for seminal contributions towards understanding matter at extreme conditions through his pioneering development of advanced ultra-fast x-ray diffraction and x-ray spectroscopy.

Election

2013 APS SCCM Officers Election

The election of Topical Group officers for the 2014 term is now open.You should already have received an email message with the subject line "2013 APS SCCM Officers Election." The email contains a link to the ballot site where you can review information about the candidates and cast your vote. It will only take a few moments, so please vote right away! If you did not receive an email ballot link or if you require a paper ballot, please contact the GSCCM Secretary/Treasurer, Mark Elert, at elert@usna.edu.

Be sure to visit the APS GSCCM website

www.shockphysics.org

Upcoming Conferences

2015 APS-SCCM Conference

Tampa, FL
June 14-19, 2015

The Marriott Waterside Hotel and Marina
Tampa, FL 33602

The 19th Biennial International Conference of the APS Topical Group on Shock Compression of Condensed Matter (SCCM-2015) will be held in Tampa, Florida, from Sunday June 14th through Friday June 19th, 2015. The chairs for the conference are Ivan Oleynik (USF), Suhithi Peiris (DTRA) and Ramon Ravelo (UTEP). More information will be provided in the coming months.

2014 Mach Conference

ANNAPOLIS, MD

April 9-11, 2014

The Loews Annapolis Hotel
126 West St.
Annapolis, MD 21401

The Mach Conference showcases the state of the art in multiscale research in materials, with an emphasis on advancing the fundamental science of materials and structures in extreme environments.

Modeled after the Gordon Conference series, the Mach Conference is intended to trigger substantial intellectual discussion about the basic mechanical behavior of materials at a wide range of length scales in extreme environments. In the spirit of the Materials Genome Initiative, the conference will include discussions of modeling, experiments and processing of materials. In particular, there will be strong interactions between the academic science community and researchers within government agencies, national laboratories and international institutions.

The Conference particularly encourages the participation of graduate students, postdocs and young scientists. Sessions will include tutorial-style lectures to enhance learning. A general poster session will be held, with awards presented to the two top-rated graduate student posters.

Technical symposia may include:

- Characterization of materials in high-temperature applications
- Amorphization and inelasticity in ceramics
- Mechanics of damage and failure at multiple scales
- Dynamics of flaws, fracture, failure, and fragmentation
- Development of Equations of State
- Advanced techniques for in situ observations at small scales and short times
- Dynamics of deformation and failure in metals, ceramics, polymers, composites, and glasses
- Novel techniques for three-dimensional material characterization
- Image-based computational mechanics
- Dislocation cores, dislocation-based plasticity, and twinning
- Multiscale modeling of mechanisms and materials
- Hierarchical multiscale frameworks: scalable and adaptive computations
- Coarse graining and fast multiscale methods
- Computational and physics-based approaches to efficient scale-bridging
- Atomistics, potential development and molecular dynamics
- Approaches to large-scale Density Functional Theory (Big DFT)
- Validation, verification and uncertainty quantification
- Materials modeling using particle methods
- Synthesis and characterization of controlled stoichiometries in ceramics
- Design and optimization of microscale and mesoscale architectures in composites
- Single fiber and single filament characterization
- Mechanics of semicrystalline polymers

CALL FOR PAPERS

Pan American Materials Conference 2014

Sao Paulo, Brazil • July 21-24, 2014

Frei Caneca Convention Center

ABOUT THE PAN AMERICAN MATERIALS CONFERENCE SERIES

The 1st ABM-TMS Interamerican Materials Congress, held in conjunction with the 65th Annual Congress of ABM (Brazilian Metallurgical, Materials and Mining Association) and the 18th IFHTSE Congress, was conducted July 26–30, 2010, in Rio de Janeiro, Brazil. This new specialty meeting was an outcome of the TMS Alliance of the Americas strategy (adopted in the early part of the millennium) to work together with society partners in North and South America. The entire meeting was managed by ABM and attracted approximately 1,500 attendees. ABM will host the second installment of this Congress in 2014 during the 69th Annual Meeting of ABM, at the 70th anniversary of the founding of ABM. The societies anticipate that this will become a standing Pan American conference series.

Pan American Materials Conference 2014 will be held in cooperation with the Metallurgical Society of Canadian Institute of Mining, Metallurgy and Petroleum (Met Soc of CIM), the Argentinian Materials Association (SAM), Peruvian Association of Metallurgy, Materials and Minerals (MMMPA) and Chilean Society of Metallurgy and Materials (SOCHIM), among others.

Conference Co-chairs:

Marc Andre Meyers,
University of California, San Diego, United States

Sergio Neves Monteiro,
Military Institute of Engineerng, Brazil

Scan QR with Phone/Tablet.

