

Obituary 2
Upcoming Meetings 3
News & Events 9
Bookshelf 10
Editorial Staff 11

2016 APS SCCM Officers:

Chair: Dan Dolan
Sandia National
Laboratories
Phone: (505) 284-8608
email: dhdolan@sandia.gov

Chair Elect: Damian Swift
Lawrence Livermore National
Laboratory
Phone: (925) 422-6781
email: swift23@llnl.gov

Vice Chair: Brian Jensen
Los Alamos National Laboratory
Phone: (505) 667-9886
email: bjensen@lanl.gov

Past Chair: Paulo Rigg
Institute for Shock Physics
Washington State University
Phone: (630) 252-0462
email: prigg@wsu.edu

Secretary/Treasurer:
Mark Elert
US Naval Academy
Phone: (410) 293-6636
FAX: (410) 293-2218
email: elert@usna.edu

Webmaster: E. Ray Lemar
Energetics Technology Center
Phone: (240) 461-5316
email: elemar@comcast.net



Message from the Chair

The alternate years between the biennial conferences seem quiet, but quite a lot occurs behind the scenes. Organization for the 20th Conference on Shock Compression of Condensed Matter is gearing up, and a lot of work remains to be done before the St. Louis meeting. This is also the time for initial planning of the following conference in 2019. A formal call for conference proposal follows, and I encourage our members to submit proposals before March 2017.

An usually high fraction of the members in our topical group work for the United States government or through a government contractor. This has traditionally been a source of strength for the group and the shock conference, but it also makes us very sensitive to federal policy changes. Differing interpretations of that policy have created significant confusion about conference hosting. Potential hosts for future conferences should carefully read suggestions in the proposal call. More information is available by contacting any officer from the executive committee.

I want to thank the organizers for the 2017 conference — Marcus Knudson, Eric Brown, and John Eggert — for their efforts. These individuals have worked very

hard against substantial gridlock to make this conference possible.

Proposals for 2019 Shock Compression Conference

Proposals to organize the 2019 Biennial Conference on Shock Compression of Condensed Matter are now being solicited. Potential hosts should submit a brief description of the intended local along with the names, qualifications, and duties of the organizing team. Proposals should be sent to any officer of the topical group (listed in the side bar on this page) before March 2017.

Conference teams typically have three or more members. Diverse organization teams are strongly encouraged, particularly those with at least one academic member. Teams should avoid using more than one employee from a particular federal agency, such as the Department of Energy, and certainly no more than two.

The 2017 meeting will be held in St. Louis, Missouri. Successive meetings traditionally move around the continental United States, so a site outside the Midwest would be preferred.

Dan Dolan

Obituary: William H. (Bill) Holt

William H. (Bill) Holt, Navy civilian shock wave physicist, passed away on October 19, 2015, in Fredericksburg, VA at the age 76.

Bill was born on August 5, 1939, in San Antonio, TX. He received a B.S. degree in Physics cum laude from St. Mary's University in San Antonio, TX in 1960. Bill received M.A. and Ph.D. degrees in Physics from the University of Texas at Austin in 1962 and 1967, respectively. The theses were completed under Professor Walter E. Millett and were in the area of angular correlation of positron annihilation radiation in nickel-zinc ferrites and ammonia. From 1967 to 1969, he was a Post-doctoral Research Fellow and Lecturer at the University of Manitoba, Winnipeg, Manitoba, Canada, under Physics Professor Benjamin G. Hogg. Bill performed research on positron interactions in solids and liquids, and worked on improvements to a large high-resolution mass spectrometer for precision measurements of nuclear masses. While in Canada, Bill published papers with friend and fellow post-doc Shu Yuen Chuang, and Professor Hogg.

In 1969, Bill joined a research group of new physics PhDs at the Naval Surface Warfare Center, Dahlgren, VA. There he started and equipped a laboratory using positron annihilation techniques for nondestructive testing of mechanical fatigue in metals, and moisture effects in polymers and other non-metals. He collaborated for many years in this area with Jag J. Singh of NASA/Langley Research Center in Hampton, VA. Bill has joint publications with Jag and other coworkers in the above research area, and is the coauthor of a patent for mechanical fatigue detection using positron probes.

