SOCIETY OF ENGINEERING SCIENCE
53rd ANNUAL TECHNICAL MEETING

University of Maryland
College Park Marriott Hotel & Conference Center
October 2-5, 2016

UNIVERSITY OF MARYLAND

www.ses2016.org

A. JAMES CLARK
SCHOOL OF ENGINEERING
DEPARTMENT OF MECHANICAL ENGINEERING

Dear colleagues,

On behalf of the University of Maryland, the local organizing committee, the various track/symposia organizers and the officers of the Society for Engineering Science, we welcome you to both the University of Maryland and the 53rd Annual Technical Meeting of the Society for Engineering Science. This conference is rapidly emerging as a leading international forum for the exchange of ideas and knowledge in all aspects of engineering science, and we look forward to hosting a vibrant conference, and once again keeping with this tradition.

This year, we have close to 800 presentations arranged in 51 symposia and two posters sessions, spread across six different tracks, addressing diverse topics in Mechanics of Fluids and Thermal Systems, Mechanics of Biological and Soft Materials, Mechanics of Solids and Structures, Mechanics in Materials Science, and Dynamics and Controls.

The growth over the previous years is testament to the growing reputation that this conference has earned among the engineering science community. To manage a conference of this size, we have made some innovative changes to the traditional program, including the introduction of a general poster track, and for the first time ever, a mobile app that makes it easier for participants to navigate among multiple parallel tracks and facilitate networking among attendees. We are also pleased to offer a unique opportunity to "Meet Editors-in-Chief of Mechanics Journals" via an open forum that discusses the topics of interest in publishing in the mechanics field.

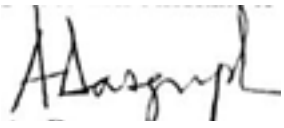
The SES is pleased to recognize the following medalists at this year's banquet: Professor J. N. Reddy, recipient of the 2016 Prager Medal; Professor Gang Chen, recipient of the 2016 Eringen Medal; Professor Mory Gharib, recipient of the 2016 Taylor Medal; and Professor Teng Li, recipient of the 2016 SES Young Investigator Medal.

In addition, it gives us great pleasure to welcome our prestigious banquet speaker. This year's banquet speaker will be Dr. Mihail Roco of the National Science Foundation, who will present on 'Nanotechnology and Other Grand Challenges in the USA.'

In closing, we thank our sponsors, the symposia/track organizers, and all of you, the participants, without whose enthusiastic contributions, this conference would not have been possible. We are honored and pleased to host you at our campus and hope that you enjoy your time at the University of Maryland.

Sincerely,

Conference Co-Chairs
Teng Li, Associate Professor
Department of Mechanical Engineering



Abhijit Dasgupta, Jeong H. Kim Professor
Department of Mechanical Engineering

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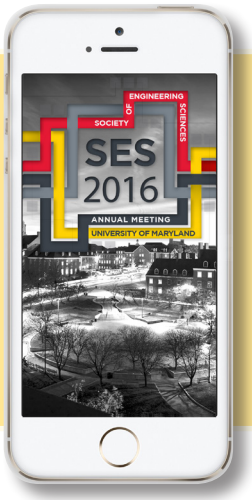

Thanks to AGENDAPOP, you can follow the full SES2016 Technical Program, search for sessions and more by downloading the SES2016 app for both Apple and Android platforms (Search 'SES technical meeting') in your app store.

More information, and complete details can be found on page 13 of this program.

▷ ▷ ▷ ***PLEASE NOTE: Symposia, presentation, and poster changes made less than two weeks prior to the conference may not be reflected in the printed program.***
Visit the website at www.ses2016.org, or download the SES 2016 app for more information.

SES2016 Symposium Schedule

Track A	Track B	Track C	Track D	Track E	Track F	Track G

Date	Monday, Oct. 3			Tuesday, Oct. 4			Wednesday, Oct. 5
Room	M1 10:00-11:40	M2 13:00-14:40	M3 15:00-16:40	T1 10:00-11:40	T2 13:00-14:40	T3 15:00-16:40	W1 10:00-11:40
1103	A1-1	A1-2	A1-3	B6-1	E9-1	E9-2	B6-2
1101/1102	A2-1	A2-2	A2-3	A2-4	A2-5	A2-6	B1-1
2110	A3-1	D15-1	D15-2	A3-2	D6-1	D6-2	B3-1
1307	E8-1	E8-2	E8-3	C4-1	C4-2	C4-3	C11-1
2116	C3-1	C3-2	C3-3	C3-4	D12-1	D12-2	C6-1
Chasen Family Room	C5-1	C5-2	C5-3	C5-4	C5-5	G1-1	C5-6
1301	C9-1	C9-2	C9-3	C1-1	C1-2	C1-3	C1-4
2111	C10-1	C10-2	C10-3	C12-1	C12-2	C12-3	C12-4
2112	D1-1	D1-2	D1-3	D1-4	D2-1	D2-2	E5-8
2106	D3-1	D3-2	D3-3	D5-1	D5-2	D5-3	D5-4
2100/2101	D4-1	D4-2	D4-3	D4-4	D4-5	D11-1	D11-2
0105	D7-1	D7-2	D7-3	D7-4	D7-5	D7-6	C8-1
0102	D8-1	D8-2	D8-3	D8-4	D8-5	D8-6	C7-1
0101	D9-1	D9-2	D9-3	D9-4	D9-5	D9-6	B4-1
2102	D13-1	D13-2	D13-3	D13-4	D13-5	D10-1	D10-2
2104	D14-1	D14-2	D14-3	D14-4	D14-5	C2-1	C2-2
2115	E1-1	E1-2	E1-3	E1-4	E1-5	E1-6	E1-7
0103	E2-1	E2-2	E2-3	B5-1	B5-2	B5-3	B5-4
1309	E3-1	E3-2	E3-3	E6-1	E6-2	E6-3	F2-1
1311	E4-1	E4-2	E4-3	E4-4	E4-5	B7-1	F5-1
1105	E5-1	E5-2	E5-3	E5-4	E5-5	E5-6	E5-7
1308	E7-1	E7-2	E7-3	B2-1	B2-2	B2-3	F1-1
2108	F3-1	F3-2	F3-3	F4-1	F4-2	F4-3	F4-4
Lower Level Concourse						P, SP	

Sunday, October 2, 2016

5:00pm-7:00pm	Registration, Meet & Greet Reception, *Main Concourse*

Monday, October 3, 2016

7:30am-5:00pm	Registration Open
7:15am	Opening Ceremony & Continental Breakfast, *Chesapeake Foyer*
8:45am-9:45am	**Prager Medalist Plenary Presentation: Dr. J. N. Reddy,** *Chesapeake & Potomac Ballrooms*
9:45am-10:00am	Break
10:00am-11:40am	1st Set of Parallel Sessions - M1 (pg. 18)
11:40am-1:00pm	Lunch, *Chesapeake & Potomac Ballrooms*
1:00pm-2:40pm	2nd Set of Parallel Sessions - M2 (pg. 30)
2:40pm-3:00pm	Break
3:00pm-4:40pm	3rd Set of Parallel Sessions - M3 (pg. 42)
5:00pm - 7:00pm	Elsevier Sponsor Reception, *Extreme Mechanics Letters (EML), Patuxent Room*

Tuesday, October 4, 2016

7:30am-5:00pm	Registration Open
7:15am	Continental Breakfast, *Chesapeake Foyer*
8:45am-9:45am	**Eringen Medalist Plenary Presentation: Dr. Gang Chen,** *Chesapeake & Potomac Ballrooms*
9:45am-10:00am	Break
10:00am-11:40am	1st Set of Parallel Sessions - T1 (pg. 56)
11:40am-1:00pm	Lunch, *Chesapeake & Potomac Ballrooms*
1:00pm-2:40pm	2nd Set of Parallel Sessions - T2 (pg. 65)
2:40pm-3:00pm	Break
3:00pm-4:40pm	3rd Set of Parallel Sessions - T3 (pg. 80) Student Poster Competition & General Poster Presentations, *Lower Level Concourse*
4:40pm - 6:00pm	Break
6:00pm-6:30pm	Cocktail Reception and Cash Bar, *Chesapeake Foyer*
6:30pm-9:00pm	Banquet, Awards Ceremony, and Special Plenary Presentation, *Chesapeake Ballroom*

Wednesday, October 5, 2016

7:30am-10:00am	Registration Open
7:15am	Continental Breakfast, *Chesapeake Foyer*
8:45am-9:45am	**G.I. Taylor Medalist Plenary Presentation: Dr. Mory Gharib** *Chesapeake & Potomac Ballrooms*
9:45am-10:00am	Break
10:00am-11:40am	1st Set of Parallel Sessions - W1 (pg. 92)
11:40am	Conclusion of SES2016

FORWORD AND ACKNOWLEDGEMENTS

The **SOCIETY OF ENGINEERING SCIENCE (SES) TECHNICAL MEETING** is held annually to foster and promote the exchange of ideas and information among the various disciplines of engineering and the fields of physics, chemistry, mathematics, bioengineering, and related scientific and engineering fields.

The 53rd Annual Technical Meeting of the Society of Engineering Science (SES) is hosted by the University of Maryland (UMD) 2-5 October 2016 at the College Park Marriott Hotel & Conference Center.

The University of Maryland is one of the premier research institutions in the United States and in the world, and has longstanding research strengths across a broad array of disciplines, supporting research that addresses the most serious global challenges we currently face. UMD places the highest emphasis upon innovation, and our location near the nation's capital, and in the vibrant state of Maryland, infuses everything we do and accomplish as a university, maximizes the impact of our research, offers our students and faculty a wide range of opportunities, and keeps our researchers focused on the most urgent and important global problems.

A conference of this size could not be successful without the help of the so many individuals who contributed their time and efforts to this event. We would like to thank the University of Maryland A. James Clark School of Engineering, the Department of Mechanical Engineering, for material and financial support. We want to thank all of our colleagues at UMD and elsewhere who served as track chairs, symposium organizers, and local organization team.

We thank several hotels around town for providing special group rates for the conference. We also thank Elsevier Publishers for their sponsorship of this conference.

Finally, this conference would not have been possible without the outstanding organizational and other contributions by Jennifer Rooks, Erin Chen, Georgia Wood, the UMD Conference and Visitor Services, the UMD Bursar's Office, the IT team in the Mechanical Engineering Dept, College Park Marriott Hotel and Conference Center, Open Concepts Systems Inc., and the many staff and students who served tirelessly as volunteers.

CONFERENCE CO-CHAIRS

TENG LI
Associate Professor
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of Mechanical
Engineering,
University of Maryland

ABHIJIT DASGUPTA
Jeong H. Kim
Professor,
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of Mechanical
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FOCUS AREA ORGANIZERS

MECHANICS OF FLUIDS AND THERMAL SYSTEMS
Ken Kiger and Bao Yang

MECHANICS OF BIOLOGICAL AND SOFT MATERIALS
Sulin Zhang, Xuanhe Zhao, and Siddhartha Das

MECHANICS OF SOLIDS AND STRUCTURES
Teng Li and Katia Bertoldi

MECHANICS IN MATERIALS SCIENCE
K. T. Ramesh, Yong Zhu, and Liangbing Hu

DYNAMICS AND CONTROLS
Olivier Bauchau and Nikhil Chopra

GRAND CHALLENGES IN ENGINEERING SCIENCES
Yonggang Huang, Abhijit Dasgupta, and Teng Li

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Hugh Bruck and Yifei Mo

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YUNFENG ZHANG
Professor, Department of Civil and Environmental Engineering

SYMPOSIA ORGANIZERS

AWARDS SYMPOSIA | BIOLOGICAL AND SOFT MATERIALS | MATERIALS SCIENCE
FLUIDS AND THERMAL SYSTEMS | SOLIDS AND STRUCTURES | DYNAMICS AND CONTROLS

	SYMPOSIUM TITLE	ORGANIZERS	EMAIL
A1	**Prager Medalist Symposium Honoring Professor J.N. Reddy**	Samit Roy; Arun Srinivasa	sroy@eng.ua.edu; arun-r-srinivasa@tamu.edu
A2	**Eringen Medal Symposium Honoring Gang Chen**	Ronggui Yang; Theodorian Borca-Tasciuc; Chris Dames; Bao Yang	ronggui.yang@colorado.edu; borcat@rpi.edu; cdames@berkeley.edu; baoyang@umd.edu
A3	**G.I. Taylor Medal Symposium Honoring Mory Gharib**	Daniel Araya	dbaraya@central.uh.edu
B1	**Pore Scale Modeling and Simulation of Multiphase Flow in Porous Media**	Amir Riaz; Nils Tilton	ariaz@umd.edu; ntilton@mines.edu
B2	**Biological and Bio-Inspired Fluid Mechanics**	Arezoo Ardekani; Hassan Masoud	ardekani@purdue.edu; hmasoud@unr.edu
B3	**Quantitative Imaging Methods in Fluid Mechanics: From Lighting to Enlightenment**	Jesse Belden; John Charonko	jesse.belden@navy.mil; jcharonk@lanl.gov
B4	**Turbulent Transport in Multiphase Flow**	Ken Kiger	kkiger@umd.edu
B5	**Heat Transfer: From Meso-Scale to Macro-Scale**	Yuan Yang; Tengfei Luo	yy2664@columbia.edu; tluo@nd.edu
B6	**Fluid-Structure Interaction and its Applications**	Sheldon Wang; Lucy Zhang; Yaling Liu	sheldon.wang@mwsu.edu; zhanglucy@rpi.edu; yal310@lehigh.edu
B7	**Viscous Flow Simulations Over Complex Geometries: Algorithms and Applications**	James D. Baeder	baeder@umd.edu
C1	**Mechanics of biological and bioinspired materials**	Wenjie Xia; Sinan Keten	wenjie.xia@northwestern.edu; sketen@northwestern.edu
C2	**Mechanics of Polymers with Dynamics Bonds**	Meredith Silberstein; Qiming Wang; Rong Long	ms2682@cornell.edu; qimingw@usc.edu; rong.long@colorado.edu
C3	**Mechanical Characterization of Soft Materials: Experiments and Modeling**	Yuhang Hu; Shengqiang Cai	yuhanghu@illinois.edu; shqcai@ucsd.edu
C4	**Molecular, Cellular, and Tissue Mechanics**	George Lykotrafitis; Ying Li	gelyko@engr.uconn.edu; yingli@engr.uconn.edu
C5	**Mechanics and Physics of Soft Materials**	Stephan Rudykh; Yuhang Hu; Oscar Lopez-Pamies; Xuanhe Zhao	rudykh@technion.ac.il; yuhanghu@illinois.edu; pamies@illinois.edu; zhaox@mit.edu
C6	**Surface Tension and Surface Charge Driven Phenomena in Soft Matter**	Siddartha Das; Joshua B. Bostwick	sidd@umd.edu; jbostwi@clemson.edu
C7	**Mechanics of inelastic deformation and failure in biological materials**	Ange-Therese Akono; Ahmed Elbanna; Nima Rahbar; Huajian Gao	aakono@illinois.edu; elbanna2@illinois.edu; nrahbar@wpi.edu; Huajian_Gao@brown.edu
C8	**Soft tissue mechanics: Theoretical considerations, experimental results, and applications**	Michael Sacks; Ellen Arruda	msacks@ices.utexas.edu; arruda@umich.edu
C9	**3D Printing Implantable Constructs for Biomedical Applications**	Lijie Grace Zhang; John P. Fisher	lgzhang@gwu.edu; jpfisher@umd.edu
C10	**Multiscale Studies of Cell Mechanics**	Bin Chen; Baohua Ji	chenb6@zju.edu.cn; bhji@bit.edu.cn

	SYMPOSIUM TITLE	ORGANIZERS	EMAIL
C11	**Mechanics of Bioinspired Soft Machines**	Qiming Wang; Christoph Keplinger	qimingw@usc.edu; Christoph.Keplinger @colorado.edu
C12	**Mechanical Behaviors of Cytoskeleton and Cells**	Taeyoon Kim; Zhangli Peng	kimty@purdue.edu; zpeng3@nd.edu
D1	**Multi-scale Mechanics of Particulate Media**	David Henann; Ken Kamrin; José Andrade; Rich Regueiro	david_henann@brown.edu; kkamrin@mit.edu; jandrade@caltech.edu; richard.regueiro@colorado. edu
D2	**Mechanics and Materials in the Oilfield**	Pedro Reis; Agathe Robisson; Nathan Wicks; Yucun Lou	preis@mit.edu; ARobisson@slb.com; nwicks@slb.com; ylou@slb.com
D3	**Mechanics of 3D Printed Materials and Structures**	Sung Hoon Kang; Howon Lee; Yaning Li; Jerry Qi	shkang@jhu.edu; howon.lee@rutgers.edu; yaning.li@unh.edu; qih@me.gatech.edu
D4	**Mechanics in Manufacturing, Synthesis and Processing of Materials, Structures and Devices**	Baoxing Xu; Weiyi Lu; Xianqiao Wang; Horacio D. Espinosa; Xiaodong (Chris) Li	bx4c@virginia.edu; wylu@egr.msu.edu; nwicks@slb.com; espinosa@northwestern.edu; x13p@virginia.edu
D5	**Mechanics and Design of Mechanical Metamaterials**	Jie Yin; Yaning Li	jieyin@temple.edu; yaning.li@unh.edu
D6	**Advanced instrumentation and fabrication techniques for measurement of mechanical and physical properties of solids and structures**	Joost Vlassak; Chris Eberl; Samantha Daly; Gi-Dong Sim	vlassak@seas.harvard.edu; chris.eberl@iwm.fraunhofer. de; samdaly@umich.edu; gdsim@jhu.edu
D7	**Instability in Solids and Structures**	Ryan Elliott; Stelios Kyriakides; Pedro Miguel Reis; Edmundo Corona	relliott@umn.edu; skk@mail.utexas.edu; preis@mit.edu; ecorona@sandia.gov
D8	**Computational Mechanics of Materials and Structures**	Shawn Chester; Christian Linder; Steve Sun	shawn.a.chester@njit.edu; linder@stanford.edu; wsun@columbia.edu
D9	**Friction, Fracture and Damage**	Ahmed Elbanna; K. Ravi-Chandar	elbanna2@illinois.edu; ravi@utexas.edu
D10	**Uncertainty Propagation and Quantification in Multiscale Simulation of Materials Response, Structural Performance, and Failure**	John M. Emery; Joseph E. Bishop; Jacob D. Hochhalter	jmemery@sandia.gov; jebisho@sandia.gov; Jacob.D.Hochhalter@nasa.gov
D11	**Instability and Interfacial Adhesions in Bio-compatible Electronics**	Shuodao Wang; Huanyu Cheng; Jianling Xiao	shuodao.wang@okstate.edu; huanyu.cheng@psu.edu; jianliang.xiao@colorado.edu
D12	**Mechanics, Materials, and Manufacture of Flexible and Stretchable Electronics**	Nanshu Lu; Cunjiang Yu	nanshulu@utexas.edu; cyu15@uh.edu
D13	**Architectured Meta-materials: Engineering Science, Design, Manufacturing and Characterization**	Francois Barthelat; Thomas Siegmund; Lorenzo Valdevit; Xiaoyu (Rayne) Zheng	francois.barthelat@mcgill.ca; siegmund@purdue.edu; valdevit@uci.edu; raynexzheng@vt.edu
D14	**Non-linear Response of Highly Deformable Structures**	Zi Chen; Huanyu Cheng; Wanliang Shan; Qiming Wang; Teng Zhang	zi.chen@dartmouth.edu; huanyu.cheng@psu.edu; wshan@unr.edu; qimingw@usc.edu; tzhang48@syr.edu

SYMPOSIA ORGANIZERS

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BIOLOGICAL AND SOFT MATERIALS
MATERIALS SCIENCE
FLUIDS AND THERMAL SYSTEMS
SOLIDS AND STRUCTURES
DYNAMICS AND CONTROLS

	SYMPOSIUM TITLE	ORGANIZERS	EMAIL
D15	**Measurement, Diagnosis, and Prognosis of Damage and Degradation for the Assessment of Materials Integrity**	Mohammad Modarres; M. Amiri; A. Kahirdeh	modarres@umd.edu; mamiri@tda-i.com; kahirdeh.ali@gmail.com
E1	**Mechanics and Electrochemistry of Energy Materials**	Siva P. V. Nadimpalli; Yifei Mo; Kejie Zhao; Zheng Jia	siva.p.nadimpalli@njit.edu; yfmo@umd.edu; kjzhao@purdue.edu; cristianojz@gmail.com
E2	**Mechanics of One-dimensional Nanomaterials: Experiment and Modeling**	Yong Zhu; Ting Zhu; Daniel S. Gianola; Scott X. Mao	yong_zhu@ncsu.edu; ting.zhu@me.gatech.edu; gianola@engineering.ucsb.edu; sxm2@pitt.edu
E3	**Advanced Nano-manufacturing for Multi-functional Nanosystems**	Hongli Zhu; Wenzhuo Wu; Huanyu Cheng; Yang Yang; Ying Li	h.zhu@neu.edu; wenzhuowu@purdue.edu; huanyu.cheng@psu.edu; Yang.Yang@ucf.edu; yingli@engr.uconn.edu
E4	**Modeling and Characterizing the Mechanics of Boundaries in Materials**	Charles Wojnar; Brandon Runnels; Irene Beyerlein	wojnarc@mst.edu; brunnels@uccs.edu; irene@lanl.gov
E5	**Mechanics of Multifunctional 2D materials and 2D-based nanostructures**	Ellad Tadmor; Shuze Zhu; Cemal Basaran; Kuan Zhang; Wei Gao	tadmor@aem.uminn.edu; shuzezhu@mit.edu; cjb@buffalo.edu; zhan4817@umn.edu; weigao@northwestern.edu
E6	**From Quantum Mechanics to Materials Engineering: first principles methods in the mechanics of materials and structures**	Phanish Suryanarayana; Amartya Banerjee	phanish.suryanarayana@ce.gatech.edu; asb@lbl.gov
E7	**Advances in modeling and simulation of material damage and failure under dynamic conditions**	C. A. Bronkhorst; H. M. Mourad; D. J. Luscher	cabronk@lanl.gov; hmourad@lanl.gov; djl@lanl.gov
E8	**Dynamic Failure, Fragmentation, and Localization**	Andrew L. Tonge; Jeffrey T. Lloyd; Justin Wilkerson	Andrew.l.tonge.civ@mail.mil; Jeffrey.t.lloyd.civ@mail.mil; Justin.wilkerson@utsa.edu
E9	**Characterization and Modeling of Damage Mechanisms of Semiconductor Packaging Materials and Components**	Bongtae Han; Patrick McCluskey; Gayatri Cuddalorepatta; Michael Azarian	bthan@umd.edu; mcclupa@umd.edu; gayatric@seas.umd.edu; mazarian@umd.edu
F1	**Dynamics and Control of Soft Robot Systems**	Derek Paley; Carmel Majidi	dpaley@umd.edu; cmajidi@andrew.cmu.edu
F2	**Modeling, Design and Safety Analysis in Physiological Closed-loop Systems**	Jin-Oh Hahn	jhahn12@umd.edu
F3	**Wave Phenomena in Linear and Nonlinear Metamaterials**	K. Bertoldi; S. Gonella	bertoldi@seas.harvard.edu; sgonella@umn.edu
F4	**Applications of Phononic Crystals and Metamaterials in Acoustics, Vibration, and Wave Propagation**	Amr Baz; Mahmoud Hussein; Ihab El-Kady	Baz@umd.edu; mih@colorado.edu; ielkady@sandia.gov
F5	**Applications of Phononic Crystals and Metamaterials in Acoustics, Vibration, and Wave Propagation**	Valentin Sonneville	vspsonn@umd.edu

SUNDAY, OCTOBER 2

WELCOME RECEPTION & REGISTRATION
5:00pm - 7:00pm | *Main Concourse*

Join us for a meet and greet reception after stopping by the registration desk located on the main level of the College Park Marriott Conference Center. Light refreshments will be provided.

MONDAY-WEDNESDAY, OCTOBER 3-5

BREAKFAST
Open at 7:15am | *Chesapeake Foyer*

LUNCH (OCTOBER 3 & 4)
11:40am - 1:00pm | *Chesapeake & Potomac Ballrooms*

Join fellow conference guests for the daily continental breakfast and buffet lunch. This is a great chance to catch up with colleagues, network, and create connections.

MONDAY, OCTOBER 3

EXTREME MECHANICS LETTERS RECEPTION
Sponsored by Elsevier
5:00pm - 7:00pm | *Patuxent Room, main level*
Cash bar and light refreshments will be available.

TUESDAY, OCTOBER 4

MEET THE EDITORS-IN-CHIEF OF MECHANICS JOURNALS
3:30pm-4:40pm | *Chasen Family Room, main level*

Come meet the Editors-in-Chief of Mechanics journals, including *Extreme Mechanics Letters*, *International Journal of Fracture*, *International Journal of Solids and Structures*, *Journal of Applied Mechanics*, and *Journal of Mechanics and Physics of Solids*, for an open forum to discuss topics of interest in publishing in mechanics field. (More info on page 91)

GENERAL POSTER SESSION & STUDENT POSTER COMPETITION
3:00pm - 4:40pm | *Lower Level Concourse*

RECEPTION & BANQUET
6:00 pm - 9:00pm | *Chesapeake Ballroom and Foyer*

BANQUET SPEAKER

Mihail C. Roco

National Science Foundation and National Nanotechnology Initiative

We are pleased to announce that Dr. Mihail C. Roco of National Science Foundation and National Nanotechnology Initiative will be the SES2016 banquet plenary speaker.

Dr. Roco is the Senior Advisor for Science and Engineering at the National Science Foundation and founding chair of the U.S. National Science and Technology Council's subcommittee on Nanoscale Science, Engineering and Technology (NSET).

Talk: *Nanotechnology and Other Grand Challenges in the United States*

Abstract: The presentation will outline key grand challenges in the United States driven by nanotechnology and its convergence with other foundational emerging technologies. A long-term vision for nanotechnology development was formulated in 1999-2000 that has promised to create basic understanding and a general purpose technology in 20-30 years (www.wtec.org/nano2). Several trends in foundational (nano-, bio-, digital- and cognitive) and spin-off areas (such as metamaterials, plasmonics, and DNA editing) will be discussed. A perspective of the current national S&T initiatives will be outlined, including National Nanotechnology Initiative, National Strategic Computing Initiative, and BRAIN research. Two new activities in 2016 are the nanotechnology signature initiative on water and the grand challenge on brain-like computing. We expected that the world would have $1 trillion worth of products that incorporate nanotechnology by 2015, and we reached that mark in 2013 according to industry surveys. By extending the S-development curve factual data of the last decade, the revenues from nanotechnology-based economy are estimated to exceed 10% of GDP by 2025 in the U.S. and several other developed countries. Convergence offers a new universe of discovery, innovation, and application opportunities through specific theories, principles, and methods (www.wtec.org/NBIC2-report) and grand challenges are mechanisms to facilitate faster scientific progress and implementation in the economy.

