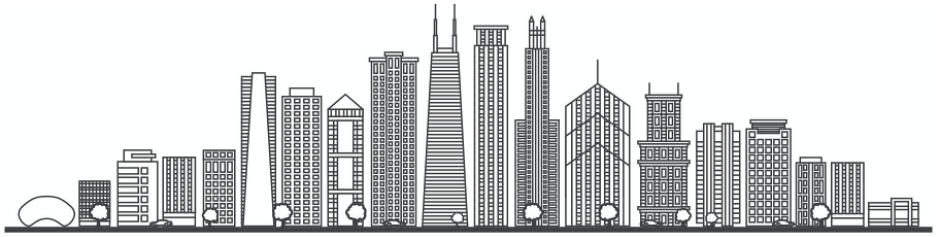
Newsletter
November 2020

APS Topical Group on Shock Compression of Condensed Matter



Shock Compression of Condensed Matter
CHICAGO, IL | JUNE 2021

Message from the Chair

It's been an honor to serve on the GSCCM Executive Committee, particularly as the Chair for the last year. I would like to thank all the Executive Board members for their service. The Nominating Committee has put together an excellent slate for the upcoming voting, which we've strived to move earlier in the year. Thank you to Matt Lane, GSCCM Secretary/Treasurer for leading that effort!

2020 has been a different kind of year, and GSCCM is working to be responsive to the evolving situation. I'm looking forward to the upcoming GSCCM Seminar Series being led by Tracy Vogler and Minta Akin. We're also looking at options for the 22nd Biennial Conference of the APS Topical Group on the Shock Compression of Condensed Matter, currently scheduled for June 27-July 2, 2021. See Page 2.

The Executive Committee has been working on several projects this year. Ivan Oleynik and John Borg have been leading the effort to have a larger GSCCM presence at the APS March Meeting. Matt Lane has been actively pursuing stabilizing our membership numbers. Our membership fluctuates between conference and non-conference years enough that it affects the number of APS Fellows that the Topical Group can nominate each year.

Proposals to organize the 2023 Shock Compression Conference are now being solicited. Potential organizers should submit a brief description of the conference vision and names, qualifications, and duties of the organizing team. Proposed locations can be included; however, the committee will work with the APS Meetings team on the meeting logistics. Conference teams typically have three members, with at least one member from academia and not more than one member from a particular federal agency, such as the Department of Energy. Proposals should be submitted to Matt Lane for consideration by the Executive Committee by March 2021.

Be sure to check your membership status, and be sure that you're a member of the Topical Group. You can add the Topical Group membership, even if it's not time to renew your APS membership. Encourage your colleagues to maintain their APS and Topical Group membership even in non-conference years.

Best Wishes!
Jen

Upcoming Meetings

2021 APS March Meeting

The APS Topical Group on Shock Compression of Condensed Matter (GSCCM) is organizing Focus Topic (FT) Sessions "Materials in Extremes: Bridging Simulations and Experiment" at the APS 2021 March Meeting, which will be held virtually from March 15 to 19. For more information, see https://march.aps.org/

The FT sessions will showcase more than 100 contributed and 10 invited talks. The virtual platform will provide new modes for exchange of information and networking among members of our Materials at Extreme Conditions as well as the entire Physics community.

The Materials in Extremes FT sessions will assess recent experimental and computational advances in exploring the fundamental properties of materials at extreme conditions, including:

- static high pressure and shock-induced materials behavior, including plasticity, phase transitions, and chemical reactions;
- static and dynamic properties of energetic materials, including structural stability at high P-T conditions, P-T phase diagrams, and detonation phenomena;
- high-pressure and high temperature synthesis and characterization of materials;
- properties of matter in the warm dense regime;
- novel experimental and computational methods to study fundamental mechanisms of materials response at the atomic, microstructural, and continuum levels as well as examples of fruitful collaborations between experiment and predictive theory/simulations.

We look forward to seeing your active participation in sessions of our Materials in Extremes FT at APS 2021 March meeting.

