Sunday, 13 October

7am **SEM.1 -**
Soft Evolutionary Materials Symposium Registration & Networking Breakfast - Invitation Only
Charles F. Knight Center

7am **NSF Mechanics of Materials and Structures (MOMS) Welcome & Networking Breakfast - Invitation Only**
Charles F. Knight Center

8am **SES Conference Desk Open 8 am - 6 pm: Information, Lost & Found, Mobile App Support**
Danforth University Center

8am **SEM.2 -**
Soft Evolutionary Materials Symposium - 8 am - 6 pm- Invitation Only
Charles F. Knight Center

11:30am **MOMS.1 -**
NSF Mechanics of Materials & Structures (MoMS) Mentoring Lunch - Pre-Registration Required
Charles F. Knight Center

1pm **P.1 -**
Opening Convocation of the Society of Engineering Science 56th Annual Technical Meeting
Graham Chapel

Opening Convocation Welcome by Washington University
» Dr. Andrew D. Martin and Dr. Aaron Bobick (Washington University in St. Louis)

1:15pm **P.2 -**
Opening Plenary: Dr. Nakhiah Goulbourne
Graham Chapel

Mechanics of Materials and Structures as a Driver of Technological Innovation in the 21st Century
» Dr. Nakhiah Goulbourne (National Science Foundation, Mechanics of Materials and Structures (MOMS))

2:30pm **Session I**

2:30pm **I.7.6.A -**
Mechanics of interfacial adhesion across diverse scales and applications
Seigle Hall 206
Chaired by: Dr. Denizhan Yavas

KEYNOTE: A Bond Rupture Model for the Mixed-Mode, Rate-Dependent Traction-Separation Relations of a Silicon/Epoxy Interface
» Prof. Kenneth Liechti[1], Mr. Tianhao Yang[1], Prof. Rui Huang[1] (1. University of Texas at Austin)

Adhesion asymmetry in peeling of thin films with patterned thickness
» Mr. Ahmed Ghareeb[1], Prof. Ahmed Elbanna[1] (1. University of Illinois at Urbana-Champaign)

Adhesion of two-dimensional Titanium Carbides (MXenes) to MXenes and graphene
» Mr. Yanxiao Li[1] (1. Missouri University of Science and Technology)

Surface roughness enhanced adhesion in adhesive elastic contacts
» Dr. Weilin Deng[1], Dr. Haneesh Kesari[1] (1. Brown University)

Continued from **Sunday, 13 October**

Correlating Interfacial Fracture Toughness to Surface Roughness in Polymer-Based Interfaces

» Dr. Denizhan Yavas[1], Prof. Ashraf Bastawros[1] (1. Iowa State University)

2:30pm

I.3.5.A -

Imaging and image analysis for mechanics

Seigle Hall L004

Chaired by: Prof. Yuan Feng and Dr. Gang Xu

KEYNOTE: Transformation Elastography: Reconstruction by spatial distortion

» Ms. Martina Guidetti[1], Mr. Harish Palnitkar[1], Prof. Dieter Klatt[1], Prof. Thomas Royston[1] (1. University of Illinois at Chicago)

Poroelastic Magnetic Resonance Elastography in the Presence of Interstitial Fluid Movement

» Prof. Matthew McGarry[1], Prof. John Weaver[2], Prof. Keith Paulsen[1] (1. Dartmouth College, 2. Dartmouth-Hitchcock Medical Center)

Estimation of anisotropic material properties by MRI of ultrasound-induced waves

» Dr. Charlotte Guertler[1], Dr. Ruth Okamoto[1], Prof. Joel Garbow[1], Dr. Hong Chen[1], Prof. Philip Bayly[1] (1. Washington University in St. Louis)

Whole-Brain, High-Resolution Imaging of Brain Viscoelasticity with MR Elastography

» Dr. Curtis Johnson[1], Mr. Alexander Cerjanic[2], Dr. Bradley Sutton[2], Dr. Matthew McGarry[3] (1. University of Delaware, 2. University of Illinois at Urbana-Champaign, 3. Dartmouth College)

In vivo contrast-enhanced microCT for the monitoring of mouse thoracic, lumbar, and coccygeal intervertebral discs

» Ms. Remy Walk[1], Dr. Simon Tang[1] (1. Washington University in St. Louis)

2:30pm

I.3.1.A -

Advanced biomaterials for nerve engineering and repair

Seigle Hall 205

Chaired by: Prof. Mikhail Berezin and Prof. Matthew Wood

KEYNOTE: Directed and enhanced neurite outgrowth following exogenous electrical stimulation on carbon nanotube-hydrogel composites

» Dr. Silviya Zustiak[1], Dr. Mozhdeh Imaninezhad[1], Mr. Kyle Pemberton[1], Dr. Fenglian Xu[1], Dr. Kristin Kalinowski[1] (1. Saint Louis University)

Integrating Advanced 3D/4D Bioprinting with Nanobiomaterials for Neural Tissue Engineering

» Mr. Se-jun Lee[1], Mr. Timothy Esworthy[1], Dr. Shida Miao[1], Dr. Haitao Cui[1], Dr. Lijie Grace Zhang[1] (1. The George Washington University)

Rapid Prototyping of Microphysiological Models of the Gut-Brain-Axis

» Prof. Abigail Koppes[1] (1. Northeastern University)

T cell contributions to nerve regeneration across bioengineered materials

» Mr. Deng Pan[1], Mr. Daniel Hunter[1], Ms. Lauren Schellhardt[1], Prof. Anja Fuchs[1], Dr. Haiying Zhou[1], Dr. Sally Jo[1], Dr. Katherine Santosa[2], Prof. Alison Snyder[1], Prof. Mikhail Berezin[1], Prof. Susan Mackinnon[1], Prof. Matthew Wood[1] (1. Washington University in St. Louis, 2. University of Michigan)

2:30pm

I.8.4.A -

Theory and simulation of nanomaterials

Seigle Hall 103

Chaired by: Dr. Swarnava Ghosh

KEYNOTE: Fast, accurate and scalable large-scale DFT calculations using DFT-FE

» Dr. Phani Motamarri[1], Mr. Sambit Das[1], Prof. Vikram Gavini[1] (1. University of Michigan)

Continued from **Sunday, 13 October**

A WENO Finite-Difference Scheme for a New Class of Hamilton-Jacobi Equations in Nonlinear Solid Mechanics
» Prof. Victor Lefevre[1], Prof. Oscar Lopez-Pamies[2] (1. Northwestern University, 2. University of Illinois at Urbana-Champaign)

Atomistic study of carbon assisted hydrogen enhanced localized plasticity in BCC Fe
» Mr. Zhi Li[1], Prof. Huajian Gao[1] (1. Brown University)

First Principles Simulations of Helical Objective Structures
» Prof. Amartya Banerjee[1] (1. University of California, Los Angeles)

Nudged elastic band method for solid-solid transition under finite deformation
» Mr. Arman Ghasemi[1], Prof. Wei Gao[1] (1. University of Texas at San Antonio)

2:30pm **I.3.6.A -**
Mechanics of growth, morphogenesis and evolution of biological solids
Seigle Hall 304
Chaired by: Dr. Franck Vernerey

KEYNOTE: How Nature Constructs a Looped Heart
» Prof. Larry Taber[1] (1. Washington University in St. Louis)

Joint morphogenesis mechanobiology: experiments and modeling of limb regeneration in an axolotl
» Dr. Ester Comellas[1], Dr. Johanna Farkas[1], Prof. James R Monaghan[1], Prof. Sandra J Shefelbine[1] (1. Northeastern University)

Geometric and mechanical factors regulate the torsion in early chick embryonic brain development
» Mr. Hao Zhang[1], Ms. Hannah Grover[1], Mr. Shicheng Huang[1], Dr. Wei Zeng[1], Mr. Guangchao Wan[1], Prof. Zi Chen[1] (1. Dartmouth College)

Mechanomorphogenesis of bacterial biofilms
» Dr. Jing Yan[1] (1. Yale University)

Mechanical principles of biofilm morphodynamics
» Mr. Chenyi Fei[1], Dr. Sheng Mao[1], Dr. Jing Yan[1], Dr. Ricard Alert[1], Prof. Howard Stone[1], Prof. Bonnie Bassler[1], Prof. Ned Wingreen[1], Dr. Andrej Kosmrlj[1] (1. Princeton University)

2:30pm **I.9.4.A -**
Controlling mechanical waves with metamaterials
Seigle Hall 104
Chaired by: Prof. Kathryn Matlack and Dr. Ramathasan Thevamaran

KEYNOTE: General nonlinear dispersion relation for elastic waves and beyond
» Prof. Mahmoud Hussein[1] (1. University of Colorado Boulder)

Nontrivial topological bandgaps and edge-localized states in quasi-periodic locally resonant metastructures
» Ms. Yiwei Xia[1], Prof. Alper Erturk[1], Prof. Massimo Ruzzene[1] (1. Georgia Institute of Technology)

On the Properties of Phononic Eigenvalue Problems
» Mr. Amir Ashkan Mokhtari[1], Prof. Ankit Srivastava[1] (1. Illinois Institute of Technology)

Spectral extended finite element method for band-structure calculations in phononic crystals
» Mr. Eric Chin[1], Mr. Amir Ashkan Mokhtari[2], Prof. Ankit Srivastava[2], Prof. N. Sukumar[1] (1. University of California, Davis, 2. Illinois Institute of Technology)

Bistable-induced tunable phononic bandgaps in low frequencies
» Dr. Yangbo Li[1], Mr. Yan Shen[1], Mr. Zhihao Xiong[1], Mr. Xiaoshun Zhang[1] (1. China Three Gorges University)

Continued from **Sunday, 13 October**

2:30pm **I.3.9.A -**

Multiscale modeling of molecular, cellular, tissue, and organ mechanics

Seigle Hall L003

Chaired by: Dr. Ying Li

KEYNOTE: Multiscale modeling of valve interstitial cells in a three-dimensional hydrogel environment

» Dr. Emma Lejeune[1], Mr. Alex Khang[1], Prof. Michael Sacks[1] (1. University of Texas at Austin)

KEYNOTE: Fluid-Structure Interaction Analysis of Transcatheter Heart Valve Mechanics

» Prof. Ming-Chen Hsu[1], Dr. Michael Wu[2], Ms. Heather Muchowski[1], Ms. Emily Johnson[1], Mr. Manoj Rajanna[1], Prof. Michael Sacks[3] (1. Iowa State University, 2. Brown University, 3. University of Texas at Austin)

Electro-mechanical Modeling of Uterine Contractions and Oxytocin Effect During Pregnancy

» Mr. Yiqi Lin[1], Dr. Mengxue Zhang[2], Dr. Patricio La Rosa[2], Prof. Arye Nehorai[1] (1. Washington University in St. Louis, 2. Bayer Company)

A Nonlinear Viscoelastic Material Model for Human Cervical Tissue Characterized with Spherical Indentation

» Mr. Lei Shi[1], Prof. Kristin Myers[1] (1. Columbia University)

2:30pm **I.4.1.A -**

Biological and bio-inspired fluid mechanics

Seigle Hall 301

Chaired by: Prof. Hassan Masoud

KEYNOTE: A discrete geometric approach to simulation of bioinspired soft robots

» Prof. Mohammad Khalid Jawed[1], Mr. Weicheng Huang[1], Mr. Xiaonan Huang[2], Ms. Yayun Du[1], Ms. Jacqueline Lam[1], Mr. Karunesh Sachanandani[1], Mr. Andrew Miller[1] (1. University of California, Los Angeles, 2. Carnegie Mellon University)

Spatiotemporal Dynamics and Transport Properties of Constrained Active Elastic Filaments

» Mr. Anupam Mishra[1], Ms. Deniz Akpinaroglu[1], Prof. Arvind Gopinath[1] (1. University of California, Merced)

Deformations in the hook and flagellum during bacterial run-reverse-flick motility

» Mr. Mehdi Jabbarzadeh[1], Prof. Henry Fu[1] (1. University of Utah)

KEYNOTE: Self-learning how to swim at low Reynolds numbers

» Dr. Alan Cheng Hou Tsang[1], Dr. Pun Wai Tong[2], Mr. Grant Mishler[3], Mr. Shreyes Nallan[3], Prof. On Shun Pak[3] (1. Stanford University, 2. Stanford Healthcare, 3. Santa Clara University)

2:30pm **I.7.5.A -**

Mechanics of fiber networks and fibrous biological systems

Simon Hall 017

Chaired by: Prof. Ioannis Chasiotis

KEYNOTE: A minimal micromechanical model for the viscoelasticity in biophysical filamentous networks

» Mr. Arjan Boerma[1], Prof. Patrick Onck[1], Prof. Erik Van der Giessen[1], Prof. Stefanos Papanikolaou[2] (1. University of Groningen, 2. West Virginia University)

Mechanics of random fiber networks with inter-fiber adhesion

» Prof. Catalin Picu[1], Mr. Vineet Negi[1], Dr. Ahmed Sengab[1] (1. Rensselaer Polytechnic Institute)

Continued from **Sunday, 13 October**

Adhesion at Fiber-to-Fiber Nanoscale Contacts during Normal and Sliding Detachment
» Dr. Debashish Das[1], Prof. Ioannis Chasiotis[1] (1. University of Illinois at Urbana-Champaign)

Cohesive and adhesive properties of crosslinked semiflexible biopolymer networks
» Prof. Sinan Keten[1] (1. Northwestern University)

Emergence of tissue-like mechanics from fibrous networks confined by close-packed cells
» Prof. Vivek Shenoy[1] (1. University of Pennsylvania)

2:30pm **I.9.2.A -**
Mechanical metamaterials
Seigle Hall 109
Chaired by: Dr. Johannes Overvelde

KEYNOTE: A New Twist of Metamaterials: Programming Properties by Establishing and Breaking Symmetries
» Prof. Jeffrey Lipton[1] (1. University of Washington)

Modular Mechanism based Programmable Metamaterial
» Ms. Yunfang Yang[1], Dr. Zhong You[1] (1. University of Oxford)

Helical Miura Origami
» Dr. Paul Plucinsky[1], Dr. Fan Feng[1], Prof. Richard James[1] (1. University of Minnesota)

Flexoelectric metamaterials
» Prof. Irene Arias[1], Ms. Alice Mocci[1], Dr. Amir Abdollahi[1] (1. Universitat Politècnica de Catalunya)

2:30pm **I.4.2.A -**
Flow and Transport in Porous Media
Simon Hall 020
Chaired by: Dr. Wen Deng and Prof. Jing Fan

KEYNOTE: In a tight spot: Heterogeneous transport in porous media
» Prof. Sujit Datta[1] (1. Princeton University)

A Deformable Poroelastic Particle in Linear Flows
» Prof. Yuan Young[1], Prof. Yoichiro Mori[2], Prof. Michael Miksis[3] (1. New Jersey Institute of Technology, 2. University of Minnesota, 3. Northwestern University)

Mechanistic Delineation of Reactive Transport in Carbonate Porous Media and its Impact on CO2 Storage Security
» Prof. Wen Song[1], Dr. Folake Ogunbanwo[2], Dr. Marianne Steinsbo[3], Prof. Martin Ferno[3], Prof. Anthony R. Kovscek[2] (1. University of Texas at Austin, 2. Stanford University, 3. University of Bergen)

Bayesian Inference of Fault Properties in Two-phase Porous Media Flow
» Dr. Eldar Khattatov[1], Dr. Umberto Villa[2], Dr. Tan Bui-Thanh[1], Dr. Omar Ghattas[1] (1. University of Texas at Austin, 2. Washington University in St. Louis)

2:30pm **I.9.1.A -**
3D/4D printed functional materials and structures: 3D printing of functional materials
Seigle Hall 208
Chaired by: Prof. Howon Lee and Prof. Qiming Wang

KEYNOTE: Ferromagnetic Soft Robots: Modeling, Printing and Applications
» Dr. Xuanhe Zhao[1] (1. Massachusetts Institute of Technology)

3D Printing of Polytetrafluoroethylene with Direct Ink Writing
» Mr. Zhuoran Jiang[1], Dr. Ozan Erol[1], Ms. Devina Chatterjee[1], Prof. Narutoshi Hibino[1], Prof. Lewis Romer[1], Prof. Sung Hoon Kang[1], Prof. David Gracias[1] (1. Johns Hopkins University)

Continued from **Sunday, 13 October**

3D Printing of Functional Liquid Metals
» Prof. Michael Dickey[1], Prof. Jacob Adams[1], Mr. Vivek Bharambe[1], Dr. Dishit Parekh[1], Mr. Taylor Neumann[1], Dr. Alex Cook[2], Dr. Christopher Tabor[2] (1. North Carolina State University, 2. Air Force Research Laboratory)