This year's SES2016 Conference is being held at the
COLLEGE PARK MARRIOTT
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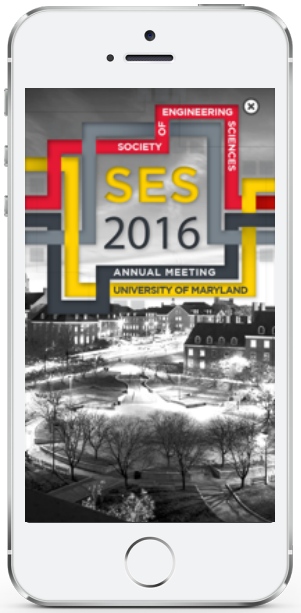

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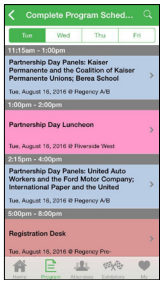
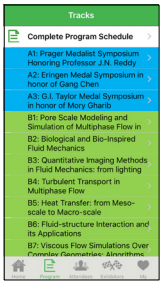


Schedule



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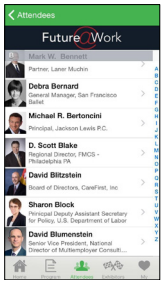
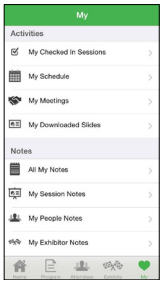


Attendees

Session Details



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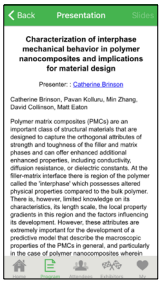

Abstracts

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MONDAY, OCTOBER 3
PLENARY PRESENTATION | 8:45 am - 9:45 am
Chesapeake Ballroom (with overflow in the Potomac Ballroom)

2016 PRAGER MEDALIST

J. N. Reddy

Dr. Reddy is a Regents Professor, Distinguished Professor,and the inaugural holder of the Oscar S. Wyatt Endowed Chair in Mechanical Engineering at Texas A&M University, College Station, Texas. Dr. Reddy is the author of over 560 journal papers and 20 text books on theoretical formulations and finite-element analysis of problems in solid and structural mechanics (plates and shells), composite materials, computational fluid dynamics, numerical heat transfer, and applied mathematics.

Dr. Reddy is also internationally-recognized for his research on mechanics of composite materials and for computational methods. The shear deformation plate and shell theories that he developed bear his name (Reddy third-order shear deformation theory and Reddy layerwise theory) in the literature. The finite element formulations and models he developed have been implemented into commercial software like ABAQUS, NISA, and HyperXtrude. In recent years, Professor Reddy and his colleagues pioneered the development of 7- and 12-parameter shell theories and nonlocal beam and plate theories using the ideas of Eringen, Mindlin, Koiter, and others. He and his colleagues developed a thermodynamically based strain gradient elasticity theory that contains Mindlin's model as a special case. His group is also working on (internal) polar continuum theories in the derivations of the conservation and balance laws.

Dr. Reddy received numerous awards, including: the Charles Russ Richards Memorial Award and the Worcester Reed Warner Medal from the American Society of Mechanical Engineers, Raymond Mindlin and Nathan M. Newmark Medals from the American Society of Civil Engineers; Award for Excellence in the Field of Composites and Distinguished Research Award from the American Society for Composites, the Computational Solid Mechanics award from the USACM, and the IACM Award from the IACM. Dr. Reddy is elected to National Academy of Engineering and as a Foreign Fellow of the Indian Academy of Engineering. He will be honored with the ASME Medal in November at the Honors Assembly of ASME.

Plenary presentation: *On Non-Local and Strain Gradient Theories In Structural Mechanics: An Overview*

Abstract: Structural continuum theories require a proper treatment of the kinematic, kinetic, and constitutive issues accounting for possible sources of non-local and non-classical continuum mechanics concepts and solving associated boundary value problems. In the case of solid and structural mechanics, there is a wide range of theories (see, e.g., Mindlin and Eringen), from higher gradient to truly nonlocal; however, there is a need for physical explanations and experimental observations that systematically corroborate these theories and provide physical interpretations of the parameters introduced in these theories. In this lecture, an overview of the author's recent research (with his colleagues) on nonlocal elasticity and couple stress theories in formulating the governing equations of functionally graded material beams and plates will be presented. In addition to Eringen's nonlocal elasticity (1972), two different nonlinear gradient elasticity theories that account for (a) geometric nonlinearity and (b) microstructure-dependent size effects are revisited to establish the connection between them. The first theory is based on modified couple stress theory of Mindlin and the second one is based on Srinivas-Reddy gradient elasticity theory. These two theories are used to derive the governing equations of beams and plates. In addition, some recent developments as an alternative to peridynamics idea of Silling will also discussed briefly.

TUESDAY, OCTOBER 3
PLENARY PRESENTATION | 8:45 am - 9:45 am
Chesapeake Ballroom (with overflow in the Potomac Ballroom)

2016 ERINGEN MEDALIST

Gang Chen

Gang Chen is currently the Head of the Department of Mechanical Engineering and Carl Richard Soderberg Professor of Power Engineering at Massachusetts Institute of Technology (MIT), and is the director of the "Solid-State Solar-Thermal Energy Conversion Center (S3TEC Center)" - an Energy Frontier Research Center funded by the US Department of Energy. He obtained his PhD degree from the Mechanical Engineering Department, UC Berkeley. He was a faculty member at Duke University and UCLA, before joining MIT in 2001. He received an NSF Young Investigator Award, an R&D 100 award, an ASME Heat Transfer Memorial Award, a Nukiyama Memorial Award by the Japan Heat Transfer Society, a World Technology Network Award in Energy, and the Capers and Marion McDonald Award for Excellences in Mentoring and Advising from MIT. He is a fellow of American Association for Advancement of Science, APS, ASME, and Guggenheim Foundation. He is an academician of Academia Sinica and a member of the US National Academy of Engineering.

Plenary presentation: *Phonon Heat Conduction Beyond Fourier Diffusion: Ballistic, Coherent, Localized, Hydrodynamic, and Divergent Modes*

Abstract: Fourier law of heat conduction is one of the bases for analyzing thermal problems. It has been recognized that Fourier law has limitations. In this talk, I will discuss different modes of heat conduction in nanostructures. Ballistic transport happens when phonon mean free path is longer than the characteristic size of the structure. I will discuss how we compute phonon mean free path distributions based on first-principles and measure the distributions with optical pump-probe techniques by exploring ballistic phonon transport processes. In superlattice structures, ballistic phonon transport across the whole thickness of the superlattices implies phase coherence. We observed this coherent transport in GaAs/AlAs superlattices. Accessing the coherent heat conduction regime opens a new venue for phonon engineering. I will further show that phonon heat conduction localization happens in GaAs/AlAs superlattice by placing ErAs nanodots at interfaces. In an opposite direction, we will discuss phonon hydrodynamic transport mode in graphene via first-principle simulations. In this mode, phonons drift with an average velocity under a temperature gradient, similar to fluid flow in a pipe. Furthermore, it is also possible to have infinite heat thermal conductivity, as suggested by the Fermi-Pasta-Ulam discovery of nonergodic behavior in one-dimensional nonlinear atomic chain in 1950s. This divergence could exist in real materials such as polymer chains. New understandings in these nondiffusive heat conduction phenomena are stimulating developments of new materials. One example is thermoelectric energy conversion for which phonon thermal conductivity is to be minimized while maintaining electron transport properties. Another example is high thermal conductivity in ultra-drawn polyethylene nanofibers and sheets. Progress in these areas will be highlighted.

WEDNESDAY, OCTOBER 3
PLENARY PRESENTATION | 8:45 am - 9:45 am
Chesapeake Ballroom (with overflow in the Potomac Ballroom)

2016 TAYLOR MEDALIST

Morteza (Mory) Gharib

Mory Gharib is Vice Provost for Research and the Hans W. Liepmann Professor of Aeronautics and Professor of Bio-Inspired Engineering at the California Institute of Technology. He received his B.S. degree in Mechanical Engineering from Tehran University (1975) and his M.S. in Aerospace and Mechanical Engineering from Syracuse University (1978) and his Ph.D. in Aeronautics from Caltech (1983). He joined the faculty of the Applied Mechanics and Engineering Sciences Department at UCSD in 1985. In 1993, he joined Caltech as a professor of Aeronautics. Dr. Gharib's current research interests in conventional fluid dynamics include Vortex dynamics, active and passive flow control, micro fluid dynamics, bio-inspired wind and hydro energy harvesting, as well as advanced flow-imaging diagnostics. His bio-mechanics and medical engineering research include cardiovascular fluid dynamics, aquatic-breathing/propulsion, and development of medical devices such as heart valves, cardiovascular health monitoring and drug delivery systems.

Dr. Gharib's honors and affiliations include: Member of American Academy of Arts and Sciences, Member of National Academy of Engineering, Charter Fellow of the National Academy of Inventors, Fellow of American Association for the Advancement Of Science (AAAS), Fellow of American Physical Society (APS), Fellow of American Society of Mechanical Engineering, Fellow of The International Academy of Medical and Biological Engineering (IAMBE). He has received five new technology recognition awards from NASA in the fields of advanced laser imaging and nanotechnology. For his 3-D imaging camera system, he has received R&D Magazine's "R&D 100 innovation award" for one of the best inventions of the year 2008. Dr. Gharib has published more than 200 papers in refereed journal and holds 90 U.S. Patents.

Dr. Gharib's creative impulse is most certainly inspired by the history of engineering, science, design and nature as evidenced by his body of work and his keen interest in the work of Leonardo da Vinci. Indeed, on the Gharib Research Group's website is the quote from Bronowski's The Ascent of Man: "Man is unique not because he does science, and he is unique not because he does art, but because science and art equally are expressions of his marvelous plasticity of mind." Dr. Gharib's work has been molded by Leonardo da Vinci's heart valve fluid dynamics. His work on this topic has been published in research journals, referenced in four books about Da Vinci, and is featured in the PBS Series "Leonardo's Dream Machines"(2003). A replica of the heart valve designed by Leonardo da Vinci was created by Professor Gharib and his team, and became part of the exhibit, Leonardo Da Vinci: Experience, Experiment, and Design, at the Victoria and Albert Museum in London (14 September 2006 – 7 January 2007). Compelled by one of history's feats in engineering, the Gharib Research Group lifted a heavy obelisk with a kite trying to prove that the Egyptians may have used kites or sails to erect their obelisks and build their monuments. This use of wind power was the subject of the History Channel documentary "Flying Pyramids: Soaring Stones" (2004). Dr. Gharib has also collected awards for his visualized images of two-dimensional flows using soap films.

Plenary presentation: *Generation of Toroidal Micro-Corona by Water Jet impingement*

Abstract: There is a broad interest in atmospheric plasma and its application in basic scientific and industrial research. As a highly ionized gas, the atmospheric pressure plasma also known as atmospheric pressure Corona does not have a defined shape or volume. In this respect it has been difficult if not impossible to design controlled experiments that could take advantage of the highly collisional state of the plasma medium. Here, we report a novel approach to produce atmospheric pressure toroidal Corona where the plasma cloud presents a topologically connected shape ideal for precisely controlled experimentation. We show that a unique corona morphology can be generated when a high-speed micro-jet of deionized water impinges on a solid dielectric surface. For certain dielectric materials with piezo properties, we show that the resonant Langmuir oscillation results in the emission of discrete radio frequency electromagnetic waves.

2016 YOUNG INVESTIGATOR MEDALIST

Teng Li

Teng Li is currently an Associate Professor of Mechanical Engineering and Keystone Professor in the Clark School of Engineering at the University of Maryland, College Park, US. He is also an affiliated faculty of Maryland NanoCenter and University of Maryland Energy Research Center. He received his Ph.D. degree in Engineering Science from Harvard University in 2006, following earlier studies at Princeton University and Tsinghua University.

He is interested in mechanics of sustainable materials, mechanics of low dimensional nanomaterials, mechanics of flexible electronics and nanoelectronics, and mechanics in energy systems. His research embraces the theory, modeling and applications to advanced materials and technology, with over 60 publications in peer-reviewed journals, including Science, Proceedings of the National Academy of Sciences (PNAS), Nature Communications, Physical Review Letters, Journal of Mechanics of Physics and Solids, etc. In his earlier research on mechanics of flexible and stretchable electronics, he elucidated key mechanisms that govern the stretchability of thin metal films supported by polymer and elastomer substrates, and proposed a general approach to making intrinsically stiff materials compliant and deformable by geometric patterning. This general approach has been later widely adopted in designing flexible and stretchable electronics. Recently, in a cover feature paper in Physics Review Letters, he revealed a method to produce uniform and ultra-strong magnetic-like field in single-layer carbon by a simple stretch, a long-sought solution in engineering the electronic property of graphene. This research has been highlighted by both Science and Nature magazines. In a recent paper published in PNAS, he and his collaborators reported a bottom-up material design strategy to make cellulose nanopaper that is orders of magnitude stronger and tougher than regular paper. This research offers a fundamental mechanism to simultaneously strengthen and toughen materials, a holy grail in engineering material design.

His recent awards include Society of Engineering Science (SES) Young Investigator Medal in 2016, RASA Research Award in 2014, US National Committee of Theoretical and Applied Mechanics Fellowship in 2012, E. Robert Kent Outstanding Teaching Award in 2012, Ralph E. Powe Faculty Award in 2007.

He has been a member of SES, ASME and MRS since 2006, served as a member of the Technical Committee of Integrated Structures in ASME Applied Mechanics Division since 2006 and served as the Chair of the Committee during 2008-2012. He currently serves as the Associate Editor of Extreme Mechanics Letters and a member of the Editorial Board of International Journal of Computational Materials Science and Engineering. With Zhigang Suo, he co-founded iMechanica.org, the world's largest online community of mechanics.

A1-1	PRAGER MEDALIST SYMPOSIUM HONORING PROFESSOR J.N. REDDY
Room 1103	SESSION CHAIRS: Samit Roy, University of Alabama Arun Srinivasa, Texas A&M University
10:00 am	***Analysis of local failure in the context of multiscale failure modeling of composites*** Ramesh Talreja, Texas A&M University
10:20 am	***A novel fiber optimization method based on normal distribution function with continuously varying fiber path*** Emilio Silva, University of Sao Paulo
10:40 am	***A novel refined 1D model for the accurate stress analysis of composite structures with arbitrary curved sections*** Alberto Garcia de Miguel, Politecnico di Torino
11:00 am	***A nonlocal phase field approach for modeling damage in quasibrittle materials*** Amirtham Rajagopal, IIT Hyderabad
11:20 am	***Exterior statistics based boundary conditions for representative volume elements of elastic composites*** Somnath Ghosh, Johns Hopkins University
A2-1	**ERINGEN MEDAL SYMPOSIUM HONORING DR. GANG CHEN**
Room 1101/1102	SESSION CHAIRS: Ronggui Yang, University of Colorado at Boulder Theodorian Borca-Tasciuc, Rensselaer Polytechnic University Chris Dames, University of California at Berkeley Bao Yang, University of Maryland
10:00 am	***Opening Remarks***
10:20 am	***Phonon dynamics at surfaces and interfaces and its implications (Invited)*** Deyu Li, Vanderbilt University
10:40 am	***Coherence and localisation of thermal phonons (Invited)*** Yann Chalopin, CNRS - Ecole CentraleSupelec
11:00 am	***Mean free path distribution of propagons in amorphous silicon (Invited)*** Renkun Chen, University of California, San Diego
11:20 am	***Time-resolved magneto-optical kerr effect of magnetic thin films for ultrafast thermal characterization (Invited)*** Xiaojia Wang, University of Minnesota

A3-1	G.I. TAYLOR MEDAL SYMPOSIUM HONORING OF DR. MORY GHARIB
Room 2110	SESSION CHAIRS: Daniel Araya, University of Houston
10:00 am	***On three-dimensional quantification of vortex rings and its significance in cardiac flows*** Ahmad Falahatpisheh, University of California, Irvine
10:20 am	***Secondary flows in models of curved arteries*** Michael Plesniak, The George Washington University
10:40 am	***Blood flow and hematological disorders*** George Karniadakis, Brown University
11:00 am	***The power of vortex*** Kamran Mohseni, University of Florida
11:20 am	***Coupled liquid-solid two-phase flow measurements with high solid phase volume fraction*** Paul S. Krueger, Southern Methodist University

E8-1	DYNAMIC FAILURE, FRAGMENTATION, AND LOCALIZATION
Room 1307	SESSION CHAIRS: Andrew L. Tonge, Army Research Laboratory Jeffrey T. Lloyd, Army Research Laboratory Justin Wilkerson, University of Texas at San Antonio
10:00 am	***Field-gradient partitioning for fracture and frictional contact in the material point method*** Michael Homel, Lawrence Livermore National Laboratory, Atmospheric, Earth, and Energy Division, Computational Geosciences Group
10:20 am	***A micro-mechanical modeling approach for dynamic fragmentation in multi-phase materials*** David Cereceda, David Cereceda, Dmitry Kats, Nitin Daphalapurkar, and Lori Graham-Brady, The Johns Hopkins University
10:40 am	***Adding subscale informed processes to simplify calibration of a continuum damage model*** Andrew Tonge, Army Research Laboratory
11:00 am	***Comparison of experimental observation and all-atom molecular dynamics characterization of polycarbonate*** Zesheng Zhang, University of Nebraska-Lincoln
11:20 am	***Soft body impact to pre-stressed curved composite laminates using progressive failure analyses*** Zana Eren, Samet TataroÄŸlu, Demet Balkan, and Zahit MecitoÄŸlu, Istanbul Technical University

C3-1	MECHANICAL CHARACTERIZATION OF SOFT MATERIALS: EXPERIMENTS AND MODELING
Room 2116	SESSION CHAIRS: Yuhang Hu, University of Illinois at Urbana-Champaign Shengqiang Cai, University of California, San Diego
10:00 am	***Characterization of interphase mechanical behavior in polymer nanocomposites and implications for material design*** Catherine Brinson, Pavan Kolluru, Min Zhang, David Collinson, and Matt Eaton, Northwestern University
10:40 am	***Using analytical modeling to design customized fiber-reinforced soft actuators*** Fionnuala Connolly, Harvard University
11:00 am	***Exploring the confinement effect on local mechanical properties of polymers in thin film systems*** Min Zhang, Shadid Askar, John M. Torkelson, and L. Catherine Brinson Northwestern University
11:20 am	***Role of the network architecture and fiber contacts in defining the mechanical behaviour of fiber-based materials*** Catalin Picu, Mohammad Islam, and Sai Deogekar Rensselaer, Polytechnic Institute
C5-1	**MECHANICS AND PHYSICS OF SOFT MATERIALS**
Chasen Family Room	SESSION CHAIRS: Stephan Rudykh, Technion – Israel Institute of Technology, Israel Yuhang Hu, University of Illinois at Urbana-Champaign Oscar Lopez-Pamies, University of Illinois at Urbana-Champaign Xuanhe Zhao, Massachusetts Institute of Technology
10:00 am	***Mechanics and physics of stretchable ionotronic devices*** Zhigang Suo, Harvard University
10:40 am	***An approximate closed-form homogenization solution for the elastic dielectric response of dielectric elastomer composites*** Oscar Lopez-Pamies, University of Illinois at Urbana-Champaign
11:00 am	***Micromechanical analysis and stability of dielectric elastomer composites with particulate microstructures*** Stephan Rudykh, Technion - Israel Institute of Technology
11:20 am	***Revisiting the instability and bifurcation behavior of soft dielectrics*** Shengyou Yang, University of Houston

C9-1	3D PRINTING IMPLANTABLE CONSTRUCTS FOR BIOMEDICAL APPLICATIONS
Room 1301	SESSION CHAIRS: Lijie Grace Zhang, The George Washington University John P. Fisher, University of Maryland
10:00 am	***3D bioprinting nano scaffold with Multi-walled carbon nanotubes for improved nerve regeneration*** Se-Jun Lee, Lijie Grace Zhang, The George Washington University
10:20 am	***Bioprinting 3D cell-laden hydrogel microarray for screening human periodontal ligament stem cell response to extracellular matrix*** Yufei Ma, Xi'an Jiaotong University
10:40 am	***In situ biomanufacturing of artificial blood vessels via 3D bioprinting*** Haitao Cui, The George Washington University
C10-1	**MULTISCALE STUDIES OF CELL MECHANICS**
Room 2110	SESSION CHAIRS: Bin Chen, Zhejiang University Baohua Ji, Beijing Institute of Technology
10:00 am	***Relaxing cells by light*** Samantha Knowl
10:20 am	***Mean deformation metrics for quantifying 3D cell-matrix interactions*** Eyal Bar-Kochba, Jonathan Estrada, Jennet Toyjanova, Haneesh Kesari, Jonathan S. Reichner, Christian Franck
10:40 am	***Mechanics of collective cell polarization and arrangement on patterned substrate*** Baohua Ji
11:00 am	***The quest for the determination of the gaussian modulus—exploiting membrane edge fluctuations*** Metthew Zelisko, Huajian Gao, Pradeep Sharma
11:20 am	***Thermodynamics of mechanotransduction at intercellular junctions*** Alireza Sarvestani

D1-1	MULTI-SCALE MECHANICS OF PARTICULATE MEDIA
Room 2112	SESSION CHAIRS: David Henann, Brown University Ken Kamrin, Massachusetts Institute of Technology José Andrade, California Institute of Technology Rich Regueiro, University of Colorado at Boulder
10:00 am	***Material instability and gradient-regularization of the "mu(I)" model of granular flow*** Joe D. Goddard, University of Califorina, San Diego
10:40 am	***A hierarchy of granular continuum models: from flow fields to impact and mobility applications*** Ken Kamrin, Massachusetts Institute of Technology
11:00 am	***Size dependence of the yield threshold in dense granular materials*** Daren Liu, Brown University
11:20 am	***Micro and macro modeling of the stress-strain and strain localization behavior of granular materials in simple shear*** Marte Gutierrez, Colorado School of Mines

D3-1	MECHANICS OF 3D PRINTED MATERIALS AND STRUCTURES
Room 2106	SESSION CHAIRS: Sung Hoon Kang, Johns Hopkins University Howon Lee, Rutgers University Yaning Li, University of New Hampshire Jerry Qi, Georgia Institute of Technology
10:00 am	***Keynote Presentation: Additive manufacturing; research today + the direct digital revolutions*** Larry Richard Holmes, Jr., US Army Research Laboratory
10:20 am	***3D printing of carbon fiber-epoxy composites with programmable fiber orientation*** Jordan R Raney, Harvard University
10:40 am	***Recyclable 3D printing of thermosets based on covalent adaptable networks*** Qian Shi, Xi'an Jiaotong University and Georgia Institute of Technology
11:00 am	***Micro 3D printing of temperature responsive hydrogel using projection micro-stereolithography*** Howon Lee, Rutgers University

D4-1	MECHANICS IN MANUFACTURING, SYNTHESIS AND PROCESSING OF MATERIALS, STRUCTURES AND DEVICES
Room 2100/2101	SESSION CHAIRS: Baoxing Xu, University of Virginia Weiyi Lu, Michigan State University Xianqiao Wang, University of Georgia Horacio D. Espinosa, Northwestern University Xiaodong (Chris) Li, University of Virginia
10:00 am	***3D shape formation through mismatch-strain self-assembly at micro-nanoscales*** K. Jimmy Hsia, Carnegie Mellon University
10:20 am	***Multiscale models for the growth of 2D materials and their heterostructures*** Vivek B Shenoy, University of Pennsylvania
10:40 am	***Stretch-and-release fabrication, testing and optimization of a flexible ceramic armor inspired from fish scales*** Francois Barthelat, McGill University
11:00 am	***Mechanics of evaporation-driven folding of graphene sheets*** Baoxing Xu, University of Virginia
11:20 am	***Nanoscale elastic recovery of silicon while cutting at different temperatures: An MD simulation-based study*** Saeed Zare Chavoshi, University of Strathclyde
D7-1	**INSTABILITY IN SOLIDS AND STRUCTURES**
Room 0105	SESSION CHAIRS: R.S. Elliott, A. Aguiar
10:00 am	***Hidden, forbidden and inherited spectra of hierarchical wrinkles of a soft material surface*** Mazen Diab, Brown University
10:20 am	***Mechanics of wrinkle-to-ridge transitions in bilayer film/substrate systems*** Lihua Jin, Stanford University
10:40 am	***Interplay of wrinkling and microstructure in nematic elastomer membranes*** Paul Plucinsky, California Institute of Technology
11:00 am	***On intrinsic material stability: enthalpy, nonuniform stresses, and rotations*** Thomas Wright, Johns Hopkins University
11:20 am	***Strong ellipticity conditions for a class of transversely isotropic bodies in plane strain*** Adair Aguiar, University of SÃ£o Paulo

D8-1	COMPUTATIONAL MECHANICS OF MATERIALS AND STRUCTURES
Room 0102	SESSION CHAIRS: Shawn Chester, New Jersey Institute of Technology Christian Linder, Stanford University Steve Sun, Columbia University
10:00 am	***Macroscopic response of particle-reinforced elastomers subjected to prescribed torques or rotations on the particles*** Pedro Ponte Castaneda, Morteza Siboni, University of Pennsylvania
10:40 am	***Ultra-composites: Multiphase composites with long range correlations of microstructural heterogeneity distribution*** Catalin Picu, Vineet Negi, Mohammad Islam, Stefan Sorohan Rensselaer Polytechnic Institute
11:00 am	***Peridynamic modeling of strain and damage sensing in nanocomposite bonded energetic materials*** Naveen Prakash and Gary Seidel, Virginia Tech
11:20 am	***An inf-sup stable low-order mixed finite element formulation for porous media at finite strains*** Christian Linder and Andreas Krischok, Stanford University
D9-1	**FRICTION, FRACTURE AND DAMAGE**
Room 0101	SESSION CHAIRS: Ahmed Elbanna, University of Illinois K. Ravi-Chandar, University of Texas at Austin
10:00 am	***Damage precursors and fatigue life prediction in heterogeneous solids: Thermal fatigue on asteroids*** Kavan Hazeli, Charles El Mir, KT Ramesh, Johns Hopkins University
10:40 am	***Supershear transition of dynamic mode II fracture in heterogeneous elastic media*** Gabriele Albertini, Cornell University
11:00 am	***Computational damage mechanics of viscoelastic materials with a gradient-enhanced propagation control*** Juan Guillermo Londono Lozano, Luc Berger-Vergiat, Haim Waisman Lozano Columbia University
11:20 am	***Hyperelastic modeling on the Mixed-Mode I/II damage evolution of 3D printed soft interfacial layer*** Yaning Li, Lei Liu University of New Hampshire

D13-1	ARCHITECTURED META-MATERIALS: ENGINEERING SCIENCE, DESIGN, MANUFACTURING
Room 2102	SESSION CHAIRS: Francois Barthelat, McGill University Thomas Siegmund, Purdue University Lorenzo Valdevit, University of California at Irvine Xiaoyu (Rayne) Zheng, Virginia Tech
10:00 am	***Phase transforming cellular materials: Design, fabrication and characterization*** Pablo Zavattieri, Purdue University
10:30 am	***Design, fabrication and testing of bistable architectured materials with interlocks*** Francois Barthelat, McGill University
10:50 am	***Form-finding through buckling in elastic gridshells*** Changyeob Baek, Massachusetts Institute of Technology
11:10 am	***Static and dynamic response of multi-stable metamaterials*** Babak Haghpanah, UC Irvine
11:30 am	***Design of reconfigurable prismatic architected materials*** Katia Bertoldi, Harvard University
D14-1	**NON-LINEAR RESPONSE OF HIGHLY DEFORMABLE STRUCTURES**
Room 2104	SESSION CHAIRS: Zi Chen, Dartmouth College Huanyu Cheng, The Pennsylvania State University Wanliang Shan, University of Nevada Qiming Wang, University of Southern California Teng Zhang, Syracuse University
10:00 am	***A mechanics study on surface Ruga morphologies of soft materials*** Ruike Zhao, Brown University
10:20 am	***Nonlinear flexoelectric energy harvesting via soft materials*** Qian Deng, Xi'an Jiaotong University
10:40 am	***Tunable helical origami structures with multistability*** Zi Chen, Dartmouth College
11:00 am	***Mechanical instabilities in soft materials*** Shengqiang Cai, University of California San Diego