Cindy Bolme,
John Borg,
Ivan Oleynik,
Nenad Velisavljevic,
Materials in Extremes FT co-organizers

2021 SCCM Conference Update

The 22nd Biennial Conference of the APS Topical Group on the Shock Compression of Condensed Matter is currently scheduled for June 27-July 2, 2021 at the Sheraton Grand Chicago in Chicago, Illinois. The travel and gathering restrictions due to COVID-19 are causing a lot of uncertainty for the Shock Conference. We've sent a survey to the GSCCM membership and conference attendees to understand your perspective on the conference. The survey has closed and we appreciate the 200+ responses. Generally, the membership and frequent conference attendees are interested in an in-person conference or a virtual conference with a high quality technical program. We'll be using the survey results along with advice from the APS Meetings team to make a proposal to the SCCM Executive Committee on the path forward for the conference.

We've put together a great technical committee and are finalizing the details on the topic areas. The Conference Website (https://www.aps.org/units/gsccm/meetings/annual/index.cfm) will be updated regularly as we make progress through the conference planning. Additionally, we'll send out emails to the GSCCM membership with updates. Be sure your APS and GSCCM membership are up-to-date!

Arianna Gleason, SLAC/Stanford University
Jennifer Jordan, Los Alamos National Laboratory

Other Meetings

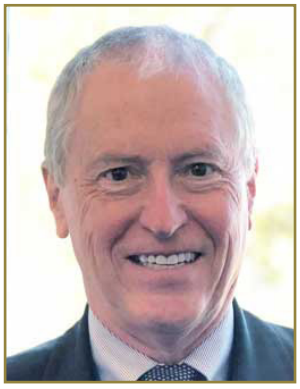
Mach Conference 2021
April 7-9, 2021
Johns Hopkins Univ, Baltimore, MD
Contact: Bess Bieluczyk (bess@jhu.edu)

Research at High Pressure - Gordon Conference
July 17-22, 2022
Holderness School, Holderness, NH
Chairs: Sakura Pascarelli and Chris Pickard

2019 George E. Duvall Shock Compression Science Award Recipient

George T. (Rusty) Gray, III
Los Alamos National Laboratory

Citation:
"For pioneering contributions in dynamic constitutive and damage response of materials; for leadership in developing programs and tools to advance our understanding of materials and structures in response to high-strain-rate and shock deformation; and for leadership in the technical community."



Background:
George T. "Rusty" Gray, III, is a laboratory fellow in the dynamic properties and constitutive modeling team within the Materials Science Division of Los Alamos National Laboratory (LANL). He received his B.S. in 1976 and M.S. in 1977, both from South Dakota School of Mines and Technology. He came to LANL following a three-year visiting scholar post at the Technical University of Hamburg-Harburg in Germany after completing his Ph.D. in materials science in 1981 at Carnegie-Mellon University. He conducts fundamental, applied, and focused programmatic research on high-strain-rate and shock deformation. He is a life member of Clare Hall, University of Cambridge, where he completed a sabbatical in 1998. He co-chaired the Physical Metallurgy Gordon Conference in 2000. He is a fellow of the American Physical Society, the American Society of Metallurgy International, and the Minerals, Metals, and Materials Society, for which he served as president in 2010. Currently, he serves on the advisory board of the European DYMAT Association and chairs the Acta Materialia Board of Governors which oversees publication of the journals Acta Materialia, Scripta Materialia, Acta Biomaterialia, and Materialia. He has authored or co-authored over 440 publications. In 2017 he was elected to the National Academy of Engineering and in 2018 was awarded the Rinehart Award from the DYMAT Association.

2019 APS Fellow

Tracy John Vogler
Sandia National Laboratories

Citation: For landmark contributions to the basic understanding of shock propagation in metals, ceramics, and granular materials, for sustained service to the APS Topical Group on Shock Compression of Condensed Matter, and for leadership in the science community.