In addition to remaining active in positron spectroscopy, Bill began working in 1970 with Dahlgren colleague Willis Mock, Jr. in the area of shock wave physics in solids. They designed and built a gas gun facility for studying the impact properties of materials under shock loading. Bill is the coauthor of over 20 patents, patent applications, and Navy invention disclosures, and over 60 publications and reports in the areas of shock wave propagation in solids, fracture and fragmentation of materials,

shock-induced chemistry of polymers, shock depoling of ferroelectrics, and new experimental techniques for gas gun research.

Bill received the Dahlgren Division's Science and Engineering Excellence Award in 1994. In 2001, he was awarded the John A. Dahlgren

Award, the highest award offered by the Dahlgren Division, for his scientific achievements in shock wave physics. He received the Dahlgren Division's Independent Research Excellence Award in 2004. Bill was the recipient of the Navy's Distinguished Achievement in Science Award in 2005, the Navy's highest scientific award, for his co-discovery of reactive materials.

He served as a session chairperson for many meetings of the APS Topical Group on the Shock Compression of Condensed Matter. He served on the Technical Program Committee for the 11th APS Topical Conference on Shock Compression of Condensed Matter, Snowbird, Utah,

1999. He also served as the NSWC Dahlgren Division's representative to the Aeroballistics Range Association. He is biographically listed in Marquis *Who's Who in Science and Engineering*, *Who's Who in America*, and *Who's Who in the World*. Bill was a member of the American Physical Society, the Canadian Association of Physicists, Sigma Xi, Sigma Pi Sigma, and the Materials Research Society.

He retired from Dahlgren in 2006, and was a senior scientist at Energy Technology Center in La Plata, MD from 2008 to 2011 before retiring completely.

Bill was very active in church and community affairs. He and wife Margaret joined a local Methodist church in 1970 shortly after moving to Fredericksburg, VA. He served as



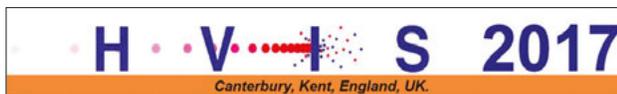
a local Lay Leader, and represented his church at the Ashland District and Virginia Conference. In addition, he was a committee member of the Virginia Interfaith Committee on Mental Illness Ministries.

He is survived by his wife Margaret of 52 years, two sons, daughter-in-law, and two grandchildren. He was a devoted and loving person to his family and is missed by his many friends and colleagues.

Willis Mock, Jr.
Kratos Defense & Rocket Support Services, Inc., King George, VA

Susan L. Bartyczak
Naval Surface Warfare Center Dahlgren Division, Dahlgren VA

Upcoming Meetings



14th Hypervelocity Impact Symposium **Monday 24th - Friday 28th April, 2017** **University of Kent, Canterbury, UK**

The Board of Directors of the Hypervelocity Impact Society is pleased to announce that the 14th Hypervelocity Impact Symposium will be held April 24th – 28th, 2017 in Canterbury, UK. This Symposium serves as the principal forum for the discussion, interchange and presentation of the physics of high- and hypervelocity impact and related technical areas. It is intended for scientists, engineers, and technical managers from academia, industry, government and defense programs.

The HVIS Symposia have a long-standing international reputation as a catalyst for stimulating research in this area through a wealth of oral and poster presentations, and commercial exhibits. The Symposium’s proceedings are the major archival source of papers published in this field. Oral and poster presentations will be made in the following technical areas:

- Hypervelocity Phenomenology Studies
- High-Velocity Launchers and Diagnostics
- Spacecraft Meteoroid/Debris Shielding and Failure-Analyses
- Material Response (including EOS)
- Fracture and Fragmentation
- High-Velocity Penetration Mechanics and Target-Response

- Armor/Anti-Armor and Ballistic Technology
- Analytical and Numerical Methodologies
- Theoretical/Applied Mechanics Relevant to Hypervelocity Impact
- Asteroid Impact and Planetary Defense Technology

A special session in the topical area of Impacts in the Solar System is also being planned. This special session will include a full afternoon of papers devoted to this topic, including a plenary speaker. We encourage those studying impacts in the solar system via experiments and modeling to submit abstracts.

Companies are also invited to exhibit during the Symposium. Space is limited, so make your plans early!

The Symposium venue is the University of Kent, Canterbury (<https://www.kent.ac.uk/http://www.canterbury.co.uk/>). For those who are not familiar with Canterbury, the city is home to Canterbury Cathedral (where Thomas Beckett was famously murdered for King Henry II), a huge number of quaint shops and restaurants and a plethora of pubs!