E1-1	MECHANICS AND ELECTROCHEMISTRY OF ENERGY MATERIALS
Room 2115	SESSION CHAIRS: Siva P. V. Nadimpalli, New Jersey Institute of Technology Yifei Mo, University of Maryland Kejie Zhao, Purdue University Zheng Jia, Northwestern University
10:00 am	***Coupled electrochemistry-mechanics phenomena in high-energy-density electrode materials for lithium ion and sodium ion batteries*** Sulin Zhang, Pennsylvania State University
10:20 am	***Experimental calibration of a cahn-hilliard phase-field model for phase transformations in Li-Sn electrodes*** Srivatsan Hulikal, Chun-Hao Chen, Eric Chason, Pradeep Guduru, Allan Bower Brown University
10:40 am	***Inelastic shape changes of silicon particles and stress evolution at binder/particle interface in a composite electrode during lithiation/delithiation cycling*** Siva Nadimpalli, Vivek Shenoy, Hailong Wang New Jersey Institute of Technology
11:00 am	***Multi-scale modeling of multi-physics processes in lithium ion battery cells*** Alberto Salvadori, Marco Magri, Karel Matous, Alexander Mukasyan, Jennifer Schaefer, and Davide Grazioli University of Notre Dame
E2-1	**MECHANICS OF ONE-DIMENSIONAL NANOMATERIALS: EXPERIMENT AND MODELING**
Room 0103	SESSION CHAIRS: Yong Zhu, North Carolina State University Ting Zhu, Georgia Institute of Technology Daniel S. Gianola, University of California at Santa Barbara Scott X. Mao, University of Pittsburgh
10:00 am	***The mechanics of contact between nanoscale bodies: in situ experiments and matched atomistic simulations*** Tevis D. B. Jacobs, University of Pittsburgh
10:20 am	***Near-theoretical fracture strengths in native and oxidized silicon nanowires*** Robert F. Cook, Materials Measurement Science Division National Institute of Standards and Technology
10:40 am	***Recoverable plasticity in twinned metallic nanowires*** Guangming Cheng, Sheng Yin, Tzu-Hsuan Chang, Huajian Gao, Yong Zhu North Carolina State University
11:00 am	***Bending and deformation characteristics of soft nanopillars*** Pijush Ghosh and Mallikarjunachari G. Indian Institute of Technology
11:20 am	***Cyclic pseudo-elastic twinning in small-scaled BCC tungsten*** Scott X. Mao, University of Pittsburgh

E3-1	ADVANCED NANO-MANUFACTURING FOR MULTI-FUNCTIONAL NANOSYSTEMS
Room 1309	SESSION CHAIRS: Hongli Zhu, Northeastern University Wenzhuo Wu, Purdue University Huanyu Cheng, The Pennsylvania State University Yang Yang, University of Central Florida Ying Li, University of Connecticut
10:00 am	***Nanoscale metrology and operando characterization for data-driven scientific understanding of carbon nanotube manufacturing*** Mostafa Bedewy, University of Pittsburgh
10:20 am	***Fabrication of stretchable supercapacitors based on wrinkled CNT macrofilms,*** Bingqing Wei, University of Delaware
10:40 am	***Large-scale assembly of functional 1D nanowires into skin electronics*** Chi Hwan Lee, Purdue University
E4-1	**MODELING AND CHARACTERIZING THE MECHANICS OF BOUNDARIES IN MATERIALS**
Room 1311	SESSION CHAIRS: Charles Wojnar, Missouri University of Science and Technology Brandon Runnels, University of Colorado Colorado Springs Irene Beyerlein, Los Alamos National Laboratory
10:00 am	***Analysis of plastic anisotropy in nanotwinned copper by a statistical dislocation activation model*** Caizhi Zhou, Rui Yuan, Irene Beyerlein Missouri University of Science and Technology
10:20 am	***History-independent fatigue response of nanotwinned metals governed by correlated necklace dislocations*** Haofei Zhou, Huajian Gao Brown University
10:40 am	***Temperature triggered stress-driven plasticity and hardening in nanotwinned materials*** Seyedeh Mohadeseh Taheri Mousavi, Haofei Zhou, Guijin Zhou, Huajian Gao Brown University
11:00 am	***Crystal size and temperature effects on the transformation in deformation modes in twin oriented Mg single crystals*** Gi-Dong Sim, Kelvin Y. Xie, Kevin J. Hemker, Jaafar A. El-Awady Johns Hopkins University
11:20 am	***The twinning genome: towards a systematic framework for predicting twinning in materials*** Dingyi Sun, Mauricio Ponga, Kaushik Bhattacharya, Michael Ortiz California Institute of Technology

E5-1	MECHANICS OF MULTIFUNCTIONAL 2D MATERIALS AND 2D-BASED NANOSTRUCTURES
Room 1105	SESSION CHAIRS: Ellad Tadmor, University of Minnesota Shuze Zhu, Massachusetts Institute of Technology Cemal Basaran, University at Buffalo Kuan Zhang, University of Minnesota Wei Gao, Northwestern University
10:00 am	***The wetting property of water on wrinkled surface*** Xi Chen, Feng Hao Columbia University
10:30 am	***Commensuration and incommensuration in the van der waals heterojunctions*** Philip Kim, Harvard University
11:00 am	***Multiscale modeling of stacking mechanics in van der waals heterostructures*** Peng Zhao, Pennsylvania State University
11:20 am	***Modeling the mechanics of 2D layered heterostructures*** Ellad Tadmor, Kuan Zhang University of Minnesota
E7-1	**ADVANCES IN MODELING AND SIMULATION OF MATERIAL DAMAGE AND FAILURE UNDER DYNAMIC CONDITIONS**
Room 1308	SESSION CHAIRS: C. A. Bronkhorst, Los Alamos National Laboratory H. M. Mourad, Los Alamos National Laboratory D. J. Luscher, Los Alamos National Laboratory
10:00 am	***Analysis of tool wear mechanism in high-speed milling of carbon fiber reinforced polymer*** YouXi Lin, Hua Lin Fuzhou University
10:20 am	***Fragmentation prediction for a brittle ceramic: a two-scale model approach*** Remi Dingreville, John Bignell, Pierre-Alexandre Juan Sandia National Laboratories
10:40 am	***Direct measurement and modeling of glass under shock loading*** Panagiotis Philippos Natsiavas, Raul Radovitzky Massachusetts Institute of Technology
11:00 am	***Interface mechanical strength and interface elastic constants calculations in polymer composites, and natural materials*** Devendra Verma, Vikas Tomar Purdue University
11:20 am	***The roles of glide set and shuffle set dislocations in the anisotropic fracture behavior of silicon*** Khalil Elkhodary, The American University in Cairo

F3-1	ADVANCED NANO-MANUFACTURING FOR MULTI-FUNCTIONAL NANOSYSTEMS
Room 2108	SESSION CHAIRS: K. Bertoldi, Harvard University S. Gonella, University of Minnesota
10:00 am	***Harnessing dynamic buckling in soft elastic metamaterials to manage nonlinearity in the propagation, reflection and absorption of elastic waves*** Vincent Tournat, Xinxin Guo, Bolei Deng, Jordan Raney, Vitalyi Gusev, Katia Bertoldi Harvard University
10:20 am	***Harnessing geometric and magnetic nonlinearities for acoustic switching and logic*** Osama R. Bilal, André G.C. Foehr, Chiara Daraio ETH Zurich
10:40 am	***Wave phenomena in microscale granular crystals*** Nicholas Boechler, University of Washington
11:00 am	***Linear and nonlinear dynamic response of a liquid solid composite*** Ahmed Elbanna, Qianli Chen University of Illinois Urbana Champaign
11:20 am	***Adaptively enhanced directivity in nonlinear lattice materials*** Ganesh Ramakrishnan, Stefano Gonella University of Minnesota

A1-2	PRAGER MEDALIST SYMPOSIUM HONORING PROFESSOR J.N. REDDY
Room 1103	SESSION CHAIRS: Samit Roy, University of Alabama Arun Srinivasa, Texas A&M University
1:00 pm	***A mechanically driven form of kirigami as a route to 3D mesostructures in micro/nanomembranes*** Yonggang Huang, Northwestern University
1:20 pm	***Achieving reconfigurable structures and metamaterials through origami engineering*** Glaucio H. Paulino, Georgia Institute of Technology
1:40 pm	***Modeling of toughness enhancement mechanisms in nanocarbon reinforced polymer composites due to length scale effect*** Samit Roy, University of Alabama
2:00 pm	***Mechanics of interaction of the pelvic organs and muscles in pelvic organ prolapse (POP)*** Arnab Chanda, University of Alabama
2:20 pm	***Mechanical behaviors of foam filled concrete under static and dynamic indentation by a scaled aircraft wheel*** YiPing Liu, South China University of Technology
A2-2	**ERINGEN MEDAL SYMPOSIUM HONORING DR. GANG CHEN**
Room 1101/1102	SESSION CHAIRS: Ronggui Yang, University of Colorado at Boulder Theodorian Borca-Tasciuc, Rensselaer Polytechnic University Chris Dames, University of California at Berkeley Bao Yang, University of Maryland
1:00 pm	***Thermoelectric transport engineering in nanostructured bulk pnictogen chalcogenides materials obtained by microwave synthesis*** Theodorian Borca-Tasciuc, Rensselaer Polytechnic University
1:20 pm	***Solid-state thermionic energy conversion in layered materials from first principles*** Keivan Esfarjani, Rutgers University
1:40 pm	***New routes to nanostructured thermoelectrics*** Michael Thompson Pettes, University of Connecticut
2:00 pm	***Thermal and thermoelectric transport measurements of an individual boron arsenide microstructure*** Jaehyun Kim, Owen M. Williams, Eric Ou, Alan H. Cowley, Li Shi University of Texas at Austin

D15-1	DAMAGE AND DEGRADATION CHARACTERIZATION AND MODELING IN SOLIDS AND STRUCTURES
Room 2110	SESSION CHAIRS: Mohammad Modarres, University of Maryland M. Amiri, Technical Data Analysis, Inc. A. Kahirdeh, University of Maryland
1:00 pm	***Nondestructive data-driven remaining useful life predictions*** Satish Rajaram, Drexel University
1:20 pm	***Computationally-driven structural damage assessment using microstructural scale damage monitoring*** Ryan Whitmore, Satish Rajaram, Brian Wisner, Konstantinos Baxevanakis, Antonios Kontsos Drexel University
1:40 pm	***Unimodality-based clustering*** Jing Tian, Michael Azarian, Michael Pecht University of Maryland
2:00 pm	***Prognostic health monitoring of composite materials based on structurally integrated multifunctional sensors*** Jonathan Fox Kordell, Abhijit Dasgupta, Miao Yu University of Maryland
E8-2	**DYNAMIC FAILURE, FRAGMENTATION, AND LOCALIZATION**
Room 1307	SESSION CHAIRS: Andrew L. Tonge, Army Research Laboratory Jeffrey T. Lloyd, Army Research Laboratory Justin Wilkerson, University of Texas at San Antonio
1:00 pm	***An explicit gradient-damage method for fragmentation*** John Dolbow and Michael Tupek Duke University
1:20 pm	***X-ray phase-contrast imaging studies of dynamic fracture in geological materials*** Andrew Fwu Tay Leong, Andrew Robinson, Kamel Fezzaa, Tao Sun, Brian Shuster, Daniel T. Casem, Paul Lambert, Kaliat T. Ramesh, Todd Hufnagel Johns Hopkins University
1:40 pm	***Failure of granular boron carbide under extreme loading*** Matthew Serge, Michael Homel, Jason Loiseau, Timothy Walter, Pouyan Motamedi, Calvin Lo, Eric B. Herbold, Andrew J. Higgins, Tomoko Sano, James D. Hogan University of Alberta
2:00 pm	***Peridynamics modeling of dynamic fracture in vehicular glass*** George A Gazonas, Raymond Wildman, James O'Grady US Army Research Laboratory
2:20 pm	***The effect of micro-scale mechanisms in macroscopic mechanical response in armor ceramic undergoing dynamic fragmentation*** Farah Huq, Andrew Tonge, Lori Graham-Brady Johns Hopkins University

C3-2	MECHANICAL CHARACTERIZATION OF SOFT MATERIALS: EXPERIMENTS AND MODELING
Room 2116	SESSION CHAIRS: Yuhang Hu, University of Illinois at Urbana-Champaign Shengqiang Cai, University of California, San Diego
1:00 pm	***Modeling and simulating fatigue in bioprosthetic heart valves: permanent set as a first step*** Will Zhang, The University of Texas at Austin
1:20 pm	***Puncture of osteoarthritic human articular cartilage for assessment of local fracture toughness*** Shengqiang Cai, University of California San Diego
1:40 pm	***Mechanical characterization of polymeric gels*** Nikola Bosnjak, Shawn A. Chester New Jersey Institute of Technology
2:00 pm	***Dynamic indentation to characterize the poroelasticity of gels*** Yuhang Hu, University of Illinois Urbana-Champaign
2:20 pm	***Mechanics of polymer networks with sacrificial bonds and hidden length*** Ahmed Elbanna, Yuhang Hu, Konik Kothari University of Illinois Urbana Champaign
C5-2	**MECHANICS AND PHYSICS OF SOFT MATERIALS**
Chasen Family Room	SESSION CHAIRS: Stephan Rudykh, Technion – Israel Institute of Technology, Israel Yuhang Hu, University of Illinois at Urbana-Champaign Oscar Lopez-Pamies, University of Illinois at Urbana-Champaign Xuanhe Zhao, Massachusetts Institute of Technology
1:00 pm	***Shrinkage induced self-folding origami during photopolymerization*** Zeang Zhao, Daining Fang, Jerry Qi Georgia Institute of Technology and Peking University
1:20 pm	***Pre-programmed folding of 2D nematic liquid crystal elastomer sheets into arbitrary 3D structures*** Yu Xia, Shu Yang, Randall Kamien University of Pennsylvania
1:40 pm	***The interaction of swelling and mechanics produces complex self-folding of patterned hydrogel films*** Jingkai Guo, The Johns Hopkins University
2:00 pm	***Guided formation of 3D helical mesostructures by mechanical buckling: analytical modeling and experimental validation*** Yonggang Huang, Yihui Zhang Northwestern University

C9-2	3D PRINTING IMPLANTABLE CONSTRUCTS FOR BIOMEDICAL APPLICATIONS
Room 1301	SESSION CHAIRS: Lijie Grace Zhang, The George Washington University John P. Fisher, University of Maryland
1:00 pm	***Physicomechanical approach for microtissue formation from amphiphilic polyurethane microgel*** Debanjan Sarkar, University at Buffalo
1:40 pm	***Cell infiltrative hydrogel fibrous scaffolds for accelerated wound healing*** Xin Zhao, Xi'an Jiaotong University
2:00 pm	***3D bioprinting of gradient scaffolds for cartilage tissue engineering*** Margaret Nowicki, The George Washington University
2:20 pm	***Modeling tumor growth with peridynamics*** Emma Lejeune, Christian Linder Stanford University
C10-2	**MULTISCALE STUDIES OF CELL MECHANICS**
Room 2111	SESSION CHAIRS: Bin Chen, Zhejiang University Baohua Ji, Beijing Institute of Technology
1:00 pm	***Mechanics of collective cell polarization and arrangement on patterned substrate*** Baohua Ji, Beijing Institute of Technology
1:20 pm	***Engineering cell microenvironment using novel hydrogels for biomedical applications*** Feng Xu, Xi'an Jiaotong University
1:40 pm	***Rigidity modulated transport of nanoparticles in mucosal tissue*** Xinghua Shi, National Center for Nanoscience and Technology, Chinese Academy of Sciences
2:00 pm	***The quest for the determination of the gaussian modulus---exploiting membrane edge fluctuations*** Fatemeh Ahmadpoor, Metthew Zelisko, Huajian Gao, Pradeep Sharma University of Houston
2:20 pm	***Thermodynamics of mechanotransduction at intercellular junctions*** Alireza Sarvestani, Ohio University

D1-2	MULTI-SCALE MECHANICS OF PARTICULATE MEDIA
Room 2112	SESSION CHAIRS: David Henann, Brown University Ken Kamrin, Massachusetts Institute of Technology José Andrade, California Institute of Technology Rich Regueiro, University of Colorado at Boulder
1:00 pm	***Multiscale modeling and vibrational character of maximally dense frictional disks under shear*** Stefanos Papanikolaou, West Virginia University
1:40 pm	***Effects of polydispersity on particle arrangements in flowing hard particle suspensions*** Eilis Jill Rosenbaum, DOE National Energy Technology Laboratory
2:00 pm	***Work conjugacy in molecular dynamics*** Leyu Wang, Jiaoyan Li, Cing-Dao Kan, James D. Lee George Mason University
2:20 pm	***Dynamics of inherent structure energy evolution in metallic glasses*** Yue Fan, Oak Ridge National Lab
D3-2	**MECHANICS OF 3D PRINTED MATERIALS AND STRUCTURES**
Room 2106	SESSION CHAIRS: Sung Hoon Kang, Johns Hopkins University Howon Lee, Rutgers University Yaning Li, University of New Hampshire Jerry Qi, Georgia Institute of Technology
1:00 pm	***Fabrication and mechanics of additive assemblies*** Thomas Siegmund, Purdue University
1:40 pm	***Mechanical characterization of high-strength porous biomaterials for bone replacement implants*** Damiano Pasini, David Melancon McGill University
2:00 pm	***Dynamic mechanical response of laser powder bed 3d printed 316l stainless steel*** Brahmananda Pramanik, Montana Tech
2:20 pm	***Fracture toughness of fused deposition modeled thermoplastics*** Rajasekhar Tripuraneni, Siva Nadimpalli New Jersey Institute of Technology

D4-2	MECHANICS IN MANUFACTURING, SYNTHESIS AND PROCESSING OF MATERIALS, STRUCTURES AND DEVICES
Room 2100/2101	SESSION CHAIRS: Baoxing Xu, University of Virginia Weiyi Lu, Michigan State University Xianqiao Wang, University of Georgia Horacio D. Espinosa, Northwestern University Xiaodong (Chris) Li, University of Virginia
1:00 pm	***Understanding thermally dominated material removal in focused ion beam nanomachining*** Harley T. Johnson, Kallol Das, Joshua Stout, Jonathan B. Freund University of Illinois at Urbana-Champaign
1:20 pm	***Multi-scale modeling of electron beam melting of functionally graded materials*** Wentao Yan, Feng Lin, Wing Kam Liu Northwestern University and Tsinghua University
1:40 pm	***Pulse-laser induced multilayer surface alloying for enhanced mechanical strength and wear resistance*** Junlan Wang, Zhou Yang University of Washington
2:00 pm	***High-temperature delamination mechanisms of dense vertically cracked thermal barrier coatings: In-situ experimental and numerical measurements*** Clifton Bumgardner, Brendan Croom, Xiaodong Li University of Virginia
2:20 pm	***Advances in picosecond laser ablation Modeling for high temperature sapphire based optical pressure transducers*** Peter Woerner and William Oates, Florida State University
D7-2	**INSTABILITY IN SOLIDS AND STRUCTURES**
Room 0105	SESSION CHAIRS: E.B. Tadmor, V. Levitas
1:00 pm	***Cauchy-Born simulations of a diamond anvil cell experiment using ABAQUS*** Ellad Tadmor, Jiadi Fan, Alexander Halaszyn, Ryan S. Elliott University of Minnesota
1:20 pm	***Modeling of twin-induced shear bands in magnesium alloys*** Konstantinos Baxevanakis, Antonios Kontsos Drexel University
1:40 pm	***Modeling shear banding in amorphous solids*** Darius Alix-Williams, Johns Hopkins University
2:00 pm	***Lattice instability during phase transformations under multiaxial stress: synergy of phase field and molecular dynamics approaches*** Valery Levitas, Hao Chen, Liming Xiong, Iowa State University
2:20 pm	***A new framework for the interpretation of modulated martensites in shape memory alloys (with OpenKIM)*** Ryan S. Elliott, University of Minnesota

D8-2	COMPUTATIONAL MECHANICS OF MATERIALS AND STRUCTURES
Room 0102	SESSION CHAIRS: Shawn Chester, New Jersey Institute of Technology Christian Linder, Stanford University Steve Sun, Columbia University
1:00 pm	***Failure of grain boundaries in graphene grown via chemical vapor deposition: Experiments and FEM simulations*** Christopher DiMarco, Jeffrey Kysar, James Hone, Aldo Marano, Troy Robillos, Pierre Turquet de Beauregard Columbia University
1:20 pm	***Indentation Schmid factor and incipient plasticity by nanoindentation pop-in tests in hexagonal close-packed single crystals*** Wei Zhang, Yanfei Gao, Yuzhi Xia, Hongbin Bei University of Tennessee
1:40 pm	***A universal discrete dislocation model for diffusion-assisted climb*** Srinath Chakravarthy, Northeastern University
2:00 pm	***A nonlinear data-driven reduced order model with physics-based construction of high-dimensional manifold*** Satyaki Bhattacharjee, University of Notre Dame
D9-2	**FRICTION, FRACTURE AND DAMAGE**
Room 0101	SESSION CHAIRS: Ahmed Elbanna, University of Illinois K. Ravi-Chandar, University of Texas at Austin
1:00 pm	***Accurate finite element simulation of stresses for stationary dynamic cracks under impact loading*** A B M Abdul Bhuiyan, Alexander Idesman Texas Tech University
1:20 pm	***Simulation of particulate raft dynamics: continuum modeling of fracture in closely-packed systems*** Christian Peco, Yingjie Liu, John Dolbow Duke University
1:40 pm	***The surface-forming energy release rate and the local energy release rate for elastic-plastic crack propagation*** Bin Liu, Tsinghua University
2:00 pm	***The failure mechanism for small defects in soft solids*** Reza Pourmodheji, Honghui Yu The City College of New York

D13-2	ARCHITECTURED META-MATERIALS: ENGINEERING SCIENCE, DESIGN, MANUFACTURING
Room 2102	SESSION CHAIRS: Francois Barthelat, McGill University Thomas Siegmund, Purdue University Lorenzo Valdevit, University of California at Irvine Xiaoyu (Rayne) Zheng, Virginia Tech
1:00 pm	***Topology Optimization of Manufacturable, High Performance Architected Materials*** James Guest, Johns Hopkins University
1:30 pm	***Programmable Materials Based on Periodic Cellular Solids*** David Restrepo, Nilesh Mankame, Pablo Zavattieri Purdue University
1:50 pm	***Mechanical properties and failure mechanisms in Octet and Rhombicuboctahedron lattices*** Damiano Pasini, Liu Lu McGill University
2:10 pm	***The Mechanical Performance of Rigid vs Non-Rigid Nanolattice Topologies*** Lucas Meza, California Institute of Technology
2:30 pm	***Computational modelling of knitted textiles*** Dani Liu
D14-2	**NON-LINEAR RESPONSE OF HIGHLY DEFORMABLE STRUCTURES**
Room 2104	SESSION CHAIRS: Zi Chen, Dartmouth College Huanyu Cheng, The Pennsylvania State University Wanliang Shan, University of Nevada Qiming Wang, University of Southern California Teng Zhang, Syracuse University
1:00 pm	***High stretchable strain sensor using kirigami-based PVDF thin-film*** Nan Hu, Dartmouth College
1:20 pm	***Tunable multistability in thick panel origami*** Ian Trase, Dartmouth College
1:40 pm	***Three-dimensional micro/mesoscale dynamical platforms assembled by compressive buckling*** Xin Ning, Heling Wang, Xinge Yu, Yihui Zhang, Yonggang Huang, John Rogers University of Illinois at Urbana-Champaign
2:00 pm	***Harnessing small scale mechanical instabilities in metasurfaces for multifunctionality*** Jie Yin, Temple University

E1-2	MECHANICS AND ELECTROCHEMISTRY OF ENERGY MATERIALS
Room 2115	SESSION CHAIRS: Siva P. V. Nadimpalli, New Jersey Institute of Technology Yifei Mo, University of Maryland Kejie Zhao, Purdue University Zheng Jia, Northwestern University
1:00 pm	***Mechanical measurements on silicon and germanium thin film electrodes for lithium-ion batteries*** Reiner Moenig, Karlsruhe Institute of Technology (KIT)
1:20 pm	***Lithium ion diffusivity study in germanium (Ge) electrode by galvanostatic intermittent titration technique (GITT) during electrochemical cycling*** Subhajit Rakshit, Rajasekhar Tripurane, Siva Nadimpalli New Jersey Institute of Technology
1:40 pm	***Measurements of stress and fracture in germanium electrodes of Li-ion batteries*** Matt Pharr, Texas A&M University
2:00 pm	***In situ measurements of mechanical properties of cathode films during electrochemical cycling*** Insun Yoon, Brown University
E2-2	**MECHANICS OF ONE-DIMENSIONAL NANOMATERIALS: EXPERIMENT AND MODELING**
Room 0103	SESSION CHAIRS: Yong Zhu, North Carolina State University Ting Zhu, Georgia Institute of Technology Daniel S. Gianola, University of California at Santa Barbara Scott X. Mao, University of Pittsburgh
1:00 pm	***Plasticity and heat transport in nanowires strengthened by nanoscale twins*** Frederic Sansoz, The University of Vermont
1:20 pm	***In situ nanomechanics*** Ting Zhu, Georgia Institute of Technology
1:40 pm	***Deformation mechanism in crystalline metallic nanowires with internal microstructures*** Sheng Yin, Brown University
2:00 pm	***Ultra-high elastic strain energy storage in AlOx-infiltrated SU-8 photoresist nanopillars*** Keith J. Dusoe, University of Connecticut
2:20 pm	***Superelasticity and one-dimensional cryogenic shape memory effects of novel intermetallic compound CaFe2As2 at small length scales*** John T. Sypek, University of Connecticut

E3-2	ADVANCED NANO-MANUFACTURING FOR MULTI-FUNCTIONAL NANOSYSTEMS
Room 1309	SESSION CHAIRS: Hongli Zhu, Northeastern University Wenzhuo Wu, Purdue University Huanyu Cheng, The Pennsylvania State University Yang Yang, University of Central Florida Ying Li, University of Connecticut
1:00 pm	***A first principle investigation of early stages of CVD growth of graphene: solubility of C in Cu and Ni*** Abhilash Harpale, Huck Beng Chew University of Illinois at Urbana-Champaign
1:20 pm	***Seed layer mediated crystallization of amorphous intermetallic films to obtain tailored microstructures*** Jagannathan Rajagopalan, Arizona State University
1:40 pm	***Bioinspired metal ion coordinated polyelectrolyte nanoreactors*** Lei Zhai, University of Central Florida
2:20 pm	***Physics and applications of plasmonic nanofocusing in deep sub-wavelength scale*** Liang Pan, Purdue University
E4-2	**MODELING AND CHARACTERIZING THE MECHANICS OF BOUNDARIES IN MATERIALS**
Room 1311	SESSION CHAIRS: Charles Wojnar, Missouri University of Science and Technology Brandon Runnels, University of Colorado Colorado Springs Irene Beyerlein, Los Alamos National Laboratory
1:00 pm	***Ferroelectric domain wall dynamics under high power drive conditions*** Geoff Brennecka, Colorado School of Mines
1:20 pm	***Ferroelectric generators and electro-thermomechanical coupling in shock environments*** Vinamra Agrawal, Kaushik Bhattacharya California Institute of Technology
1:40 pm	***Influence of electric field-induced ferroelectric domain wall motion on mechanical damping*** Will K. Hays, Charles Wojnar Missouri University of Science and Technology
2:00 pm	***Hysteretic responses of max-phases at room temperature: modeling and experiment*** Anastasia Muliana, Berenice Kramer, Junwei Xing, Miladin Radovic Texas A&M University