Learn more about the event at:
www.abmbrasil.com.br/seminarios/materials-conference/2014/general-information.asp

SUBMIT AN ABSTRACT

The conference technical program will include plenary, keynote, and contributed presentations covering a range of topics. Those topics include:

- Biomaterials, smart materials, and structures
- Dynamic properties of materials
- Mechanical behavior of structural materials
- Composites and hybrid materials
- Materials for energy
- Light metals and alloys
- Modeling and simulation of processes, microstructures, and behavior
- Processing of materials
- Minerals processing
- Bulk metallic glasses, nanocrystalline materials, and ultrafine-grain materials
- Thin films and surface engineering

The Pan American Materials Conference–2014 will also include the Mehl symposium, comemorating the role played by R. F. Mehl in the founding of ABM. The symposium will feature a line-up of distinguished, invited speakers. Confirmed participants include: J. Narayan, 2014 Mehl Award Recipient; H. Gleiter, Karlsruhe I.T.; K. Lu, Institute for Metal Research, China; T. Massalski, Carnegie Mellon University; R. O. Ritchie, University of California Berkeley.

Submit an abstract at
http://www.programmaster.org/PAMC2014.

Abstract deadline:
January 31, 2014

SUBMIT ABSTRACTS NOW FOR

Pan American Materials Conference 2014

Sao Paulo, Brazil • July 21-24, 2014

Submit an Abstract Today!

Symposium on Dynamic Properties of Materials

The goal of this symposium is to provide an international forum on the latest developments in dynamic properties of materials, including:

- Shock Wave Effects
- High-Strain-Rate Deformation and Fabrication
- Dynamic Failure and Fragmentation
- Shock Synthesis
- Structural Damage

By attending this program, the audience will gain a deep insight on the current status of research and development in academia, national laboratories, and industries in the field of dynamic properties of materials.

Organizers:

George T. Gray,
Los Alamos National Laboratory, United States

N. Thadhani,
Georgia Institute of Technology, United States

Luis Henrique Leme Louro,
Instituto Militar de Engenharia, Brazil

Abstract Deadline: January 31, 2014

To submit an abstract today, visit **www.ProgramMaster.org** and click on the Pan American Materials Conference logo.

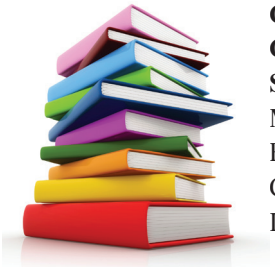
Scan QR with Phone/Tablet.

Learn more about the event at:
www.abmbrasil.com.br/seminarios/materials-conference/2014/general-information.asp

APS 2014 March Meeting Focus Sessions: "Materials in Extremes: Bridging Simulations and Experiment"

The GSCCM sponsored focus sessions "Materials in Extremes: Bridging Simulations and Experiment" will be held at APS 2014 March Meeting in Denver, CO, March 4-6, 2013. The seven focus sessions, consisting of several invited and contributed talks, will assess recent experimental and computational efforts towards exploring fundamental properties of materials at extreme conditions, including (1) shock-induced materials behavior, including plasticity, phase transitions, and chemical reactions; (2) high strain rate phenomena occurring upon ultrafast energy deposition; (3) dynamic properties of energetic materials, including detonation phenomena; (4) high-pressure and high temperature synthesis and characterization of novel materials; (5) properties of matter in the warm dense regime; and (6) new computational methods including development of interatomic potentials and multi-scale simulations.

Bookshelf



Continuum Mechanics: Constitutive Modeling of Structural and Biological Materials
F. M. Capaldi
Cambridge University Press
ISBN 9781107011816

Dynamic Behavior of Materials, Volume 1
Proceedings of the 2012 Conference on Experimental and Applied Mechanics
Conference Proceedings of the Society for Experimental Mechanics Series
V. Chalivendra, B. Song, and D. Casem (Eds.)
ISBN 9781461442387

Extreme Physics:
Properties and Behavior of Matter at Extreme Conditions
J. Colvin and J. Larsen
Cambridge University Press
ISBN 9781107019676

Fundamentals of Engineering Plasticity
W. F. Hoshford
Cambridge University Press
ISBN 9781107037557
Available from September, 2013

Introduction to Biomaterials:
Basic Theory with Engineering Applications
C. M. Agrawal, J. L. Ong, M. R. Appleford and G. Mani
Cambridge University Press
ISBN 9780521116909

Materials in Mechanical Extremes:
Fundamentals and Applications
N. Bourne
Cambridge University Press
ISBN 9781107023758

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*Lead for this and next issues

Please send any questions or comments about the newsletter to any of the editors.

Special thanks to Kerry Johnson and Nancy Bennett-Karasik of APS Special Publications.

The APS Topical Group on Shock Compression of Condensed Matter (GSCCM) was founded in 1984 to promote the development and exchange of information on the dynamic high-pressure properties of materials. The Topical Group sponsors biennial technical meetings on shock compression and detonation physics research, including experimental, theoretical and computational studies, and new experimental methods and developments