The Symposium local organising committee Co-Chairs are Prof. Mark Burchell, Dr. Mark Price and Dr. Penny Wozniakiewicz. More information on the Symposium, including contact information, hotel reservations, schedules, commercial exhibits, and timelines can be found at the Symposium website: <http://astro.kent.ac.uk/HVIS2017/> or by contacting the organising committee’s email: HVIS2017@star.kent.ac.uk.

We are looking forward to seeing you all in Canterbury next year!

14th International Conference on Fracture (ICF14)

Rhodes, Greece

June 18-23, 2017

(webpage: <http://www.icf14.org>).

Dear colleague,

It is with great pleasure that I extend to you this cordial invitation to the 14th International Conference on Fracture (ICF14) in Rhodes, Greece, during June 18-23, 2017 (webpage: <http://www.icf14.org>). The conference is organized under the auspices of the International Congress on Fracture.

ICF14 will comprise of invited lectures by eminent academics together with contributed presentations covering all aspect of fracture mechanics. During the conference, special symposia in major areas of research activity as well as honoring individuals will be organized by members of the Scientific Advisory Board.

The attendees of ICF14 will have the opportunity to interact with the world leaders of fracture mechanics and get acquainted with the latest developments. ICF14 will be a forum where academia, industry, and government interact and exchange ideas in an area of utmost scientific and technological importance.

I am sure that besides the superb technical program, you will enjoy the majestic island of Rhodes with its unique beaches and scenic beauty, the medieval town and castle, many areas of historical interest and archeological importance, the delicious local cuisine, and the traditional Greek hospitality. ICF14 will be an unforgettable event: scientifically, socially and recreationally.

I look forward to welcoming you in Rhodes in 2017.

Best wishes,

Emmanuel E. Gdoutos

ICF14 Chairman

Conference Tracks

Track 1 Nanomaterials and Nanostructures

- Fracture and fatigue of nanostructured materials
- Failure mechanisms
- Fatigue and fracture of MEMS and NEMS
- Failure analysis of nanodevices
- Fatigue and fracture at atomistic and molecular scales

- Thin films
- Electronic materials
- Failure of nanocomposites

Track 2

Engineering Materials and Structures

- Physical aspects of fracture
- Micromechanisms in fracture and fatigue
- Brittle fracture
- Ductile fracture
- Nonlinear fracture mechanics
- Fatigue and fracture
- High temperature fracture
- Fretting fatigue
- Polymers and composites
- Ceramics
- Fracture mechanics analysis
- Surface treatment technologies
- Probabilistic approaches to fracture mechanics
- Computational fracture mechanics
- Experimental; fracture mechanics
- Creep fracture
- Environment assisted fracture
- Dynamic, high strain rate, or impact fracture
- Damage mechanics
- Residual stress effects
- Concrete and rock
- Sandwich structures
- Novel testing and evaluation techniques
- NDE
- Mixed-mode fracture
- Structural integrity
- Scaling and size effects
- Mesofracture mechanics
- Smart materials and structures
- Fracture of biological materials
- Geophysical and tectonic problems
- Restoration engineering

Mini-Symposium Announcement:

High Temperature Fracture Mechanics Based Component Life Assessment Considering: Air and Environmentally assisted Creep and Creep/Fatigue and Load History Effects

Organised by

Prof. Kamran Nikbin*, Dr Catrin Davies*, Prof David Dean
*Imperial College, London, EDF Energy, UK

With an increasing need to operate plants under varying loading cycles and possibly more corrosive and higher temperature environmental conditions there is a need to assess the present state of the art in fracture mechanics based methods in order to improve design and lifing methods for these components. This mini symposium will accept papers that can highlight the following areas of multidisciplinary research to shed more light on the new problems facing industry:

Materials: Development and Metallurgical Assessment of High Temperature and Fatigue Resistant Advanced Steels, Specific Work on 316 Stainless, 9 Cr Steels

Mechanisms of Crack Growth: Brittle Fracture, Ductile Rupture, Creep and Fatigue Crack Growth, of as Received, Ex-Service Steels and Their Weldments with Focus on The Micro-Macro Cracking Properties