E5-2	MECHANICS OF MULTIFUNCTIONAL 2D MATERIALS AND 2D-BASED NANOSTRUCTURES
Room 1105	SESSION CHAIRS: Ellad Tadmor, University of Minnesota Shuze Zhu, Massachusetts Institute of Technology Cemal Basaran, University at Buffalo Kuan Zhang, University of Minnesota Wei Gao, Northwestern University
1:00 pm	***Mechanics and electromechanics of graphene kirigami*** Harold Park, Boston University
1:20 pm	***The role of mechanical constraints in electromechanical and structural phase change properties of two-dimensional materials*** Evan Reed, Stanford University
1:40 pm	***Programmable extreme pseudomagnetic fields in graphene by a uniaxial stretch*** Shuze Zhu, Teng Li Massachusetts Institute of Technology
2:00 pm	***Unusual fracture behavior of polycrystalline silicene*** Xianqiao Wang, Ning Liu University of Georgia
E7-2	**ADVANCES IN MODELING AND SIMULATION OF MATERIAL DAMAGE AND FAILURE UNDER DYNAMIC CONDITIONS**
Room 1308	SESSION CHAIRS: C. A. Bronkhorst, Los Alamos National Laboratory H. M. Mourad, Los Alamos National Laboratory D. J. Luscher, Los Alamos National Laboratory
1:00 pm	***Distribution enhanced homogenization of coupled damage and crystal plasticity*** Coleman Alleman, Sandia National Laboratories
1:20 pm	***Co-designed simulations and experiments of projectile impact test with uncertainty quantification*** Alberto Salvadori, University of Notre Dame
1:40 pm	***Fracture model for beryllium and other materials*** Abigail Hunter, Los Alamos National Laboratory
2:00 pm	***On the micromechanics of dynamic ductile failure*** Justin W. Wilkerson, University of Texas at San Antonio
2:20 pm	***Meso to macro mechanics of metallic ductile damage under dynamic loading conditions*** Curt Bronkhorst, Los Alamos National Laboratory

F3-2	ADVANCED NANO-MANUFACTURING FOR MULTI-FUNCTIONAL NANOSYSTEMS
Room 2108	SESSION CHAIRS: K. Bertoldi, Harvard University S. Gonella, University of Minnesota
1:00 pm	***Unidirectional strongly nonlinear transition waves in bistable lattices*** Neel Nadkarni, Andres Felipe Arrieta, Christopher Chong, Dennis M. Kochmann, Chiara Daraio California Institute of Technology
1:20 pm	***Sonic waves and propagating phase boundaries in bi-stable chains with stretch and twist*** Prashant Kishore Purohit, Qingze Zhao University of Pennsylvania
1:40 pm	***Wave control through soft microstructural curling: bandgap shifting, reconfigurable anisotropy and switchable chirality*** Paolo Celli, Stefano Gonella University of Minnesota
2:00 pm	***Elastic wave propagation in soft microstructured materials undergoing finite strains*** Stephan Rudykh, Pavel Galich Technion - Israel Institute of Technology
2:20 pm	***Band gap transmission in periodic, bistable mechanical lattices*** Michael Joseph Frazier, Dennis Kochmann California Institute of Technology

A1-3	PRAGER MEDALIST SYMPOSIUM HONORING PROFESSOR J.N. REDDY
Room 1103	SESSION CHAIRS: Samit Roy, University of Alabama Arun Srinivasa, Texas A&M University
3:00 pm	***A non-classical internal polar continuum theory for solids with finite deformation and finite strain*** Karan S. Surana, University of Kansas
3:20 pm	***Nonlinear mechanics of surface growth for cylindrical and spherical elastic bodies*** Arash Yavari, Georgia Institute of Technology
3:40 pm	***Network based finite element method: a reformulation of conventional finite element method for study of damage*** Parisa Khodabakhshi, J.N. Reddy, Arun Srinivasa Texas A&M University
4:00 pm	***Spectral/hp least-squares finite element analysis for generalized newtonian fluids*** Namhee Kim, Texas A&M University
4:20 pm	***An internal polar continuum theory for fluent continua: a more complete continuum framework*** Michael Joseph Powell, Texas A&M University
A2-3	**ERINGEN MEDAL SYMPOSIUM HONORING DR. GANG CHEN**
Room 1101/1102	SESSION CHAIRS: Ronggui Yang, University of Colorado at Boulder Theodorian Borca-Tasciuc, Rensselaer Polytechnic University Chris Dames, University of California at Berkeley Bao Yang, University of Maryland
3:00 pm	***Casimir interactions between periodic nanostructures*** Zhuomin Zhang, Xianglei Liu Georgia Institute of Technology
3:25 pm	***Radiative heat transfer at the nanoscale*** Pramod Reddy, Bai Song, Dakotah Thompson, Anthony Fiorino, Edgar Meyhofer University of Michigan
3:50 pm	***Controlling near field energy transfer with quantum spillover and electrostatic gating in 2D materials*** Nicholas Fang, Massachusetts Institute of Technology
4:15 pm	***Manipulating near-field and far-field thermal radiation*** Austin J. Minnich, Caltech

D15-2	DAMAGE AND DEGRADATION CHARACTERIZATION AND MODELING IN SOLIDS AND STRUCTURES
Room 2110	SESSION CHAIRS: Mohammad Modarres, University of Maryland M. Amiri, Technical Data Analysis, Inc. A. Kahirdeh, University of Maryland
3:00 pm	***Detection and analysis of solenoid valve electromagnetic coil insulation degradation*** Noel Jordan Jameson, University of Maryland
3:20 pm	***Acoustic emission entropy during fatigue degradation*** Ali Kahirdeh, Central Connecticut State University
3:40 pm	***Modeling damage initiation in unidirectional polymer composites incorporating manufacturing induced fiber clusters*** Aswathi Sudhir, Ramesh Talreja Texas A&M University
4:00 pm	***Damage initiation in unidirectional fiber reinforced polymeric composites with nonuniform fiber distribution*** Sarah A. Elnekhaily, Ramesh Talreja Texas A&M University
4:20 pm	***Estimation of fatigue life in straight attachment lug using extended isogeometric analysis (XIGA)*** Mehdi Naderi, Technical Data Analysis
E8-3	**DYNAMIC FAILURE, FRAGMENTATION, AND LOCALIZATION**
Room 1307	SESSION CHAIRS: Andrew L. Tonge, Army Research Laboratory Jeffrey T. Lloyd, Army Research Laboratory Justin Wilkerson, University of Texas at San Antonio
3:00 pm	***Modeling the anisotropic shock response of single-crystal RDX*** DJ Luscher, Marc Cawkwell, Frank Addessio, Kyle Ramos, John Barber Los Alamos National Laboratory
3:20 pm	***Correlating propensity for localization and orientation in rolled magnesium*** Jeffrey T. Lloyd, Matthew Priddy US Army Research Laboratory
3:40 pm	***A framework for dislocation-based viscoplasticity and dynamic failure of shocked crystals*** Thao Nguyen, D.J. Luscher, Justin Wilkerson University of Texas at San Antonio
4:00 pm	***Strength and strain localization in an AZ31B magnesium alloy: strain rate effects*** Vignesh Kannan, Nick Krywopusk, Kaliat Ramesh, Timothy Weihs, Lazlo Kecskes, Daniel Casem Johns Hopkins University
4:20 pm	***Pressure effect on the material properties of magnesium alloy AZ31B*** Meng Zhao, Debjoy Mallick, K T Ramesh Johns Hopkins University

C3-3	MECHANICAL CHARACTERIZATION OF SOFT MATERIALS: EXPERIMENTS AND MODELING
Room 2116	SESSION CHAIRS: Yuhang Hu, University of Illinois at Urbana-Champaign Shengqiang Cai, University of California, San Diego
3:00 pm	***Novel analytic methods for measuring viscoelastic properties of compliant polymers via impact indentation*** Aleksandar S Mijailovic, Bo Qing, Krystyn J. Van Vliet Massachusetts Institute of Technology
3:20 pm	***Characterizing the impact energy dissipation response of brain tissues and polymer gels via impact indentation*** Bo Qing, Krystyn J. Van Vliet Massachusetts Institute of Technology
3:40 pm	***The 'sixth sense' of ultrasound: probing nonlinear elasticity with acoustic radiation force*** Bojan Guzina, University of Minnesota
4:00 pm	***Novel experiments to elucidate the coupling between time and length scales on the large deformation behavior of polystyrene nanofibers*** Pavan V. Kolluru, Ioannis Chasiotis Northwestern Univeristy
4:20 pm	***Vesicle adhesion reveals novel universal relationships for biophysical characterization*** Ehsan Irajizad, Ashutosh Agrawal University of Houston
C5-3	**MECHANICS AND PHYSICS OF SOFT MATERIALS**
Chasen Family Room	SESSION CHAIRS: Stephan Rudykh, Technion – Israel Institute of Technology, Israel Yuhang Hu, University of Illinois at Urbana-Champaign Oscar Lopez-Pamies, University of Illinois at Urbana-Champaign Xuanhe Zhao, Massachusetts Institute of Technology
3:00 pm	***Extracting rate dependent adhesive interactions between soft materials*** Kenneth M. Liechti, University of Texas at Austin
3:40 pm	***Nanoprobe investigations of viscoelastic behavior in elastomeric nanocomposites*** Matthew D. Eaton, Pavan V. Kolluru, David W. Collinson, David Delgado, Kenneth Shull, L. Catherine Brinson Northwestern University
4:00 pm	***Highly stretchable double-network composite*** Xiangchao Feng, Iowa State University
4:20 pm	***Constitutive modeling of triple-shape crystallizable shape memory polymers within a thermodynamic framework*** Swapnil Moon, Fangda Cui, I. Joga Rao Northeastern University

C9-3	3D PRINTING IMPLANTABLE CONSTRUCTS FOR BIOMEDICAL APPLICATIONS
Room 1301	SESSION CHAIRS: Lijie Grace Zhang, The George Washington University John P. Fisher, University of Maryland
3:00 pm	***The entropic force between a particle and a fluctuating cell membrane*** Fatemeh Ahmadpoor, Huajian Gao University of Houston
3:20 pm	***The roles of white matter shear anisotropy and vasculature in mild TBI*** Fatma Madouh, Kaliat Ramesh Johns Hopkins University
3:40 pm	***A critical role of flexoelectricity in hearing*** Qian Deng, Pradeep Sharma Xi'an Jiaotong University
4:00 pm	***Effect of system compliance on crack nucleation in soft solids*** Shruti Rattan, Alfred Crosby UMass Amherst
4:20 pm	***On the `ultra-donut' topology of the nuclear envelope*** Ashutosh Agrawal, University of Houston
C10-3	**MULTISCALE STUDIES OF CELL MECHANICS**
Room 2111	SESSION CHAIRS: Bin Chen, Zhejiang University Baohua Ji, Beijing Institute of Technology
3:00 pm	***Geometric asymmetry induces upper limit of mitotic spindle size*** Hongyuan Jiang, University of Science and Technology of China
3:20 pm	***The race to the nociceptor: mechanical versus temperature effects in thermal pain of dental neuron*** Min Lin, Xi'an Jiaotong University
3:40 pm	***Single-molecular bond dissociation at ultralow loading rate*** Dechang Li, Beijing Institute of Technology
4:00 pm	***A tensegrity model of cell reorientation under stretches*** Guang-Kui Xu, Xi'an Jiaotong University
4:20 pm	***Quantifying bond breaking rates of a single myosin*** Bin Chen, Zhejiang University

D1-3	MULTI-SCALE MECHANICS OF PARTICULATE MEDIA
Room 2112	SESSION CHAIRS: David Henann, Brown University Ken Kamrin, Massachusetts Institute of Technology José Andrade, California Institute of Technology Rich Regueiro, University of Colorado at Boulder
3:00 pm	***Strengthening, yield, and flow in fluid-sheared granular beds*** Abe Clark, Mark Shattuck, Nick Ouellette, Corey O'Hern Yale University
3:40 pm	***Rheological behavior of partially-wet granular matter*** Ken Kamrin, Ramin Ghelichi Massachusetts Institute of Technology
4:00 pm	***Modeling shear-rate gradient driven size-segregation in dense, bidisperse granular systems*** David Henann, Daren Liu Brown University
4:20 pm	***Evolving dynamics of a tapped column of inelastic spheres*** Anthony D. Rosato, Denis Blackmore, Christoher Windows-Yule New Jersey Institute of Technology

D3-3	MECHANICS OF 3D PRINTED MATERIALS AND STRUCTURES
Room 2106	SESSION CHAIRS: Sung Hoon Kang, Johns Hopkins University Howon Lee, Rutgers University Yaning Li, University of New Hampshire Jerry Qi, Georgia Institute of Technology
3:00 pm	***Algorithm driven design of tough composite materials realized through additive manufacturing*** Markus J. Buehler, Massachusetts Institute of Technology
3:20 pm	***3D printing of active origami with complicated folding patterns*** Chao Yuan, Georgia Institute of Technology
3:40 pm	***Influence of material properties and internal geometry on wrinkled interfaces in 3D printed layered composites with hyper-viscoelastic phases*** Stephan Rudykh, Viacheslav Slesarenko Technion - Israel Institute of Technology
4:00 pm	***3D printed chiral composites with amplified auxetic effects due to elevated internal rotation*** Yaning Li, Yunyao Jiang University of New Hampshire
4:20 pm	***Topology optimization of 3D printable self-sensing structures*** Ryan Seifert, Virginia Tech

D4-3	MECHANICS IN MANUFACTURING, SYNTHESIS AND PROCESSING OF MATERIALS, STRUCTURES AND DEVICES
Room 2100 /2101	SESSION CHAIRS: Baoxing Xu, University of Virginia Weiyi Lu, Michigan State University Xianqiao Wang, University of Georgia Horacio D. Espinosa, Northwestern University Xiaodong (Chris) Li, University of Virginia
3:00 pm	***Computational modeling of electromechanical instabilities in dielectric elastomers*** Harold Park, Boston University
3:20 pm	***Exploiting adhesion mechanics to improve nanomembrane microtransfer printing processes*** Kevin T. Turner, University of Pennsylvania
3:40 pm	***When will graphene crack in roll-to-roll transfer?*** Kenneth M. Liechti, University of Texas at Austin
4:00 pm	***Stress analysis for nanomembranes under stamp compression*** Shutao Qiao, Nanshu Lu University of Texas at Austin
4:20 pm	***Microstructural evolution, constitutive property determination and reliability of TLPS joints*** Patrick McCluskey, Hannes Greve, Seyed Ali Moeini University of Maryland
D7-3	**INSTABILITY IN SOLIDS AND STRUCTURES**
Room 0105	SESSION CHAIRS: E.B. Tadmor, V. Levitas
3:00 pm	***History dependence of temperature and load on transformation induced plasticity in nickel titanium*** Daniel Biggs, Chris Churchill, John Shaw University of Michigan
3:20 pm	***Constitutive modeling of pseudoelastic NiTi and its application to structural problems*** Dongjie Jiang, Stelios Kyriakides, Chad Landis The University of Texas at Austin
3:40 pm	***Dynamics of multistable structures: from domain evolution and switching to phase transitions*** Michael Frazier, Dennis Kochmann California Institute of Technology
4:00 pm	***Anisotropic finite-strain models for plastically deforming porous metals with evolving microstructure: implications for macroscopic response and shear localization*** Dawei Song, Michalis Agoras, Pedro Ponte Castaneda University of Pennsylvania
4:20 pm	***Modeling of dielectric viscoelastomers with application to electromechanical instabilities*** Shuolun Wang, David Henann, Shawn Chester New Jersey Institute of Technology

D8-3	COMPUTATIONAL MECHANICS OF MATERIALS AND STRUCTURES
Room 0102	SESSION CHAIRS: Shawn Chester, New Jersey Institute of Technology Christian Linder, Stanford University Steve Sun, Columbia University
3:00 pm	***Sharp vs. diffuse interface models for the kinetics of ferroelectric switching*** Dennis Kochmann, Wei Lin Tan, Neel Nadkarni, A. Vidyasagar California Institute of Technology
3:20 pm	***Identifying kinetic relation parameters in ferroelectricity models via viscoelasticity measurements*** Charles Wojnar, Missouri University of Science and Technology
3:40 pm	***Spectral methods for understanding kinetics of domain wall motion in ferroelectric polycrystals*** Vidyasagar A., Dennis Kochmann California Institute of Technology
4:00 pm	***A 3D hybrid finite-element framework in nonlinear electroselastostatics and application to dielectric elastomer composites*** Victor Lefevre, Oscar Lopez-Pamies University of Illinois at Urbana-Champaign
4:20 pm	***A finite element method for light activated materials*** Shawn Chester, New Jersey Institute of Technology
D9-3	**FRICTION, FRACTURE AND DAMAGE**
Room 0101	SESSION CHAIRS: Ahmed Elbanna, University of Illinois K. Ravi-Chandar, University of Texas at Austin
3:00 pm	***Renormalization scaling of friction and fracture with hierarchical multiscale mechanisms*** Kyung-Suk Kim, Brown University
3:40 pm	***Brittle to ductile transition in a model of amorphous materials*** Xiao Ma, University of Illinois at Urbana Champaign
4:00 pm	***Stability analysis of regularized variational fracture model*** Kaushik Vijaykumar, Haneesh Kesari Brown University
4:20 pm	***Mathematical modeling of the growth of crack pairs*** Ken Kamrin, Ramin Ghelichi Massachusetts Institute of Technology

D13-3	ARCHITECTURED META-MATERIALS: ENGINEERING SCIENCE, DESIGN, MANUFACTURING
Room 2102	SESSION CHAIRS: Francois Barthelat, McGill University Thomas Siegmund, Purdue University Lorenzo Valdevit, University of California at Irvine Xiaoyu (Rayne) Zheng, Virginia Tech
3:00 pm	***Design, fabrication, and testing of low-density, high-strength materials*** Andrew Gross, Katia Bertoldi Harvard University
3:40 pm	***Tensile Response of 3D Nano-architected Lattices*** Arturo Mateos, California Institute of Technology
4:00 pm	***Thermally stable 3D architected materials with superior mechanical performance*** Damiano Pasini, Hang Xu McGill University
4:20 pm	***Multi-scale super-extensible metallic metamaterials*** Xiaoyu Zheng, Virginia Tech
D14-3	**NON-LINEAR RESPONSE OF HIGHLY DEFORMABLE STRUCTURES**
Room 2104	SESSION CHAIRS: Zi Chen, Dartmouth College Huanyu Cheng, The Pennsylvania State University Wanliang Shan, University of Nevada Qiming Wang, University of Southern California Teng Zhang, Syracuse University
3:00 pm	***Variational elasticity of thin plates*** James Hanna, Virginia Tech
3:20 pm	***Symplectic elasticity for surface wrinkles of multilayer system*** Teng Zhang, Syracuse University
3:40 pm	***Employing substrate deformation in the study of cCell mechanobiology*** James Henderson, Syracuse University
4:00 pm	***Adhesion enhanced by micro-surface craters under large deformation*** Nanshu Lu, University of Texas at Austin

E1-3	MECHANICS AND ELECTROCHEMISTRY OF ENERGY MATERIALS
Room 2115	SESSION CHAIRS: Siva P. V. Nadimpalli, New Jersey Institute of Technology Yifei Mo, University of Maryland Kejie Zhao, Purdue University Zheng Jia, Northwestern University
3:00 pm	***2D materials for energy storage and catalysis*** Vivek B. Shenoy, University of Pennsylvania
3:20 pm	***First principles study of solid electrolyte-electrode interfaces in all-solid-state Li-ion batteries*** Yizhou Zhu, Xingfeng He, Yifei Mo University of Maryland
3:40 pm	***Atomistic insights into the plasticity of amorphous Li-Si*** Xin Yan, Pradeep Sharma University of Houston
4:00 pm	***Mechanics of silicon electrodes in high-capacity Li-ion batteries*** Haoran Wang, Huck Beng Chew University of Illinois at Urbana-Champaign
E2-3	**MECHANICS OF ONE-DIMENSIONAL NANOMATERIALS: EXPERIMENT AND MODELING**
Room 0103	SESSION CHAIRS: Yong Zhu, North Carolina State University Ting Zhu, Georgia Institute of Technology Daniel S. Gianola, University of California at Santa Barbara Scott X. Mao, University of Pittsburgh
3:00 pm	***Nanorod-based metallic glue for ambient environments*** Hanchen Huang, Northeastern University
3:20 pm	***Stretchable conductors, sensors and actuators based on 1D nanomaterials*** Yong Zhu, North Carolina State University
3:40 pm	***Strain-dependent and hysteretic resistance of stretchable carbon nanotube networks*** Lihua Jin, Alex Chortos, Christian Linder, Zhenan Bao, Wei Cai Stanford University
4:00 pm	***In-situ structural health monitoring in polymer bonded surrogate energetic materials*** Engin Cem Sengezer, Gary Don Seidel Virginia Tech
4:20 pm	***Self-assembly of protruding islands on spherical substrates by surface instability*** Xiangbiao Liao, Columbia University

E3-3	ADVANCED NANO-MANUFACTURING FOR MULTI-FUNCTIONAL NANOSYSTEMS
Room 1309	SESSION CHAIRS: Hongli Zhu, Northeastern University Wenzhuo Wu, Purdue University Huanyu Cheng, The Pennsylvania State University Yang Yang, University of Central Florida Ying Li, University of Connecticut
3:00 pm	***Wrinkle and crack formation during fabrication of soft/metallic bilayers*** Antonia Antoniou, Timothy Ibru, Kyriaki Kalaitzidou Georgia Institute of Technology
3:20 pm	***Surface instability of graphene supported by polymer substrate: toward stretchable and flexible electronics*** Ying Li, University of Connecticut
3:40 pm	***High-rate nanomanufacturing and printing of electronics, sensors, energy and functional materials applications*** Ahmed Busnaina, Northeastern University
4:00 pm	***Controlled mechanical buckling for origami-inspired construction of 3D microstructures in advanced materials*** Yihui Zhang, Yonggang Huang, John A. Rogers Tsinghua University
E4-3	**MODELING AND CHARACTERIZING THE MECHANICS OF BOUNDARIES IN MATERIALS**
Room 1311	SESSION CHAIRS: Charles Wojnar, Missouri University of Science and Technology Brandon Runnels, University of Colorado Colorado Springs Irene Beyerlein, Los Alamos National Laboratory
3:00 pm	***Understanding and exploiting structure-property relationships of grain boundaries and interfaces for materials design*** Mark A. Tschopp, US Army Research Laboratory
3:20 pm	***Entropic interactions between fluctuating twin boundaries*** Yashashree Kulkarni, Dengke Chen University of Houston
4:00 pm	***Mobility of grain boundaries with defects via atomistic modeling*** Dengke Chen, Yashashree Kulkarni Georgia Institute of Technology
4:20 pm	***Fully-nonlocal 3D quasicontinuum modeling of defect interactions with grain boundaries*** Ishan Tembhekar, Dennis Kochmann California Institute of Technology

E5-3	MECHANICS OF MULTIFUNCTIONAL 2D MATERIALS AND 2D-BASED NANOSTRUCTURES
Room 1105	SESSION CHAIRS: Ellad Tadmor, University of Minnesota Shuze Zhu, Massachusetts Institute of Technology Cemal Basaran, University at Buffalo Kuan Zhang, University of Minnesota Wei Gao, Northwestern University
3:00 pm	***Effect of strain and temperature on mechanical and thermal transport properties of monolayer MoS2*** MD Zahaul Islam, Baoming Wang, M. Aman Haque Pennsylvania State University
3:20 pm	***Temperature dependence of joule heating in zigzag graphene nanoribbon*** Cemal Basran, University at Buffalo
3:40 pm	***High temperature and current density induced degradation of multi-layer graphene*** Baoming Wang, Aman Haque, Alexander E. Mag-isa, Jae-Hyun Kim, Hak-Joo Lee, The Pennsylvania State University
4:00 pm	***Bending fluctuations as an explanation for the negative thermal expansion coefficient of graphene*** Prashant Kishore Purohit, Xiaojun Liang, University of Pennsylvania
4:20 pm	***Nonlinear elasticity and the thermal fluctuations of graphene*** Fatemeh Ahmadpoor, Peng Wang, Rui Huang, Pradeep Sharma University of Houston
E7-3	**ADVANCES IN MODELING AND SIMULATION OF MATERIAL DAMAGE AND FAILURE UNDER DYNAMIC CONDITIONS**
Room 1308	SESSION CHAIRS: C. A. Bronkhorst, Los Alamos National Laboratory H. M. Mourad, Los Alamos National Laboratory D. J. Luscher, Los Alamos National Laboratory
3:00 pm	***Subcycling-accelerated crystal plasticity fe model for discrete twin evolution in magnesium alloys*** Somnath Ghosh, Jiahao Cheng , Johns Hopkins University
3:20 pm	***Numerical implementation of a crystal plasticity model with dislocation transport for high strain rate applications*** Hashem M. Mourad, Jason R. Mayeur, Darby J. Luscher, Abigail Hunter, Mark A. Kenamond, Los Alamos National Laboratory
3:40 pm	***Ignition sensitivity of hmx accounting for grain-scale hot spot mechanisms and chemical reaction*** Christopher Miller, Georgia Institute of Technology
4:00 pm	***A discrete dislocation dynamics study on the temperature effects on the plastic flow in magnesium single crystals under c-axis compression loading*** Kinshuk Srivastava, Jaafar El-Awady Johns Hopkins University
4:20 pm	***Anisotropy of solute effect on dislocation slips in an hcp metal: an atomistic simulation study of mg alloys*** Michael L. Falk, Peng Yi, Johns Hopkins University

F3-3	ADVANCED NANO-MANUFACTURING FOR MULTI-FUNCTIONAL NANOSYSTEMS
Room 2108	SESSION CHAIRS: K. Bertoldi, Harvard University S. Gonella, University of Minnesota
3:00 pm	***Helical edge states and topological phase transitions in phononic systems using bi-layered lattices*** Raj Kumar Pal, Georgia Institute of Technology
3:20 pm	***Auxetic elastic meta-structures for vibration absorption*** Kathryn H Matlack, André Kissling, Antonio Palermo, Chiara Daraio ETH Zurich
3:40 pm	***Linear operators for spectral analysis and design*** Rose Weisburgh, Peter W. Chung University of Maryland
4:00 pm	***Metamaterial properties of periodic laminates*** Ankit Srivastava, Illinois Institute of Technology

STUDENT POSTER COMPETITION FINALISTS

TUESDAY, OCTOBER 4

STUDENT POSTER COMPETITION | 3:00 pm - 4:40 pm | Lower Level Concourse

Can rigid proteins make a membrane softer? — the curios case of HIV induced cell membrane softening
▷ **HIMANI AGRAWAL,** University of Houston

Interacting elastic curves on a rigid manifold
▷ **VIKASH CHAURASIA,** University of Houston, Texas, Okinawa Institute of Science and Technology, Okinawa, Japan

Quantifying the Dislocation Emission Process from Nanocrystalline Grain Boundaries with Continuum-Equivalent Traction Fields ▷ **RUIZHI LI,** University of Illinois at Urbana-Champaign

Interface Mechanical Strength and Interface Elastic Constants Calculations in Polymer Composites, and Natural Materials
▷ **DEVENDRA VERMA,** Purdue University

Unraveling Metamaterial Concepts with Reconfigurable Bricks
▷ **PAOLO CELLI,** University of Minnesota

Continuum Models of Liquid-Solid Phase Change
▷ **AARON JOY,** University of Kansas

Patterning of graphene by hydrogen plasma: A molecular dynamics study ▷ **ABHILASH HARPALE, University of Illinois at Urbana-Champaign**

In-situ nanocompression of solution-grown crystalline superelastic materials: ThCr2Si2-structured novel intermetallic compounds ▷ **KEITH DUSOE,** University of Connecticut

Atomic Modeling of Toughening graphene through bio-inspired topological designs ▷ **BO NI,** Brown University

A High Aspect-Ratio Tapered Structure Achieved Through Re-Purposed 3D Printable Materials
▷ **DAVID W COLLINSON,** Northwestern University

Computational damage mechanics of viscoelastic materials with a gradient-enhanced propagation control
▷ **JUAN GUILLERMO LONDONO LOZANO,** Columbia University

Reconfigurable and multifunctional soft mechanical metasurface via cuts-guided buckling ▷ **GAOJIAN LIN,** Temple University

Programming three-dimensional shape shifting of polymer sheets via self-folding origami and kirigami with light
▷ **QIUTING ZHANG**, Temple University

Modulating elastic band gap structure in layered soft composites using sacrificial interfaces ▷ **QIANLI CHEN,** University of Illinois at Urbana Champaign

An Investigation Of Non-Schmid Effects In Single Crystal Metal Plasticity Using Phonon-Stability Analysis
▷ **HOSSEIN SALAHSHOOR,** Georgia Institute of Technology

A Bidirectional Self-Folding Actuator Based on Bilayer Shape Memory Polymer Composites ▷ **SHUYANG CHEN,** Johns Hopkins University

Breaking the Lattice Model: Redefining Mechanical Properties of Nanoarchitected Materials
▷ **CARLOS M. PORTELA,** California Institute of Technology

Study of Graphene Nano Ribbon with Vacancy Defects under Uniaxial Tension ▷ **JI ZHANG,** University at Buffalo

Configurational Anisotropy and Toughness Asymmetry in Graphene ▷ **VENKATESWARAN SANTHANAM,** University of Delaware

Analytical Studies on Organic-inorganic Interface in Nacreous Structures ▷ **SINA ASKARINEJAD,** Worcester Polytechnic Institute

Topology optimization of structures with mechanical interface phenomena ▷ **REZA BEHROU,** University of Colorado Boulder

Effective thermoelastic properties in van der Waals heterostructures ▷ **KAZI ISTIAQUE ALAM,** University of Delaware

Effect of symmetry breaking in viscous pumping of oscillating plates in an intermediate Reynolds numbers
FARHAD SAFFARAVAL, University of Maryland

The Twinning Genome: A Systematic Framework for Predicting Twinning in Materials ▷ **DINGYI SUN,** California Institute of Technology

Congratulations to our 2016 SES Annual Technical Meeting Student Poster Compeition Finalists!