3D Printing of Continuous Fiber - Reinforced Thermoset Composites
» Prof. Kai Yu[1], Mr. Xu He[1] (1. University of Colorado Denver)

Grayscale Digital Light Processing 3D printing for Highly Functional Graded Materials
» Dr. Xiao Kuang[1], Mr. Stuart Montgomery[1], Mr. Qiang Zhang[1], Prof. Hang Qi[1] (1. Georgia Institute of Technology)

2:30pm **I.8.3.A -**
Mechanics of nanomaterials and nanocomposites
Seigle Hall L002
Chaired by: Prof. Xiaoyan Li and Dr. Wendy Gu

KEYNOTE: Experimental molecular dynamics on deformation of single lattice pillar
» Prof. Scott Mao[1] (1. University of Pittsburgh)

Fracture of three-dimensional nano to microscale lattice architectures
» Mr. Bryce Edwards[1], Prof. Julia Greer[1] (1. California Institute of Technology)

Hardening in Au-Ag Nanoboxes from Stacking Fault-Dislocation Interactions
» Ms. Radhika Patil[1], Mr. David Doan[1], Dr. Zachary Aitken[2], Mr. Shuai Chen[2], Mr. Mehrdad Kiani[1], Dr. Christopher Barr[3], Dr. Khalid Hattar[3], Dr. Yong-Wei Zhang[2], Dr. Wendy Gu[1] (1. Stanford University, 2. Institute of High Performance Computing, A*STAR, 3. Sandia National Laboratories)

On Deformation Stability of Nanotwinned Materials
» Prof. Shailendra Joshi[1] (1. University of Houston)

2:30pm **I.7.3.A -**
Mechanics and physics of soft materials
Simon Hall 001

Mechanics of a polymer brush
» Dr. Manav Manav[1], Prof. Mauricio Ponga[1], Prof. A. Srikantha Phani[1] (1. University of British Columbia)

Hydrophobic Hydrogels
» Prof. Wei Hong[1], Dr. Hui Guo[2], Prof. Jian-Ping Gong[3] (1. Southern University of Science and Technology, 2. Sun Yat-sen University, 3. Hokkaido University)

Contraction-induced solvent release in active polymer gels
» Prof. Luciano Teresi[1], Prof. Paola Nardinocchi[2], Dr. Michele Curatolo[2] (1. Università di RomaTre, 2. Sapienza Università di Roma)

Molecular source of ratcheting in polydisperse polycarbonate
» Mr. Zesheng Zhang[1], Prof. Mehrdad Negahban[1] (1. University of Nebraska-Lincoln)

Diffusion of particles through soft networks with reversible binding
» Mr. Shankar Lalitha Sridhar[1], Mr. Kanghyeon Koo[1], Dr. Loren Hough[1], Dr. Franck Vernerey[1] (1. University of Colorado Boulder)

Extreme Tailorability of Soft Slender Substrates Using Biomimetic Scales
» Dr. Ranajay Ghosh[1] (1. University of Central Florida)

2:30pm **I.7.9.A -**
Multiscale mechanics of porous and nanostructured materials
Seigle Hall 204
Chaired by: Prof. Wenjie Xia and Prof. Anna Tarakanova

Continued from **Sunday, 13 October**

Single Chain Polymer Nanoparticle Assemblies – Manipulating Bulk Polymer Properties by Tailoring Intra and Intermolecular Interactions

» Dr. Meredith Silberstein[1], Mr. Suwon Bae[1], Ms. Or Galant[2], Prof. Charles Diesendruck[2] (1. Cornell University, 2. Technion-Israel Institute of Technology)

Effects of Fibrous Network Morphology and Crystallinity on Mechanical Behavior of Non-woven Nanocellulose Paper

» Prof. Xiangiao Wang[1], Mr. Nicholas Winter[1] (1. University of Georgia)

Tailoring Thermomechanical Properties and Moisture Responsiveness of Cellulose-Based Nanocomposites Using Direct Polymer Grafting

» Dr. Robert Sinko[1] (1. Northern Illinois University)

Nanoconfinement and Interfaces in Polymer Materials

» Prof. Wenjie Xia[1] (1. North Dakota State University)

Epoxy resins and nanocomposites by design for impact-resistant applications

» Prof. Zhaoxu Meng[1], Prof. Sinan Keten[2] (1. Clemson University, 2. Northwestern University)

Engineering elasticity inspired by natural biopolymers

» Prof. Anna Tarakanova[1] (1. University of Connecticut)

2:30pm **I.5.2.A -**

Deformation, strength, and resilience of structures

Simon Hall 023

Chaired by: Dr. Anthony Paris and Dr. Jeffry Sundermeyer and Dr. Catherine Ambrose

TRACK PLENARY: Magnetic Shape Memory: An Engineering Paradigm

» Dr. Peter Mullner[1] (1. Boise State University)

TRACK PLENARY: Thermo-mechanical stability of metallic multilayer thin films

» Dr. Zhou Yang[1], Prof. Junlan Wang[1] (1. University of Washington)

TRACK PLENARY: Hydrogen Embrittlement: From Experiments and Modeling to Prognosis

» Prof. Petros Sofronis[1], Ms. Zahra Hosseinisarani[1], Dr. Mohsen Dadfarnia[2], Prof. Masanobu Kubota[3], Dr. Akihide Nagao[4], Dr. Brian Somerday[5], Prof. Robert Ritchie[6] (1. University of Illinois at Urbana-Champaign, 2. Seattle University, 3. Kyushu University, 4. JFE Steel Corporation, 5. Southwest Research Institute, 6. University of California, Berkeley)

3:30pm **Coffee Break**

4:15pm **Session II**

4:15pm **II.7.6.B -**

Mechanics of interfacial adhesion across diverse scales and applications

Seigle Hall 206

Chaired by: Dr. Denizhan Yavas

Investigation of interfacial damage in particulate reinforced composites using X-ray microtomography and digital volume correlation

» Mr. Manue Martinez[1], Dr. Joanna Li-Mayer[2], Dr. Maria Charalambides[2], Prof. John Lambros[1] (1. University of Illinois at Urbana-Champaign, 2. Imperial College of Science, Technology, and Medicine)

A Discrete, Functionally-Graded Shear Lag Model Demonstrating the Effect of Ductile Reinforcement Spacing on Attachment Strength

» Mr. Ethan Hoppe[1], Ms. Iden Kurtaliaj[2], Dr. Victor Birman[3], Dr. Stavros Thomopoulos[2], Prof. Guy Genin[1] (1. Washington University in St. Louis, 2. Columbia University, 3. Missouri University of Science and Technology)

Continued from **Sunday, 13 October**

Controlled motion of a peeling arch on an adhesive substrate
» Ms. Zoe Lemon[1], Prof. Tal Cohen[1] (1. Massachusetts Institute of Technology)

Static and Fatigue Failure Mechanisms in Cross-Ply Curved Laminates
» Prof. Demirkan Coker[1], Ms. Burcu Tasdemir[1] (1. Middle East Technical University)

Coarse-grained Simulations of Water Freezing on Graphite and the Ice-Graphite Interface Fracture
» Mr. Hang Li[1], Mr. Yipeng Peng[1], Prof. Liming Xiong[1] (1. Iowa State University)

Characterization of Ice Adhesion Using Single Cantilever Beam Test
» Mr. Bishoy Dawood[1], Mr. Christopher Giuffre[1], Dr. Denizhan Yavas[1], Prof. Ashraf Bastawros[1] (1. Iowa State University)

4:15pm **II.3.5.B -**
Imaging and image analysis for mechanics
Seigle Hall L004
Chaired by: Dr. Songbai Ji and Dr. Curtis Johnson

Extract information from clinical data by simulation using the immersed boundary method
» Dr. Wenjun Kou[1], Mr. Shashank Acharya[1], Mr. Sourav Halder[1], Prof. Neelesh Patankar[1], Prof. John Pandolfino[1] (1. Northwestern University)

Identifiability of ligament material properties with full-field inverse methods
» Ms. Callan Luetkemeyer[1], Mr. Ryan Rosario[1], Dr. Jonathan Estrada[1], Dr. Ulrich Scheven[1], Prof. Ellen Arruda[1] (1. University of Michigan)

Displacement-encoded Magnetic Resonance for Soft Material Characterization
» Prof. Jonathan Estrada[1], Ms. Callan Luetkemeyer[1], Dr. Ulrich Scheven[1], Prof. Ellen Arruda[1] (1. University of Michigan)

KEYNOTE: Understanding Traumatic Brain Injury with a Non-injurious MRI Model
» Dr. Dzung Pham[1], Dr. Andrew Knutsen[1], Dr. Lawrence Latour[2], Prof. Philip Bayly[3], Dr. John Butman[4] (1. Henry M. Jackson Foundation for the Advancement of Military Medicine, 2. National Institute of Neurological Disorders and Stroke, 3. Washington University in St. Louis, 4. National Institutes of Health)

KEYNOTE: Lamb wave propagation in human skull: Analysis of leaky modes and equivalent properties
» Dr. Christopher Sugino[1], Prof. Massimo Ruzzene[1], Prof. Alper Erturk[1] (1. Georgia Institute of Technology)

4:15pm **II.3.4.A -**
Engineering tools to model altered soft tissue mechanics
Seigle Hall 205
Chaired by: Dr. Gretchen Meyer and Dr. Silviya Zustiak

KEYNOTE: Understanding and Exploiting Cancer Mechanobiology
» Prof. Adam Engler[1] (1. University of California, San Diego)

Skeletal Muscle Stiffness is Regulated by Collagen Architecture
» Ms. Sarah Brashear[1], Dr. Elisabeth Barton[2], Dr. Lucas R Smith[1] (1. University of California, Davis, 2. University of Florida)

Multidimensional matrix confinement tools for nuclear and cytoskeletal mechanobiology
» Dr. Andrew Holle[1], Prof. Yu Suk Choi[2], Prof. Ralf Kemkemer[3], Prof. Joachim Spatz[1] (1. Max Planck Institute for Medical Research, 2. University of Western Australia, 3. Reutlingen University)

Evaluating in situ extracellular matrix strain under tension
» Ms. Andrea Acuna[1], Mr. Julian Jimenez[1], Dr. Sarah Calve[1] (1. Purdue University)

Continued from **Sunday, 13 October**

4:15pm **II.8.4.B -**
Theory and simulation of nanomaterials
Seigle Hall 103
Chaired by: Prof. Amartya Banerjee

KEYNOTE: Interactions and assembly of inclusions on lipid membranes
» Prof. Prashant Purohit[1], Mr. Xinyu Liao[1] (1. University of Pennsylvania)

Atomistic Simulations on Fracture Behaviours and Mechanisms of Nanotwinned Materials
» Prof. Xiaoyan Li[1] (1. Tsinghua University)

Exploiting Twins in 2D Materials for Tunable Electronic Properties
» Mr. David Rojas[1], Dr. Dingyi Sun[2], Prof. Mauricio Ponga[1] (1. University of British Columbia, 2. Brown University)

Engineering Zero-Dimensional Quantum Confinement in Transition Metal Dichalcogenide Heterostructures
» Mr. Nathan Frey[1], Mr. Chris Price[1], Prof. Deep Jariwala[1], Prof. Vivek Shenoy[1] (1. University of Pennsylvania)

Energy Renormalization for Coarse-Grained Modeling of Polymers
» Prof. Wenjie Xia[1] (1. North Dakota State University)

4:15pm **II.3.6.B -**
Mechanics of growth, morphogenesis and evolution of biological solids
Seigle Hall 304
Chaired by: Prof. Zi Chen

KEYNOTE: Mechanical forces in lung development
» Prof. Celeste M. Nelson[1] (1. Princeton University)

Ectopic sources of FGF-10 promote epithelial buckling and the formation of supernumerary branches in cultured embryonic lung explants
» Prof. Victor Varner[1], Ms. Kara Peak[1] (1. University of Texas at Dallas)

Mechanical model of branching morphogenesis during lung development
» Dr. Andrej Kosmrlj[1], Ms. Katharine Goodwin[1], Dr. Sheng Mao[1], Mr. Tristan Guyomar[2], Prof. Celeste M. Nelson[1] (1. Princeton University, 2. Ecole Normale Superieure de Lyon)

Flower inspiration: Iridescence through hierarchical wrinkles in soft multilayers
» Dr. Chao Chen[1], Dr. Chiara Airoldi[2], Dr. Carlos Lugo[2], Prof. Beverley Glover[2], Prof. Alfred Crosby[1] (1. University of Massachusetts Amherst, 2. University of Cambridge)

Wrinkles on tori
» Ms. Xiaoxiao Zhang[1], Prof. Patrick Mather[2], Prof. Mark Bowick[3], Dr. Teng Zhang[1] (1. Syracuse University, 2. Bucknell University, 3. University of California, Santa Barbara)

4:15pm **II.9.4.B -**
Controlling mechanical waves with metamaterials
Seigle Hall 104
Chaired by: Dr. Ramathasan Thevamaran and Prof. Kathryn Matlack

KEYNOTE: Valley-Hall Junctions for Structural Logic Circuits
» Dr. Jihong Ma[1], Prof. Kai Sun[2], Prof. Stefano Gonella[1] (1. University of Minnesota, 2. University of Michigan)

Nonlinearly Tunable Linear Dynamic Response of Vertically Aligned Carbon Nanotube Foams
» Mr. David Murgado[1], Dr. Ramathasan Thevamaran[1] (1. University of Wisconsin-Madison)

Vibration mitigation in tunable micro-architected materials
» Mr. Carlos Portela[1], Prof. Chiara Daraio[1], Prof. Dennis Kochmann[2], Prof. Julia Greer[1] (1. California Institute of Technology, 2. ETH Zurich)

Continued from **Sunday, 13 October**

Lightweight architected hollow sphere foams for simultaneous noise and vibration
» Prof. Yanyu Chen[1], Mr. Huan Jiang[1] (1. University of Louisville)

Patterning of cell populations via strain-cued solitary waves
» Dr. Brian Cox[1] (1. Independent Scholar)

4:15pm **II.3.9.B -**
Multiscale modeling of molecular, cellular, tissue, and organ mechanics
Seigle Hall L003
Chaired by: Prof. George Lykotrafitis

KEYNOTE: The Roles of Surface Tension in Cellular Force Generation and Transmission, Normal Development and Diseases
» Prof. Sulin Zhang[1], Mr. Tiankai Zhao[1], Mr. Xuechen Shi[1] (1. The Pennsylvania State University)

Dynamic Mechanisms of Rupture Formation in the Cell Cortex
» Ms. Wonyeong Jung[1], Mr. Jacob Thomas[1], Prof. Taeyoon Kim[1] (1. Purdue University)

Using Spatial Statistical Modeling and Virtual Cells to Quantify the Morphological Variation in Endothelial Monolayers
» Mr. William Bachman[1], Dr. David Long[1] (1. Wichita State University)

Modeling "Phase Transitions" in Collective Cell Migration
» Ms. Zigian Wu[1], Ms. Catalina-Paula Spatarelu[1], Prof. Dung Nguyen[2], Mr. Calin Mocanu[3], Mr. Hao Zhang[1], Prof. Zi Chen[1] (1. Dartmouth College, 2. Seattle Pacific University, 3. Independent Scholar)

Effects of heterogeneity on stress fields in multicellular systems
» Mr. Zachary Goldblatt[1], Ms. Habibeh Ashouri[1], Dr. Heather Cirka[1], Mr. Will Linthicum[1], Ms. Vivian Liang[1], Prof. Dannel McCollum[2], Prof. Kristen Billiar[1], Prof. Nima Rahbar[1] (1. Worcester Polytechnic Institute, 2. University of Massachusetts Medical School)

4:15pm **II.7.8.A -**
Multiscale and multiphysics modeling of dissipative materials
Seigle Hall 208
Chaired by: Prof. Maryam Shakiba and Dr. Trisha Sain

Multiphysics modeling of deterioration and deformation in glass/ polymer composites
» Dr. Zhiye Li[1], Prof. Michael Lepech[1] (1. Stanford University)

A Finite Strain Constitutive Model for Polycrystalline Shape Memory Alloys accounting for Pseudoelasticity, One Way Shape Memory Effect, Orientation, Reorientation, "Ferroelasticity", and Latent Heat Effects
» Dr. Theocharis Baxevanis[1], Ms. Mengqian Zhang[1] (1. University of Houston)

Experimental and numerical modeling of the fracture behavior of semicrystalline polymers
» Mr. Jeff Wiersma[1], Dr. Trisha Sain[1] (1. Michigan Technilogical University)