Modelling: Empirical and Continuum Damage Models, Multiaxial Fracture Mechanics, Multi-Scale Modelling Creep and Fatigue Crack Growth Models, Crack Path and Rate Simulation, Statistical Models, Micromechanical Models, Constraint Effects, Weldment Models

Loading History Effects: Pre-Damaged or Pre-Strained Material Testing and Their Subsequent Response to Creep and Fatigue Cracking Behaviour, Effects of Frequency on Creep/Fatigue Interaction

Residual Stress Measurement and Modelling

Environmental Assisted Damage: Fracture Initiation and Cracking testing and modelling in corrosive, oxidising and Unusual High Temperature environments

Methods: Analytical Solutions, Finite Element Modelling, Laboratory Experiments, Full Scale Experiments, Failure Analysis

Industrial Applications: Example Assessment in Conventional Plant, Nuclear and Chemical Engineering Plant, Modelling of Components Using Fracture Mechanics Based FFS Methods

Selected papers will be published in special issues of the journals: “**Theoretical and Applied Fracture Mechanics**” and/or “**Fatigue and Fracture of Engineering Materials and Structures**”. Please send by email your expression of interest with a tentative title of your presentation together with the name, affiliation and email address of the corresponding author and the names of

co-authors before 10th Sept. 2016 (**QUOTING on the Subject line ICF14-MS**) to:

K.Nikbin@imperial.ac.uk
V.Crawford@Imperial.ac.uk

Mini-Symposium

Fracture under High Rate and Impact Loading

Chair: Prof. Yuri Petrov

St. Petersburg State University, St Petersburg, Russia

Co-chair: Prof. Vadim Silberschmidt

Loughborough University, Loughborough, UK

You are cordially invited to submit an abstract to the Mini-Symposium “Fracture under High Rate and Impact Loading”, which is organised within the framework of the ICF 14 to be held in Rhodes, Greece on June 18-23, 2017 (see <http://www.icf14.org/>).

The topics of the Symposium include, but are not limited to, the following:

- high-strain rate loading
- dynamic fracture
- impact and blast loading
- high-speed penetration
- impact fatigue
- stress waves in microstructured materials
- simulation of failure and damage in materials under dynamic loading

The materials of interest range from traditional ones such as metals, alloys, ceramics, polymers and composites to advanced and emerging materials as well as bio- and biomedical materials.

Selected papers will be published in special issues of journals: “Engineering Fracture Mechanics” and/or “Mechanics of Advanced materials and Modern Processes”. Please send your expression of interest with a tentative title of your presentation together with the name, affiliation and email address of the corresponding author and the names of co-authors before 15 September 2016 (quoting ICF14-MS in the Subject line) to:

yp@yp1004.spb.edu
v.silberschmidt@lboro.ac.uk



First Announcement

20th American Physical Society Topical Conference on Shock Compression of Condensed Matter

July 9-14, 2017

Hyatt Regency at the Arch
St. Louis, Missouri, USA

We are excited to announce that the 20th Biennial APS Shock Compression of Condensed Matter Conference will be held in St. Louis, Missouri, on July 9-14, 2017 at the Hyatt Regency St. Louis at the Arch. The conference hotel is situated in the heart of downtown St. Louis at the base of the Gateway Arch, immediately adjacent to the newly renovated Gateway Arch National Park.

St. Louis, located on the Mississippi River, is known as the Gateway to the West. Home to the St. Louis Cardinals and Anheuser-Busch, St. Louis is also one of the more family-friendly cities. Next to Washington, D.C. St. Louis offers the greatest number of free attractions, including their World-class Zoo, many museums, the Muny (St. Louis' outdoor amphitheater), and much more. Easily accessible by airplane and centrally located in the U.S., St. Louis will be a great venue for this Conference.

The scientific focus of the Conference will be on fundamental and applied research topics related to dynamic compression of condensed matter. This multidisciplinary field of research encompasses areas of physics, chemistry, materials science, mechanics, geophysics, planetary science, and applied mathematics.

The conference will include both oral and poster presentations. In addition, a day-long student symposium will take place on Sunday, July 9, 2017.