Superelasticity and One-Dimensional Cryogenic Shape Memory Effects of Novel Intermetallic Compound CaFe2As2 at Small Length Scales ▷ **JOHN T. SYPEK,** University of Connecticut

Engineering Toughness-strength Correlation in Glass
▷ **TENGYUAN HAO,** University of Delaware

Reprogrammable ultra-fast shape-transformation of macroporous composited hydrogel sheets in response to light
▷ **JIAN CHENG,** University of Maryland

Effect of Stress State and Interfacial Roughness on Creep Rupture of SAC305 Solder Interconnects
▷ **QIAN JIANG**, University of Maryland

Coexistence of wrinkles and cracks in elastomer/metallic bilayers with strong interfacial adhesion
▷ **TIMOTHY IBRU**, Georgia Institute of Technology

Deformation Mechanisms in Crystalline Ag Nanowires
▷ **GUANGMING CHENG**, North Carolina State University

Coexistence of wrinkles and cracks in elastomer/metallic bilayers with strong interfacial adhesion
▷ **TIMOTHY IBRU**, Georgia Institute of Technology

Deformation Mechanisms in Crystalline Ag Nanowires
▷ **GUANGMING CHENG**, Yong Zhu, North Carolina State University

Transparent Wood as Energy Efficient Building Material
▷ **TIAN LI**, University of Maryland

3D printable high temperature and high rate micro-heaters
▷ **YONGGANG YAO**, University of Maryland

GENERAL POSTER SESSION PRESENTERS

TUESDAY, OCTOBER 4

GENERAL POSTER SESSION | 3:00 pm - 4:40 pm | Lower Level Concourse

The inflation response of the human lamina cribrosa in the optic nerve head: effects of age and regional variations
▷ **DAN MIDGETT,** Johns Hopkins University

Nanoscale elastic recovery of silicon while cutting at different temperatures: an MD simulation-based study
▷ **SAEED ZARE CHAVOSHI,** University of Strathclyde

Flow sensing and moment control of a soft bioinspired underwater robot
▷ **FEITIAN ZHAN,** George Mason University

Analysis the influence of asperities in rough surface of optical lens to its subsurface damage
▷ **REN ZHIYING,** Fuzhou University

The Bauschinger effect in highly confined thin films: a discrete dislocation plasticity study
▷ **SANA WAHEED,** Imperial College London

Diffusion of water into biopolymer matrix under different mechanical strain
▷ **SANTHOSH MATHESAN,** Indian Institute of Technology Madras

Response of cylindrical composite structures subjected to underwater impulsive loading: experimentations and computations
▷ **TAO QU,** Georgia Institute of Techonology

A bidirectional self-folding actuator based on bilayer shape memory polymer composites
▷ **SHUYANG CHEN,** Johns Hopkins University

DNA-sequence controlled self-folding of microfabricated hydrogel architectures
▷ **ANGELO JOHN CANGIALOSI,** Johns Hopkins University

Novel insoles for diabetic foot ulcer management
▷ **ARNAB CHANDA,** University of Alabama

Floppy modes in mechanical metamaterials
▷ **LUUK LUBBERS,** Leiden University/AMOLF

Acoustic band gaps of two-dimensional auxetic lattice with tailored microstructure
▷ **SHIVAM SHARMA,** Indian Institute of Technology Roorkee, India

Necking phenomenon of polymer-metal-polymer package materials
▷ **ZHANSHENG GUO,** Shanghai Institute of Applied Mathematics and Mechanics, Shanghai University

Nanoscale characterization of the mechanical properties across the interfaces present in 3D printed materials
▷ **DAVID W. COLLINSON,** Northwestern University

Mechanotargeting of nanoparticles
▷ **QIONG WEI,** Pennsylvania State University, University Park

Engineering cuts and cut-outs for reconfigurable hierarchical soft mechanical metamaterials
▷ **YICHAO TANG,** Temple University

Optimizing the grading of IPNs to obtain FG-IPNs with substantially improved load capacity of parts compared to using uniform IPNs
▷ **ZHONG CHEN,** University of Nebraska Lincoln

Stochastic multiscale modeling of organic-rich shale
▷ **SARA ABEDI,** Texas A&M University

A growth and remodeling model for the right ventricle myocardium during pulmonary hypertension
▷ **REZA AVAZMOHAMMADI,** University of Texas at Austin

The effect of crystal size on the cross-slip activation stress and volume of FCC single crystals from discrete dislocations dynamics simulations
▷ **MOHAMED HAMZA,** Johns Hopkins University

Scaling of fracture toughness for 3d printed polymer parts
▷ **DARREN BELL,** Purdue University

Correlating free volume distribution to glass transition temperature in epoxy polymers: a coarse-grained molecular dynamics study
▷ **AMIN ARAMOON,** Johns Hopkins University

The structural efficiency of inverse FCC photonic structural metamaterials
▷ **JONATHAN BERGER,** UCSB

Investigating deformation mechanisms in ultrafine-grained metal films using MEMS based in situ TEM with automated crystal orientation mapping
▷ **EHSAN IZADI, AMITH DARBAL, ROHIT SARKAR, JAGANNATHAN RAJAGOPALAN,** Arizona State University

In process quality control of 3D printed parts through Digital Image Correlation
▷ **OLIVER HAMMOND,** University of Virginia

Visualizing in-situ Microstructure Dependent Crack Tip Stress Distribution in IN-617 Using Nano-mechanical Raman Spectroscopy
▷ **YANG ZHANG,** ***Purdue University***

B6-1	FLUID-STRUCTURE INTERACTION AND ITS APPLICATIONS
Room 2110	SESSION CHAIRS: Sheldon Wang, Midwestern State University Lucy Zhang, Rensselaer Polytechnic Institute Yaling Liu, Lehigh University
10:00 am	***Immersogeometric fluid-structure interaction: application to multidisciplinary design optimization*** Ming-Chen Hsu, Michael C.H. Wu, David Kamensky, Fei Xu Iowa State University
10:20 am	***Simulation results on the ultra small aspect ratio weapons by different dimension number interior models*** Shuyuan Jiang, Nanjing University of Science and Technology
10:40 am	***Metastable states in terminal orientation of hinged symmetric bodies in a flow*** Ashwin Vaidya, Montclair State University
11:00 am	***Effects of contours on a flutter suppression device*** Sheldon Wang, Midwestern State University
11:20 am	***Computational investigation of bio-inspired composite nano rotor blade based on fluid-structure interaction*** Zhen Liu, Xi'an Jiaotong University
A2-4	**ERINGEN MEDAL SYMPOSIUM HONORING DR. GANG CHEN**
Room 1101/1102	SESSION CHAIRS: Ronggui Yang, University of Colorado at Boulder Theodorian Borca-Tasciuc, Rensselaer Polytechnic University Chris Dames, University of California at Berkeley Bao Yang, University of Maryland
10:00 am	***Phonon transport and thermal conductivity in transition metal dichalcogenides*** Xiaokun Gu, University of Colorado at Boulder
10:25 am	***Mapping and controlling thermal spectra of 2D van der waals materials*** Yongjie Hu, UCLA
10:50 am	***Thermoelectric transport in single layer graphene*** Mona Zebarjadi, Rutgers University
11:15 am	***Tuning electronic heat transport in graphene/metal heterostructures with ultralow thermal conductivity*** Yee Kan Koh, National University of Singapore

A3-2	G.I. TAYLOR MEDAL SYMPOSIUM HONORING OF DR. MORY GHARIB
Room 2110	SESSION CHAIRS: Daniel Araya, University of Houston
10:00 am	***Quantitative visualization of turbulent free-surface flows*** Thomas C. Fu, Office of Naval Research
10:20 am	***The development of a 3D particle tracking velocimetry technique for microflow and LES studies*** Nicholas Dona, Joshua Hunt, James Riley, Dana Dabiri University of Washington
10:40 am	***Coherent dynamics in the wake of utility-scale wind turbines:new insights gained by integrating field-scale PIV with LES*** Fotis Sotiropoulos, Stony Brook University
11:00 am	***Optical measurements in naval hydrodynamics applications*** Paisan Atsavapranee, Naval Surface Warfare Center Carderock Division
C4-1	**MOLECULAR, CELLULAR, AND TISSUE MECHANICS**
Room 1307	SESSION CHAIRS: George Lykotrafitis, University of Connecticut Ying Li, University of Connecticut
10:00 am	***Mechanical tension - a universal mechanism for matrix remodeling by cells*** M. Taher A. Saif, Kyung Hwa Choi, Onur Aydin University of Illinois at Urbana-Champaign
10:40 am	***Microcavitation as a neuronal damage mechanism in an in vitro model of blast traumatic brain injury*** Jonathan B. Estrada, Mark Scimone, Harry Cramer, Paul Hopkins, Christian Franck, Carlos Barajas, Eric Johnsen Brown University
11:00 am	***Caveolae mediated SK channel endocytosis in neurons*** Krithika Abiraman, Anastasios Tzingounis, George Lykotrafitis University of Connecticut
11:20 am	***Bovine cartilage undergoing large-strain shear: anisotropy, heterogeneity and dependence on thickness*** Stephany Santos, Franz Maier, David M. Pierce University of Connecticut

C3-4	MECHANICAL CHARACTERIZATION OF SOFT MATERIALS: EXPERIMENTS AND MODELING
Room 2116	SESSION CHAIRS: Yuhang Hu, University of Illinois at Urbana-Champaign Shengqiang Cai, University of California, San Diego
10:00 am	***The two-potential constitutive framework for finite viscoelasticity: theoretical aspects and application to elastomers*** Oscar Lopez-Pamies, Aditya Kumar University of Illinois at Urbana-Champaign
10:40 am	***A nonlinear viscoelastic model based on multiple natural configuration theory*** Anastasia Muliana, Daniel Tscharnuter, KR Rajagopal Texas A&M University
11:00 am	***Characterization and modeling of time and temperature dependent polyethylene films*** Jun Li, Kawai Kwok, Sergio Pellegrino University of Massachusetts Dartmouth
11:20 am	***Correlating free volume distribution to glass transition temperature in epoxy polymers: a coarse-grained molecular dynamics study*** Amin Aramoon, Johns Hopkins University
C5-4	**MECHANICS AND PHYSICS OF SOFT MATERIALS**
Chasen Family Room	SESSION CHAIRS: Stephan Rudykh, Technion – Israel Institute of Technology, Israel Yuhang Hu, University of Illinois at Urbana-Champaign Oscar Lopez-Pamies, University of Illinois at Urbana-Champaign Xuanhe Zhao, Massachusetts Institute of Technology
10:00 am	***A finite-deformation framework for soft electro-magneto-elastic materials*** Robert L. Lowe, The Ohio State University
10:20 am	***Influence of structural relaxation on the thermomechanical and shape memory performances of amorphous polymers*** Ming Lei, Kai Yu, H. Jerry Qi Georgia Institute of Technology
10:40 am	***Applications of shear lag model to friction of extensible strips and shear loading of pressure sensitive adhesive tapes*** Ahmad Rezaei Mojdehi, Virginia Tech
11:00 am	***Fringe instability in constrained soft elastic layers*** Shaoting Lin, Massachusetts Institute of Technology
11:20 am	***Can rigid proteins make a membrane softer? The curious case of HIV induced cell membrane softening*** Himani Agrawal, University of Houston

C1-1	MECHANICS OF BIOLOGICAL AND BIOINSPIRED MATERIALS
Room 1301	SESSION CHAIRS: Sinan Keten, Northwestern University
10:20 am	***Mechanics of composite pillars for tunable and enhance adhesion*** Helen Keays Minsky, Kevin Turner The University of Pennsylvania
10:40 am	***Bio-inspired Al/NiTi laminated composites*** Frederick Michael Heim, Yunya Zhang, Xiaodong Li University of Virginia
11:00 am	***Tough and strong bioinspired composites: a coarse-grain molecular study*** Ning Liu, Xianqiao Wang University of Georgia
11:20 am	***Computational material designs for water filtration*** Zhao Qin, Shengjie Ling, David Kaplan, Markus Buehler Massachusetts Institute of Technology
C12-1	**MECHANICAL BEHAVIORS OF CYTOSKELETON AND CELLS**
Room 2111	SESSION CHAIRS: Taeyoon Kim, Purdue University Zhangli Peng, University of Notre Dame
10:00 am	***A chemo-mechanical model for cell-mediated fiber recruitment, focal adhesion growth and extracellular matrix mechanosensing in fibrillar microenvironments*** Vivek Shenoy, University of Pennsylvania
10:40 am	***Strain-enhanced stress relaxation of collagen gels and implications for matrix remodeling by cells*** Sungmin Nam, Ovijit Chaudhuri Stanford University
11:00 am	***Mechanosensing in filopodia dynamics and structural mechanics of viscoelastic ECM fiber networks*** Min-Cheol Kim, Hyeonyu Kim, Rohan Abeyaratne, Roger D. Kamm, H. Harry Asada Massachusetts Institute of Technology
11:20 am	***A thermodynamical model of cell-substrate interactions*** Tiankai Zhao, Sulin Zhang Pennsylvania State University, University Park

D1-4	MULTI-SCALE MECHANICS OF PARTICULATE MEDIA
Room 2112	SESSION CHAIRS: David Henann, Brown University Ken Kamrin, Massachusetts Institute of Technology José Andrade, California Institute of Technology Rich Regueiro, University of Colorado at Boulder
10:00 am	***Force measurements in stiff, 3D, opaque granular materials*** Ryan Colt Hurley, Jose E. Andrade, Jonathan Wright Lawrence Livermore National Laboratory
10:20 am	***Influences of particle-scale properties on the bulk scale mechanical properties of particulate systems in engineering applications*** Simon Joseph Antony, University of Leeds, UK
10:40 am	***Experimental investigation of force chains in opaque granular material under shear*** Eloise Marteau, California Institute of Technology
11:00 am	***Annular coated inclusion model and applications for polymer nanocomposites*** Zhen Wang, Frank Fisher Stevens Institute of Technology
11:20 am	***Second-order homogenization estimates for the macroscopic behavior and field fluctuations in viscoplastic composites and comparisons with full-field simulations*** Joshua Furer, Pedro Ponte-Castaneda University of Pennsylvania
D5-1	**MECHANICS AND DESIGN OF MECHANICAL METAMATERIALS**
Room 2106	SESSION CHAIRS: Yaning Li, University of New Hampshire Jie Yin, Temple University
10:00 am	***Combinatorial design of textured mechanical metamaterials*** Martin van Hecke, Amolf Amsterdam & Leiden University
10:40 am	***Selecting failure modes in 2-d lattices*** Daniel Rayneau-Kirkhope, Aalto University
11:00 am	***Oxidation-induced negative poissonâ ™s ratio of phosphorene*** Feng Hao, Xi Chen Columbia University
11:20 am	***Simultaneously tuning the stiffness and damping of functionally graded metamaterials with negative stiffness unit cells*** Kaikai Che, Julien Meaud, Chao Yuan, and Jerry Qi Georgia Institute of Technology

D4-4	MECHANICS IN MANUFACTURING, SYNTHESIS AND PROCESSING OF MATERIALS, STRUCTURES AND DEVICES
Room 2100 /2101	SESSION CHAIRS: Baoxing Xu, University of Virginia Weiyi Lu, Michigan State University Xianqiao Wang, University of Georgia Horacio D. Espinosa, Northwestern University Xiaodong (Chris) Li, University of Virginia
10:00 am	***Controlling printed microstructure of two-phase composite materials via acoustic forces*** Matthew Begley, University of Virginia
10:20 am	***Bio-inspired tough carbon nanotube sheets*** Sameh Tawfick, Yue Liang, Matthew Robertson University of Illinois Urbana-Champaign
10:40 am	***B4C nanowire/microsheet hybrid reinforcements in epoxy composites*** Ningning Song, University of Virginia
11:00 am	***Smooth volumetric billboard based representation and modeling of complex 3D Ni/Al high energy ball milled composites*** Dewen Yushu, Sangmin Lee, Karel MatouÅi University of Notre Dame
11:20 am	***Elasto-capillary shape memory of long hair*** Sameh Tawfick, Matthew Robertson, Dongwoo Shin, Yue Liang University of Illinois Urbana-Champaign
D7-4	**INSTABILITY IN SOLIDS AND STRUCTURES**
Room 0105	SESSION CHAIRS: S. Gaitanaros, P. Ponte Castaneda
10:00 am	***Crushing and energy-absorption of polydisperse foams*** Stavros Gaitanaros, Stelios Kyriakides, Andrew Kraynik Johns Hopkins University
10:20 am	***Macroscopic and microscopic instabilities in fiber composites with hyperelastic and rate dependent constituents*** Stephan Rudykh, Viacheslav Slesarenko Technion - Israel Institute of Technology
10:40 am	***Compression and recovery of carbon nanotube networks described as a phase transition*** Xiaojun Liang, University of Pennsylvania
11:00 am	***Macroscopic response and instabilities in short-fiber-reinforced elastomers*** Pedro Ponte Castaneda, Reza Avazmohammadi University of Pennsylvania
11:20 am	***The mechanical behavior of 3D printed auxetic cellular materials under bi-axial compression*** Yaning Li, Yunyao Jiang University of New Hampshire

D8-4	COMPUTATIONAL MECHANICS OF MATERIALS AND STRUCTURES
Room 0102	SESSION CHAIRS: Shawn Chester, New Jersey Institute of Technology Christian Linder, Stanford University Steve Sun, Columbia University
10:00 am	***Computational thermo-hydro-mechanics for multiphase frozen soil with unfrozen water flow in the finite deformation range*** WaiChing Sun, SeonHong Na Columbia University
10:20 am	***Modeling of hydraulic fracture in porous media*** Zhanli Liu, Tsinghua University
10:40 am	***On the analysis of periodically heterogenous beams*** Shilei Han, Shanghai Jiao Tong University
11:00 am	***A computational method for spirally-wounded lithium-ion cells in battery modules and packs*** Chao Li, Assimina Pelegri Rutgers University
11:20 am	***Multiscale investigation of the piezoresistive effect of nanocomposite bonded explosives (NCBXs) with continuum damage mechanics*** Krishna Kiran Talamadupula, Adarsh Chaurasia, Gary Seidel Virginia Tech
D9-4	**FRICTION, FRACTURE AND DAMAGE**
Room 0101	SESSION CHAIRS: Ahmed Elbanna, University of Illinois K. Ravi-Chandar, University of Texas at Austin
10:00 am	***A Multi-Bond Model of Single-Asperity Wear at the Nano-Scale*** Michael Falk, Johns Hopkins University
10:20 am	***A threshold-force model for adhesion and mode I fracture*** Srivatsan Hulikal, Kaushik Bhattacharya, Nadia Lapusta Brown University
10:40 am	***Numerical modeling and analysis of sub-surface damage in the cutting process of carbon fiber reinforced plastic composites*** Lin Youxi, Fuzhou University
11:00 am	***An experimental and numerical study to uncover the mechanisms and mechanics of actuation-induced fracture in shape memory alloys*** Dimitris C. Lagoudas, Texas A&M University

D13-4	ARCHITECTURED META-MATERIALS: ENGINEERING SCIENCE, DESIGN, MANUFACTURING
Room 2102	SESSION CHAIRS: Francois Barthelat, McGill University Thomas Siegmund, Purdue University Lorenzo Valdevit, University of California at Irvine Xiaoyu (Rayne) Zheng, Virginia Tech
10:00 am	***Architectured Materials for Sound Management*** Thomas Siegmund, Purdue University
10:20 am	***Low frequency metamaterials for underwater acoustics*** Alireza Amirkhizi, University of Massachusetts, Lowell
10:40 am	***Stable propagation of mechanical signals in soft media using stored elastic energy*** Jordan Raney, eel Nadkarni, Chiara Daraio, Dennis M Kochmann, Jennifer A. Lewis, Katia Bertoldi Harvard University
11:00 am	***Quasi-isotropic, Hexagonal Architecture in Polymer Composites for Simultaneously High Stiffness and Damping*** Muhammed Imam, Trisha Sain North Carolina A&T State University
11:20 am	***Low Porosity Architectured Materials for thermomechanical performance*** Damiano Pasini, Gerard Reynolds, Jiazhen Leng, Alireza Sayyidmousavi McGill University
D14-4	**NON-LINEAR RESPONSE OF HIGHLY DEFORMABLE STRUCTURES**
Room 2104	SESSION CHAIRS: Zi Chen, Dartmouth College Huanyu Cheng, The Pennsylvania State University Wanliang Shan, University of Nevada Qiming Wang, University of Southern California Teng Zhang, Syracuse University
10:00 am	***Nonlinear vibration of dielectric elastomer incorporating strain stiffening*** Fangfang Wang, Xi'an Jiaotong University
10:20 am	***Instability induced structural transition of compressed emulsions*** Jing Fan, The City College of New York
10:40 am	***Harnessing elastic instability of swelling hydrogels using micro 3D printing*** Howon Lee, Rutgers University
11:00 am	***Sheets shaping liquids and liquids shaping sheets*** Joseph Paulsen, Syracuse University

E1-4	MECHANICS AND ELECTROCHEMISTRY OF ENERGY MATERIALS
Room 2115	SESSION CHAIRS: Siva P. V. Nadimpalli, New Jersey Institute of Technology Yifei Mo, University of Maryland Kejie Zhao, Purdue University Zheng Jia, Northwestern University
10:00 am	***Mechanical degradation and optimization of solid electrolyte interphases in Li ion batteries*** Brian W. Sheldon, Brown University
10:20 am	***Mechanical property degradation of lithium anode in lithium-sulfur batteries*** Yunya Zhang, University of Virginia
10:40 am	***Rate-dependent stress evolution in nanostructured Si anodes upon lithiation*** Zheng Jia, Wing Kam Liu Northwestern University
B5-1	**HEAT TRANSFER: PHONON THEORY**
Room 0103	SESSION CHAIRS: Yuan Yang, Columbia University Tengfei Luo, Notre Dame Mark Kedzierski, Thanh Tran
10:00 am	***Thinking beyond the phonon gas model*** Asegun Henry, Georgia Institute of Technology
10:30 am	***Thermal phonon scattering at interfaces and boundaries: linking atomistic structure and the phonon spectrum*** Austin J. Minnich, Caltech
11:00 am	***Variational approach to solving the boltzmann transport equation and new frontiers for MFP reconstruction*** Vazrik Chiloyan, Massachusetts Institute of Technology
11:20 am	***Grain-size dependent kapitza resistance model for the thermal conductivity of polycrystals*** Jean-Baptiste Bouquet, Claudio V Di Leo, Julian J Rimoli Georgia Institute of Technology

E6-1	FROM QUANTUM MECHANICS TO MATERIALS ENGINEERING: FIRST PRINCIPLES METHODS IN THE MECHANICS OF MATERIALS AND STRUCTURES
Room 1309	SESSION CHAIRS: Phanish Suryanarayana, Georgia Institute of Technology Amartya Banerjee, Lawrence Berkeley National Laboratory
10:00 am	***Accurate quantum molecular dynamics with thousands of atoms*** John Pask, LLNL
10:20 am	***Large-scale density functional theory calculations*** Phanish Suryanarayana, Georgia Institute of Technology
10:40 am	***Some recent developments in the large scale first principles simulations of complex materials*** Amartya S. Banerjee, Lin Lin, Wei Hu, Chao Yang, John E. Pask Lawrence Berkeley National Laboratory
11:00 am	***Tucker-tensor approach for large-scale kohn-sham density functional theory calculations*** Phani Motamarri, Vikram Gavini University of Michigan Ann Arbor
11:20 am	***Lanczos-filter subspace iteration for self-consistent-field calculation*** Xin Cindy Wang, U.S. Army Research Laboratory
E4-4	**MODELING AND CHARACTERIZING THE MECHANICS OF BOUNDARIES IN MATERIALS**
Room 1311	SESSION CHAIRS: Charles Wojnar, Missouri University of Science and Technology Brandon Runnels, University of Colorado Colorado Springs Irene Beyerlein, Los Alamos National Laboratory
10:00 am	***Exhaustive enumeration of solutions to the quantized frank-bilby equation in cubic bicrystals*** Ali Sangghaleh, Texas A&M University
10:20 am	***Quantification of dislocation behavior and deformation twinning at high strain rates*** Mitra Taheri Mousavi, Asher Leff, Christopher Barr, Shang-Hao Huang, Evan Kahl, Logan Shanahan, J.P. Lui, Y. Zhang, Leslie Lamberson
10:40 am	***Modeling and simulation of grain boundary anisotropy-driven mechanics in fcc and bcc materials*** Brandon Runnels, University of Colorado
11:00 am	***Quantifying the dislocation emission process from canocrystalline grain boundaries with continuum-equivalent traction fields*** Ruizhi Li, Huck Beng Chew University of Illinois at Urbana-Champaign
11:20 am	***Atomistically derived cohesive zone model of intergranular fracture in polycrystalline graphene*** Laurent Guin, Jean Raphanel, Jeffrey W. Kysar Ecole Polytechnique