Nominated by: Topical Group on Shock Compression of Condensed Matter

Lower GSCCM membership numbers in 2019 allowed only one fellow to be nominated in that year.

2020 APS Fellows

Ralph Menikoff
Los Alamos National Laboratory

Citation: For pioneering contributions to the fundamental understanding of materials under extreme conditions, including the physics and modeling of shock waves, detonation waves, equations of state, and reactive burn models for chemical explosives.

Eugene Zaretsky
Ben-Gurion University of the Negev

Citation: For groundbreaking experiments that led to fundamental insights into shock-induced plasticity, phase transitions and dynamic strength of metals, ceramics and complex materials.

Nominated by: Topical Group on Shock Compression of Condensed Matter

Past Meetings

21st Biennial APS Conference on Shock Compression of Condensed Matter

The Twenty-First Biennial American Physical Society Conference on Shock Compression of Condensed Matter (SCCM-2019) was held at the Hilton Portland Downtown in Portland, OR, USA, from June 16 to June 21, 2019. The conference was a premier forum for the presentation and discussion of cutting-edge world-wide research in fundamental science and applications of shock and detonation physics and chemistry, energetic materials, and materials response to extreme conditions. More than 650 submitted abstracts were organized in 10 major topical areas including 1 focus sub-topic, Mesoscale Modeling of Explosive Initiation. The presentations consisted of five plenary lectures, 45 invited talks, 468 contributed papers, and 141 poster presentations given during two poster sessions. An early full-day Early Career Symposium was held on the Sunday preceding the main conference and consisted of 22 oral presentations and 18 posters.

The conference was attended by scientists from 19 countries.

Duvall Award winner Rusty Gray, of Los Alamos National Lab, presented a plenary lecture entitled "Developing a Pathway to Microstructure-Aware Predictive Capability for the Dynamic Response of Materials." Other plenary speakers included: Todd Hufnagel (JHU), "Quantitative x-ray phase contrast imaging during dynamic deformation and fracture"; Aidan Thompson (SNL), "Molecular Dynamics Simulation: Engine of Discovery or Bridge to Nowhere?"; Laura Smilowitz (LANL), "Thermal Decomposition to Detonation: Understanding Reaction Violence"; and Federica Coppari (LLNL), "Unraveling the exotic properties of water ices with laser-driven compression and x-ray diffraction."

This year's GSCCM Early Career Award was given to Alison Saunders, of Lawrence Livermore National Lab, who was selected by the selection committee from the pool of current graduate students or researchers within two years of PhD completion. She presented a talk titled "Development of high-power laser platforms to study metal ejecta interactions."

SCCM-2019 Co-Chairs
Ryan Wixom, David Damm, and Joe Zaug

Shock Seminar Series Speakers

The GSCCM virtual seminar series will cover topics of interest in materials response to high pressures, strain rates, and temperatures. Applications of interest include high velocity impact, explosives, and inertial confinement fusion. The series will cover recent experimental, theoretical, and computational advances in the field as well as more holistic views of key topics.

The inaugural Zoom seminar, entitled "Watching solids and liquids through the ultrafast shock compression microscope" was presented by Prof. Dana Dlott of University of Illinois at Urbana-Champaign.

The December Seminar will be given by Megan Bruck Syal, a Design Physicist at Lawrence Livermore National Laboratory (LLNL). Dr. Syal leads the Planetary Defense project at LLNL and serves as a Group Leader in the Design Physics Division. Her PhD in Geological Sciences is from Brown University.

We would like to solicit nominations for future seminars and anticipate having a mix of a single speaker or two speakers during an hour time slot. Please email your nominations to Tracy Vogler (tjvogle@sandia.gov).