Abstracts will be solicited for the following technical areas:

- Detonation and shock-induced chemistry
- Energetic and reactive materials
- Equations of state
- Experimental developments; diagnostics and loading techniques

- First-principles and molecular dynamics
- Geophysics and planetary science
- Grain-scale to continuum modeling
- High energy density physics / warm dense matter
- Inelastic deformations, fracture, and spall
- Materials science
- Particulate, porous, and composite materials
- Phase transitions
- Soft matter
- Ballistics studies
- Spectroscopy and optical studies
- Additional Focus Areas

We are currently soliciting ideas for Focus Areas; please forward your ideas to the Conference Co-Chairs.

Calendar of Events

- December 12, 2016 – 2nd Announcement and Call for Abstracts
- January 1, 2017 – Reservation, Registration, and Activity Information
- February 24, 2017 – Abstracts Deadline
- June 12, 2017 – Hotel Reservation Deadline and Early Registration Deadline
- July 9-14, 2017 – Conference

We invite you to save these dates, and next summer.

Join Us in St. Louis!

SCCM-2017 Co-Chairs

Eric Brown, Marcus Knudson, and Jon Eggert

en_brown@lanl.gov

mknudson@wsu.edu

eggert1@llnl.gov



8th International Conference on Fracture of Polymers, Composites and Adhesives

10-14 September 2017

Eurotel Victoria

Les Diablerets, Switzerland

<http://www.esistc4conference.com/>

This will be the 8th International Conference in the series organised by the European Structural Integrity Society- Technical Committee 4 on Fracture Mechanics related to Polymers, Polymeric Composites and Adhesives. We are

again inviting papers in the areas reflecting the current and future interests of TC4 as listed below. New developments and innovative applications are especially welcome. Both experimental and theoretical work is sought in order to give a balanced view of the subject areas:

Polymers: Low rate properties, K_{Ic} , G_c and J_c . Essential work of fracture. Impact and high rate properties. Ductile energy dissipation and notching effects. Environmental effects. Fracture in soft materials. Cutting, machining and scratching.

Composites: Delamination in continuous fibre composites including cross-ply and 3-D reinforcement. Impact and high rate properties. Fatigue and thermal properties. Toughness of short fibre and particulate composites. Nano and micro-scale composites. Mixed-mode and mode II fracture. Peeling of flexible laminates.

Adhesives: Structural adhesives toughness evaluation. Geometry and thickness effects on G_c . Toughening mechanisms, including nano-scale additives. Impact and high rate behaviour. Peeling of flexible laminates.

Application of fracture mechanics: Service life prediction models, including cyclic fatigue loads and environmental ageing effects. Data for FE design codes. Applications in electronics, pipelines and layered structures. Crash simulations

2016 Meetings



Wound Ballistic Congress

June 6-7, 2016

Terrorism and Firearms Program

Université Lyon 1 – Laennec

7 rue Guillaume PARADIN – 69008 Lyon

Metro D – stop LAENNEC

www.congres-balistique-lesionnelle.f

Dear colleagues, ladies and gentlemen,

In 2015, Europe was marked by a succession of attacks or

attempted attacks by firearms, mobilizing strong skills in ballistics and wound ballistics.

Therefore, the next edition of the Congress, regularly held to deal with these issues, could only grant a large place to the preponderance of firearms in the contemporary manifestation of terrorism.

Organized by the French National Forensic Science Institute (Institut National de Police scientifique – INPS) with the support of Euroballistics® and the European society of wound ballistics (JONJACK), this year’s session will be held on Monday 6 and Tuesday 7 June at the “Université Lyon 1 – Laennec”. Internationally minded, this congress (with presentations given in English and French) is aimed at all professionals working on the use of firearms and its consequences: judges, investigators, ballisticians, doctors, psychologists, psychiatrists, lawyers, etc.

The first day will be entirely dedicated to reflections related to the attacks, from a medical and a technical point of view, but also from a historical and a criminological perspective. We will be particularly pleased to open this meeting with an introductory lecture of Alain Bauer, Professor of Criminology at the “Conservatoire National des Arts et Métiers” and at the Universities of New York, Beijing and Shanghai.

The second day, while carrying on with the terrorist approach, including in terms of the psychological sequelae, will be devoted to the free presentations. Abstracts for oral or displayed presentations may be submitted through the following link: call for abstract available on the website. Deadline for abstract submission: April 30, 2016.

The date limit for the submission of abstracts is April 30, 2016.

The diversity of topics, the multiple professional origins of the delegates and speakers will undoubtedly enrich the exchanges. We would really appreciate sharing this event with you and would be very happy to count you among our attendees. We remain at your disposal for any further information.