E5-4	MECHANICS OF MULTIFUNCTIONAL 2D MATERIALS AND 2D-BASED NANOSTRUCTURES
Room 1105	SESSION CHAIRS: Ellad Tadmor, University of Minnesota Shuze Zhu, Massachusetts Institute of Technology Cemal Basaran, University at Buffalo Kuan Zhang, University of Minnesota Wei Gao, Northwestern University
10:00 am	***Multiscale modeling and experiment of 2D materials and structures*** Markus Beuhler, Massachusetts Institute of Technology
10:30 am	***Topological toughening of graphene and other 2D materials*** Huajian Gao, Brown University
11:00 am	***Stone-Wales refects in graphene rano ribbons*** Cemal Basran, University at Buffalo
11:20 am	***Configurational anisotropy and toughness asymmetry in graphene*** Venkateswaran Santhanam, Zubaer Hossain University of Delaware
B2-1	**BIOLOGICAL FLUID MECHANICS I: MICRO SWIMMERS AND PROPULSION**
Room 1308	SESSION CHAIRS: Arezoo Ardekani, Purdue University Hassan Masoud, University of Nevada, Reno Henry Fu
10:00 am	***Reverse marangoni propulsion*** Vahid Vandadi, Saeed Jafari Kang, Hassan Masoud University of Nevada Reno
10:20 am	***Near wall motion of micro-swimmers in non-newtonian fluids*** Arezoo Ardekani, Gaojin Li Purdue University
10:40 am	***Propulsion in a suspension of rod-like particles*** Juan Shi, Brown University
11:00 am	***Self-organization of swimming bacteria in confinement*** Enkeleida Lushi, Brown University
11:20 am	***Helicobacter pylori couples motility and diffusion to actively create a heterogeneous complex medium in gastric mucus*** Henry Chien Fu, University of Utah

F4-1	ACOUSTIC METAMATERIALS
Room 2108	SESSION CHAIRS: Michael Leamy
10:00 am	***Transformation acoustics, phononic structures and focusing*** Andrew Norris, Xiaoshi Su Rutgers University
10:20 am	***Wave field mapping in acoustic metamaterials using optical fiber probe*** Miao Yu, University of Maryland
10:40 am	***Active nonreciprocal acoustic metamaterials*** Amr M. Baz, University of Maryland
11:00 am	***Nonlinearity based use of acoustic metamaterials*** Saliou B. Telly, Balakumar Balachandran University of Maryland

E9-1	CHARACTERIZATION AND MODELING OF DAMAGE MECHANISMS OF SEMICONDUCTOR PACKAGING MATERIALS AND COMPONENTS
Room 1103	SESSION CHAIRS: Bongtae Han, University of Maryland Patrick McCluskey, University of Maryland Gayatri Cuddalorepatta, Harvard University Michael Azarian, University of Maryland
1:00 pm	***Quantifying moisture diffusion into three dimensional axisymmetric sealant structures*** David Buchanan Leslie, Abhijit Dasgupta, J.W.C. de Vries University of Maryland
1:20 pm	***Elimination of tin whisker growth by indium addition to electroplated tin coatings in electronic packages*** Susmriti Das Mahapatra, Soumik Banerjee, Bhaskar Majumdar, Indranath Dutta Washington State University
1:40 pm	***Health monitoring of electrical interconnects using time domain reflectometry*** Michael H. Azarian, University of Maryland
2:00 pm	***Thermal displacement measurement of automotive ECU by moire interferometry*** Bulong Wu, Dae-Suk Kim, Bongtae Han University of Maryland
2:20 pm	***Mechanical constitutive properties of three high-temperature solders*** Qian Jiang, Subhasis Mukherjee, Abhijit Dasgupta, David Shaddock, Liang Yin University of Maryland
A2-5	**ERINGEN MEDAL SYMPOSIUM HONORING DR. GANG CHEN**
Room 1101/1102	SESSION CHAIRS: Ronggui Yang, University of Colorado at Boulder Theodorian Borca-Tasciuc, Rensselaer Polytechnic University Chris Dames, University of California at Berkeley Bao Yang, University of Maryland
1:00 pm	***Large-scale nanophotonic absorbers for solar energy conversion*** Sheng Shen, Carnegie Mellon University
1:20 pm	***Solar thermal processes and power generation*** Thomas Cooper, Lee A. Weinstein, George Ni, Sungwoo Yang, Bikram Bhatia, Lin Zhao, Elise Strobach, Svetlana V Boriskina, Evelyn N. Wang, Gang Chen Massachusetts Institute of Technology
1:40 pm	***Polymer-based metamaterial for large scale radiative cooling*** Xiaobo Yin, University of Colorado Boulder
2:00 pm	***Energy transfer and radiative cooling beyond conventional limits via photon and polariton localization*** Svetlana V. Boriskina, Jonathan K. Tong, Wei-Chun Hsu, Yi Huang, Lee Weinstein, Yanfei Xu, Vazrik Chiloyan, Yoichiro Tsurimaki, Gang Chen Massachusetts Institute of Technology

D6-1	ADVANCED INSTRUMENTATION AND FABRICATION TECHNIQUES FOR THE MEASUREMENT OF MECHANICAL AND PHYSICAL PROPERTIES OF SOLIDS AND STRUCTURES
Room 2110	SESSION CHAIRS: Joost Vlassak, Harvard University Chris Eberl, Fraunhofer Institute for Mechanics of Materials Samantha Daly, University of Michigan Gi-Dong Sim, Johns Hopkins University
1:00 pm	***Micro fatigue and tensile tests provide the damage behavior for simulation models at microstructural resolution*** Tobias Kennerknecht Fraunhofer, Sascha Fliegener, Thomas Straub, Chris Eberl, IWM
1:20 pm	***Characterization of the mechanical behavior of freestanding ultra thin films*** Gayatri K. Cuddalorepatta, Katia Bertoldi, Han Li, Daniel Pantuso, Joost J. Vlassak Harvard University
1:40 pm	***In-situ Multi-domain Characterization of Nanoscale Materials*** Baoming Wang, Aman Haque The Pennsylvania State University
2:00 pm	***In-situ nanocompression of solution-grown crystalline superelastic materials: ThCr2Si2-structured novel intermetallic compounds*** Keith J. Dusoe, John T. Sypek, Paul C. Canfield, Christopher R. Weinberger, Seok-Woo Lee, University of Connecticut
2:20 pm	***In-situ Instrumentation and Microfabrication for Mechanical Testing of Thin Films at Elevated Temperature*** Gi-Dong Sim, Joost J. Vlassak, Johns Hopkins University
C4-2	**MOLECULAR, CELLULAR, AND TISSUE MECHANICS**
Room 1307	SESSION CHAIRS: George Lykotrafitis, University of Connecticut Ying Li, University of Connecticut
1:00 pm	***Cell and nanoparticle adhesion: multiscale characterization and modeling*** Yaling Liu, Salman Sohrabi Leigh University
1:20 pm	***Modeling cell mechanics using coarse-grained approach*** Igor Pivkin, Kirill Lykov, University of Lugano
1:40 pm	***Vesiculation and band-3 protein diffusion in the healthy and defective red blood cell membrane*** George Lykotrafitis, University of Connecticut
2:00 pm	***Lipid dipole potential modulates transmembrane movement of a voltage sensor*** Mehdi Torbati, Ashutosh Agrawal University of Houston

D12-1	MECHANICS, MATERIALS, AND MANUFACTURE OF FLEXIBLE AND STRETCHABLE ELECTRONICS
Room 2116	SESSION CHAIRS: Nanshu Lu, University of Texas at Austin Cunjiang Yu, University of Houston
1:00 pm	***Mechanics design principles for body-integrated electronic systems*** John Ashley Rogers, Northwestern University
1:20 pm	***A dielectric elastomer force sensor with in situ tunable sensitivity*** Jian Cheng, Zheng Jia, Teng Li University of Maryland College Park
1:40 pm	***Elastomer-based high-deformation sensors: from liquid-metal to conductive composites*** Michelle C. Yuen, Edward L White, Jennifer C. Case, Rebecca K. Kramer Purdue University
2:00 pm	***All-printed flexible and stretchable liquid metal-based electronics*** Mohammed Gamal Mohammed, Purdue University
2:20 pm	***An investigation of piezoelectric materials with kirigami structures*** Lichen Fang, Johns Hopkins University
2:40 pm	***"Cut-and-Paste" manufacture of transparent and stretchable epidermal sensors based on large area CVD graphene*** Nanshu Lu, University of Texas at Austin
C5-5	**MECHANICS AND PHYSICS OF SOFT MATERIALS**
Chasen Family Room	SESSION CHAIRS: Stephan Rudykh, Technion – Israel Institute of Technology, Israel Yuhang Hu, University of Illinois at Urbana-Champaign Oscar Lopez-Pamies, University of Illinois at Urbana-Champaign Xuanhe Zhao, Massachusetts Institute of Technology
1:00 pm	***Animating soft matter with the elastic leidenfrost effect*** Scott R. Waitukaitis, Martin van Hecke Leiden University
1:20 pm	***Leptocephali-inspired high-speed, high-force, invisible hydrogel actuators and robots*** Xuanhe Zhao, Massachusetts Institute of Technology
1:40 pm	***Reprogrammable ultra-fast shape-transformation of macroporous composited hydrogel sheets in response to light*** Jian Cheng, Hongyu Guo, Zhihong Nie, Teng Li, Zheng Jia University of Maryland
2:00 pm	***Optically/thermally induced large deformation and motion of liquid crystal elastomers*** Chihyung Ahn, Shengqiang Cai, University of California San Diego
2:20 pm	***Chemomechanics of soft hydrogels interacting with a porous solid*** Ali Ghahremaninezhad, Ali Ghahremaninezhad University of Miami

C1-2	MECHANICS OF BIOLOGICAL AND BIOINSPIRED MATERIALS
Room 1301	SESSION CHAIRS: Sinan Keten, Northwestern University
1:00 pm	***De novo materials design - computation, synthesis, characterization*** Markus J. Buehler, Massachusetts Institute of Technology
1:20 pm	***Designing multi-layer graphene-based assemblies for enhanced toughness in nacre-inspired nanocomposites*** Wenjie Xia, Zhaoxu Meng, Sinan Keten Northwestern University
1:40 pm	***In situ fracture experiments reveal anisotropic effects of nanoscale toughening mechanisms in bone*** Ottman Tertuliano, Julia R. Greer Califonia Institute of Technology
2:00 pm	***Examining mechanical properties of the cellulose nanocrystal-polymer interphase through nanoscale experiments and modeling*** Ridvan Kahraman, Pavan V. Kolluru, Robert A. Sinko, Douglas M. Fox, Sinan Keten, L. Catherine Brinson Northwestern University
2:20 pm	***Adhesion enhanced by octopus-inspired micro-surface craters*** Shutao Qiao, Liu Wang, Greg Rodin, Nanshu Lu University of Texas at Austin
C12-2	**MECHANICAL BEHAVIORS OF CYTOSKELETON AND CELLS**
Room 2111	SESSION CHAIRS: Taeyoon Kim, Purdue University Zhangli Peng, University of Notre Dame
1:00 pm	***Cell sensing and motility in confinement*** Konstantinos Konstantopoulos, Johns Hopkins University
1:20 pm	***Using cytoskeletal waves for texture sensing and directed cell migration*** Sebastian Schmidt, Wolfgang Losert
1:40 pm	***Microtubules' role in positioning the centrosome during 1D cell migration*** Katrina Adlerz, Helim Aranda-Espinoza University of Maryland
2:00 pm	***Computational study of cell migration behaviors*** Xiaowei Zeng, Liqiang Lin University of Texas at San Antonio

D2-1	MECHANICS AND MATERIALS IN THE OILFIELD
Room 2112	SESSION CHAIRS: Pedro Reis, Massachusetts Institute of Technology Agathe Robisson, Schlumberger Nathan Wicks, Schlumberger Yucun Lou, Schlumberger
1:00 pm	***Impact and creep response of PEEK in high-pressure high-temperature applications*** Zhenyu Xue, Veryst Engineering
1:20 pm	***Control of the curing reaction of epoxy thermosets: a major challenge to develop new high performance materials in the oilfield industry*** Thomas Julian Vidil, FranÃ§ois Tournilhac, Ludwik Leibler ESPCI-Paris
1:40 pm	***Damage of wellbore cement due to tunneling crack propagation*** Yucun Lou, Doll Research Center
2:00 pm	***Phase-field modeling of hydraulic fracture*** Chad M. Landis, Zachary A. Wilson The University of Texas at Austin
2:20 pm	***An implicit level set algorithm (ILSA) for modeling hydraulic fractures with multiscale near tip behavior*** Egor Dontsov. University of Houston
D5-2	**MECHANICS AND DESIGN OF MECHANICAL METAMATERIALS**
Room 2106	SESSION CHAIRS: Jie Yin, Temple University Yaning Li, University of New Hampshire
1:00 pm	***Design of mechanical metamaterials through pattern transformation*** Shu Yang, Gaoxiang Wu, Yigil Cho, Bo Cao, Tom C. Lubensky University of Pennsylvania
1:40 pm	***Programmable kirigami-based mechanical metamaterials*** Yichao Tang, Gaojian Lin, Shu Yang, Yun Kyu Yi, Randall Kamien, Jie Yin Temple University
2:00 pm	***Unique deformation mechanisms of 3D printed chiral structures with auxetic cores*** Yaning Li, Yunyao Jiang University of New Hampshire
2:20 pm	***Geometry driven design of multistable origami metamaterials*** Scott R. Waitukaitis, Peter Dieleman, Martin van Hecke Leiden University, FOM Institute AMOLF

D4-5	MECHANICS IN MANUFACTURING, SYNTHESIS AND PROCESSING OF MATERIALS, STRUCTURES AND DEVICES
Room 2100 /2101	SESSION CHAIRS: Baoxing Xu, University of Virginia Weiyi Lu, Michigan State University Xianqiao Wang, University of Georgia Horacio D. Espinosa, Northwestern University Xiaodong (Chris) Li, University of Virginia
1:00 pm	***Hybrid 3D printing for shape changing structures and devices*** H. Jerry Qi, Georgia Institute of Technology
1:20 pm	***Probing the mechanisms of residual stresses evolution in air plasma spray coatings with digital image correlation*** Brendan Croom, Clifton Bumgardner, Xiaodong Li University of Virginia
1:40 pm	***Microstructure evolution and deformation behavior of powder materials during sintering*** Sudipta Biswas, Purdue University
2:00 pm	***Large deformation model for coupled elastoplasticity and strain-induced phase transformations in diamond anvil cells*** Biao Feng, Valery Levitas Iowa State University
2:20 pm	***Finite element simulations on strength and impact of pharmaceutical tablets*** Jie Ren, Gerard Klinzing, Jennifer M. Cislo, Adam Procopio Merck & Co.
D7-5	**INSTABILITY IN SOLIDS AND STRUCTURES**
Room 0105	SESSION CHAIRS: Pedro Miguel Reis, Massachusetts Institute of Technology D. Holmes
1:00 pm	***Periodic buckling patterns on constrained elastic shells*** Joel Marthelot, Pierre-Thomas Brun, Francisco López Jiménez, Pedro Reis Massachusetts Institute of Technology
1:20 pm	***Defect-controlled buckling of pressurized spherical shells*** Anna Lee, Massachusetts Institute of Technology
1:40 pm	***Stability and buckling of flat circular configurations of closed, intrinsically nonrectilinear filaments spanned by fluid films*** Tuan Hoang, Okinawa Institute of Science and Technology Graduate University
2:00 pm	***Geometry and mechanics of shell growth by residual swelling*** Douglas Holmes, Matteo Pezzulla, Paola Nardinocchi Boston University
2:20 pm	***Depth-dependent hysteresis in adhesive elastic contacts for large surface roughness*** Weilin Deng, Brown University

D8-5	COMPUTATIONAL MECHANICS OF MATERIALS AND STRUCTURES
Room 0102	SESSION CHAIRS: Shawn Chester, New Jersey Institute of Technology Christian Linder, Stanford University Steve Sun, Columbia University
1:00 pm	***Multi-scale modeling of nickel-based superalloys*** Shahriyar Keshavarz, Somnath Ghosh, Andrew Reid, Stephan Langer National Institute of Standards and Technology
1:20 pm	***Dynamic response of porous SMAs under high strain rate loading conditions*** Dinesh Pant, Siladitya Pal India Institute of Technology, Roorkee
1:40 pm	***Compatible-strain mixed finite element methods for nonlinear elasticity*** Arzhang Angoshtari, Mostafa Faghih Shojaei The George Washington University
2:00 pm	***Polygonal finite elements for finite elasticty*** Heng Chi, Cameron Talischi, Oscar Lopez-Pamies, Glaucio Paulino Georgia Institute of Technology
2:20 pm	***The Schwarz alternating method in computational solid mechanics*** Alejandro Mota, Sandia National Laboratories
D9-5	**FRICTION, FRACTURE AND DAMAGE**
Room 0101	SESSION CHAIRS: Ahmed Elbanna, University of Illinois K. Ravi-Chandar, University of Texas at Austin
1:00 pm	***K-Dominance of atomistic cracks*** Ellad Tadmor, Min Shi University of Minnesota
1:20 pm	***A binary eigen-deformation model for propagating fractures and shear failure in fluid-infiltrating porous media*** WaiChing Sun, Kun Wang Columbia University
1:40 pm	***Controlling toughness-strength correlation in glass by nanotube architectures*** Tengyuan Hao, Zubaer Hossain University of Delaware
2:00 pm	***Heterogeneity of internal structure and damage initiation in elastomers*** Alireza Sarvestani, Mohammad Tehrani Ohio University

D13-5	ARCHITECTURED META-MATERIALS: ENGINEERING SCIENCE, DESIGN, MANUFACTURING
Room 2102	SESSION CHAIRS: Francois Barthelat, McGill University Thomas Siegmund, Purdue University Lorenzo Valdevit, University of California at Irvine Xiaoyu (Rayne) Zheng, Virginia Tech
1:00 pm	***Carving 3D architectures within glass: exploring new strategies to transform the mechanics and performance of materials*** Francois Barthelat, Mohammad Mirkhalaf McGill University
1:20 pm	***Mechanics and Biomimetics of Seed-Coat-Inspired Composite Plates*** Yaning Li, Chao Gao, University of New Hampshire
1:40 pm	***Bio-inspired flexible armors with 3D printed tailored architectures*** Francois Barthelat, Roberto Martini, Yanis Balit, David Van Zyl McGill University
2:00 pm	***An investigation of the roles of strength and toughness in the glass spicules of Euplectella aspergillum*** Michael Monn, Haneesh Kesari, Brown University
2:20 pm	***A Revised Stiffness Scaling for Rigid and Non-Rigid Architected Lattice Materials*** Carlos Portela, Lucas R. Meza, Greg Philpot, Dennis M. Kochmann, Julia R. Greer California Institute of Technology
D14-5	**NON-LINEAR RESPONSE OF HIGHLY DEFORMABLE STRUCTURES**
Room 2104	SESSION CHAIRS: Zi Chen, Dartmouth College Huanyu Cheng, The Pennsylvania State University Wanliang Shan, University of Nevada Qiming Wang, University of Southern California Teng Zhang, Syracuse University
1:00 pm	***Mechanics of cracks in thin sheets*** Marcelo Dias, Aalto University/Nordita/James Madison University
1:20 pm	***Buckling profile of a thin elastic rod embedded in a fractured elastic medium*** Amir Mohammadi Nasab, Zi Chen, Wanliang Shan University of Nevada-Reno
1:40 pm	***Bistable helical ribbons*** Ian Trase, Dartmouth College

E1-5	MECHANICS AND ELECTROCHEMISTRY OF ENERGY MATERIALS
Room 2115	SESSION CHAIRS: Siva P. V. Nadimpalli, New Jersey Institute of Technology Yifei Mo, University of Maryland Kejie Zhao, Purdue University Zheng Jia, Northwestern University
1:00 pm	***Recent studies of lithium-ion battery electrodes using in situ TEM*** Ting Zhu, Georgia Institute of Technology
1:20 pm	***Failure mechanics of a wrinkling thin film anode on a substrate under cyclic charging and discharging*** Zheng Jia, Northwestern University
1:40 pm	***Computational analysis of chemomechanical behaviors of composite electrodes in Li-ion batteries*** Rong Xu, Purdue University
2:00 pm	***Two-fold anisotropy in sodiation of black phosphorous for sodium ion batteries*** Tianwu Chen, Pennsylvania State University
B5-2	**MECHANICS OF ONE-DIMENSIONAL NANOMATERIALS: EXPERIMENT AND MODELING**
Room 0103	SESSION CHAIRS: Yuan Yang, Columbia University Tengfei Luo, University of Notre Dame Mark Kedzierski, Thanh Tran
1:00 pm	***Thermal transport mechanisms and structure engineering in polymer composites with self-assembled and branched networks of nanoscale fillers*** Theodorian Borca-Tasciuc, Rensselaer Polytechnic University
1:20 pm	***Nanostructured materials for advanced heat transfer*** Sheng Shen, Carnegie Mellon University
1:40 pm	***Electrical-potential dependent enhancement of heat transport in graphite suspensions*** Shien-Ping Feng, The University of Hong Kong
2:00 pm	***Thermal transport in mesoscale, heterogeneous system*** Amy Marconnet, Purdue University
2:20 pm	***The electronic and thermal properties in the folds of MoS2*** Jie Peng, University of Maryland

E6-2	FROM QUANTUM MECHANICS TO MATERIALS ENGINEERING: FIRST PRINCIPLES METHODS IN THE MECHANICS OF MATERIALS AND STRUCTURES
Room 1309	SESSION CHAIRS: Phanish Suryanarayana, Georgia Institute of Technology Amartya Banerjee, Lawrence Berkeley National Laboratory
1:00 pm	***Toward exascale quantum and reactive molecular dynamics simulations*** Aiichiro Nakano, University of Southern California
1:20 pm	***Large scale hybrid density functional calculations with adaptively compressed exchange operator*** Wei Hu, Lawrence Berkeley National Laboratory
1:40 pm	***Electron-phonon scattering and joule heating in copper at extreme cold temperatures*** Tingyue Lan, SUNY at Buffalo
2:00 pm	***Quantum mechanics modeling of copper at extreme cold temperatures*** Cemal Basaran, University at Buffalo
2:20 pm	***Strain functionals for characterizing atomistic geometries and potential functions*** Edward M. Kober, Los Alamos National Laboratory
E4-5	**MODELING AND CHARACTERIZING THE MECHANICS OF BOUNDARIES IN MATERIALS**
Room 1311	SESSION CHAIRS: Charles Wojnar, Missouri University of Science and Technology Brandon Runnels, University of Colorado Colorado Springs Irene Beyerlein, Los Alamos National Laboratory
1:00 pm	***Thermomechanics of evolving interfaces within phase field approach*** Valery Levitas, Iowa State University
1:20 pm	***A new phase-field model for dynamic recrystallization and modeling of tribo-layer formation*** Dibakar Datta, New Jersey Institute of Technology
1:40 pm	***Phase field crystal model for generation of grain boundary in graphene with arbitrary tilt angle*** Jiaoyan Li, Brown University
2:00 pm	***Deformation mechanics of cu-ag nanoscale multilayered metals*** Ruizhi Li, University of Illinois at Urbana-Champaign
2:20 pm	***Atomistic simulation algorithm for studying dislocation glide loops' grain boundary interactions in Al*** Khanh Q. Dang, University of Florida

E5-5	MECHANICS OF MULTIFUNCTIONAL 2D MATERIALS AND 2D-BASED NANOSTRUCTURES
Room 1105	SESSION CHAIRS: Ellad Tadmor, University of Minnesota Shuze Zhu, Massachusetts Institute of Technology Cemal Basaran, University at Buffalo Kuan Zhang, University of Minnesota Wei Gao, Northwestern University
1:00 pm	***A theory of multiscale modelling of 2D materials from atoms to continuum*** James Lee, Jiaoyan Li, Zhen Zhang The George Washington University
1:20 pm	***A coarse-grained model for the mechanical behavior of graphene oxide*** Zhaoxu Meng, Northwestern University
1:40 pm	***Damage mechanics of graphene nano ribbons with defect*** Cemal Basran, University at Buffalo
2:00 pm	***Nanoscale patterning of graphene by hydrogen plasma: a molecular dynamics study*** Abhilash Harpale, Huck Beng Chew University of Illinois at Urbana-Champaign
2:20 pm	***Fracture and wrinkling of graphene: effect of complex loading and hydrogen functionalization*** Dibakar Datta, Siva Nadimpalli, Yinfeng Li New Jersey Institute of Technology
B2-2	**BIOLOGICAL FLUID MECHANICS II: ANIMAL HYDRODYNAMICS**
Room 1308	SESSION CHAIRS: Arezoo Ardekani, Purdue University Hassan Masoud, University of Nevada, Reno
1:00 pm	***Animal drinking*** Sunghwan Jung, Virginia Tech
1:20 pm	***Numerical modeling of biological fluid-structure interactions with immersed boundary method*** Amneet Pal Singh Bhalla, Boyce E. Griffith University of North Carolina Chapel Hill
1:40 pm	***Hydrodynamics and kinematics of sea lion swimming*** Aditya A. Kulkarni, Rahi K. Patel, Chen Friedman, Megan C. Leftwich The George Washington University
2:00 pm	***Utilizing synthetic cilia array in microfluidic device to sort soft particles based on their size, shape and stiffness*** Salman Sohrabi, Lehigh University
2:20 pm	***Bioinspiration from aquatic swimmer: the leading edge vortex*** Iman Borazjani, University at Buffalo SUNY

F4-2	WAVE PROPAGATION IN METAMATERIALS (1)
Room 2108	SESSION CHAIRS: Massimo Ruzzene
1:00 pm	***Nonlinear periodic media and metamaterials: invariant waveforms and reflected spectral content*** Matthew Fronk, Michael Leamy Georgia Tech
1:20 pm	***Manipulating waves by distilling frequencies: a tunable shunt-enabled rainbow trap*** Paolo Celli, Stefano Gonella University of Minnesota
1:40 pm	***Dissipative elastic metamaterials for broadband subwavelength wave mitigation*** Guoliang Huang, University of Missouri
2:00 pm	***Observation of trampoline effects in locally-resonant and inertially-amplified meta-plates*** Osama R. Bilal, André G. C. Foehr, Chiara Daraio ETH Zurich