Resilient Composite Sandwich Structures with Architected Core
» Mr. Vinay Damodaran[1], Ms. Kelsey Hacker[1], Dr. Pavana Prabhakar[1] (1. University of Wisconsin-Madison)

Capturing Chemo-Mechanical Coupled Response in Solid-Fluid Systems: Mixture Theory Model and Stabilized FEM Implementation with Application to Thermal Oxidation of SiC
» Mr. Marcelino Anguiano[1], Prof. Arif Masud[1], Mr. Harishanker Gajendran[1] (1. University of Illinois at Urbana-Champaign)

Continued from **Sunday, 13 October**

Effect of porosity on coupled moisture-mechanical damage of heterogeneous viscoelastic materials

» Mr. Aimane Najmeddine[1], Prof. Maryam Shakiba[1] (1. Virginia Tech)

4:15pm **II.7.5.B -**

Mechanics of fiber networks and fibrous biological systems

Simon Hall 017

Chaired by: Dr. Debashish Das

KEYNOTE: Imaging and analysis of a three-dimensional spider web and application in sonification

» Prof. Markus Buehler[1], Ms. Isabelle Su[1], Mr. Tomás Saraceno[2], Mr. Adrian Krell[2], Mr. Roland Mühlethaler[2], Ms. Ally Bisshop[2], Prof. Evan Ziporyn[1], Dr. Zhao Qin[3] (1. Massachusetts Institute of Technology, 2. Saraceno Studios, 3. Syracuse University)

High-speed polarization imaging of dynamic collagen fiber realignment

» Dr. Xianyu Wu[1], Prof. Mark Pankow[1], Prof. Hsiao-Ying Shadow Huang[1], Dr. Takashi Onuma[2], Prof. Kara Peters[1] (1. North Carolina State University, 2. Photron Limited)

Evaluating quantitative polarized light imaging signal in both reflectance and transmission modes under varying light intensities

» Ms. Leanne Iannucci[1], Prof. Spencer Lake[1] (1. Washington University in St. Louis)

Mechanical structure function properties and fracture toughness of Articular Cartilage modeled as a biopolymer double network

» Mr. Leo Sutter[1], Mr. Andrew Sindermann[1], Ms. Pancy Lwin[1], Dr. Lena Bartell[2], Mr. Thomas Jackson[2], Dr. Lawrence Bonassar[2], Dr. Itai Cohen[2], Dr. Moumita Das[1] (1. Rochester Institute of Technology, 2. Cornell University)

Effects of the fiber network generation algorithm on their nonaffine mechanical response

» Prof. Hamed Hatami-Marbini[1] (1. University of Illinois at Chicago)

4:15pm **II.9.2.B -**

Mechanical metamaterials

Seigle Hall 109

Chaired by: Dr. Johannes Overvelde and Prof. Sung Hoon Kang

KEYNOTE: Functional Kirigami Mechanical Metamaterials for Actuators, Muscles, and Grippers

» Prof. Douglas Holmes[1], Mr. Yi Yang[1], Prof. Marcelo A. Dias[2] (1. Boston University, 2. Aarhus University)

Origami-Inspired, On-Demand Deployable and Collapsible Mechanical Metamaterials with Tunable Stiffness

» Prof. Hanqing Jiang[1], Mr. Zirui Zhai[1], Prof. Yong Wang[2] (1. Arizona State University, 2. Zhejiang University)

Inflatable Origami-Inspired Deployable Structures

» Mr. David Melancon[1], Dr. Benjamin Gorissen[1], Dr. Jason Ku[2], Prof. Erik Demaine[2], Mr. Chuck Hoberman[1], Prof. Katia Bertoldi[1] (1. Harvard University, 2. Massachusetts Institute of Technology)

Origami-inspired architected materials for adaptive overflow control system

» Mr. Chunping Ma[1], Mr. Benjamin Luce[1], Ms. Yan Long[1], Ms. Liz Morales[1], Prof. Nan Hu[1] (1. The Ohio State University)

4:15pm **II.3.8.A -**

Mechanobiology of Chronic Disease

Simon Hall 020

Chaired by: Dr. Adele Doyle

Mechanisms of arterial stiffening with age and atherosclerosis

» Dr. Richard Assoian[1], Dr. Elizabeth Hawthorne[1], Dr. Paola Castagnino[1], Dr. Ian Roberts[1], Dr. Tina Xu[1] (1. University of Pennsylvania)

Continued from **Sunday, 13 October**

Longer collagen fibers enable persistent collective epithelial cell streaming on soft substrates via mechanoactivation and cell-cell cooperation

» Dr. Bapi Sarker[1], Mr. Amrit Bagchi[1], Mr. Christopher Walter[1], Dr. Amit Pathak[1] (1. Washington University in St. Louis)

Numerical and Experimental Determination of Mechanisms of Mechanical Activation of PIEZO Ion Channels

» Mr. Alireza Savadipour[1], Dr. Robert Nims[1], Ms. Neda Rashidi[1], Prof. Farshid Guilak[1] (1. Washington University in St. Louis)

Intramuscular Adipose Tissue Impairs Skeletal Muscle Force Production

» Ms. Nicole Biltz[1], Dr. Charles Harris[2], Dr. Gretchen Meyer[2] (1. Northwest Rehabilitation Associates, 2. Washington University in St. Louis)

Systematic Comparison of Mechanosignaling of Common Chronic Diseases

» Mr. Weiqing Qi[1], Mr. Robert Stegman[1], Ms. Delanee Stapp[1], Dr. Adele Doyle[1] (1. University of California, Santa Barbara)

4:15pm

II.5.3.A -

Machine learning in mechanics and materials

Seigle Hall 106

Chaired by: Dr. Zhao Qin

Smart Constitutive Laws: Homogenizing Nonlinear and History Dependent Microstructures Through Machine Learning

» Prof. Julian Rimoli[1], Dr. German Capuano[1], Mr. Hernan Logarzo[1] (1. Georgia Institute of Technology)

KEYNOTE: Extreme architecture materials designed by machine learning

» Dr. Xuanhe Zhao[1] (1. Massachusetts Institute of Technology)

Generative Adversarial Networks for Material Design of Bio-Inspired Microstructure

» Mr. Michael Hsu[1], Mr. Sung-Lin Tsai[1], Mr. Jyun-Ping Wang[1], Prof. Po-Yu Chen[2], Prof. Shu-Wei Chang[3], Prof. Chuin-Shan Chen[1] (1. National Taiwan University, 2. National Tsing Hua University, 3. National Taiwan Unversity)

KEYNOTE: Inverse Design of Stretchable Graphene Kirigami using Machine Learning

» Dr. Paul Hanakata[1], Dr. Ekin Cubuk[2], Prof. David Campbell[1], Prof. Harold Park[1] (1. Boston University, 2. Google Brain)

4:15pm

II.8.3.B -

Mechanics of nanomaterials and nanocomposites

Seigle Hall L002

Chaired by: Dr. Wendy Gu and Prof. Xiaoyan Li

KEYNOTE: In-Situ Nanoscale Mechanical Characterization under Monotonic and Cyclic Loading

» Prof. Ming Dao[1] (1. Massachusetts Institute of Technology)

Nano Indentation of Hydrogen-Terminated Amorphous Silicon Particles

» Prof. Kenneth Liechti[1], Mr. Taizhi Jiang[1], Prof. Korgel Brian[1] (1. University of Texas at Austin)

Size effects in single-crystal silver nano-cubes

» Ms. Claire Griesbach[1], Prof. Seog-Jin Jeon[2], Dr. Ramathasan Thevamaran[1] (1. University of Wisconsin-Madison, 2. Kumoh National Institute of Technology)

Effect of polymer characteristics on mechanical properties of hairy nanoparticle assemblies

» Mr. Nitin Krishnamurthy Hansoge[1], Prof. Sinan Keten[1] (1. Northwestern University)

Deconvolution of Structural Effects in the Determination of Local Mechanical Properties from Atomic Force Microscopy

» Mr. David Collinson[1], Mr. Matthew Eaton[1], Prof. Kenneth Shull[1], Prof. L. Catherine Brinson[2] (1. Northwestern University, 2. Duke University)

Continued from **Sunday, 13 October**

4:15pm **II.7.3.B -**
Mechanics and physics of soft materials
Simon Hall 001
Chaired by: Dr. Shawn Chester

Anti-fatigue-fracture hydrogels
» Mr. Shaoting Lin[1], Dr. Xuanhe Zhao[1] (1. Massachusetts Institute of Technology)

Cracking and self-healing of shrinkable, granular materials
» Prof. Sujit Datta[1] (1. Princeton University)

'Sideways' and stable crack propagation in a silicone elastomer
» Prof. Matt Pharr[1], Mr. Seunghyun Lee[1] (1. Texas A&M University)

An adaptive quasi-continuum approach for modelling fracture in polymer networks
» Mr. Ahmed Ghareeb[1], Prof. Ahmed Elbanna[1] (1. University of Illinois at Urbana-Champaign)

Strength of highly stretchable materials under tri-axial stress by Griffith approach
» Dr. Reza Pourmodheji[1], Prof. Shaoxing Qu[2], Prof. Honghui Yu[1] (1. City College of New York, 2. Zhejiang University)

Slip-resistant kirigami shoe grips
» Dr. Sahab Babaee[1], Mr. Simo Pajovic[1], Dr. Ahmad Rafsanjani[2], Prof. Katia Bertoldi[3], Prof. Giovanni Traverso[1] (1. Massachusetts Institute of Technology, 2. ETH Zurich, 3. Harvard University)

4:15pm **II.7.9.B -**
Multiscale mechanics of porous and nanostructured materials
Seigle Hall 204
Chaired by: Prof. Xianqiao Wang and Prof. Wenjie Xia and Prof. Qiming Wang

Computational design of lightweight structural materials with triply periodic minimal surfaces
» Dr. Zhao Qin[1], Prof. Markus Buehler[2] (1. Syracuse University, 2. Massachusetts Institute of Technology)

Predicting Concrete's Strength by Machine Learning
» Prof. Mathieu Bauchy[1] (1. University of California, Los Angeles)

Mechanics of onion epidermal cell walls
» Dr. Yao Zhang[1], Dr. Xuan Wang[1], Prof. Daniel J. Cosgrove[1] (1. The Pennsylvania State University)

Analytical expressions of mechanical fields for Gurson type model
» Dr. Cédric Sartori[1], Prof. Sébastien Mercier[1], Prof. Alain Molinari[1] (1. University of Lorraine)

An experimentally validated multiscale model for capturing fracture in nanocomposite anodes
» Prof. Katerina Aifantis[1], Mr. Bo Wang[1], Mr. Utkarsh Ahuja[1], Dr. Pu Hu[1] (1. University of Florida)

4:15pm **II.5.2.B -**
Deformation, strength, and resilience of structures
Simon Hall 023
Chaired by: Prof. Kyung-Suk Kim and Prof. Diana Lados

KEYNOTE: Study of Dynamic Nano-Phase Toughening in a Copolymer, the Polyurea
» Prof. Kyung-Suk Kim[1], Mr. Hanxun Jin[1], Mr. Reed Brown[1], Dr. Tong Jiao[1], Prof. Rodney Clifton[1] (1. Brown University)

KEYNOTE: Design of Cold-Spray 6061 Aluminum Alloys for Fatigue Crack Growth Resistance in Structural Components, Coatings, and Repairs
» Dr. Anastasios Gavras[1], Dr. Robert Warren[1], Dr. Victor Champagne[2], Dr. Dileep Singh[3], Prof. Diana Lados[1] (1. Worcester Polytechnic Institute, 2. U.S. Army Research Laboratory, 3. Argonne National Laboratory)

Continued from **Sunday, 13 October**

High Speed Microscopic Imaging of Initiation and Propagation of Adiabatic Shear Bands
» Mr. Pinkesh Malhotra[1], Prof. Pradeep Guduru[1] (1. Brown University)

Nonlinear augment finite element method (N-AFEM) for arbitrary evolving cracks in plates and shells at large deformation
» Dr. Liang Wang[1], Dr. Qingda Yang[1] (1. University of Miami)

6pm **Registration Closes**
Danforth University Center

6pm **MOMS Posters -**
NSF MOMS Poster Session & Reception
Whitaker Hall and Brauer Hall
Chaired by: Dr. Amit Pathak

Capturing fracture in Si/polymer anodes of Li-ion batteries
» Prof. Katerina Aifantis[1], Mr. Bo Wang[1], Mr. Utkarsh Ahuja[1], Dr. Pu Hu[1] (1. University of Florida)

Influence of Structural Disorder on Strength Response of Polysialate Composites
» Prof. Ange Therese Akono[1] (1. Northwestern University)

Enhanced Mechanical Properties of Boron Carbide through Grain Boundary Engineering
» Prof. Qi An[1], Mr. Dezhou Guo[1], Prof. Madhav Reddy[2] (1. University of Nevada, Reno, 2. Shanghai Jiao Tong University)

Fracture Mechanics of Phase-Separated Glasses by Peridynamic Simulations
» Dr. Longwen Tang[1], Prof. Mathieu Bauchy[1] (1. University of California, Los Angeles)

Investigation of Precipitation of γ" in Inconel 625 at Non-Equilibrium Thermal Conditions during Additive Manufacturing
» Dr. Yucheng Liu[1], Mr. Yenusah Caleb[1] (1. Mississippi State University)

Phase-field modelling of deformation and failure
» Prof. Lei Cao[1] (1. University of Nevada, Reno)

Adhesion at Fiber-to-Fiber Nanoscale Contacts under Normal and Sliding Forces
» Dr. Debashish Das[1], Prof. Ioannis Chasiotis[1] (1. University of Illinois at Urbana-Champaign)

Temperature in coarse grained atomistic simulation
» Prof. Youping Chen[1], Mr. Weixuan Li[1], Mr. Yang Li[1] (1. University of Florida)

Experiments and modeling the viscoelastic behavior of polymeric gels
» Dr. Shawn Chester[1], Mr. Nikola Bosnjak[1], Mr. Justin Newkirk[1] (1. New Jersey Institute of Technology)

Photo-degradation of polymeric materials
» Mr. Nikola Bosnjak[1], Ms. Maria DeOliveria[1], Dr. Shawn Chester[1] (1. New Jersey Institute of Technology)

Does diffusion describe creep relaxation in light-pressure polyacrylamide contacts?
» Mr. Christopher Johnson[1], Mr. Jiho Kim[1], Dr. Alison Dunn[2] (1. University of Illinois at Urbana-Champaign, 2. University of Illinois at Chicago)

Synergistic Modeling, Characterization, and Design of Embedded Phase Transforming Sensory Particles
» Dr. Mirmilad Mirsayar[1], Prof. Darren Hartl[1] (1. Texas A&M University)

Continued from **Sunday, 13 October**

New Insights into the Indentation Size Effect in Silicate Glasses

» Ms. Maryam Kazembeyki[1], Prof. Mathieu Bauchy[2], Prof. Christian Hoover[1] (1. Arizona State University, 2. University of California, Los Angeles)

A phyto-inspired, osmosis-mediated, dynamic soft composite

» Ms. Amrita Kataruka[1], Prof. Shelby Hutchens[1] (1. University of Illinois at Urbana-Champaign)

Cutting-Driven Fracture and Fracture-Relevant Microstructural Length Scales in Soft Elastomers

» Mr. Bingyang Zhang[1], Mr. Andrew Dou[1], Prof. Shelby Hutchens[1] (1. University of Illinois at Urbana-Champaign)

Investigation of drag effects in liquid-immersed granular media

» Dr. Nikhil Karanjgaokar[1], Mr. Hrachya Kocharyan[1] (1. Worcester Polytechnic Institute)

Extreme mechanical deformation of nanostructured block-polymer microspheres

» Prof. Jae-Hwang Lee[1], Ms. Ara Kim[1] (1. University of Massachusetts Amherst)

Modeling nano-architected electrodes with elastic instabilities: The role of buckling on electrochemical performance.