GSCCM Virtual Seminar Series Organizing Committee
Minta Akin, Dana Dlott, Dan Eakins, Christopher "Kit" Neel, Laura Smilowitz, and Tracy Vogler

Dr. Megan Syal
Lawrence Livermore National Laboratory

"Planetary Defense"
Dec 7, 2020, 3:00 PM Eastern Time

Zoom info at: https://www.aps.org/units/gsccm/

Abstract: The question of how to defend Earth from hazardous asteroids and comets has gained substantial U.S. government and international attention in recent years, particularly since the February 2013 Chelyabinsk meteor event. A National Near-Earth Object Preparedness Strategy and Action Plan, released by the White House's Office of Science and Technology Policy in 2018, lays out the goals that NASA, the National Laboratories, and other Federal Departments and Agencies must work toward over the next 10 years to increase the country's readiness. A major goal of this national effort is improving simulations of asteroid mitigation; two of the most effective methods for asteroid impact avoidance, kinetic impact deflection and nuclear deflection or disruption, require extensive shock physics simulations (many in 3D), in order to understand and anticipate asteroid response. Another major goal, strengthening impact emergency procedures, requires accurate shock physics simulations to assess Earth-impact consequences, including airbursts, water, and land impacts. This talk will provide an overview of current planetary defense research activities, including: new meshless methods for assessing airburst consequences; large ocean-wave generation, propagation, and flooding from asteroid impacts; simulations to support the first asteroid deflection test, to be carried out by NASA's DART mission at the "moonlet" asteroid Dimorphos in 2022; and recent work to improve multiphysics modeling and simulation capabilities for nuclear and kinetic deflection of asteroids.

Early Career Award Nominations

The 2021 APS GSCCM Early Career Award will be given to recognize outstanding work by either a current graduate student or a researcher within two years of PhD completion. Nominations for the award are invited from the entire community and should include a cover letter, at least two letters of support, an example of recent work (publication, conference proceedings, poster or abstract), and the nominee's CV. The recipient will be recognized at the conference and will give an oral presentation on their work.

Send nominations to Cindy Bolme (cbolme@lanl.gov) with the subject line "SCCM Early Career Award Nomination."

Nominations due by Monday March 16, 2021

Newsletter Staff Volunteers Needed

As the GSCCM Topical Group reinvents our Member Newsletter, we seek Newsletter staff volunteers.

This is a great way to get involved and network with the community.

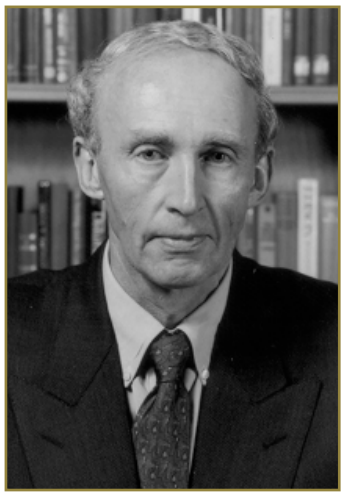
Writers, Editors, Designers needed.

Contact Matt Lane
jlane@sandia.gov

Obituaries

John E. Field

1936-2020



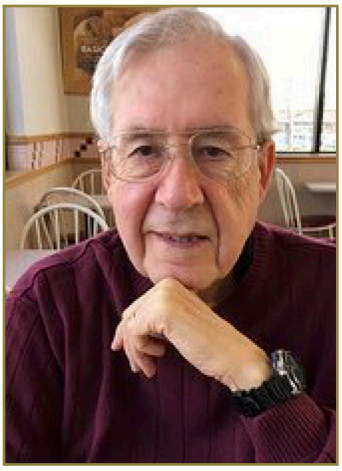
John Field was born in September 1936. From 1955 to 1958 he attended University College, London obtaining a First Class Honours degree in Physics. In 1962 he graduated PhD in Physics at Cambridge under the supervision of the late Professor Philip Bowden, founding professor of the Physics and Chemistry of Solids Group. The title of John Field's thesis was "High speed liquid impact and the deformation and fracture of brittle solids." In 1962 he was elected an Owens Illinois Research Fellow. In 1964 he joined Magdalene College, Cambridge as a Research Fellow and College Lecturer in Physics. This was followed in 1966 by his appointment as University Demonstrator in Physics at the Cavendish Laboratory (Department of Physics), Cambridge. He rose in seniority in the department becoming a Lecturer in 1971, a Reader in 1990, and Professor (of Applied Physics) in 1994. He was a Deputy Head of the Department of Physics 1995-2003. He was awarded the Duddell Medal and Prize in 1990 by the Institute of Physics, the citation being for 'Advances in Instrumentation'. He retired from his professorship in 2003, taking the title Emeritus Professor of Applied Physics. Two universities have bestowed honorary doctorates on him: Luleå (Sweden) in 1989 and Cranfield (UK) in 2003. The Royal Society of London elected him a Fellow in 1994 and the Royal Society of South Africa elected him an Honorary Fellow in 2002. He was a Visiting Professor at the University of Luleå, Sweden, the Ecole Polytechnique Federale Lausanne, Switzerland, and the National University of Singapore. In 2009, he was awarded the John Rinehart Award by the DYMAT Association for his research on the dynamic properties of materials. He was an advisor to the Ministry of Defence on research on energetic materials. In 2014, the University of Luleå, Sweden, named a laboratory in his honour.