E9-2	CHARACTERIZATION AND MODELING OF DAMAGE MECHANISMS OF SEMICONDUCTOR PACKAGING MATERIALS AND COMPONENTS
Room 1103	SESSION CHAIRS: Bongtae Han, University of Maryland Patrick McCluskey, University of Maryland Gayatri Cuddalorepatta, Harvard University Michael Azarian, University of Maryland
3:00 pm	***Fracture toughness in microelectronics using nano-indentation*** Carlos Morillo, Yan Ning, Michael H. Azarian, Julie Silk, Michael G. Pecht University of Maryland
3:20 pm	***Effect of temperature on the fracture behavior of lead-free solder joints*** Patrick Thompson, Richard Johnson, Siva Nadimpalli New Jersey Institute of Technology
3:40 pm	***Mechanical behavior of pressure-sensitive adhesives (PSAS)*** Hao Huang, Abhijit Dasgupta University of Maryland
4:00 pm	***Viscoplastic properties of nonhomogeneous materials using indentation with*** a spherical indenter David Buchanan Leslie, Abhijit Dasgupta, Carlos Morillo University of Maryland
4:20 pm	***Determination of adhesion strength of EMC/PSR interface in thin packages using modified single cantilever adhesion test*** Byung Yub Kim, Kenny Mahan, Bongtae Han, University of Maryland
A2-6	**ERINGEN MEDAL SYMPOSIUM HONORING DR. GANG CHEN**
Room 1101/1102	SESSION CHAIRS: Ronggui Yang, University of Colorado at Boulder Theodorian Borca-Tasciuc, Rensselaer Polytechnic University Chris Dames, University of California at Berkeley Bao Yang, University of Maryland
3:00 pm	***Microemulsion absorbents and their application in cooling systems*** Bao Yang, University of Maryland
3:20 pm	***Dislon - the quantum journey of dislocations*** Mingda Li, Massachusetts Institute of Technology
3:40 pm	***Understanding electron-phonon interaction at the single-mode level: simulation and experiment*** Bolin Liao, Jiawei Zhou, Te-Huan Liu, Gang Chen California Institute of Technology
4:00 pm	***Thermal transport across hard-soft material interfaces*** Tengfei Luo, University of Notre Dame
4:20 pm	***Combined computational and experimental investigation of thermal transport in thin films*** Pamela Norris, University of Virginia

D6-2	ADVANCED INSTRUMENTATION AND FABRICATION TECHNIQUES FOR THE MEASUREMENT OF MECHANICAL AND PHYSICAL PROPERTIES OF SOLIDS AND STRUCTURES
Room 2110	SESSION CHAIRS: Joost Vlassak, Harvard University Chris Eberl, Fraunhofer Institute for Mechanics of Materials Samantha Daly, University of Michigan Gi-Dong Sim, Johns Hopkins University
3:00 pm	***Characterization of Non-Arrhenius Diffusion in Cu-Zr Metallic Glass Thin Films using Nanocalorimetry*** Joost J. Vlassak, Harvard University
3:20 pm	***Measurements of Local, Atomic Level Elastic Strain in Metallic Glass Thin Films using in situ Electron Diffraction*** Jagannathan Rajagopalan, E. Izadi, C.Rentenberger, J. Rajagopalan Arizona State University
3:40 pm	***A New in situ planar biaxial far-field high energy diffraction microscopy experiment*** Garrison Michael Hommer, Jun-Sang Park, Peter Chancellor Collins, Adam L. Pilchalk, Aaron Paul Stebner Colorado School of Mines
4:00 pm	***Resolving the Distribution of Local Mechanical Properties across Polymer Nanocomposite Interphases via novel AFM-based Indentation Experiments*** Pavan V. Kolluru, David W Collinson, Min Zhang, L.Catherine Brinson Northwestern University
4:20 pm	***Photon Doppler Velocimetry in Plate Impact Experiments*** Debjoy Mallick, Meng Zhao, Brian Schuster, Daniel Casem, KT Ramesh Johns Hopkins University, Army Research Lab
C4-3	**MOLECULAR, CELLULAR, AND TISSUE MECHANICS**
Room 1307	SESSION CHAIRS: George Lykotrafitis, University of Connecticut Ying Li, University of Connecticut
3:00 pm	***Self-assembly of core-polyethylene glycol-lipid shell (CPLS) nanoparticles and the potential as drug delivery vehicles*** Ying Li, University of Connecticut
3:20 pm	***Stable adhesion of rolling cells to soft substrates*** Alireza Sarvestani, Mohammad Moshaei, Ohio University
3:40 pm	***Network mechanics in biological materials: bond dissociations and network measures of damage*** Amy Dagro, K.T. Ramesh Johns Hopkins University/US Army Research Laboratory
4:00 pm	***Complementary curvatures from proteins and lipids catalyze mitochondrial fission via geometric instability*** Ashutosh Agrawal, University of Houston
4:20 pm	***Nanorod-mediated mechanical destruction of cell membranes*** Liuyang Zhang, Xianqiao Wang, University of Georgia

D12-2	MECHANICS, MATERIALS, AND MANUFACTURE OF FLEXIBLE AND STRETCHABLE ELECTRONICS
Room 2116	SESSION CHAIRS: Nanshu Lu, University of Texas at Austin Cunjiang Yu, University of Houston
3:00 pm	***Soft Core/Shell packages for stretchable electronics*** Yonggang Huang, Yinji Ma, John A. Rogers, Northwestern University
3:20 pm	***Strain isolation of wearable electronics via liquid-filled substrates*** Matt Pharr, Texas A&M University
3:40 pm	***Directly printed, highly stretchable and self-similar fiber-based nanogenerator*** YongAn Huang, Yongqing Duan, Yajiang Ding, Jing Bian, Lin Xiao, Zhouping Yin, University of Science and Technology
4:00 pm	***Cotton-textile-enabled flexible power sources with exceptional electrochemical performance and mechanical robustness*** Zan Gao, University of Virginia
4:20 pm	***Opto-mechanical designs enabling stretchable photonics*** Lan Li, Juejun Hu, Hongtao Lin, Yizhong Huang, Junying Li, Jerome Michon, Shutao Qiao, Nanshu Lu, Laurent Vivien, Carlos Ramos, Jason Lonergan, Kathleen Richardson, Massachusetts Institute of Technology
4:40 pm	***The manufacture and testing of electrically conductive aramid fibers for use as electronic sensors*** Max Chan Tenorio, Assamina Pelegri, Alexandra Tucker, Rutgers University

C1-3	MECHANICS OF BIOLOGICAL AND BIOINSPIRED MATERIALS
Room 1301	SESSION CHAIRS: Sinan Keten, Northwestern University
3:00 pm	***Creep-assisted slow crack growth in bio-inspired dental multilayers*** Jing Du, Xinrui Niu, Wole Soboyejo Penn State University
3:20 pm	***Multi-objective optimization of nacre-like materials*** Nasra Said Al-Maskari, Texas A&M University
3:40 pm	***Unfolding fibers and scaled controlled stiffening: molecular tricks at the macroscale*** Steve Cranford, Northeastern University
4:00 pm	***Self-folding behavior of smart biopolymers in detection of phenol*** Amrita Rath, Santhosh Mathesan, Pijush Ghosh Indian Institute of Technology
4:20 pm	***A fluctuating elastic plate for lipid membranes*** Xiaojun Liang, University of Pennsylvania
C12-3	**MECHANICAL BEHAVIORS OF CYTOSKELETON AND CELLS**
Room 2111	SESSION CHAIRS: Taeyoon Kim, Purdue University Zhangli Peng, University of Notre Dame
3:00 pm	***Stress fiber contractile behaviors in aortic valve interstitial cells*** Michael Sacks, Yusuke Sakamoto, Rachel M. Buchanan, Johannah S. Adams, Farshid Guilak, The University of Texas at Austin
3:40 pm	***Electrohydrodynamic instability of a lipid bilayer membrane coupled to a cytoskeleton network*** Yuan-Nan Young, New Jersey Institute of Technology
4:00 pm	***Water dynamics and actomyosin mechanics govern cell mechanical behavior*** Sean Sun, Johns Hopkins University
4:20 pm	***Mechanics of red blood cells in human spleen and some consequences for health and disease*** Zhangli Peng, Igor Pivkin, George Karniadakis, Pierre Buffet, Ming Dao University of Notre Dame

D2-2	MECHANICS AND MATERIALS IN THE OILFIELD
Room 2112	SESSION CHAIRS: Pedro Reis, Massachusetts Institute of Technology Agathe Robisson, Schlumberger Nathan Wicks, Schlumberger Yucun Lou, Schlumberger
3:00 pm	***Engineering fracking fluids with computer simulation*** Eric Stefan Shaqfeh, Stanford University
3:40 pm	***An experimental model on hydraulic fracturing in an homogeneous elastic reservoir*** Ching-Yao Lai, Princeton University
4:00 pm	***Using brittle hydrogel to understand the complexity of hydraulic fracture*** Will Steinhardt, Harvard University
4:20 pm	***Using waves to infer hydraulic fracture geometry*** Chao Liang, Ossian O'Reilly, Eric M. Dunham, Dan Moos Stanford University
D5-3	**MECHANICS AND DESIGN OF MECHANICAL METAMATERIALS**
Room 2106	SESSION CHAIRS: Jie Yin, Temple University Yaning Li, University of New Hampshire
3:00 pm	***3D micro-structured mechanical metamaterials by laser printing*** Martin Wegener, Muamer Kadic, Tobias Frenzel, Claudio Findeisen, Jingyuan Qu, Andreas Naber, Peter Gumbsch Institute of Applied Physics, Karlsruhe Institute of Technology (KIT)
3:40 pm	***Lightweight mechanical metamaterials with tunable negative thermal expansion*** Nicholas Fang, Massachusetts Institute of Technology
4:00 pm	***Lightweight microlattice with tunable mechanical properties using 3D printed shape memory polymer*** Chen Yang, Howon Lee Rutgers University
4:40 pm	***The elastic structural efficiency of mechanical metamaterials*** Jonathan Berger, UCSB

D11-1	INSTABILITY AND INTERFACIAL ADHESIONS IN BIO-COMPATIBLE ELECTRONIC
Room 2100 /2101	SESSION CHAIRS: Shuodao Wang, Oklahoma State University Huanyu Cheng, Pennsylvania State University Jianling Xiao, University of Colorado at Boulder
3:00 pm	***Flexible and stretchable device design: When soft materials meet hard solids (Invited)*** Baoxing Xu, University of Virginia
3:30 pm	***Adaptive fluid-infused porous film with tunable transparency and wettability (Invited)*** Yuhang Hu, University of Illinois Urbana-Champaign
4:00 pm	***Puncture mechanics of soft membranes*** Shaoxing Qu, Zhejiang University
4:20 pm	***Conformability analysis at device/skin interface with two-dimensional wavy patterns*** YongAn Huang Huazhong, University of Science and Technology
D7-6	**INSTABILITY IN SOLIDS AND STRUCTURES**
Room 0105	SESSION CHAIRS: R.S. Elliott, University of Minnesota Pedro Miguel Reis, Massachusetts Institute of Technology
3:00 pm	***Multi-stability and bifurcations of thin bands*** Tian Yu, Virginia Polytechnic Institute and State University
3:20 pm	***Interacting elastic curves on a rigid manifold*** Vikash Chaurasia, University of Houston
3:40 pm	***Stability of constrained elastica*** Anna Liakou, University of Minnesota
4:00 pm	***Competition between wrinkles and folds/ridges by embedded*** defects in substrate Xiangbiao Liao, Columbia University
4:20 pm	***Tapered skeletal elements in the marine sponge Tethya aurantia are ideally designed to resist buckling*** Michael Monn, Haneesh Kesari Brown University

D8-6	COMPUTATIONAL MECHANICS OF MATERIALS AND STRUCTURES
Room 0102	SESSION CHAIRS: Shawn Chester, New Jersey Institute of Technology Christian Linder, Stanford University Steve Sun, Columbia University
3:00 pm	***A fixed-grid Eulerian approach to structural elastodynamics based on the space-time CESE method*** Robert Lowe, The Ohio State University
3:20 pm	***Harmonic balance-boundary element method for nonlinear ultrasonic waves caused by crack face friction*** Taizo Maruyama, Terumi Touhei Tokyo University of Science
3:40 pm	***Near field equation - scaled boundary finite element method for detecting cracks in 2D heterogeneous beams*** Taku Nikaido, Terumi Touhei, Albert Saputra Tokyo University of Science
4:00 pm	***A new hybrid numerical scheme for accurate near field truncation of waves in elastodynamic simulations*** Ahmed Elbanna, Setare Hajaroalsvadi, Albert Saputra University of Illinois Urbana Champaign
4:20 pm	***Particle impact simulations using a coupled atomistic/discrete dislocation (CADD) model: Observing high-strain-rate plasticity*** James Martino, Northeastern University

D9-6	FRICTION, FRACTURE AND DAMAGE
Room 0101	SESSION CHAIRS: Ahmed Elbanna, University of Illinois K. Ravi-Chandar, University of Texas at Austin
3:00 pm	***Energy scaling in rock cutting*** Emmanuel Detournay, Jia-Liang Le University of Minnesota
3:40 pm	***A direct method of determining mode-II traction-separation relation of TSV/Si interface*** Kenneth M. Liechti, University of Texas at Austin
4:00 pm	***Image-based dynamic fracture analysis of brittle polymers*** Leslie Lamberson, Drexel University
4:20 pm	***Effective toughness at the nanoscale*** Zubaer Hossain, University of Delaware
4:40 pm	***Interlocking-induced stiffness in 2D and 3D stochastically microcracked materials beyond the transport percolation threshold*** Anirban Pal, Catalin R Picu Rensselaer Polytechnic Institute

D10-1	UNCERTAINTY PROPAGATION AND QUANTIFICATION IN MULTISCALE SIMULATION OF MATERIALS RESPONSE, STRUCTURAL PERFORMANCE, AND FAILURE
Room 2102	SESSION CHAIRS: John M. Emery, Sandia National Laboratories Joseph E. Bishop, Sandia National Laboratories Jacob D. Hochhalter, NASA Langley Research Center
3:00 pm	***Parametric Homogenization framework for Continuum Elasto-Plastic and Fatigue Damage Models for Titanium Alloys*** Somnath Ghosh, Shravan Kotha, Deniz Ozturk Johns Hopkins University
3:40 pm	***Establishing a Coarse-graining Length-Scale for Stochastic Multi-Scale Modeling of Localized Plastic Deformation in Metallic Glasses*** Dihui Ruan, Chris H. Rycroft, Michael D. Shields, Michael L. Falk Johns Hopkins University
4:00 pm	***Stochastic behavior of nanoscale dielectric wall buckling*** Lawrence H. Friedman, Igor Levin, Robert F. Cook National Institute of Standards and Technology
4:20 pm	***Concurrent Multiscale Modeling of Microstructural Effects on Localization Behavior in Finite Deformation Solid Mechanics*** James Wesley Foulk III, Coleman Alleman, Alejandro Mota Sandia National Laboratories
4:40 pm	***Efficient structural reliability including the effects of crystallographic texture on engineering-scale performance*** John M. Emery, Brian A Robbins, Jay Carroll, Joseph E. Bishop, Richard V. Field Jr., Sandia National Laboratories

C2-1	MECHANICS OF POLYMERS WITH DYNAMIC BONDS
Room 2104	SESSION CHAIRS: Meredith Silberstein, Cornell University Qiming Wang, University of Southern California Rong Long, University of Colorado, Boulder
3:00 pm	***Interfacial welding of dynamic covalent network polymers*** H. Jerry Qi, Kai Yu Georgia Institute of Technology
3:40 pm	***Interfacially bonded mechanophores in polymer composites*** Meenakshi Sundaram Manivannan, Meredith Silberstein Cornell University
4:00 pm	***Role of reversible hydrogen bonds in high performance nanoparticle / nanofiber composite*** Zhouzhou Zhao, Ellen M. Arruda, University of Michigan, Ann Arbor
4:20 pm	***Controllable reconfiguration of bio-inspired nanoparticle networks under torsion*** Tao Zhang, Badel L. Mbanga, Victor V. Yashin, Anna C. Balazs University of Pittsburgh
4:40 pm	***Puncture mechanics of soft membranes*** Shaoxin Qu, Zhejiang University

E1-6	MECHANICS AND ELECTROCHEMISTRY OF ENERGY MATERIALS
Room 2115	SESSION CHAIRS: Siva P. V. Nadimpalli, New Jersey Institute of Technology Yifei Mo, University of Maryland Kejie Zhao, Purdue University Zheng Jia, Northwestern University
3:00 pm	***Nanomechanics of lithium-ion storage materials*** Shuman Xia, Georgia Institute of Technology
3:20 pm	***Intrinsic stress mitigation via elastic softening during two-step electrochemical lithiation of amorphous silicon*** Zheng Jia, Teng Li Northwestern University
3:40 pm	***Investigation of fabric-based stretchable electrodes for lithium ion batteries*** Bahar Moradi Ghadi, Haleh Ardebili University of Houston
4:00 pm	***The investigation of tryptic soy broth in lithium ion battery*** Mengying Yuan, Haleh Ardebili University of Houston
4:20 pm	***Influence of electrolyte soaking on the heat-sealing strength of polymer-metal-polymer pac*** Yang Fan, Shanghai University

B5-3	HEAT TRANSFER: RADIATIVE, CONVETIVE AND EVAPORATIVE HEAT TRANSFER
Room 0103	SESSION CHAIRS: Yuan Yang, Columbia University Tengfei Luo, University of Notre Dame Mark Kedzierski, Thanh Tran
3:00 pm	***Natural and biomimetic radiative cooling nano-photonic structures*** Nanfang Yu, Columbia University
3:20 pm	***High heat flux evaporative heat transfer through nanoporous membrane*** Renkun Chen, University of California, San Diego
3:40 pm	***Ultrahigh-performance radiative cooling*** Zhen Chen, Stanford University
4:00 pm	***Thermally insulating and flame retarding 3D honeycomb graphene scaffolds*** Menglong Hao, University of California, Berkeley
4:20 pm	***Anisotropic of thermal flow from full brillouin zone anisotropic solution to the three dimensional phonon boltzmann transport equation*** Francis VanGessel, University of Maryland

E6-3	FROM QUANTUM MECHANICS TO MATERIALS ENGINEERING: FIRST PRINCIPLES METHODS IN THE MECHANICS OF MATERIALS AND STRUCTURES
Room 1309	SESSION CHAIRS: Phanish Suryanarayana, Georgia Institute of Technology Amartya Banerjee, Lawrence Berkeley National Laboratory
3:00 pm	***Dislocation cores and defect interactions from first principles: current state of the art and new challenges*** Dallas R. Trinkle, University of Illinois, Urbana-Champaign
3:20 pm	***Quantum-mechanical effects in dislocation behavior using large-scale electronic-structure calculations*** Sambit Das, Vikram Gavini University of Michigan, Ann Arbor
3:40 pm	***Effects of elastic anisotropy on the stacking fault width of dislocations in face centered cubic materials*** Abigail Hunter, Los Alamos National Laboratory
4:00 pm	***A first principles based approach to generating yield surfaces in magnesium*** Dingyi Sun, Mauricio Ponga, Kaushik Bhattacharya, Michael Ortiz California Institute of Technology
4:20 pm	***Anderson localization of thermal phonons leads to thermal conductivity maximum*** Jonathan Mendoza, Massachusetts Institute of Technology
B7-1	**VISCOUS FLOW SIMULATIONS OVER COMPLEX GEOMETRIES**
Room 1311	SESSION CHAIRS: James Baeder, University of Maryland Bharath Govindarajan, University of Maryland
3:00 pm	***A high-order nonconforming sliding-mesh method for simulating unsteady compressible viscous flows around rotating objects*** Chunlei Liang, The George Washington University
3:20 pm	***Solution algorithm for unstructured grids using a hamiltonian-strand approach*** YongSu Jung, University of Maryland
3:40 pm	***Adaptive wavelet multiresolution pseudo-spectral solver for nonlinear partial differential equations*** Cale Harnish, Karel Matouš, Daniel Livescu University of Notre Dame
4:00 pm	***Shock wave spotting in convergent-divergent nozzles*** Hady K. Joumaa, Massachusetts Institute of Technology

E5-6	MECHANICS OF MULTIFUNCTIONAL 2D MATERIALS AND 2D-BASED NANOSTRUCTURES
Room 1105	SESSION CHAIRS: Ellad Tadmor, University of Minnesota Shuze Zhu, Massachusetts Institute of Technology Cemal Basaran, University at Buffalo Kuan Zhang, University of Minnesota Wei Gao, Northwestern University
3:00 pm	***Unraveling properties in armchair and zigzag graphene nanoribbons*** Weixiang Zhang State, University of New York at Buffalo
3:20 pm	***Structural transformation of 2D nanosheets to 1D materials*** Kasra Momeni, Pennsylvania State University
3:40 pm	***Interfacial properties in 2D graphene oxide based nanocomposite*** Wei Gao, Horacio Espinosa Northwestern University
4:00 pm	***Multifunctional hierarchical fibers from self-assembled graphene ribbons*** Sameh Tawfick, Kaihao Zhang, Matthew Poss University of Illinois Urbana-Champaign
4:20 pm	***High strength graphene oxide-polymer nanocomposites*** Jamison Lee Bartlett, University of Virginia
B2-3	**BIOLOGICAL FLUID MECHANICS III: BLOOD CLOTTING AND CELL MOTION**
Room 1308	SESSION CHAIRS: Arezoo Ardekani, Purdue University Hassan Masoud, University of Nevada, Reno
3:00 pm	***Coupled multiphysics models of cardiac thrombosis*** Rajat Mittal, Johns Hopkins University
3:40 pm	***Removing biofilm using impacting bubbles*** Ehsan Esmaili, Virginia Polytechnic Institute and State University
4:00 pm	***Numerical simulation of cancer cell squeezing through microfluidic channels*** Jifu Tan, Yaling Liu University of Pennsylvania
4:20 pm	***Seamless multiscale modeling of blood clotting*** Alireza Yazdani, Brown University

F4-3	PHONONIC CRYSTALS
Room 2108	SESSION CHAIRS: Ihab El-Kady, Sandia National Laboratories
3:00 pm	***Phononic crystals: experimental investigations into rf acoustic components and reduction of thermal conductivity*** Zayd Leseman, Kansas State University
3:40 pm	***Acoustic beam splitting based on self-collimation in 2D phononic crystals*** Yuning Guo, Mike Hettich, Thomas Dekorsy Department of Physics, University of Konstanz
4:00 pm	***A phononic crystal based quantum computer*** Ihab El-Kady, Sandia National Laboratories
4:20 pm	***Nano-scale optomechanical devices and phononic crystals for RF signal processing*** Charles M. Reinke, Heedeuk Shin, Aleem Siddiqui, Jonathan Cox, Robert Jarecki, Andrew Starbuck, Peter Rakich Sandia National Laboratories
G1-1	**MEET THE EDITOR-IN-CHIEF OF MECHANICS JOURNALS AT SES2016: AN OPEN FORUM**
Chasen Family Room	MODERATOR: Teng Li
	Editors-in-Chief Panelists: Huajian Gao, *Journal of Mechanics and Physics of Solids* (JMPS) Jimmy K. Hsia, *Extreme Mechanics Letters* (EML) Yonggang Huang, *Journal of Applied Mechanics* (JAM) Stelios Kyriakides, *International Journal of Solids and Structures* (IJSS) K. Ravi-Chandar, *International Journal of Fracture* (IJF) Zhigang Suo, *Extreme Mechanics Letters* (EML)

Huajian Gao
JMPS

Jimmy K. Hsia
EML

Yonggang Huang
JAM

Stelios Kyriakides
IJSS

K. Ravi-Chandar
IJF

Zhigang Suo
EML

B6-2	FLUID-STRUCTURE INTERACTION AND ITS APPLICATIONS
Room 1103	SESSION CHAIRS: Sheldon Wang, Midwestern State University Lucy Zhang, Rensselaer Polytechnic Institute Yaling Liu, Lehigh University
10:00 am	***Immersed boundary models of cardiac fluid dynamics in vitro and in vivo*** Boyce Griffith, University of North Carolina at Chapel Hill
10:20 am	***A Computational Framework to Simulate Multiphysics Problems Involving Three-Phase (Gas-Liquid-Solid) Interactions*** Lucy T. Zhang, Rensselaer Polytechnic Institute
10:40 am	***Volume of fluid (vof) based numerical modeling of non newtonian fluid flow characteristics and dimensional analysis in fused deposition melting*** Md Easir Arafat Papon, Anwarul Haque, Muhammad Ali Rob Sharif The University of Alabama
11:00 am	***On the structure and dynamics of wakes behind oscillating cylinders*** Mark A. Stremler, Wenchao Yang, Saikat Basu Virginia Tech
11:20 am	***Coupling lattice boltzmann fluid solver with molecular dynamics using multiple CPUs*** Jifu Tan, Yaling Liu University of Pennsylvania
B1-1	**PORE SCALE MODELING AND SIMULATION OF MULTIPHASE FLOW IN POROUS MEDIA**
Room 1101/1102	SESSION CHAIRS: Amir Riaz, University of Maryland Nils Tilton, Colorado School of Mines
10:00 am	***Finite analytic numerical method for fluid flows in heterogeneous porous media*** Xiao-Hong Wang, University of Science and Technology of China
10:20 am	***Multi-scale dynamics in reactive porous systems for energy applications*** Ilenia Battiato, San Diego State University
10:40 am	***Micro-continuum approach for pore-scale simulation of subsurface processes*** Cyprien Soulaine, Stanford University
11:00 am	***Challenges in meso-scale modeling of multiphase flow in porous media*** Amir Riaz, University of Maryland

B3-1	QUANTITATIVE IMAGING METHODS IN FLUID MECHANICS
Room 2110	SESSION CHAIRS: Jesse Belden, Naval Undersea Warfare Center-Newport John Charonko, Los Alamos National Laboratory
10:00 am	***Stereoscopic PIV of the flow within a randomly packed bed of spheres comparison to numerical modelling*** Staffan Lundström, Luleå University of Technology
10:40 am	***Light field measurement of gas-liquid interface geometry*** Madison Boyer, Jesse Belden, Alexander Jafek, Tadd Truscott Brigham Young University
11:00 am	***Error propagation dynamics of PIV-based pressure calculation: from poisson equations to kirchhoff plates*** Zhao Pan, Jared Whitehead, Tadd Truscott Utah State University
C11-1	**MOLECULAR, CELLULAR, AND TISSUE MECHANICS**
Room 1307	SESSION CHAIRS: Qiming Wang, University of Southern California Christoph Keplinger, University of Colorado, Boulder
10:00 am	***Dielectric elastomer and bistable electroactive polymer materials and devices*** Qibing Pei, UCLA
10:20 am	***Control of soft robotic devices with no electronics*** Iain Anderson, University of Auckland
10:40 am	***Materials as machines: the functional mimicry of physiology using soft robotics*** Rob Shepherd, Cornell University
11:00 am	***Soft robotics: sensory-active skins and fabrics for intelligent material systems*** Rebecca Kramer, Purdue University
11:20 am	***Design of a bistable dome-shaped dielectric elastomer actuators*** Eesha Khare, Samuel Shian, David R. Clarke Harvard University

C6-1	SURFACE TENSION AND SURFACE CHARGE DRIVEN PHENOMENA IN SOFT MATTER
Room 2116	SESSION CHAIRS: Siddartha Das, University of Maryland, College Park Joshua B. Bostwick, Clemson University
10:00 am	***Deformation of an elastic substrate due to a resting sessile droplet*** Aaron Bardall, North Carolina State University
10:20 am	***Wetting ridge geometry and contact-angle hysteresis*** Joshua Bostwick, Su Ji Park Clemson University, Mechanical Engineering
10:40 am	***Membrane tension regulates the geometry of stable pores in fused nuclear membranes*** Mehdi Torbati, Ashutosh Agrawal University of Houston
11:00 am	***Clathrin polymerization exhibits high mechano-geometric sensitivity*** Ehsan Irajizad, Ashutosh Agrawal University of Houston
C5-6	**MECHANICS AND PHYSICS OF SOFT MATERIALS**
Chasen Family Room	SESSION CHAIRS: Stephan Rudykh, Technion – Israel Institute of Technology, Israel Yuhang Hu, University of Illinois at Urbana-Champaign Oscar Lopez-Pamies, University of Illinois at Urbana-Champaign Xuanhe Zhao, Massachusetts Institute of Technology
10:00 am	***Surface instabilities in pre-stressed elastic bilayers*** Francisco López Jiménez, Rashed Al-Rashed, Pedro M. Reis Massachusetts Institute of Technology
10:20 am	***Effect of surface tension on the molding and deformation of*** micro-surface craters Liu Wang, Shutao Qiao, Nanshu Lu, University of Texas at Austin
10:40 am	***Weakly nonlinear regime of rayleigh taylor instability in soft solids*** Aditi Chakrabarti, Basile Audoly, Serge Mora, Yves Pomeau Lehigh University
11:00 am	***A micromechanical approach to model strain-induced crystallization in rubber-like materials*** Christian Linder, Reza Rastak, Stanford University
11:20 am	***Characterization polymer thin film - substrate interfaces of applying nano dynamic mechanical analysis (Nano-DMA)*** Pijush Ghosh, Mallikarjunachari G., Indian Institute of Technology