Frederic Dupuch

Director INPS

F.DUPUCH_Site

Alain Miras

Forensic pathologist,

Congress Chairperson

11th International Conference on Advances in Experimental Mechanics

5th to 7th September 2016

University of Exeter, UK

www.bssm.org/conf2016

Call for Papers

The 11th in a series of conferences showcasing novel and innovative research in Experimental Mechanics.

The conference is organised by the British Society for Strain Measurement and chaired by Professor Chris Smith from the University of Exeter. The conference will bring together internationally leading researchers across a wide range of disciplines in both academia and industry to exchange ideas and discuss new research.

Conference Highlights

- An interactive exhibition of state of the art instrumentation.
- See the brightest early career researchers take part in the Young Stress Analyst Competition which is sponsored by industry.
- Enjoy all the conference social activities along with the glorious sights of Exeter.
- Reception at the University of Exeter and Conference Banquet at Exeter Castle.



15th International Conference on Fracture and Damage Mechanics

Melia Hotel – Alicante, Spain

14-16 September, 2016

The 15th international conference on fracture and damage mechanics (FDM 2015) will take place in Alicante, Spain. The conference follows the success of previous meetings held in London, UK (1999), Milan, Italy (2001), Paderborn, Germany (2003), Mallorca, Spain (2005), Harbin, China (2006), Madeira, Portugal (2007), Seoul, Korea (2008), St. George, Malta (2009), Nagasaki, Japan (2010), Dubrovnik, Croatia (2011), Xian, China (2012), Sardinia, Italy (2013), Ponta Delgado, Azores (2014) and Budva, Montenegro (2015).

The conference series has the support of the experts in the field of fracture and damage mechanics and has become established as a leading international forum for presenting latest research. The high quality researches presented at the previous meetings are archived in conference proceedings published in book form. In addition, special issues in leading journals such as International Journal of Fracture, Engineering Fracture Mechanics and Key Engineering Materials have been devoted to the work presented at the meeting.

The proceedings of the 15th international conference will be published in the Journal of Key Engineering Materials and distributed to the delegates at the conference.



IMPLAST 2016

The 11th International Symposium on Plasticity and Impact Mechanics

Indian Institute of Technology Delhi

December 11 - 14, 2016

Message from the Conference Chairman

On behalf of the Organizing Committee and the Indian Institute of Technology (IIT) Delhi, it is my pleasure to cordially invite you to participate in IMPLAST 2016, the 11th International Symposium on Plasticity and Impact Mechanics, being held in New Delhi, one of India's most historic and culturally rich cities.

IMPLAST series began in 1973, seven of these have been held in India and three, the 7th, 9th and 10th Symposia, were held in Melbourne, Australia in 2000, Bochum, Germany in 2007, and Rhode Island, USA in 2010.

IMPLAST Symposia are attended by the scientists, engineers and researchers from the universities, scientific laboratories, and industries across the globe to share their latest research findings in fundamental and applied aspects of large deformation and failure of materials and structures resulting from quasi-static, earthquake, fire, impact or blast loading.

In addition to providing a platform for sharing the latest developments in plasticity and impact mechanics, these symposia have proven instrumental in building and

strengthening lasting relationships between the participating scientists.

The weather in New Delhi in December is especially pleasant, and organizing committee will arrange for sight-seeing and cultural events.

We look forward to welcoming you in New Delhi for attending the Symposium, and for the joy of meeting old friends and making new ones.

News and Events

Feeling the force between sand grains



LLNL researchers have measured how force moves through 3D granular materials such as sand and soil. Photo by Sean O’Flaherty.

For the first time, Lawrence Livermore National Laboratory (LLNL) researchers have measured how forces move through 3D granular materials, determining how this important class of materials might pack and behave in processes throughout nature and industry.

Granular materials such as sand, soil and rice exist everywhere around us. However, scientists and engineers do not yet fully understand how external forces move through these materials. The ability to quantify that force transmission is missing, yet critical in efforts to predict material behavior.

Using X-ray diffraction, computed tomography and new mathematical analysis, the team measured how forces move through a slowly compressed, opaque 3D granular material. The new technique confirmed that forces move spatially through granular materials in patterns that agree with theory and simulations, and tend to behave more

uniformly as load is increased.