» Dr. Claudio Di Leo[1], Mr. Arman Afshar[1] (1. Georgia Institute of Technology)

Phase Transformations Si I□Si II: Sinergy of First Principle, Molecular Dynamics, and Phase Field Approaches

» Prof. Valery Levitas[1], Mr. Hamed Babaei[1] (1. Iowa State University)

Computing Stress Intensity Factors Along the Front of a Three-Dimensional Crack on Unstructured Meshes

» Prof. Adrian Lew[1], Mr. Benjamin Grossman-Ponemon[1], Prof. Leon Keer[2] (1. Stanford University, 2. Northwestern University)

Understanding the Self-healing of Reversible Polymer Networks through Coarse-grained Molecular Dynamic Simulation

» Mr. Zhiqiang Shen[1], Mr. Huilin Ye[1], Prof. Qiming Wang[2], Dr. Ying Li[1] (1. University of Connecticut, 2. University of Southern California)

Mapping three-dimensional micromechanics between micro-pillars and soft gel substrates

» Ms. Kristin Calahan[1], Mr. Yuan Qi[1], Prof. Mark Rentschler[1], Prof. Rong Long[1] (1. University of Colorado Boulder)

The poker-chip experiments of Gent and Lindley (1959) explained

» Prof. Oscar Lopez-Pamies[1] (1. University of Illinois at Urbana-Champaign)

Non-classical Micromorphic Continuum Model for Granular Microstructure Design

» Prof. Anil Misra[1], Mr. Nima Nejadsadeghi[1], Mr. Michele De Angelo[1], Mr. Rizacan Sarikaya[1] (1. University of Kansas)

Mechanics of Energy Storage Materials

» Prof. Siva Nadimpalli[1], Mr. Akshay Pakhare[1], Mr. Igor Bezsonov[1], Mr. Subhajit Rakshit[1] (1. New Jersey Institute of Technology)

Topological toughening of graphene and other 2D materials

» Mr. Bo Ni[1], Prof. Huajian Gao[1] (1. Brown University)

Heterogeneity and length-scale dependence of fibrous materials

» Mr. Stephen Tyznik[1], Ms. Maria Proestaki[1], Mr. Alexander Ogren[1], Dr. Brian Burkel[1], Dr. Jacob Notbohm[1] (1. University of Wisconsin-Madison)

Continued from **Sunday, 13 October**

Realization of a Non-reciprocal Metamaterial by Geometric Time-modulation

» Mr. Mohammad Ali Attarzadeh[1], Mr. Jesse Callanan[1], Dr. Mostafa Nouh[1] (1. University at Buffalo (SUNY))

Three body coarse-grained potentials of polyethylene developed by iterative Boltzmann inversion

» Dr. Jay Oswald[1], Dr. Vipin Agrawal[1], Mr. Jianlan Ye[1] (1. Arizona State University)

Natural Curvature and Soft Shells: Shape Shifting through Mechanical Instabilities

» Prof. Douglas Holmes[1], Ms. Lucia Stein-Montalvo[1], Dr. Matteo Pezzulla[1], Prof. Harold Park[1] (1. Boston University)

Mechanical characterization of soft elastomers for small scale friction and adhesion

» Prof. Jonathan Pham[1], Mr. Justin Glover[1] (1. University of Kentucky)

Mechanics of Nanofiber Networks with Adhesion

» Prof. Catalin Picu[1], Mr. Vineet Negi[1], Dr. Ahmed Sengab[1] (1. Rensselaer Polytechnic Institute)

Transformation Elastography: Distorting Anisotropy to get Isotropy

» Ms. Martina Guidetti[1], Prof. Dieter Klatt[1], Prof. Thomas Royston[1] (1. University of Illinois at Chicago)

Unraveling the fundamental mechanisms of nanoscale deformation in bulk metallic glasses

» Dr. Amit Datye[1], Dr. Yuanchao Hu[1], Mr. Zheng Chen[1], Prof. Jiaxin Yu[2], Prof. Corey OHern[1], Prof. Udo Schwarz[1] (1. Yale University, 2. Southwest University of Science and Technology)

Multi-physics modeling of time-dependent materials

» Prof. Maryam Shakiba[1] (1. Virginia Tech)

Torque-Dense Photomechanical Actuation

» Dr. Mahnoush Babaei[1], Dr. Kaushik Dayal[1], Dr. M. Ravi Shankar[2] (1. Carnegie Mellon University, 2. University of Pittsburgh)

Mechanics of Topologically Interlocked Stereotomic Material Systems

» Prof. Thomas Siegmund[1] (1. Purdue University)

Synthesis and Characterization of Mechanochromic Polycarbonate

» Mr. Steven Yang[1], Dr. Yuval Vidavsky[1], Dr. Meredith Silberstein[1] (1. Cornell University)

Shockwave Propagation and Dynamic Fracture of Hydrogels via Integrated Computational and Experimental Studies (CMMI #1634188)

» Mr. Kshitiz Upadhyay[1], Dr. Ke Luo[1], Prof. Ghatu Subhash[1], Prof. Douglas Spearot[1] (1. University of Florida)

A non-cooperative game approach for multiscale predictive material modeling in knowledge multi-graphs and polytrees

» Prof. WaiChing Sun[1], Dr. Kun Wang[1] (1. Columbia University)

Stress corrosion cracking of graphene

» Dr. Alireza Tabarraei[1], Mr. Mohan Surya Raja Elapolu[2] (1. University of North Carolina at Chapel Hill, 2. University of North Carolina at Charlotte)

Multi-Resolution Discontinuous Galerkin Method for Linear Elasticity

» Dr. Timothy Truster[1], Ms. Elina Geut[1] (1. University of Tennessee)

Interfacial Slip and Dissipation in Superlubric 2D Nanoelectromechanical Systems

» Prof. Arend van der Zande[1], Mr. Sunphil Kim[1], Mr. Paolo Furlanetto Ferrari[1] (1. University of Illinois at Urbana-Champaign)

Highly Switchable Adhesion of N-Doped Graphene Interfaces for Robust Micromanipulation

» Prof. Zhenhai Xia[1], Dr. Yiyang Wan[1] (1. University of North Texas)

Continued from **Sunday, 13 October**

Coarse-grained Atomistic Measurement of the Cohesive Strength of the Grain Boundary in Ice and its Adhesive Strength to the Cold Surfaces of Graphite

» Mr. Hang Li[1], Mr. Yipeng Peng[1], Prof. Liming Xiong[1] (1. Iowa State University)

Transfer Printing of Thin Films in a Liquid Environment: Chemomechanics Theory, Computational Implementation, and Experimental Validation

» Prof. Baoxing Xu[1] (1. University of Virginia)

Microstructural Effects on the Effective Piezoelectric Responses of Additively Manufactured Triply Periodic Co-Continuous Piezocomposite

» Dr. Yucheng Liu[1], Mr. Wenhua Yang[1] (1. Mississippi State University)

Mechanics of Extreme Buckling Driven Delamination in Thin Films

» Prof. Jie Yin[1], Dr. Qiuting Zhang[1] (1. Temple University)

Helium irradiation induced ultra-high strength nanotwinned Cu with nanovoids

» Prof. Xinghang Zhang[1] (1. Purdue University)

Lattice models for elastic solids

» Dr. Teng Zhang[1] (1. Syracuse University)

Bridging Mechanics and Electrochemistry: Theories and Experiments on Battery Materials

» Prof. Kejie Zhao[1] (1. Purdue University)

In situ nano-thermo-mechanical experiment reveals brittle to ductile transition in silicon nanowires

» Dr. Guangming Cheng[1], Mr. Yin Zhang[2], Dr. Tzu-Hsuan Chang[3], Dr. Qunfeng Liu[2], Dr. Lin Chen[4], Dr. Wei Lu[4], Prof. Ting Zhu[2], Prof. Yong Zhu[3] (1. Princeton University, 2. Georgia Institute of Technology, 3. North Carolina State University, 4. University of Michigan)

Application of Micro-Raman Spectroscopy to Characterization of Hydrogels

» Dr. Malisa Sarntinoranont[1], Dr. Hui Zhou[1] (1. University of Florida)

6pm

Posters -

SES Poster Session and Welcome Reception

Jubel Hall

Chaired by: Dr. Amit Pathak

A Novel Hybrid Numerical Finite Element-Spectral Boundary Integral Scheme For Modeling Earthquake Cycles

» Mr. Mohamed Abdelmeguid[1], Mr. Xiao Ma[1], Prof. Ahmed Elbanna[1] (1. University of Illinois at Urbana-Champaign)

Data Science Analysis of Dislocation Microstructures

» Mr. Shamseddin Akhondzadeh[1], Dr. Ryan Sills[2], Prof. Wei Cai[1] (1. Stanford University, 2. Rutgers University)

Effect of geometry and temperature on fracture toughness in the Ductile-to-Brittle Transition region

» Mr. Aboubakr Amzil[1], Dr. Jacques Besson[2], Dr. Anna Dahl[3] (1. EDF R&D/Mines Paristech, 2. MINES ParisTech, 3. EDF R&D)

Morphological Changes of Vertebral Endplates due to Mechanical Tension in a Mouse Model of Scoliosis Distraction

» Ms. Kaitlyn Broz[1], Dr. Pooria Salari[2], Mr. Garrett Easson[1], Dr. Simon Tang[1] (1. Washington University in St. Louis, 2. Saint Louis University)

Developing Artificial Scaffolds for Plant Cell Growth

» Mr. Ryan Calcutt[1], Mr. Richard Vincent[2], Dr. Derrick Dean[3], Dr. Treena Arinzeh[2], Dr. Ram Dixit[1] (1. Washington University in St. Louis, 2. New Jersey Institute of Technology, 3. Alabama State University)

Biomaterial-based microfluidic platform for drug screening applications

» Ms. Allison Clancy[1], Ms. Lindsay Hill[1], Dr. Dayi Chen[2], Ms. Nicole Xia[2], Dr. Aaron Timperman[2], Dr. Silviya Zustiak[1] (1. Saint Louis University, 2. University of Illinois at Urbana-Champaign)

Continued from **Sunday, 13 October**

Effects of dynamic contact angle on the mobilization of nonwetting droplet in pore constriction

» Dr. Chao Zeng[1], Dr. Wen Deng[1] (1. Missouri University of Science and Technology)

Controlling the Perception of Softness in Haptic Interfaces - The Role of Indentation Depth and Contact Area

» Prof. Charles Dhong[1] (1. University of Delaware)

Modeling Fungal Infections: Matrix Development in Zombie Ants

» Mr. Farshad Ghanbari[1], Mr. Mohammad Jannesari[2], Prof. Francesco Costanzo[1], Prof. David Hughes[1], Prof. Christian Peco[1] (1. The Pennsylvania State University, 2. Isfahan University of Technology)

Towards a neural network approach to describe the constitutive modeling of sheet metal

» Dr. Maysam Gorji[1], Mr. Mojtaba Mozaffar[2], Mr. Julian Heidenreich[1], Prof. Dirk Mohr[3] (1. Massachusetts Institute of Technology, 2. Northwestern University, 3. ETH Zurich)

Health Monitoring of Composite Systems Using Machine Learning

» Mr. Mason Hickman[1], Prof. Peekay Basu[1] (1. Vanderbilt University)

Design of Biocompatible Crosslinkers for Tuning the Degradation of Polyethylene Glycol Hydrogels

» Ms. Stephanie Kroger[1], Ms. Lindsay Hill[1], Dr. Era Jain[2], Dr. Paul Bracher[1], Dr. Silviya Zustiak[1] (1. Saint Louis University, 2. Washington University in St. Louis)

A 3D Model of Helicobacter pylori Swimming in Gastric Mucus

» Mr. Suraj Kumar Kamarapu[1], Prof. Henry Fu[1] (1. University of Utah)

Strength and Hardening at a Single Precipitate in a Au@Cu Nanocube

» Mr. Mehrdad Kiani[1], Dr. Wendy Gu[1] (1. Stanford University)

Rapid discrimination of swimming microorganisms using an aggregate motility measure

» Ms. Minji Kim[1], Ms. Emma Huff[1], Prof. Philip Bayly[1], Dr. John Mark Meacham[1] (1. Washington University in St. Louis)

Mechanical Characterisation of Carbon Fibre Artificial Muscles for the Design of Orthotic Devices

» Mr. Parth Kotak[1], Dr. Caterina Lamuta[1], Dr. Jason Wilken[1] (1. University of Iowa)

Factors influencing transverse deformation of maize stems

» Mr. Ryan Larson[1], Mr. Christopher Stubbs[2], Dr. Douglas Cook[1] (1. Brigham Young University, 2. New York University)

Stress-dependent regulation of microtubule alignment during plant cell morphogenesis

» Mr. Jing Li[1], Dr. Daniel Szymanski[1], Prof. Taeyoon Kim[1] (1. Purdue University)

Fluid Flow with Suspended Deformable Soft Particles in Porous Media

» Mr. Shuaijun Li[1], Prof. Jing Fan[1] (1. City College of New York)

In situ nanomechanical characterization of multi-layer MXene membranes

» Mr. Yanxiao Li[1] (1. Missouri University of Science and Technology)

Mechanical insight into MXenes

» Mr. Yanxiao Li[1], Ms. Shuohan Huang[1], Mr. Congjie Wei[1], Dr. Chenglin Wu[1], Dr. Vadym Mochalin[1] (1. Missouri University of Science and Technology)

Flaw tolerance under complex loading conditions

» Mr. Xing Liu[1], Dr. Christos Athanasiou[1], Prof. Brian Sheldon[1], Prof. Huajian Gao[1] (1. Brown University)

Continued from **Sunday, 13 October**

Gait-optimized locomotion of wave-driven soft sheets

» Mr. Pearson Miller[1], Prof. Jörn Dunkel[1] (1. Massachusetts Institute of Technology)

Mechanical Properties of Low Dimensional and Bio-inspired Composites

» Prof. Arun Nair[1], Mr. Raghuram Santhanpuram[1] (1. University of Arkansas)

Deformation mechanisms of core-shell structures

» Prof. Arun Nair[1] (1. University of Arkansas)

Evaluation of a Wireless Accelerometer Instrumented Mouthguard for Use in the Field as a TBI and m/TBI Diagnostic Tool

» Dr. Jennifer Brock[1], Dr. John Lund[2], Dr. Anthony Paris[1] (1. University of Alaska Anchorage, 2. Western Washington University)

Supersonic Impact on Carbon Nano-architected Materials

» Mr. Carlos Portela[1], Mr. Bryce Edwards[1], Dr. David Veysset[2], Mr. Yuchen Sun[2], Prof. Keith Nelson[2], Prof. Dennis Kochmann[3], Prof. Julia Greer[1] (1. California Institute of Technology, 2. Massachusetts Institute of Technology, 3. ETH Zurich)

Tensile Response of Hybrid Elastoplastic Lattices

» Prof. Hamed Hatami-Marbini[1], Mr. Milad Rohanifar[1] (1. University of Illinois at Chicago)

Approach to finite-size prey by the choanoflagellate Salpingoeca rosetta

» Mr. Kiarash Samsami[1], Prof. Henry Fu[1] (1. University of Utah)

Murine Atherosclerosis Characterization Using Cross-Sectional Lipid-Specific Photoacoustic and Longitudinal 4D Ultrasound Imaging

» Mr. Gurneet Sangha[1], Prof. Craig Goergen[1] (1. Purdue University)

Buckling of thermalized cylindrical shells

» Mr. Siddhartha Sarkar[1], Dr. Andrej Kosmrlj[1] (1. Princeton University)

Substrate-Grafted iPSC-Derived Micro Heart Muscles to Investigate Effects of Mechanical Loading on Tissue Physiology

» Mr. Daniel Simmons[1], Ms. Jingxuan Guo[1], Ms. Mary Munsell[1], Mr. Brennan Kandalaft[1], Mr. David Schuftan[1], Dr. Nathaniel Huebsch[1] (1. Washington University in St. Louis)

Adaptive Structures via Additive Manufacturing of Stimuli-Responsive Polymers

» Prof. Svetlana Sukhishvili[1] (1. Texas A&M University)

Spinning de novo 3D Spider Webs without the Spider

» Dr. Chi-Hua Yu[1], Ms. Isabelle Su[1], Prof. Markus Buehler[1] (1. Massachusetts Institute of Technology)

Discover High Toughness Microstructures of Bio-Inspired Materials using Machine Learning Techniques

» Mr. Sung-Lin Tsai[1], Mr. Michael Hsu[1], Prof. Po-Yu Chen[2], Prof. Shu-Wei Chang[3], Prof. Chuin-Shan Chen[1] (1. National Taiwan University, 2. National Tsing Hua University, 3. National Taiwan Unversity)

Fluid Structure Interaction and Dynamics of Dacron vascular prostheses

» Dr. Eleonora Tubaldi[1], Dr. Giovanni Ferrari[2], Mr. Prabakaran Balasubramanian[2], Prof. Marco Amabili[2] (1. University of Arizona, 2. McGill University)

OCT-Based Microindentation for Measuring the Elasticity of the Fibroblast-Populated Collagen Matrix