C1-4	MECHANICS OF BIOLOGICAL AND BIOINSPIRED MATERIALS
Room 1301	SESSION CHAIRS: Sinan Keten, Northwestern University
10:00 am	***Nanotwin-governed toughening mechanism in hierarchically structured biological materials*** Sheng Yin, Brown University
10:20 am	***A finite element homogenization method for viscoelastic brain matter*** Daniel Sullivan Rutgers, Assimina Pelegri, The State University of New Jersey
10:40 am	***Naturally-occurring impact resistant protective systems*** David Restrepo, Nicholas Yaraghi, Jesus Rivera, David Kisailus, Pablo Zavattieri Purdue University
11:00 am	***Mechanical modeling of a pomelo peel bioinspired foam*** Jonel Aaron Ortiz, Texas A&M
11:20 am	***Cohesive finite element modeling of damage growth in mineralized collagen fibril*** Mohammad Maghsoudi-ganjeh, Liqiang Lin, Xiaowei Zeng, Xiaodu Wang University of Texas at San Antonio
C12-4	**MECHANICAL BEHAVIORS OF CYTOSKELETON AND CELLS**
Room 2111	SESSION CHAIRS: Taeyoon Kim, Purdue University Zhangli Peng, University of Notre Dame
10:00 am	***How acting polymerization generates pulling forces to bend the cell membrane*** Anders Einar Carlsson, Dennis Tweten, Philip Bayly Washington University in St Louis
10:40 am	***Mechanochemical modeling of the eukaryotic cytoskeleton*** Garegin A. Papoian, The University of Maryland
11:00 am	***3D model of cytokinetic contractile ring assembly: node-mediated and "backup" pathways*** Dimitrios Vavylonis, Tamara Bidone, Lehigh University
11:20 am	***Morphological transformation, contraction, and force generation of active cytoskeletal structures*** Taeyoon Kim, Wonyeong Jung, Jing Li, Purdue University

E5-8	MECHANICS OF MULTIFUNCTIONAL 2D MATERIALS AND 2D-BASED NANOSTRUCTURES
Room 2112	SESSION CHAIRS: Ellad Tadmor, University of Minnesota Shuze Zhu, Massachusetts Institute of Technology Cemal Basaran, University at Buffalo Kuan Zhang, University of Minnesota Wei Gao, Northwestern University
10:00 am	***Prediction of a two-dimensional trisulfur dinitride (S3N2) solid for nanoscale optoelectronic applications*** Hang Xiao, Columbia University
10:20 am	***Electronic response of vdW heterostructures at extreme deformation*** Kazi Istiaque Alam, Zubaer Hossain University of Delaware
10:40 am	***Defective 2D materials for energy storage: current and future directions*** Dibakar Datta, New Jersey Institute of Technology
11:00 am	***Strength of graphene grain boundaries under arbitrary in-plane tension*** Upamanyu Ray, Andy Fox, Teng Li University of Maryland
11:20 am	***Strain-induced programmable half-metal and spin-gapless semiconductor in an edge-doped boron nitride nanoribbon*** Shuze Zhu, Teng Li Massachusetts Institute of Technology
D5-4	**MECHANICS AND DESIGN OF MECHANICAL METAMATERIALS**
Room 2106	SESSION CHAIRS: Yaning Li, University of New Hampshire Jie Yin, Temple University
10:00 am	***Mechanics and designs of soft network materials with bio-inspired hierarchical lattice constructions*** Yihui Zhang, Yonggang Huang, John A. Rogers Tsinghua University
10:20 am	***Modulating elastic band gap structure in layered soft composites using sacrificial interfaces.*** Qianli Chen, Ahmed Elbanna University of Illinois at Urbana Champaign
10:40 am	***Exploring phononic crystal tunability using dielectric elastomers*** Michael Jandron, David Hennan ***Naval Undersea Warfare Center, Newport, RI***
11:00 am	***Dynamic behavior of mechanical cloaks designed by direct lattice transformation*** Muamer Kadic, André Diatta, Sebastien Guenneau, André Nicolet, Fréderic Zolla, Martin Wegener Karlsruhe Institute of Technology

D11-2	INSTABILITY AND INTERFACIAL ADHESIONS IN BIO-COMPATIBLE ELECTRONICS
Room 2100/2101	SESSION CHAIRS: Shuodao Wang, Oklahoma State University Huanyu Cheng, Pennsylvania State University Jianling Xiao, University of Colorado at Boulder
10:00 am	***Design of strain-limiting substrate materials for stretchable and flexible electronics (Invited)*** Yonggang Huang, Yinji Ma, Northwestern University
10:30 am	***Mechanics of stretchable interconnects with fractal-inspired designs (Invited)*** Yihui Zhang, Yonggang Huang Tsinghua University
11:00 am	***Buckling of spherical-sector shell and its implications in measuring the mechanical properties of tympanic membrane*** Shuodao Wang, Bo Wang Oklahoma State University
11:00 am	***Conformability of a thin elastic membrane laminated on a soft substrate with slightly wavy surface*** Liu Wang, Nanshu Lu University of Texas at Austin
C8-1	**SOFT TISSUE MECHANICS: THEORETICAL CONSIDERATIONS, EXPERIMENTAL RESULTS, AND APPLICATIONS**
Room 0105	SESSION CHAIRS: Michael Sacks, University of Texas at Austin Ellen Arruda, University of Michigan
10:00 am	***Long-range force transmission in fibrous matrices enabled by tension-driven alignment of fibers*** Vivek Shenoy, University of Pennsylvania
10:20 am	***3D micromechanical characterization of extracellular matrices*** Mohak Patel, Christian Franck Brown University
10:40 am	***Mechanical characterization of the cuticle of caenorhabditis elegans and its age related changes*** Mohammad Rahimi Lenji, Howard A. Stone, Coleen T. Murphy Princeton University
11:00 am	***A functionally graded material model for the transmural stress distribution of the aortic valve leaflet*** Bruno Vale Rego, University of Texas at Austin
11:20 am	***Comparison of five models of thoracic aortic aneurysms reveals a distinct biomechanical phenotype*** Jay D. Humphrey, Yale University

C7-1	ADVANCES IN MECHANICS OF INELASTIC DEFORMATION AND FAILURE IN BIOLOGICAL MATERIALS
Room 0102	SESSION CHAIRS: Ange-Therese Akono, University of Illinois at Urbana-Champaign Ahmed Elbanna, University of Illinois at Urbana-Champaign Nima Rahbar, Worcester Polytechnic Institute Huajian Gao, Brown University
10:00 am	***The structure and mechanics of key interfaces within biological and bio-inspired materials*** Francois Barthelat, McGill University
10:40 am	***Numerical investigation of the influence of organic interfacial properties on the mechanical behaviors of extrafibrillar matrix in bone*** Liqiang Lin, Xiaowei Zeng, Xiaodu Wang University of Texas at San Antonio
11:00 am	***Analytical studies on organic-inorganic interface in nacreous structures*** Sina Askarinejad, Worcester Polytechnic Institute
11:20 am	***Micromechanism and multiscale modeling of diffuse damage in bone*** Zehai Wang, Rensselaer Polytechnic Institute
B4-1	**TURBULENT MULTIPHASE FLOW**
Room 0101	SESSION CHAIRS: Ken Kiger, University of Maryland
10:00 am	***A large eddy simulation eulerian two-phase model for sediment transport*** Zhen Cheng, University of Delaware
10:20 am	***Quantifying and modeling the force variation within random arrays of spheres*** Georges Akiki, University of Florida
10:40 am	***Wave-induced sheet flow on a sandbar: roles of the pressure gradient and bed shear stress*** Ryan Scott Mieras, University of Delaware
11:00 am	***Multi-camera PIV of two-phase oscillating sheet flow*** Chang Liu, Ken Kiger University of Maryland

D10-2	UNCERTAINTY PROPAGATION AND QUANTIFICATION IN MULTISCALE SIMULATION OF MATERIALS RESPONSE, STRUCTURAL PERFORMANCE, AND FAILURE
Room 2102	SESSION CHAIRS: John M. Emery, Sandia National Laboratories Joseph E. Bishop, Sandia National Laboratories Jacob D. Hochhalter, NASA Langley Research Center
10:00 am	***Stochastic Methods for Upscaling Material Properties and Behavior with Application to Composites*** Roger G. Ghanem, Loujaine Mehrez, Charanraj Thimmisetty, Venkat Aitharaju, William Rodgers, Jacob Fish University of Southern California
10:20 am	***Uncertainty quantification for computational models in fiber-reinforced composite materials using an adaptive sparse grid collocation method*** Anindya Bhaduri, Lori Graham-Brady, Michael Shields, Yanyan He, Robert M. Kirby, Johns Hopkins University
10:40 am	***A stochastic framework for upscaling elastic and damage behavior of concrete at mesoscale*** Vasav Dubey, Arash Noshadravan, Texas A&M University
11:00 am	***Bayesian Approach to Constitutive Model Selection, Calibration, and Uncertainty Propagation: Application to Traumatic Brain Injury*** Kumar Vemaganti, Sandeep Madireddy, University of Cincinnati
11:20 am	***Parallel Asynchronous Space-Time Algorithm for Localized Uncertainty Quantification*** Waad Subber, Karel Matous, University of Notre Dame
C2-2	**MECHANICS OF POLYMERS WITH DYNAMIC BONDS**
Room 2104	SESSION CHAIRS: Meredith Silberstein, Cornell University Qiming Wang, University of Southern California Rong Long, University of Colorado, Boulder
10:00 am	***Constitutive modeling of multi-shape crystallizable shape memory polymers with light-induced bond exchange reactions*** Fangda Cui, Swapnil Moon, I. Joga Rao New Jersey Institute of Technology
10:20 am	***Light induced RET/CNT composite actuation*** Xudong Liang, Zichen Zhang, Abhishek Sathisha, Prabhakar Bandaru, Shengqiang Cai, UCSD
10:40 am	***Carbon fiber reinforced thermoset composite with near 100% recyclability*** Kai Yu, Qian Shi, Martin L. Dunn, Tiejun Wang, H. Jerry Qi University of Colorado at Denver
11:00 am	***Modeling polymer gel that strengthen under tension*** Santidan Biswas, Victor V. Yashin, Anna C. Balazs, University of Pittsburgh
11:20 am	***Mechanics of ultratough nanocomposite hydrogels*** Qiming Wang, University of Southern California

E1-7	MECHANICS AND ELECTROCHEMISTRY OF ENERGY MATERIALS
Room 2115	SESSION CHAIRS: Siva P. V. Nadimpalli, New Jersey Institute of Technology Yifei Mo, University of Maryland Kejie Zhao, Purdue University Zheng Jia, Northwestern University
10:00 am	***Understanding the mechanical behavior of materials for electrochemical energy storage*** Yang-Tse Cheng, University of Kentucky
10:20 am	***Electro-mechanical behaviour at rough interfaces*** Chongpu Zhai, Dorian Hanaor, Yixiang Gan The University of Sydney
10:40 am	***Resonant frequency tuning approaches for membrane-based electroactive polymer energy harvesters*** Lin Dong, Michael Grissom, Frank T. Fisher Stevens Institute of Technology
11:00 am	***Nanostructured thin-film electrocatalysts for water splitting*** Yang Yang, University of Central Florida
11:20 am	***Failure mechanisms in conductive polymer based capacitive devices*** Anto Sheryl Peter, University of Maryland
B5-4	**HEAT TRANSFER: PHONON THEORY**
Room 0103	SESSION CHAIRS: Yuan Yang, Columbia University Tengfei Luo, University of Notre Dame Mark Kedzierski, Thanh Tran
10:00 am	***Some unconventional thermal metrologies*** Chris Dames, UC Berkeley
10:20 am	***Mechanically tunable thermal conductivity in bilayer heterostructures*** Yuan Gao, Baoxing Xu University of Virginia
10:40 am	***Quantifying thermal exchange between a heated microprobe and sample: applications in scanning thermoelectric microscopy*** Adam A. Wilson, Rensselaer Polytechnic Institute
11:00 am	***Dynamic disorders in superatomic crystals and organic-inorganic perovskites control thermal transport behavior*** Wee-Liat Ong, Evan O.Brien, Giselle Elbaz, Octavi Semonin, Patrick Dougherty, Daniel Paley, C. Fred Higgs, Alan McGaughey, Jonathan Malen, Xavier Roy Columbia University
11:20 am	***Strategies to characterize thermal properties of nanostructured materials, thin-films and interfaces*** Adam A. Wilson, US Army Research Laboratory

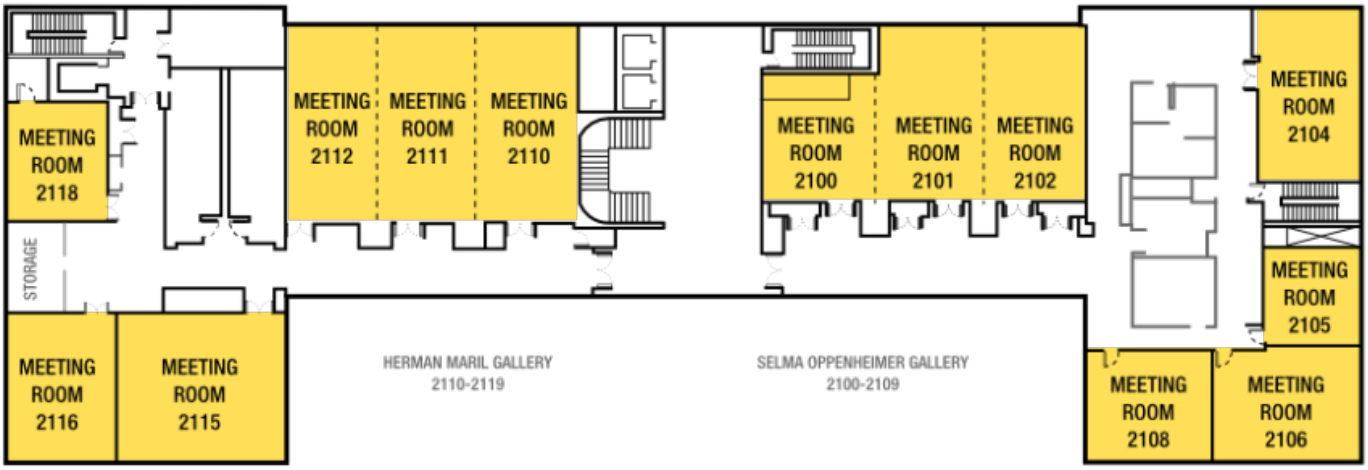
F2-1	MODELING, DESIGN AND SAFETY ANALYSIS IN PHYSIOLOGICAL CLOSED-LOOP SYSTEMS
Room 1309	SESSION CHAIRS: Jin-Oh Hahn, University of Maryland
10:00 am	***Design and safety analysis of closed-loop respiratory support systems for neonates*** Nelson Claure, University of Miami School of Medicine
10:20 am	***Computer aided clinical trials for implantable cardiac devices*** Houssam Abbas, University of Pennsylvania
10:40 am	***Mathematical modeling for in-silico testing of closed-loop fluid resuscitation controllers*** Jin-Oh Hahn, Ramin Bigamian University of Maryland
11:00 am	***Virtual-subject based data-driven control of physiological systems*** Insup Lee, University of Pennsylvania
11:20 am	***Regulatory science for non-clinical testing of physiological closed-loop controlled medical devices*** Bahram Parvinian, Christopher Scully FDA
F5-1	**RIGID AND FLEXIBLE MULTIBODY DYNAMICS SYSTEMS MODELING**
Room 1311	SESSION CHAIRS: Valentin Sonneville, University of Maryland
10:00 am	***Pick-up and impact*** Harmeet Singh, Virginia Polytechnic Institute and State University
10:20 am	***Refined beam theory for flexible multibody dynamics systems*** Olivier A. Bauchau, University of Maryland
10:40 am	***Efficient numerical simulation of flexible multibody systems based on a frame-invariant motion formalism*** Valentin Sonneville, Olivier Bauchau University of Maryland
11:00 am	***The effects of bearing stiffness on the stability of planetary gears*** Xinhua Long Shanghai, Jiao Tong University

E5-7	MECHANICS OF MULTIFUNCTIONAL 2D MATERIALS AND 2D-BASED NANOSTRUCTURES
Room 1105	SESSION CHAIRS: Ellad Tadmor, University of Minnesota Shuze Zhu, Massachusetts Institute of Technology Cemal Basaran, University at Buffalo Kuan Zhang, University of Minnesota Wei Gao, Northwestern University
10:00 am	***Molecular dynamics study on nanoindentation experiments of monolayer molybdenum disulfide membranes*** Weidong Wang, Longlong Li Xidian University
10:20 am	***Surface instabilities and multifunctional properties of large area*** monolayer MoS2 Alper Gurarslan, Yong Zhu North Carolina State University
10:40 am	***Self-healing of molybdenum disulfide to silicon oxide*** Kenneth M. Leichti, University of Texas at Austin
11:00 am	***Misfit dislocation mechanics in lateral heterostructures of 2D materials*** Harley Johnson, Brian McGuigan, Pascal Pochet University of Illinois at Urbana-Champaign
11:20 am	***A unified model for wettability gradient-driven motion of water droplet on solid surfaces*** Qingchang Liu, Baoxing Xu, University of Virginia
F1-1	**DYNAMICS AND CONTROL OF SOFT ROBOT SYSTEMS**
Room 1308	SESSION CHAIRS: Derek Paley, University of Maryland Carmel Majidi, Carnegie Mellon University
10:00 am	***The importance of design in soft robotic control*** Jennifer Case, Edward White, Rebecca Kramer Purdue University
10:20 am	***Soft electronics & sensors for bio-inspired robots and wearable computing*** Carmel Majidi, Carnegie Mellon University
10:40 am	***Getting soft robots to move: numerical study of actuation schemes for a pneumatically actuated soft robot*** Kristin Miriam de Payrebrune, Oliver M. O'Reilly University of California at Berkeley
11:00 am	***Bioinspired planar strain control in elastomeric sheets via*** reinforcing fiber arrays Kamran Mohseni, Michael Krieg University of Florida at Gainesville
11:20 am	***Muscular compliance in bioinspired soft robots*** Norman Wereley, University of Maryland

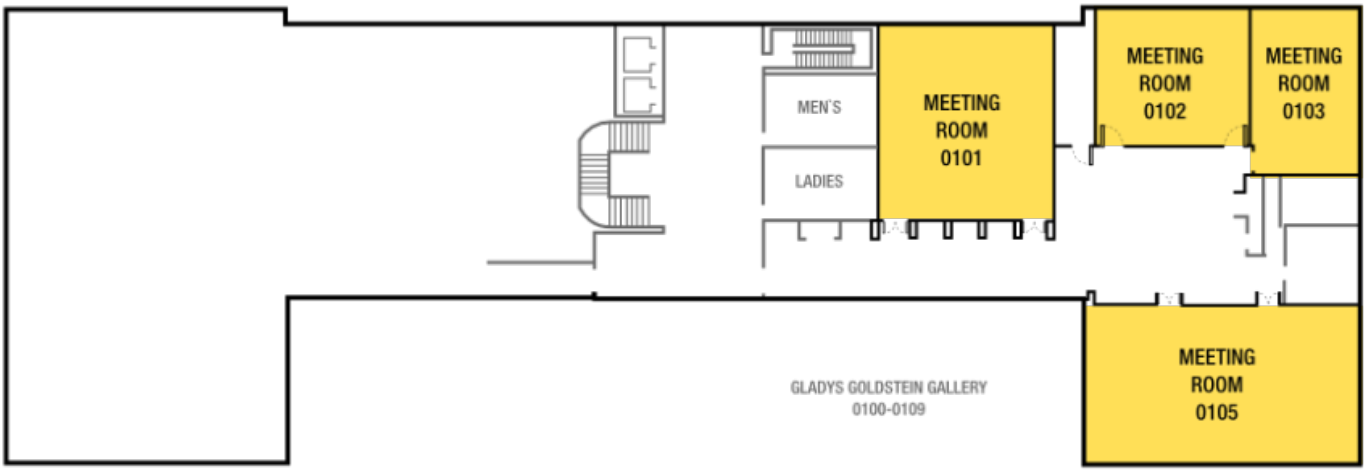
F4-4	ACOUSTIC METAMATERIALS
Room 2108	SESSION CHAIRS: Michael Leamy
10:00 am	***In-plane elastic waves measurement in lattice structures*** via digital image correlation Marshall Schaeffer, Giuseppe Trainiti, Massimo Ruzzene Georgia Institute of Technology
10:20 am	***Topology optimization of a constrained layer damping plate coupled with an acoustic cavity*** Ling Zheng, Chongqinq University
10:40 am	***Band gap characteristics of gyroscopic periodic systems*** Yaser Alsafar, Sadok Sassi, Amr Baz University of Maryland

MARRIOTT CONFERENCE CENTER | MAIN FLOOR

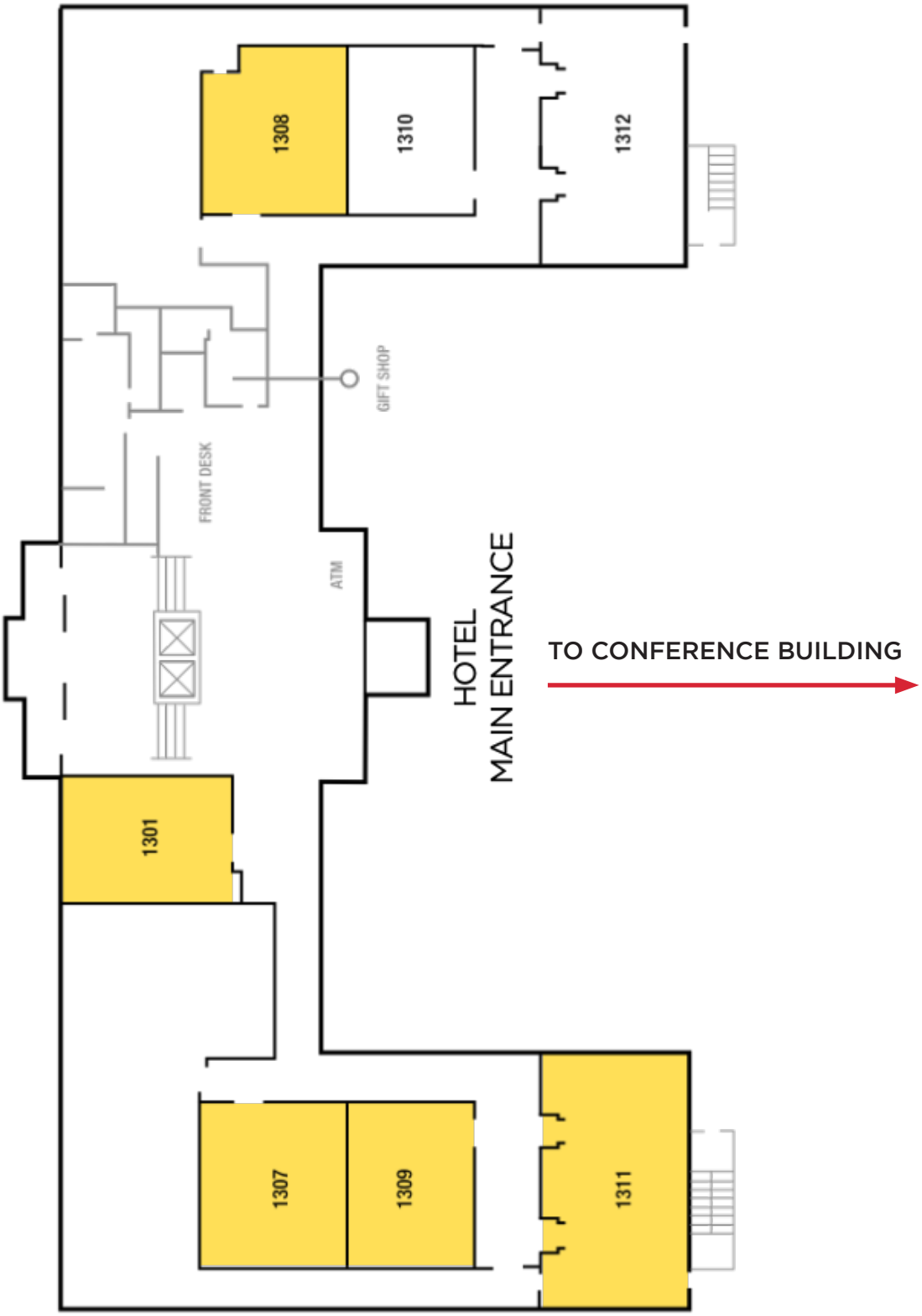
MARRIOTT CONFERENCE CENTER | SECOND FLOOR



MARRIOTT CONFERENCE CENTER | LOWER LEVEL



MARRIOTT HOTEL | MAIN FLOOR



Northeastern University

SES 2017 Boston

54TH Annual Technical Meeting

SOCIETY OF ENGINEERING SCIENCE • ASME-AMD JOINT CONFERENCE

July 18-21, 2017
Northeastern University
Boston, MA

Northeastern University will be hosting the 54th Annual Technical Meeting of the Society of Engineering Science (SES) in Summer 2017

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The Society of Engineering Science (SES) Technical Meeting is held annually to foster and promote the exchange of ideas and information among the various disciplines of engineering and the fields of physics, chemistry, mathematics, bioengineering, and related scientific and engineering fields.

The 54th Annual Technical Meeting of the Society of Engineering Science (SES), a joint event with the Applied Mechanics Division of the American Society of Mechanical Engineers, will be hosted by Northeastern University, on July 18-21, 2017 at its Boston campus.

Northeastern is a global, experiential, research university built on a tradition of engagement with the world, creating a distinctive approach to education. Born out of our world-leading cooperative education (co-op) program, we have enjoyed unprecedented growth in attracting world class researchers and teachers, educating the next generation of leaders, and supporting entrepreneurial activities for impact across critical fields and technologies. We are proud to host the 2017 SES Technical Meeting, and are planning a program that not only addresses discoveries in core fundamental disciplines, but also creativity across boundaries and fields.

As Co-Chairs, we strive to provide a cozy and relaxing platform of scientific exchanges for you; and we look forward to welcoming you in Boston.

SES 2017: List of Planned Topics For Discussion	
I	*Damage and Defect Mechanics*
II	*Frontiers of Computational Mechanics*
III	*Impact and High Strain Rate Deformation*
IV	*Mechanobiology*
V	*Nanoscale Mechanics*
VI	*Mechanics of Hierarchical and Multifunctional Materials – From Nano to Macro*
VII	*Mechanics of Soft and Biological Materials, and Flexible Structures*
VIII	*Contact and Adhesion*
IX	*Advanced Manufacturing*
X	*Fluid Mechanics and Fluid-Structure Interaction*
XI	*US-China Collaboration*
XII	*Engineering Science Education*

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SOCIETY OF ENGINEERING SCIENCE

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University of Maryland
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