“Understanding how forces move through granular materials is important for building models and predicting the behavior of geologic materials such as sands and soils (e.g., when they fracture and flow during hydraulic fracturing and when they are penetrated to defeat buried enemy targets),” said Ryan Hurley, a LLNL scientist and lead author of the study *Physical Review Letters*.

Hurley also said that the research is relevant to the packing properties of everything from pharmaceutical pills, food grains in silos and additive manufacturing powders.

In their experiments, the researchers found that the various mathematical tools scientists use to understand these patterns are incomplete and often conflicting.

“The research sets the stage for further characterizing forces in larger 3D granular systems under more varied loading conditions,” Hurley said. “This characterization will enable more predictive modeling of processes throughout nature and industry.”

Anne M. Stark

Sr. Public Information Officer
Lawrence Livermore National Laboratory
(925) 422-9799

APS-GSCCM Election, November 2016



We are soliciting your nominations for candidates for the APS Shock Compression of Condensed Matter elections to be held in November. This year, we will

elect a new Vice-Chair who will serve a four-year rotation (Vice-Chair, Chair Elect, Chair, and Past Chair) and two Executive Committee At-Large members who will serve two-year terms. Please send your nominations to me at prigg@wsu.edu no later than COB October 31. Please also include a short justification for your nomination.

It is important to remember the membership of APS is diverse and global. Nominations of women, members of underrepresented minority groups, and scientists from outside the United States are especially encouraged.

Paulo Rigg (Past Chair)

Chair of Nominating Committee

Bookshelf

Books and Proceedings



*Combustion Waves and Fronts in Flows
Flames, Shocks, Detonations, Ablation
Fronts and Explosion of Stars*
Authors: Paul Clavin and Geoff Searby
ISBN: 9781107098688

Computational Thermodynamics of Materials
Authors: Zi-Kui Liu and Yi Wang
ISBN: 9780521198967

*Dynamic Behavior of Materials
Volume 1: Proceedings of the 2016 Annual Conference on
Experimental and Applied Mechanics*
Editors: Dan Casem, Leslie Lamberson and Jamie Kimberley
ISBN: 9783319411323

*Dynamic Behavior of Materials at High Strain Rates:
Experiments, Modeling and Simulation*
Editors: E. Cadoni, H. Couque and S. Hiermaier
The European Physical Journal Special Topics (EPJ ST)
Vol. 225, Number 2, April 2016

*Experimental Methods of Shock Wave Research
Shock Waves Science and Technology Reference Library,
Vol. 9*
Editors: Ozer Igra and Friedrich Seiler
ISBN: 9783319237459

Fibrous Materials
Author: Krishan Chawla
ISBN: 9781107029729

*Hypervelocity Launchers
Shock Wave Science and Technology Reference Library,
Vol. 10*
Editors: Friedrich Seiler and Ozer Igra
ISBN: 9783319260181

*Impactful Times
Memories of 60 Years of Shock Wave
Research at Sandia National Laboratories*
Authors: James R. Asay, Lalit C.
Chhabildas, R. Jeffery Lawrence and
Mary Ann Sweeney
ISBN: 9783319333472



*Imperfections in Crystalline Solids
(Part of MRS-Cambridge Materials Fundamentals)*
Authors: Wei Cai and William D. Nix
ISBN: 9781107123137

*Response of Structures Under Extreme Loading
Proceedings of the Fifth International Workshop on
Performance, Protection & Strengthening of Structures
Under Extreme Loading (PROTECT 2015), June 28-30,
2015*
Editors: Venkatesh K. R. Kodur and Nemkumar Banthia
ISBN: 9781605952277

The Gas Dynamics of Explosions
Author: John H. S. Lee
ISBN: 9781107106307

The Physics of the Manhattan Project
Author: Bruce Cameron Reed
ISBN: 9783642147081

Terminal Ballistics
Authors: Zvi Rosenberg and Erez Dekel
ISBN: 9789811003936

American Physical Society

One Physics Ellipse
College Park, MD 20740

www.aps.org

APS GSCCM
www.shockphysics.org

Editorial Staff

Eric Chisolm, Los Alamos National Laboratory
(eric.chisolm@gmail.com)

Sunil Dwivedi,* Georgia Institute of Technology
(sunil.dwivedi@mse.gatech.edu)

Eric Herbold, Lawrence Livermore National Laboratory
(herbold1@llnl.gov)

*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