» Mr. Joseph Wagner[1], Mr. David Bowman[1], Dr. Melville Vaughan[1], Dr. Gang Xu[1] (1. University of Central Oklahoma)

High-Temperature Molecular Dynamics Prediction of GFA in Metallic Alloys

» Mr. Porter Weeks[1], Dr. Juan Wang[1], Prof. Katharine Flores[1] (1. Washington University in St. Louis)

Continued from **Sunday, 13 October**

A deep learning approach for deformation of multi-walled carbon nanotubes
» Mr. Upendra Yadav[1], Mr. Shashank Pathrudkar[1], Dr. Susanta Ghosh[1] (1. Michigan Technilogical University)

Lattice models for elastic solids
» Dr. Teng Zhang[1], Mr. Junbo Chen[1] (1. Syracuse University)

Magnetic Symmetry-breaking Actuation for Shape Morphing and Soft Robotics
» Mr. Shuai Wu[1], Dr. Qiji Ze[1], Mr. Rundong Zhang[1], Prof. Nan Hu[1], Mr. Yang Cheng[1], Prof. Fengyuan Yang[1], Prof. Ruike Zhao[1] (1. The Ohio State University)

Artificial intelligence method to design and fold structural proteins from the primary amino acid sequence
» Dr. Kai Guo[1], Dr. Zhao Qin[1], Prof. Markus Buehler[1] (1. Massachusetts Institute of Technology)

7pm **SES Members Meeting**

Monday, 14 October

8am **SES Conference Desk Open 8 am - 6 pm: Information, Lost & Found, Mobile App Support**
Danforth University Center

8am **P.3 -**
SES Remarks & Announcements
Graham Chapel

8:15am **P.4 -**
Eringen Medal Winner, Dr. Evelyn Hu
Graham Chapel

It's Not How Small You Make It....
» Dr. Evelyn Hu (Harvard University)

9:15am **P.5 -**
Prager Medal Winner, Dr. Horacio Espinosa
Graham Chapel

Experimental Solid Mechanics across Spatial and Temporal Scales
» Dr. Horacio Espinosa (Northwestern University)

10am **Coffee Break**

10:30am **Session III**

10:30am **III.1.1.A -**
Prager Medal Symposium
Seigle Hall 301
Chaired by: Prof. Zdenek P. Bazant and Prof. Sinan Keten

KEYNOTE: Pressure-Shear Plate Impact (PSPI): Retrospective and Promise
» Prof. Rodney Clifton[1] (1. Brown University)

Mechanical Analogues of Catch Bonds in Proteins
» Prof. Sinan Keten[1], Mr. Kerim Dansuk[1], Ms. Jenny Liu[1] (1. Northwestern University)

A Model for Amorphization in Boron Carbide
» Dr. Qinglei Zeng[1], Dr. Andrew Tonge[2], Prof. KT Ramesh[1] (1. Johns Hopkins University, 2. U.S. Army Research Laboratory)

Continued from **Monday, 14 October**

Characterization of the Mechanical Behavior of Poroelastic Hydrogels

» Ms. Si Chen[1], Prof. Krishnaswamy Ravi-Chandar[1] (1. University of Texas at Austin)

Microstructural Origin of Work Hardening in FCC Cu Single Crystals

» Mr. Shamseddin Akhondzadeh[1], Dr. Ryan Sills[2], Dr. Nicolas Bertin[1], Prof. Wei Cai[1] (1. Stanford University, 2. Sandia National Laboratories)

10:30am **III.1.2.A - Eringen Medal Symposium**

Seigle Hall 206

Chaired by: Prof. Yonggang Huang

KEYNOTE: Engineering Education and the Liberal Arts: Finally, A School of Engineering at Harvard

» Prof. Venky Narayanamurti[1] (1. Harvard University)

KEYNOTE: Towards a Scanning Single-Electron Box Array

» Mr. Thomas Zirkle[1], Dr. Alexander Mintairov[1], Dr. Alexei Orlov[1], Dr. Gregory Snider[1] (1. University of Notre Dame)

KEYNOTE: Nanoassembly of 3D microstructures for IR scatterers and integrated magnetics

» Dr. Shanying Cui[1] (1. HRL Laboratories, LLC)

10:30am **III.3.1.B - Advanced biomaterials for nerve engineering and repair**

Seigle Hall 205

Chaired by: Prof. Mikhail Berezin and Prof. Matthew Wood

Real-time Dextrous Fine Motor Control of an Advanced Prosthetic Arm Using Regenerative Peripheral Nerve Interface (RPNI) Signals

» Dr. Stephen Kemp[1], Mr. Nathan Lawera[1], Dr. Philip Vu[1], Dr. Zachary Irwin[1], Mr. Alex Vaskov[1], Mr. Chrono Nu[1], Prof. Deanna Gates[1], Dr. Richard Gillespie[1], Prof. Theodore Kung[1], Prof. Paul Cederna[1], Prof. Cynthia Chestek[1] (1. University of Michigan)

Tools of neurophotonics for human health problems

» Prof. Daniel Cote[1] (1. CERVO Brain Research Center/Université Laval)

Perfluorocarbon Materials for Nerve Injury Imaging and Repair

» Dr. Jelena Janjic[1], Mr. Eric Lambert[1], Dr. Vijay S. Gorantla[2] (1. Duquesne University, 2. Wake Forest Institute for Regenerative Medicine)

10:30am **III.2.1.A - Fatigue and fracture, a symposium in memory of Paul C. Paris**

Seigle Hall L006

Chaired by: Prof. Nadia Lapusta

KEYNOTE: Paul Paris at the Dawn of Fracture Mechanics: Personal Historical Perspectives

» Prof. John Landes[1] (1. University of Tennessee)

Unresolved Issues Associated with the Simulation of 3-D Fatigue Crack Growth in Complex Geometries

» Dr. Murat Saribay[1], Dr. Zoubida Hadri[2], Dr. Noémie Rakotomalala[3], Dr. Eric Marechal[2], Prof. Herman Nied[4] (1. Dogus University, 2. Safran Aero Boosters, 3. Safran Tech, 4. Lehigh University)

Fatigue Behaviours of Materials, as the Response of the Self Organised systems

» Prof. László Toth[1] (1. Bay Zoltán Nonprofit Ltd. for Applied Research l)

Continued from **Monday, 14 October**

Fast determination of fatigue properties of materials beyond one billion cycles

» Prof. Nicolas Ranc[1], Dr. Taylan Ors[1], Mr. Vincent Jacquemain[1], Mr. Vinvent Michel[1], Prof. Véronique Favier[1], Dr. Olivier Castelnau[1], Dr. Dominique Thiaudière[2], Dr. Cristian Mocuta[2] (1. ENSAM, 2. Synchrotron SOLEIL)

From Cracks to Cambridge to Cressensac to CRISPR-Cas9: Paul Paris' Amazing Influence in an Unconventional Journey

» Dr. Andrew Schiermeier[1] (1. Intellia)

10:30am **III.3.6.C -**

Mechanics of growth, morphogenesis and evolution of biological solids

Seigle Hall 304

Chaired by: Dr. Andrej Kosmrlj

KEYNOTE: Hierarchical "buckling without bending" and cerebellar shape

» Prof. Jen Schwarz[1], Mr. Mahesh Gandikota[1] (1. Syracuse University)

KEYNOTE: Measurements and Models of Cortical Folding in the Brain

» Prof. Philip Bayly[1], Dr. Kara Garcia[2], Dr. Christopher Kroenke[3] (1. Washington University in St. Louis, 2. Indiana University, 3. Oregon Health Sciences University)

Cortical folding, axon tension, and white matter organization in the developing brain

» Dr. Kara Garcia[1] (1. Indiana University)

10:30am **III.6.2.A -**

Multi-scale mechanics of granular media

Seigle Hall 306

Chaired by: Dr. Ranganathan Parthasarathy

A coupled, continuum model for flow and size-segregation in dense, bidisperse granular materials

» Dr. Daren Liu[1], Prof. David Henann[2] (1. Cadence Design Systems, Inc., 2. Brown University)

Connecting discrete and continuum models for granular materials

» Dr. Payam Poorsolhjouy[1], Prof. Thomas Hochrainer[2] (1. Graz University, 2. Graz University of Technology)

Gibbs Formulation of Granular Micromechanics for Failure Analysis

» Mr. Rizacan Sarikaya[1], Prof. Anil Misra[1], Dr. Payam Poorsolhjouy[2] (1. University of Kansas, 2. Graz University)

Quantifying Kinematics During High-Strain-Rate Loading of Granular Materials

» Mr. Adyota Gupta[1], Prof. KT Ramesh[1], Prof. Ryan Hurley[1] (1. Johns Hopkins University)

10:30am **III.3.9.C -**

Multiscale modeling of molecular, cellular, tissue, and organ mechanics

Seigle Hall L003

Chaired by: Prof. Alireza Sarvestani

KEYNOTE: Axon membrane skeleton effect on axonal membrane protein diffusion

» Dr. Yihao Zhang[1], Prof. Anastasios Tzingounis[1], Prof. George Lykotrafitis[1] (1. University of Connecticut)

A Discrete Model of Propagating Waves and Instabilities in Cilia and Flagella

» Mr. Louis Woodhams[1], Prof. Philip Bayly[1] (1. Washington University in St. Louis)

Continued from **Monday, 14 October**

Governing factors for motions of molecular motors in the actin cytoskeleton

» Ms. Wonyeong Jung[1], Dr. A. Pasha Tabatabai[2], Mr. Jacob Thomas[1], Prof. S. M. Ali Tabei[3], Prof. Michael Murrell[2], Prof. Taeyoon Kim[1] (1. Purdue University, 2. Yale University, 3. University of Northern Iowa)

Elasticity and anisotropy of cortical and trabecular bone in mouse femur via AFM indentation

» Dr. Meisam Asgari[1], Prof. Damiano Pasini[2] (1. Northwestern University, 2. McGill University)

Simulation of mechanical regulation of podocyte attachment

» Mr. Shumeng Jiang[1], Prof. Jeff Miner[1], Prof. Guy Genin[1], Prof. Hani Suleiman[1] (1. Washington University in St. Louis)

10:30am **III.3.3.A - Engineering plant biology to address global challenges**

Seigle Hall L004

Chaired by: Dr. Erin Sparks and Dr. Elizabeth Haswell

3D imaging, computer vision, statistical and mathematical approaches reveal the genetic basis of crop root and inflorescence architectures

» Dr. Christopher Topp[1] (1. Donald Danforth Plant Science Center)

Engineering artificial scaffolds to study plant cell morphogenesis in microdevices

» Dr. Ram Dixit[1] (1. Washington University in St. Louis)

Spatial temporal tracking of plant cell division and tissue differentiation with 3D-printing

» Mr. Charles Melvin[1], Mr. Eli Buckner[1], Prof. Cranos Williams[1], Prof. Timothy Horn[1], Dr. Ross Sozzani[1] (1. North Carolina State University)

Plant cell walls as targets to optimize stomatal development and dynamics

» Dr. Charles Anderson[1], Ms. Yintong Chen[1], Dr. Yue Rui[2], Prof. Hojae Yi[1], Dr. Baris Kandemir[3], Ms. Dolzodmaa Davaasuren[1], Prof. James Wang[1], Prof. Virendra Puri[1] (1. The Pennsylvania State University, 2. Stanford University, 3. DeepMap, Inc.)

SENTINEL: Sensor plants for detecting chemicals in the environment

» Prof. Sean Cutler[1], Dr. Andrea Eveland[2], Dr. Malia Gehan[2], Dr. David LeBauer[3], Dr. Dmitri Nusinow[2], Prof. Rodrigo Vargas[4], Prof. Ian Wheeldon[1], Prof. Timothy Whitehead[5], Prof. Alina Zare[6], Dr. Ru Zhang[2], Prof. Matias Zurbriggen[7] (1. University of California, Riverside, 2. Donald Danforth Plant Science Center, 3. University of Arizona, 4. University of Delaware, 5. University of Colorado Boulder, 6. University of Florida, 7. University of Dusseldorf)

The Signal and the Noise: Understanding and Engineering Plant Signaling with Synthetic Biology and Natural Variation

» Dr. Clay Wright[1] (1. Virginia Tech)

10:30am **III.4.1.B - Biological and bio-inspired fluid mechanics**

Seigle Hall L002

Chaired by: Prof. Henry Fu

KEYNOTE: Bacterial diodes: Rectified transport of swimming cells in porous media flow

» Prof. Jeffrey Guasto[1] (1. Tufts University)

Hopping and trapping of bacteria in 3D porous media

» Prof. Sujit Datta[1] (1. Princeton University)

Bioremediation and motility: how fluid flow and nutrient distribution affect bacterial foraging

» Mr. Nikhil Desai[1], Mr. Vaseem Shaik[1], Dr. Arezoo Ardekani[1] (1. Purdue University)

KEYNOTE: Improved models and large scale simulations of micro-swimmer collective motion

» Prof. Enkeleida Lushi[1] (1. New Jersey Institute of Technology)

Continued from **Monday, 14 October**

10:30am **III.5.1.A -**

Damage localization, fracture and size-effect in composites

Simon Hall 017

Chaired by: Dr. Gianluca Cusatis and Dr. Marco Salviato

KEYNOTE: Fracture and size-effect of textile composites: computational modeling and experimental evidence.

» Dr. Gianluca Cusatis[1], Dr. Marco Salviato[2], Dr. Weixin Li[3], Prof. Zdenek P. Bazant[1] (1. Northwestern University, 2. University of Washington, 3. Johns Hopkins University)

Micromechanical Investigations into the Enhanced Ductility and Hardening Behavior of Fiber Composites with 3D Architectures

» Prof. Lucas Meza[1], Dr. Jim Schormans[2], Prof. Joris Remmers[3], Prof. Vikram Deshpande[4] (1. University of Washi, 2. Code Product Solutions, 3. Eindhoven University of Technology, 4. University of Cambridge)

Effect of Patterned Inclusions on the Fracture Behavior of Ceramic Composites

» Mr. Congjie Wei[1], Dr. Chenglin Wu[1], Dr. Charles Wojnar[2] (1. Missouri University of Science and Technology, 2. Lawrence Livermore National Laboratory)

In-situ X-ray Tomography and Diffraction Measurements to Study Elasticity and Fracture in Cement

» Prof. Ryan Hurley[1], Dr. Darren Pagan[2] (1. Johns Hopkins University, 2. Cornell University)

10:30am **III.5.3.B -**

Machine learning in mechanics and materials

Seigle Hall 106

Prediction of Grain Boundary Dislocation Emission Using Machine Learning Approach

» Mr. Yue Cui[1], Prof. Huck Beng Chew[1] (1. University of Illinois at Urbana-Champaign)

Using machine learning techniques to predict mechanical properties of composites beyond the elastic limit

» Prof. Seunghwa Ryu[1] (1. Korea Advanced Institute of Science and Technology)

KEYNOTE: A Machine Learning Based Approach to Fracture Simulation in Two-Dimensional Materials

» Prof. Huajian Gao[1], Dr. Zhigong Song[1] (1. Brown University)

Learning to Twin: An Application of Machine Learning to Twinning in Metals

» Dr. Dingyi Sun[1], Dr. William Schill[2] (1. Brown University, 2. California Institute of Technology)

10:30am **III.5.4.A -**

Non-classical and non-local continuum mechanics and constitutive theories

Seigle Hall 208

Chaired by: Prof. Karan Surana and Dr. Aaron Joy

KEYNOTE: Nonlocal Theory and its Applications to Fracture Mechanics and Wave Propagation

» Prof. James Lee[1], Dr. Jiaoyan Li[2], Ms. Kerlin Robert[1] (1. The George Washington University, 2. Idaho National Laboratory)

A Nonlocal Theory of Diffusion and Heat Transfer in Materials with Large Mean Free Path

» Dr. Samit Roy[1] (1. University of Alabama, Tuscaloosa)

A nonlocal phase field approach for modeling damage

» Mr. Karthik Srinivas[1], Dr. Amirtham Rajagopal[1] (1. Indian Institute of Technology, Hyderabad)

Unfitted B-spline-based computational approach for non-local continuum mechanics. Application to hard and soft flexoelectric materials and composites

» Mr. David Codony[1], Dr. Onofre Marco[1], Mr. Jordi Barcelo[1], Prof. Sonia Fernandez-Mendez[1], Prof. Irene Arias[1] (1. Universitat Politècnica de Catalunya)

Continued from **Monday, 14 October**

10:30am **III.6.1.A -**

Multiscale and multiphysics computations in geomechanics

Seigle Hall 303

Chaired by: Dr. Kane Bennett and Dr. Joseph Morris

KEYNOTE: New trends in computational geomechanics

» Prof. José E. Andrade[1], Mr. John Harmon[1], Mr. Konstantinos Karapiperis[1] (1. California Institute of Technology)

Mechanism-based micromechanical modeling of deformation and failure of rock-like materials under dynamic multiaxial loading

» Dr. Weixin Li[1], Prof. KT Ramesh[1] (1. Johns Hopkins University)

Modeling Multiscale Dynamics of Complex Fault Zones using a Hybrid Finite Element-Spectral Boundary Integral Approach.