His research interests included: strength properties of solids, fracture, impact, erosion (by both liquid and solid impact), reactivity of solids, explosive initiation, shock physics, laser damage, acoustics, and diamond physics. He supervised 84 doctoral students, authored or co-authored over 460 papers, edited two books (on Diamond Physics), obtained two patents, and organised (or co-organised) a number of conferences on erosion phenomena, diamond physics, high speed photography, energetic materials, and high rate properties of materials.

Contributors:

Stephen Walley (Cavendish Laboratory) and Bill Proud (Imperial College)

E. Ray Lemar



E. Ray Lemar passed away at the Washington Hospital Center on Oct. 29, 2020 of congestive heart failure with complications. He is survived by his wife Linda of Laurel MD, and sons Eric of Seattle, WA and Ryan of Richmond, VA. Ray was very active in the American Physical Society's Topical Group on Shock Compression of Condensed Matter. He also served as Secretary/Treasurer of the Topical Group for six years and set up and continued to maintain the Topical group's website.

Ray obtained his PhD in Physics from the University of Illinois in 1972. He then held a postdoctoral position in Solid State Physics at Washington State Uni-

(Obituaries continued from page 6)

versity (WSU) from 1972 to 1974. He taught both introductory and advanced undergraduate courses in physics at WSU from 1974 to 1976. He then had a research position in the Shock Dynamics Laboratory at WSU from 1976 to 1980, where he worked with Prof. George Duvall on electrical and mechanical properties of materials under shockwave loading conditions.

In 1980, Ray obtained a research position at the Naval Surface Warfare Center(NSWC-WO) in White Oak, Maryland where he worked on shock wave studies. He conducted shockwave experiments on explosives and inert materials in bombproof test chambers as well as one dimensional(1-D) gas gun shock compression experiments. In 1986 Ray became the Group Leader of the Explosives Response Group of the Detonation Physics Branch at NSWC-WO. He developed the techniques and the software needed to analyze the results from CYLEX (cylinder expansion) and the aquarium underwater shock gauge tests. In 1996 the Navy moved the research department on energetics to the Naval Surface Warfare Center (NSWC-IH) at Indian Head, MD.

After retiring from in 2009, Ray took a Research Physicist position at Energetics Technology Center where he helped develop an equation of state for porous aluminum. He also worked on a project that involved the analysis of several explosive tests ran at NSWC-IH in 2011. Part of this project entailed transitioning this analysis capability to NSWC-IH.

Contributor:

Jerry Forbes (Retired)

American Physical Society
One Physics Ellipse
College Park, MD 20740

http://www.aps.org

APS GSCCM
https://www.aps.org/units/gsccm/

Seeking Editorial Staff

Sunil Dwivedi
(dwivedis001@gmail.com)

Matt Lane, Sandia National Laboratories
(jlane@sandia.gov)

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

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.