» Prof. Ahmed Elbanna[1], Mr. Xiao Ma[1] (1. University of Illinois at Urbana-Champaign)

Liquid clustering & capillary stress fields in disordered porous media

» Dr. Siavash Monfared[1], Mr. Tingtao Zhou[2], Prof. Farhang Radjai[3], Prof. Roland Pellenq[2], Prof. Franz-Josef Ulm[2] (1. California Institute of Technology, 2. Massachusetts Institute of Technology, 3. Universite de Montpellier)

An Elasto-plastic Homogenization Framework for Layered Materials with Planes of Weakness

» Dr. Shabnam Semnani[1], Dr. Joshua A. White[2] (1. University of California, San Diego, 2. Lawrence Livermore National Laboratory)

10:30am **III.7.2.A -**

Functional soft composites – Design, mechanics, and manufacturing

Seigle Hall 104

Chaired by: Prof. Ruike Zhao and Dr. Teng Zhang

KEYNOTE: Singularity-Growth-Instability and Symmetry-Breaking Characteristics of Crease

» Prof. Kyung-Suk Kim[1], Dr. Mrityunjay Kothari[1], Mr. Hanxun Jin[1], Prof. Ruike Zhao[2] (1. Brown University, 2. The Ohio State University)

Design and Fabrication of Heterogeneous, Deformable Substrates for the Mechanically Guided 3D Assembly

» Dr. Haiwen Luan[1] (1. Northwestern University)

4D Printing of Glass Fiber-Regulated Composites with Tunable Shape and High Stiffness

» Ms. Shayuan Weng[1], Dr. Xiao Kuang[1], Prof. Hang Qi[1], Prof. Ning Hu[2] (1. Georgia Institute of Technology, 2. Chongqing University)

Wrinkling patterns in a bi-layer structures under equal bi-axial loading

» Dr. Teng Zhang[1] (1. Syracuse University)

Mechanical Modeling of Viscoelastic Crystallizable Two-Way Shape Memory Polymers (TWSMP)

» Mr. Aayush Prasad[1], Dr. Swapnil Moon[1], Dr. I. J. Rao[1] (1. New Jersey Institute of Technology)

10:30am **III.7.3.C -**

Mechanics and physics of soft materials

Simon Hall 001

Chaired by: Dr. Shawn Chester

Cutting-Driven Fracture and Fracture-Relevant Microstructural Length Scales in Soft Elastomers

» Mr. Bingyang Zhang[1], Mr. Andrew Dou[1], Prof. Shelby Hutchens[1] (1. University of Illinois at Urbana-Champaign)

Measuring the Interfacial Strength of Fused Filament Fabrication using Polycarbonate

» Mr. Ojaswi Agarwal[1], Mr. Lichen Fang[1], Mr. Zheliang Wang[1], Dr. Jonathan Seppala[2], Prof. Sung Hoon Kang[1], Prof. Thao Nguyen[1], Prof. Kevin Hemker[1] (1. Johns Hopkins University, 2. National Institute of Standards and Technology)

Continued from **Monday, 14 October**

Light-field based volumetric investigation of cavitation in soft elastomers
» Dr. Alexander Landauer[1], Ms. Selda Buyukozturk[1], Prof. Christian Franck[2] (1. Brown University and University of Wisconsin - Madison, 2. University of Wisconsin-Madison)

Self-Healing Mechanics of Polymers
» Prof. Qiming Wang[1] (1. University of Southern California)

Rate-dependent fracture mechanics of transient networks
» Mr. Tong Shen[1], Dr. Franck Vernerey[1] (1. University of Colorado Boulder)

Instability-induced pattern formations in soft composites
» Prof. Stephan Rudykh[1], Dr. Jian Li[2], Dr. Viacheslav Slesarenko[3], Dr. Pavel Galich[4], Mr. Artemii Goshkoderia[3] (1. University of Wisconsin-Madison, 2. Massachusetts Institute of Technology, 3. Technion-Israel Institute of Technology, 4. Rice University)

10:30am **III.7.9.C -**
Multiscale mechanics of porous and nanostructured materials
Seigle Hall 204
Chaired by: Prof. Mohammad Javad Abdolhosseini Qomi and Dr. Luis Ruiz Pestana

Towards improved simulation methods for mineral surface reactivity
» Dr. Adam Wallace[1], Dr. Abrar Quadery[1] (1. University of Delaware)

Nanoconfinement effects on chemical reactivity
» Dr. Luis Ruiz Pestana[1] (1. University of Miami)

Interfacial Reaction Pathways for Geological Sequestration of Carbon Dioxide
» Prof. Mohammad Javad Abdolhosseini Qomi[1], Mr. Siavash Zare[1] (1. University of California, Irvine)

Coupled hydrology, chemistry, and mechanics of clay-rich sedimentary rock: from molecular to meter scales
» Prof. Ian Bourg[1] (1. Princeton University)

Sorption-induced deformation in nanoporous polymers and related hysteresis: mechanism, modeling and upscaling
» Dr. Mingyang Chen[1], Dr. Benoit Coasne[2], Prof. Robert Guyer[3], Dr. Dominique Derome[4], Prof. Jan Carmeliet[1] (1. ETH Zurich, 2. Université Grenoble Alpes, 3. University of Nevada, Reno, 4. Empa)

11:30am **Lunch Available 11:30 am - 1:30 pm**
Umrath Hall and Danforth University Center

1pm **P.6 -**
G.I. Taylor Medal Winner, Dr. Arif Masud
Graham Chapel

A New Class of Variational Methods for Fluid Mechanics
» Dr. Arif Masud (University of Illinois at Urbana-Champaign)

1:30pm **MOMS.3 -**
By Appointment Only: Program Officer Meetings
Charles F. Knight Center

2:15pm **Session IV**

2:15pm **IV.1.1.B -**
Prager Medal Symposium
Seigle Hall 301
Chaired by: Prof. Kyung-Suk Kim

Continued from **Monday, 14 October**

KEYNOTE: Contraction of polymer gels created by the activity of molecular motors
» Prof. Robert McMeeking[1], Prof. Mattia Bacca[2], Prof. Omar Saleh[1] (1. University of California, Santa Barbara, 2. University of British Columbia)

Engineering New Biological Functions with Magnetic Nanoparticles
» Prof. Sheng Tong[1], Prof. Gang Bao[1] (1. Rice University)

KEYNOTE: Tensional pathway to neuronal function
» Dr. Anthony Fan[1], Dr. Alireza Tofangchi[1], Prof. M Taher Saif[1] (1. University of Illinois at Urbana-Champaign)

Cell Mechanics Based Microfluidic Technologies for Disease Diagnosis
» Prof. Chwee Teck Lim[1] (1. National University of Singapore)

2:15pm **IV.1.2.B - Eringen Medal Symposium**
Seigle Hall 206
Chaired by: Prof. Yonggang Huang

KEYNOTE: Gallium Nitride Electronics; the future is here
» Dr. Umesh Mishra[1] (1. University of California, Santa Barbara/Transphorm)

KEYNOTE: Automated MWh-scale Thermal Storage via Frozen Warehouses
» Dr. Alex Woolf[1], Mr. Alexander Zhang[1] (1. Lineage Logistics)

KEYNOTE: Nano-litz: Overcoming skin effect at microwave frequencies
» Dr. Kasey Russell[1] (1. The Charles Stark Draper Laboratory, Inc.)

2:15pm **IV.1.3.A - G. I. Taylor Medal Symposium**
Seigle Hall 204
Chaired by: Prof. Jinhui Yan

KEYNOTE: Stabilized and Variational Multiscale Methods: A brief history of ideas and origins
» Prof. Thomas Hughes[1] (1. University of Texas at Austin)

Variational Multiscale Method as an Error Indicator
» Prof. Assad Oberai[1] (1. University of Southern California)

A Variational Multiscale Discontinuous Galerkin Method for Imposing Periodic Boundary Conditions on Nonconforming Meshes
» Dr. Timothy Truster[1], Mr. Sunday Aduloju[1] (1. University of Tennessee)

Variational Multiscale Modeling with Discretely Divergence-Free Subscales
» Prof. John Evans[1], Dr. David Kamensky[2], Prof. Yuri Bazilevs[2] (1. University of Colorado Boulder, 2. Brown University)

2:15pm **IV.2.1.B - Fatigue and fracture, a symposium in memory of Paul C. Paris**
Seigle Hall L006
Chaired by: Dr. Anthony Paris

KEYNOTE: Crack Growth in Extreme Environments
» Dr. Ashok Saxena[1] (1. University of Arkansas)

Fatigue and Fracture among the Asteroids
» Dr. Charles El Mir[1], Prof. KT Ramesh[1] (1. Johns Hopkins University)

Modeling fracture and fragmentation for extreme-events applications
» Dr. George Moutsanidis[1], Prof. David Kamensky[2], Prof. Yuri Bazilevs[1] (1. Brown University, 2. University of California, San Diego)

Continued from **Monday, 14 October**

Improved blast loading simulation with metal foam projectile
» Prof. Tian Jian Lu[1] (1. Nanjing University of Aeronautics and Astronautics)

Computational fracture mechanics for high-temperature creep-fatigue crack growth in two nickel-base superalloys
» Mr. Joshua Pribe[1], Prof. Thomas Siegmund[1], Prof. Jamie Kruzic[2], Mr. Halsey Ostergaard[2] (1. Purdue University, 2. University of New South Wales)

2:15pm **IV.3.6.D -**
Mechanics of growth, morphogenesis and evolution of biological solids
Seigle Hall 304
Chaired by: Dr. Andrej Kosmrlj

KEYNOTE: Modelling the mechanics and self-organization and of cells and tissues
» Prof. Marino Arroyo[1], Dr. Alejandro Torres-Sánchez[1], Dr. Sohan Kale[1], Dr. Guillermo Vilanova[1], Mr. Waleed Mirza[1], Dr. Dimitri Kaurin[1] (1. Universitat Politècnica de Catalunya)

Effect of surface stresses on soft tissue mechanics during self-healing
» Mr. Erik Mailand[1], Dr. Bin Li[2], Prof. Jeroen Eyckmans[3], Prof. Selman Sakar[1], Prof. Nikolaos Bouklas[2] (1. École polytechnique fédérale de Lausanne (EPFL), 2. Cornell University, 3. Boston University)

Cell walls as dynamic networks- understanding expansive growth of fungal cells
» Mr. Shankar Lalitha Sridhar[1], Ms. Revathi Priyanka Mohan[1], Mr. Abhishek Das[1], Dr. Joesph Ortega[2], Dr. Franck Vernerey[1] (1. University of Colorado Boulder, 2. University of Colorado Denver)

The Mechanics of Active Networks—Lessons from Fire-Ant Aggregations
» Mr. Tong Shen[1], Mr. Shankar LalithaSridhar[1], Dr. Franck Vernerey[1] (1. University of Colorado Boulder)

Collective behavior in co-cultures of cells with different mechano-adhesive properties
» Dr. Supravat Dey[1], Dr. Moumita Das[2] (1. University of Delaware, 2. Rochester Institute of Technology)

2:15pm **IV.6.2.B -**
Multi-scale mechanics of granular media
Seigle Hall 306
Chaired by: Prof. David Henann

KEYNOTE: Studying Relationships Across Length Scales Using Grain-Resolved In-Situ Measurements in 3D Granular Materials
» Prof. Ryan Hurley[1], Dr. Chongpu Zhai[1], Dr. Eric Herbold[2], Dr. Stephen Hall[3], Dr. Darren Pagan[4] (1. Johns Hopkins University, 2. Lawrence Livermore National Laboratory, 3. Lund University, 4. Cornell University)

Granular micromechanics: paradigm for bridging grain interactions and continuum descriptions
» Prof. Anil Misra[1] (1. University of Kansas)

Hybridization method for discrete and continuum models of granular media
» Prof. Ken Kamrin[1], Mr. Maytee Chantharayukhonthorn[1], Prof. Yonghao Yue[2], Mr. Peter Chen[3], Dr. Breannan Smith[3], Prof. Eitan Grinspun[3] (1. Massachusetts Institute of Technology, 2. University of Tokyo, 3. Columbia University)

Optimal transition from systems of heavy particles to a Cosserat continuum
» Prof. Mehrdad Negahban[1], Mr. Zesheng Zhang[1] (1. University of Nebraska-Lincoln)

Utilizing Additive Manufacturing to Verify Granular Micromechanics Model
» Mr. Nima Nejadsadeghi[1], Mr. Michele De Angelo[1], Prof. Anil Misra[1] (1. University of Kansas)

Continued from **Monday, 14 October**

2:15pm **IV.3.9.D -**

Multiscale modeling of molecular, cellular, tissue, and organ mechanics

Seigle Hall L003

Chaired by: Dr. Zhangli Peng

KEYNOTE: Membrane Wrapping Efficiency of Elastic Nanoparticles during Endocytosis: Size and Shape Matter

» Dr. Ying Li[1], Mr. Zhiqiang Shen[1], Mr. Huilin Ye[1], Prof. Xin Yi[2] (1. University of Connecticut, 2. Peking University)

Necking phenomena in biological membranes – modeling instabilities using Kirchhoff-Love shell kinematics

» Prof. Shiva Rudraraju[1], Mr. Ritvik Vasan[2], Prof. Padmini Rangamani[2], Prof. Krishna Garikipati[3] (1. University of Wisconsin-Madison, 2. University of California, San Diego, 3. University of Michigan)

Force-Driven Recruitment of Receptors into Cell Focal Adhesion

» Prof. Alireza Sarvestani[1] (1. Mercer University)

Mechanics of pore development in a heterogeneous liquid membrane

» Mr. Yue Liu[1], Dr. Guijin Zou[1], Prof. Huajian Gao[1] (1. Brown University)

A Universal Law for Interaction of 2D Materials with Cellular Membranes

» Dr. Fatemeh Ahmadpoor[1], Dr. Guijin Zou[2], Prof. Huajian Gao[3] (1. New Jersey Institute of Technology, 2. Brown University, 3. Nanyang Technological University)

2:15pm **IV.3.10.A -**

Plant biomechanics

Seigle Hall L004

Chaired by: Dr. Douglas Cook

Comparative biomechanical characterization of maize brace roots within and between plants

» Mx. Lindsay Erndwein[1], Ms. Elahe Ganji[1], Dr. Megan Killian[1], Dr. Erin Sparks[1] (1. University of Delaware)

Putting a new spin on ballistic seed dispersal

» Prof. Dwight Whitaker[1], Prof. Erin Tripp[2] (1. Pomona College, 2. University of Colorado Boulder)

An Integrated Experimental and Computational Approach to Discover Mechanical Properties of Arabidopsis Leaf Trichomes

» Ms. Sedighe Keynia[1], Mr. Thomas Davis[2], Dr. Daniel Szymanski[2], Prof. Joseph Turner[1] (1. University of Nebraska-Lincoln, 2. Purdue University)

Time-dependent response of sorghum stems under mechanical loading

» Mr. Omid Zargar[1], Mr. Seunghyun Lee[1], Mr. Coleman Fincher[1], Dr. Scott A. Finlayson[1], Prof. Anastasia Muliana[1], Dr. Matt Pharr[1] (1. Texas A&M University)

Vortex-Induced Vibrations of Soft Corals

» Prof. Frederick Gosselin[1], Mr. Mouad Boudina[1], Prof. Stephane Etienne[1] (1. Polytechnique Montreal)

Effect of wind on morphology and mechanical properties of Arabidopsis thaliana

» Mr. Oleksandr Zhdanov[1], Dr. Angela Busse[1], Dr. Andrea Cammarano[1], Dr. Hossein Zare-Behtash[1], Prof. Michael Blatt[1] (1. University of Glasgow)

2:15pm **IV.4.1.C -**

Biological and bio-inspired fluid mechanics

Seigle Hall L002

Chaired by: Dr. Arezoo Ardekani

KEYNOTE: Cell nucleus as a mcirorheological probe to study the rheology of the cytoskeleton

» Prof. Ehssan Nazockdast[1], Dr. Moslem Moradi[1] (1. University of North Carolina at Chapel Hill)

Continued from **Monday, 14 October**

Ion-Mediated Swelling in a Model of Gastric Mucus Gel
» Dr. Owen Lewis[1], Dr. James Keener[2], Dr. Aaron Fogelson[2] (1. Florida State University, 2. University of Utah)

Collective hydrodynamics of robotic fish
» Mr. Rohit Pandhare[1], Mr. Mitchel L. Timm[1], Prof. Hassan Masoud[1] (1. Michigan Technilogical University)

Biomimetic leaf for underwater applications: mechanism and fabrication
» Dr. Pengyu Lv[1], Mr. Yaolei Xiang[1], Prof. Huiling Duan[1] (1. Peking University)

2:15pm **IV.7.5.C -**
Mechanics of fiber networks and fibrous biological systems
Simon Hall 017
Chaired by: Prof. Catalin Picu

KEYNOTE: Tuning strain stiffening and fracture of composite fibre networks
» Prof. Jasper van der Gucht[1], Mr. Justin Tauber[1], Dr. Simone Dussi[1], Ms. Frederica Burla[2], Prof. Gijsje Koenderink[2] (1. Wageningen University, 2. Amolf)

Compression of fluid filled fiber network modeled as a gel
» Prof. Prashant Purohit[1], Mr. Chuanpeng Sun[1] (1. University of Pennsylvania)

Drastic swelling-induced softening of biopolymer networks
» Dr. Noy Cohen[1], Prof. Claus Eisenbach[2] (1. Technion-Israel Institute of Technology, 2. University of Stuttgart)

Deformation modes of long fibre random networks embedded in a weak matrix
» Dr. Harika Tankasala[1], Prof. Vikram Deshpande[1], Prof. Norman Fleck[1] (1. University of Cambridge)

Elastic Behavior of a Germanium Nanowire Network
» Mr. Revanth Bodepudi[1], Mr. William Sullivan[1], Prof. Korgel Brian [1], Prof. Benny Freeman[1], Prof. Kenneth Liechti[1] (1. University of Texas at Austin)

2:15pm **IV.5.3.C -**
Machine learning in mechanics and materials
Seigle Hall 106
Chaired by: Dr. Zhao Qin and Prof. Markus Buehler

Machine Learning Based Design for Active Composites
» Mr. Craig Hamel[1], Prof. Hang Qi[1] (1. Georgia Institute of Technology)

De novo protein design using machine learning, structure prediction and analysis using molecular modeling
» Dr. Chi-Hua Yu[1], Dr. Zhao Qin[2], Prof. Markus Buehler[1] (1. Massachusetts Institute of Technology, 2. Syracuse University)

KEYNOTE: Adaptive Machine Learning enabled Search for Functional Materials with Targeted Properties
» Prof. Prasanna V. Balachandran[1] (1. University of Virginia)

Physics-aware Deep Learning for Discovery of Multiscale Governing Laws with Scarce, Noisy Data
» Mr. Zhao Chen[1], Prof. Yang Liu[1], Prof. Hao Sun[1] (1. Northeastern University)

A machine-learning based framework for accelerated design in architected materials
» Mr. Chunping Ma[1], Mr. Zhiwei Zhang[1], Dr. Mohammad Rafiei[2], Prof. Nan Hu[1] (1. The Ohio State University, 2. Johns Hopkins University)

2:15pm **IV.5.4.B -**
Non-classical and non-local continuum mechanics and constitutive theories
Seigle Hall 208
Chaired by: Prof. James Lee and Prof. Karan Surana

Continued from **Monday, 14 October**

KEYNOTE: Cauchy-Maxwell Equations: A Conformal Gauge Theoretic Model for Electro-Magneto-Mechanical Response in Solids

» Prof. Debasish Roy[1], Dr. Pranesh Roy[1] (1. Indian Institute of Science)

KEYNOTE: Thermodynamically Consistent Mechanism of Dissipation in Solid Continua Based on Classical Continuum Mechanics and Nonclassical Continuum Mechanics Incorporating Internal Rotations

» Prof. Karan Surana[1], Mr. Sri Sai Charan Mathi[1], Mr. Celso Carranza[1], Prof. J.N. Reddy[2] (1. University of Kansas, 2. Texas A&M University)

Validation of Properties of a Linealy Elastic Peridynamic Material Based on Equilibrium

» Prof. Adair Aguiar[1], Mr. Alan Seitenfuss[1] (1. University of São Paulo)

2:15pm **IV.6.1.B -**
Multiscale and multiphysics computations in geomechanics
Seigle Hall 303
Chaired by: Dr. Esteban Rougier and Dr. Abigail Hunter

A multiscale meta-modeling game for fluid-infiltrating porous media

» Dr. Kun Wang[1], Prof. WaiChing Sun[1] (1. Columbia University)

Statistically Informed Upscaling of Damage Evolution in Brittle Materials

» Mr. Kevin Larkin[1], Mr. Nathan Vaughn[2], Ms. Alina Kononov[3], Mr. Bryan Moore[4], Dr. Esteban Rougier[5], Dr. Hari Viswanathan[5], Dr. Abigail Hunter[5] (1. New Mexico State University, 2. University of Michigan, 3. University of Illinois at Urbana-Champaign, 4. Broadridge Financial Solutions, 5. Los Alamos National Laboratory)

Fracture in Microstructure Accelerated by Machine Learning

» Dr. Abigail Hunter[1], Dr. Hari Viswanathan[1], Dr. Esteban Rougier[1], Dr. Gowri Srinivasan[1] (1. Los Alamos National Laboratory)

A framework for salt diapir simulation: ALE mechanics & immersed interfaces

» Prof. Guglielmo Scovazzi[1] (1. Duke University)

Correlating permeability changes with damage in brittle geomaterials

» Prof. John Stormont[1], Prof. Mahmoud Reda Taha[1], Mr. Samuel Boyce[1], Mr. Tyler Hagengruber[1], Ms. Angel Padilla[1], Mr. Joaquin Martinez[1], Dr. Esteban Rougier[2], Mr. Earl Knight[2] (1. University of New Mexico, 2. Los Alamos National Laboratory)

Dynamic compressive strength of rock salts

» Mr. Scott Broome[1], Dr. Stephen Bauer[1], Dr. Bo Song[1], Dr. Brett Sanborn[1] (1. Sandia National Laboratories)

2:15pm **IV.7.2.B -**
Functional soft composites – Design, mechanics, and manufacturing
Seigle Hall 104
Chaired by: Prof. Ruike Zhao and Dr. Xiao Kuang

KEYNOTE: Enhancing Mechanochemical Activity in Polymer Nanocomposites

» Prof. Nancy Sottos[1] (1. University of Illinois at Urbana-Champaign)

Magnetic-actuated soft material for fast-transforming and shape-locking

» Prof. Ruike Zhao[1], Dr. Qiji Ze[1], Dr. Xiao Kuang[2], Mr. Shuai Wu[1], Ms. Janet Wong[2], Mr. Rundong Zhang[1], Mr. Daniel Kimmel[2], Prof. Hang Qi[2] (1. The Ohio State University, 2. Georgia Institute of Technology)

Continued from **Monday, 14 October**

A Liquid Metal Elastomer Nanocomposite for Stretchable Dielectric Materials

» Mr. Chengfeng Pan[1], Dr. Eric Markvicka[1], Dr. Mohammad Malakooti[1], Dr. Jiajun Yan[1], Mr. Leiming Hu[1], Prof. Krzysztof Matyjaszewski[1], Prof. Carmel Majidi[1] (1. Carnegie Mellon University)

Flexible Porous Polymer Thin Film for Cardiac Energy Harvesting

» Dr. Lin Dong[1], Mr. Andrew Closson[1], Prof. Zi Chen[1], Prof. John. X.J. Zhang[1] (1. Dartmouth College)

Chemical Recycling of Epoxy Thermosets and Composites via Small Molecule Participated Exchange Reactions

» Dr. Xiao Kuang[1], Mr. Craig Hamel[1], Prof. Hang Qi[1] (1. Georgia Institute of Technology)

2:15pm **IV.7.3.D -**

Mechanics and physics of soft materials

Simon Hall 001

Chaired by: Prof. Stephan Rudykh

KEYNOTE: Soft Wearable Microfluidic Sensors for Healthcare Applications

» Prof. Chwee Teck Lim[1] (1. National University of Singapore)

Instabilities driven by controlled release in spherical microcapsules

» Dr. Michele Curatolo[1], Prof. Paola Nardinocchi[1] (1. Sapienza Università di Roma)

Elastic Instabilities in Hyperelastic Composites

» Mr. Nitesh Arora[1], Mr. Jian Li[2], Dr. Viacheslav Slesarenko[2], Prof. Stephan Rudykh[1] (1. University of Wisconsin-Madison, 2. Technion-Israel Institute of Technology)

2:15pm **IV.7.10.A -**

Physical and mechanical properties of metallic glasses; Glass Forming and Processing

Seigle Hall 103

Chaired by: Prof. Yue Fan and Prof. Katharine Flores

KEYNOTE: Tuning the glass-forming ability of metallic glasses through energetic frustration

» Prof. Corey OHern[1], Dr. Yuanchao Hu[1], Prof. Mark Shattuck[2], Prof. Jan Schroers[1] (1. Yale University, 2. City College of New York)

KEYNOTE: Controlling Disorder-Property Relationships in Metallic Alloys via Targeted Processing

» Prof. Daniel Gianola[1], Mr. Glenn Balbus[1], Dr. Mclean Echlin[1], Ms. Charlette Grigorian[2], Prof. Tim Rupert[2], Prof. Tresa Pollock[1] (1. University of California, Santa Barbara, 2. University of California, Irvine)

Stress- and temperature-driven structural dynamics in a Zr-based metallic glass

» Prof. Robert Maass[1] (1. University of Illinois at Urbana-Champaign)

Atomic Imprinting into Metallic Glasses

» Dr. Rui Li[1], Mr. Zheng Chen[1], Dr. Amit Datye[1], Dr. Georg H. Simon[2], Dr. Jittisa Ketkaew[1], Dr. Emily Kinser[1], Prof. Ze Liu[3], Mr. Chao Zhou[1], Dr. Omur E. Dagdeviren[1], Dr. Sungwoo Sohn[1], Prof. Jonathan P. Singer[4], Prof. Chinedum O. Osuji[1], Prof. Jan Schroers[1], Prof. Udo Schwarz[1] (1. Yale University, 2. Fritz-Haber Institute of the Max-Planck Society, 3. Wuhan University, 4. Rutgers University)

2:15pm **IV.5.2.C -**

Deformation, strength, and resilience of structures

Simon Hall 023

Chaired by: Prof. Matthew Begley and Dr. Catherine Ambrose

KEYNOTE: Response of 3D printed truss and thin-walled structures

» Prof. Matthew Begley[1], Ms. Connie Dong[1], Ms. Sara Messina[1] (1. University of California, Santa Barbara)

Continued from **Monday, 14 October**

KEYNOTE: The Structural and Material Properties of Bone
» Dr. Catherine Ambrose[1] (1. University of Texas Health Science Center)

Dentin horn angle and enamel thickness control tooth resilience and bite force
» Prof. Herzl Chai[1] (1. Tel Aviv University)

Evolution of Microstructure and Creep Behavior in an Fe-Ni-Cr-Nb-C Heat Resistant Alloy Tube During Elevated Temperature Aging
» Dr. Dingyi Sun[1], Dr. Changwoo Jeon[1], Dr. Hyungsoo Lee[1], Prof. Allan Bower[1], Prof. Sharvan Kumar[1], Dr. Ihho Park[2], Dr. Yunjo Ro[2], Dr. Raghavan Ayer[2] (1. Brown University, 2. SK Innovation)

3:30pm **Coffee Break**

4pm **Session V**

4pm **V.1.1.C -**
Prager Medal Symposium
Seigle Hall 301
Chaired by: Prof. Guruswami Ravichandran

KEYNOTE: Quasibrittle Failure Probability at 10-6 Tail: Fishnet Model for Nacreous Material Architecture and Its Scaling
» Prof. Zdenek P. Bazant[1], Mr. Wen Luo[1] (1. Northwestern University)

Fracture of Heterogeneous Materials
» Prof. Guruswami Ravichandran[1] (1. California Institute of Technology)

A Model for the Quasistatic Evolution of Cracks with Spurs of Supercritical Propagation
» Prof. Adrian Lew[1], Prof. Maurizio Chiaramonte[2] (1. Stanford University, 2. Princeton University)

KEYNOTE: The dynamics of phase transformations in deep earthquakes
» Dr. Xanthippi Markenscoff[1] (1. University of California, San Diego)

4pm **V.1.2.C -**
Eringen Medal Symposium
Seigle Hall 206
Chaired by: Prof. Yonggang Huang

KEYNOTE: Atomically Precise Fabrication for Quantum Devices: A Digital Approach
» Dr. John Randall[1], Dr. James H.G. Owen[1], Dr. Ehud Fuchs[1], Mr. Joseph Lake[1], Mr. Rahul Saini[1], Prof. Reza Moheimani[2], Prof. Wiley Kirk[3] (1. Zyvex Labs, 2. University of Texas at Dallas, 3. 3D Epitaxial Technologies/University of Texas at Arlington)

KEYNOTE: Mechanics-guided, deterministic 3D assembly
» Prof. Yonggang Huang[1], Prof. Yihui Zhang[2], Prof. John Rogers[1] (1. Northwestern University, 2. Tsinghua University)

Plasticity in metallic nanocrystals
» Prof. Scott Mao[1] (1. University of Pittsburgh)

Finite Element Analysis of General Micromorphic Theory
» Prof. James Lee[1], Dr. Jiaoyan Li[2], Ms. Kerlin Robert[1] (1. The George Washington University, 2. Idaho National Laboratory)

4pm **V.1.3.B -**
G. I. Taylor Medal Symposium
Seigle Hall 204
Chaired by: Prof. Thomas Hughes

Continued from **Monday, 14 October**

Towards patient-specific multi-physics modeling of cardiac function

» Dr. Alison Marsden[1], Dr. Vijay Vedula[1], Mr. Oguz Tikenogullari[1], Dr. Ellen Kuhl[1] (1. Stanford University)

Stabilized and Multiscale Methods: Unifying CFD for Science and Engineering

» Prof. Yuri Bazilevs[1] (1. Brown University)

A residual-based variational multi-scale formulation for environmental flows with changing densities

» Prof. Jinhui Yan[1] (1. University of Illinois at Urbana-Champaign)

Stabilized Cut Finite Elements for Mixed Dimensional Problems

» Prof. Erik Burman[1], Prof. Peter Hansbo[2], Prof. Mats G. Larson[3], Dr. Karl Larsson[3] (1. University College London, 2. Jonkoping University, 3. Umea University)

Variational Multiscale Formulations for Reduced Order Models in Flow Problems

» Prof. Ramon Codina[1] (1. Universitat Politècnica de Catalunya)

4pm

V.2.1.C -

Fatigue and fracture, a symposium in memory of Paul C. Paris

Seigle Hall L006

Chaired by: Prof. Diana Lados

KEYNOTE: The structure of long-dormant Earth faults in the subsurface and their susceptibility to reactivation by nearby fluid injection

» Prof. James R. Rice[1], Dr. Alissar Yehya[2], Mr. Zhuo Yang[1] (1. Harvard University, 2. American University of Beirut)

High-Speed, Hydraulic Soft Fracture

» Mr. Matt Milner[1], Dr. Randy Mrozek[2], Prof. Shelby Hutchens[1] (1. University of Illinois at Urbana-Champaign, 2. U.S. Army Research Laboratory)

Applications of fracture mechanics concepts to earthquake source processes

» Prof. Nadia Lapusta[1], Mr. Valère Lambert[1] (1. California Institute of Technology)

Fracture in 2D materials

» Prof. Huajian Gao[1] (1. Brown University)

Multiscale modelling of fracture – an Overview and Review and Opportunities for Future Work

» Prof. Markus Buehler[1] (1. Massachusetts Institute of Technology)

4pm

V.3.6.E -

Mechanics of growth, morphogenesis and evolution of biological solids

Seigle Hall 304

Chaired by: Dr. Franck Vernerey

KEYNOTE: Organ size, inflationary embryology, and the statistical physics of tissue growth

» Prof. David Lubensky[1], Mr. Ojan Khatib Damavandi[1] (1. University of Michigan)

Exploring Shape-Dependent Tissue Spreading Using an Elastic Continuum Model

» Dr. Holley Lynch[1], Dr. Tracy Stepien[2] (1. Stetson University, 2. University of Florida)

Growth Dynamics of Large, Freely Expanding Epithelial Monolayers

» Mr. Matt Heinrich[1], Ms. Julienne LaChance[1], Dr. Tom Zajdel[1], Dr. Daniel Cohen[1], Dr. Andrej Kosmrlj[1] (1. Princeton University)

Fibroblasts remodel collagen in three dimensions via hierarchical compaction and contraction

» Dr. Delaram Shakiba[1], Dr. Farid Alisafaei[2], Mr. Zhangao Liu[1], Mr. Alireza Savadipour[1], Dr. Roger Rowe[1], Dr. Kenneth Pryse[1], Prof. Vivek Shenoy[2], Prof. Elliot Elson[1], Prof. Guy Genin[1] (1. Washington University in St. Louis, 2. University of Pennsylvania)

Continued from **Monday, 14 October**

Emergence of functional neuro-muscular units – a case of in vitro development
» Mr. Onur Aydin[1], Prof. M Taher Saif[1] (1. University of Illinois at Urbana-Champaign)

4pm **V.3.7.A -**
Mechanics of the brain
Seigle Hall L002
Chaired by: Dr. Songbai Ji and Dr. Andrew Knutsen

KEYNOTE: Intraoperative Image Updating for Guiding Brain Tumor Resection
» Prof. Keith Paulsen[1], Dr. Xiaoyao Fan[1], Prof. David Roberts[1] (1. Dartmouth College)

Characterizing Complex Morphology of Brain by Imaging and Mechanical Modeling
» Prof. Mir Jalil Razavi[1], Prof. Xianqiao Wang[2] (1. Binghamton University (SUNY), 2. University of Georgia)

Mechanical behavior of brain tissue by considering in-vivo intracranial dynamics
» Dr. Lixiang Yang[1] (1. University of Cincinnati)

The Biomechanics of Indirect Traumatic Optic Neuropathy Using a Computational Head Model with a High-Fidelity Orbit
» Dr. Nitin Daphalapurkar[1], Mr. Yang Li[2], Dr. Eric Singman[3] (1. Los Alamos National Laboratory, 2. Johns Hopkins University, 3. Johns Hopkins Medicine)

MR image based biomechanical modelling of brain
» Mr. Changxin Lai[1], Mr. Suhao Qiu[1], Prof. Michael Sacks[2], Prof. Yuan Feng[1] (1. Shanghai Jiao Tong University, 2. University of Texas at Austin)

4pm **V.3.9.E -**
Multiscale modeling of molecular, cellular, tissue, and organ mechanics
Seigle Hall L003
Chaired by: Reza Avaz

Collective Migration of Heterogenous Cell Populations Defined by Varying Polarity
» Mr. Jairaj Mathur[1], Dr. Bapi Sarker[1], Dr. Amit Pathak[1] (1. Washington University in St. Louis)

Characterization of Cell Morphogenesis by Spectral Decomposition Analysis
» Dr. Xiao Ma[1], Prof. Klaus Hahn[2], Prof. Gaudenz Danuser[1] (1. University of Texas Southwestern Medical Center, 2. University of North Carolina at Chapel Hill)

Cancer cell deformability in microfluidic devices
» Prof. Igor Pivkin[1] (1. USI Lugano)

Boundary integral simulations of a red blood cell squeezing through a submicron slit under prescribed inlet and outlet pressures
» Dr. Zhangli Peng[1], Ms. Huijie Lu[1] (1. University of Notre Dame)

Dermal Human Microvascular Endothelial Cells Resist Morphological Changes Due to Fluid Shear Stress
» Ms. Jessica Aldrich[1], Dr. David Long[1] (1. Wichita State University)

Circulating tumor cell transport, adhesion, and capture efficiency prediction in cell suspensions in microfluidic devices
» Dr. Jifu Tan[1], Mr. Zhenya Ding[2], Dr. Wei Li[2] (1. Northern Illinois University, 2. Texas Tech University)

4pm **V.3.10.B -**
Plant biomechanics
Seigle Hall L004
Chaired by: Prof. Joseph Turner

Continued from **Monday, 14 October**

Perimembrane arabinogalactan proteins: observations and electromechanical models for patterning, with proposals for how pattern regulates growth and turgor responses

» Dr. Renate A Weizbauer[1], Dr. Shaobao Liu[2], Prof. Li Hong Zhou[3], Prof. David W. Ehrhardt[1], Prof. Feng Xu[4], Prof. Guy Genin[5], Prof. Barbara G. Pickard[5] (1. Carnegie Institution at Stanford, 2. Xi'an Xiaotong University, 3. Hebei Agricultural University, 4. Xi'an Jiaotong University, 5. Washington University in St. Louis)

Living Plant Cell Wall Mechanical Properties and Turgor Pressure Probed by Nanoindentation and Mechanical Modeling

» Dr. Wenlong Li[1], Ms. Faezeh Afshar[1], Mr. Samuel Belteton[2], Dr. Daniel Szymanski[2], Prof. Joseph Turner[1] (1. University of Nebraska-Lincoln, 2. Purdue University)

A mechano-chemical approach to understanding directional plant growth patterns

» Ms. Natasha Bilkey[1], Mr. Huiyong Li[1], Dr. Marcus Foston[1], Dr. Ram Dixit[1] (1. Washington University in St. Louis)

The role of cell wall elasticity in the directional stem curling of the resurrection plant Selaginella lepidophylla

» Dr. Meisam Asgari[1], Dr. Veronique Brule[1], Prof. Tamara Western [1], Prof. Damiano Pasini[1] (1. McGill University)

Modelling the Mechanics of Stomatal Complexes to Determine the Functional Contributions of Cell Wall Components

» Prof. Hojae Yi[1], Ms. Yintong Chen[1], Dr. Yue Rui[1], Dr. Baris Kandemir[1], Ms. Dolzodmaa Davaasuren[1], Prof. James Wang[1], Dr. Charles Anderson[1], Prof. Virendra Puri[1] (1. The Pennsylvania State University)

A Method for Mapping the Transverse Material Properties of Maize Tissue to Finite Element Models with Computed Tomography

» Mr. Christopher Stubbs[1], Mr. Ryan Larson[2], Dr. Douglas Cook[2] (1. New York University, 2. Brigham Young University)

4pm

V.7.4.A -

Mechanics of electrochemically active materials: Multi-scale modeling

Simon Hall 018

Chaired by: Dr. Claudio Di Leo

KEYNOTE: Integrating mechanics and electrochemistry across scales in battery research

» Prof. Wei Lu[1] (1. University of Michigan)

KEYNOTE: Two-level FE modelling of Li-ion battery and its degradation

» Prof. Bai-Xiang Xu[1] (1. Technische Universitaet Darmstadt)

Phase-field study of the particle size and average concentration dependent miscibility gap in nanoparticles of LixMn2O4, LixFePO4, and NaxFePO4

» Mr. Tao Zhang[1], Prof. Marc Kamlah[1] (1. Karlsruhe Institute of Technology)

Non-linear kinetics interface element for modeling multi-particle behavior in Li-ion electrodes

» Mr. Donald Bistri[1], Dr. Claudio Di Leo[1] (1. Georgia Institute of Technology)

4pm

V.5.1.B -

Damage localization, fracture and size-effect in composites

Simon Hall 017

Chaired by: Dr. Gianluca Cusatis and Dr. Marco Salviato

KEYNOTE: A Size-Effect Study on the Strength and Cohesive Behavior of Thermoset Polymers at the Microscale

» Dr. Marco Salviato[1], Mr. Yao Qiao[1] (1. University of Washington)

Experimental and numerical investigation on the mechanical behavior of 3D woven composites

» Dr. Weixin Li[1], Dr. Marco Salviato[2], Dr. Kyle Warren[3], Prof. Zdenek P. Bazant[4], Dr. Gianluca Cusatis[4] (1. Johns Hopkins University, 2. University of Washington, 3. Albany Engineered Composites, Inc, 4. Northwestern University)

Continued from **Monday, 14 October**

Multiscale Virtual Testing and Validation of a DARPA TuFF Material
» Dr. Garrett Nygren[1], Dr. Liang Wang[1], Dr. Ryan Lee Karkkainen[1], Dr. Qingda Yang[1] (1. University of Miami)

Effective toughness of heterogeneous materials: experimental study on pinning and depinning dynamics
» Mr. Gabriele Albertini[1], Mr. Mathias Lebihain[2], Dr. Francois Hild[3], Dr. Laurent Ponson[2], Prof. David Kammer[4] (1. Cornell University, 2. Sorbonne Université, 3. ENS Paris-Saclay, 4. ETH Zurich)

Discrete element models of crack propagation and toughness in enamel, a complex 3D biocomposite
» Dr. John Pro[1], Prof. Francois Barthelat[1] (1. McGill University)

4pm

V.5.3.D -
Machine learning in mechanics and materials
Seigle Hall 106
Chaired by: Dr. Zhao Qin

Application of time series prediction method for potential of mean force calculations with molecular dynamics
» Mr. Wen-Hao Yang[1], Mr. Deng Li[1], Prof. Tai-Chia Lin[1], Prof. Shu-Wei Chang[2] (1. National Taiwan University, 2. National Taiwan Unversity)

KEYNOTE: Text and Data mining to aid Materials Synthesis
» Prof. Elsa Olivetti[1], Dr. Edward Kim[1], Mr. Zach Jensen[1] (1. Massachusetts Institute of Technology)

Topology-Informed Machine Learning for Predicting Glasses' Stiffness
» Prof. Mathieu Bauchy[1] (1. University of California, Los Angeles)

Physics-based inverse design of elastic rods with deep neural network
» Dr. Longhui Qin[1], Dr. Tianyi Wang[1], Dr. Tonmoy Monsoor[1], Prof. Vwani Roychowdhury[1], Prof. Mohammad Khalid Jawed[1] (1. University of California, Los Angeles)

4pm

V.5.4.C -
Non-classical and non-local continuum mechanics and constitutive theories
Seigle Hall 208
Chaired by: Prof. Debasish Roy and Dr. Albert Romkes

SES FELLOW KEYNOTE: Parametrically Homogenized Constitutive Models (PHCM) from Image-based Crystal Plasticity Modeling to Predict Fatigue Crack Nucleation
» Prof. Somnath Ghosh[1] (1. Johns Hopkins University)

Thermodynamic theory of crystal plasticity – formulation and application to fcc copper
» Dr. Charles Lieou[1], Prof. Curt Bronkhorst[2] (1. Los Alamos National Laboratory, 2. University of Wisconsin-Madison)

Reformulation of continuum mechanics for concurrent atomistic-continuum simulation of crystalline solids
» Prof. Youping Chen[1] (1. University of Florida)

Self-Consistent Model for Crack Propagation in Crystal Plasticity Using Concurrent Atomistic-CPFE Framework
» Dr. Subhendu Chakraborty[1], Prof. Somnath Ghosh[1] (1. Johns Hopkins University)

Thermodynamically Consistent Thermoelastic Beam Mathematical Models Based on Nonclassical Continuum Mechanics Incorporating Internal Rotations
» Prof. Karan Surana[1], Mr. Celso Carranza[1], Prof. J.N. Reddy[2] (1. University of Kansas, 2. Texas A&M University)

4pm

V.6.1.C -
Multiscale and multiphysics computations in geomechanics
Seigle Hall 303
Chaired by: Dr. Kane Bennett and Dr. Esteban Rougier

Continued from **Monday, 14 October**

KEYNOTE: Fluid-Structure Interaction Problems via the Combined Finite-Discrete Element Method

» Dr. Esteban Rougier[1], Dr. Zhou Lei[1], Dr. Bryan Euser[1], Mr. Earl Knight[1], Dr. Antonio Munjiza[2] (1. Los Alamos National Laboratory, 2. University of Split)

Three-Dimensional Discrete Element Method Parallel Computation of Cauchy Stress Distribution over Granular Materials

» Dr. Beichuan Yan[1], Prof. Richard Regueiro[1] (1. University of Colorado Boulder)

Development of a Particle-shape-captured DEM-CFD Coupled Model towards Large-scale and Synchronized Parallel Computations of Gas-particles Interaction

» Dr. Beichuan Yan[1], Prof. Richard Regueiro[1] (1. University of Colorado Boulder)

Modelling Fracture and Fragmentation via the Combined Finite-Discrete Element Method

» Dr. Zhou Lei[1], Dr. Esteban Rougier[1], Dr. Bryan Euser[1], Mr. Earl Knight[1], Dr. Antonio Munjiza[2] (1. Los Alamos National Laboratory, 2. University of Split)

Material Point Method Simulations of Dynamic Fracture in Granular Materials

» Dr. Chris Long[1], Dr. George Moutsanidis[2], Prof. Yuri Bazilevs[2] (1. Los Alamos National Laboratory, 2. Brown University)

4pm

V.7.2.C -

Functional soft composites – Design, mechanics, and manufacturing

Seigle Hall 104

Chaired by: Prof. Ruike Zhao and Dr. Mrityunjay Kothari

KEYNOTE: Computational design of soft functional composite hydrogel structures and devices

» Prof. Thao Nguyen[1], Mr. Jiayu Liu[1], Prof. David Gracias[1] (1. Johns Hopkins University)

Smart Composites Made of LMPA Foam and Elastomer with >100x Stiffness Tunability

» Mr. Siavash Sharifi[1], Dr. Amir Mohamadinassab[2], Dr. Yiliang Liao[3], Dr. Wanliang Shan[1] (1. University of Nevada, Reno/Syracuse University, 2. University of Nevada, Reno/Yale University, 3. University of Nevada, Reno)

Multi-material 3D Printing: Integrating Digital Light Processing and Direct Ink Writing

» Mr. Xirui Peng[1], Dr. Xiao Kuang[1], Mr. Devin Roach[1], Prof. Hang Qi[1] (1. Georgia Institute of Technology)

An electrically conductive and stiffness tunable soft composite with shape memory effect

» Dr. Amir Mohammadi Nasab[1], Mr. Siavash Sharifi[2], Dr. Wanliang Shan[2] (1. University of Nevada, Reno/Yale University, 2. University of Nevada, Reno/Syracuse University)

Graph theory analysis of rich fiber-scale data yields very fast simulations of damage evolution in composites

» Dr. Jerry Quek[1], Dr. Brian Cox[2] (1. IHPC, 2. Independent Scholar)

4pm

V.7.3.E -

Mechanics and physics of soft materials

Simon Hall 001

Chaired by: Dr. Shengqiang Cai

Dynamic rheological behavior of poly(ethylene glycol) diacrylate hydrogels at high shear strain rates

» Dr. Ke Luo[1], Mr. Kshitiz Upadhyay[1], Prof. Ghatu Subhash[1], Prof. Douglas Spearot[1] (1. University of Florida)

Geometrical and Mechanical Characterization of Interlayer Bonding Quality in Fused Filament Fabrication of Polycarbonate

» Mr. Lichen Fang[1], Ms. Yishu Yan[1], Mr. Ojaswi Agarwal[1], Prof. Kevin Hemker[1], Prof. Sung Hoon Kang[1] (1. Johns Hopkins University)

Continued from **Monday, 14 October**

Effective ionic conductivity of soft solid heterogeneous electrolytes
» Ms. Kosar Mozaffari[1], Dr. Liping Liu[2], Prof. Pradeep Sharma[1] (1. University of Houston, 2. Rutgers University)

Experiments and modeling the viscoelastic behavior of polymeric gels
» Mr. Nikola Bosnjak[1], Mr. Justin Newkirk[1], Dr. Shawn Chester[1] (1. New Jersey Institute of Technology)

Using Indentation To Characterize The Mechanical, Transport And Adhesion Properties Of Gels
» Dr. Yuhang Hu[1] (1. Georgia Institute of Technology)

Varying bubble amplitude in polyacrylamide hydrogels to test robustness of Inertial Microcavitation Rheometry technique
» Ms. Selda Buyukozturk[1], Dr. Jin Yang[2], Prof. Christian Franck[2] (1. Brown University, 2. University of Wisconsin-Madison)

4pm

V.7.10.B -
Physical and mechanical properties of metallic glasses; Modeling & Theory I
Seigle Hall 103
Chaired by: Prof. Katharine Flores and Prof. Yue Fan

KEYNOTE: A Structural Measure of Effective- (Fictive-) Temperature and its Basis in Statistical Mechanics
» Dr. Darius Alix-Williams[1], Prof. Michael Falk[1] (1. Johns Hopkins University)

Poisson ratio effects on structure, dynamics, and thermodynamics in metallic liquids and glasses
» Dr. James Morris[1], Prof. Takeshi Egami[2] (1. Oak Ridge National Laboratory, 2. University of Tennessee)

A Viscoelastic Hydrodynamics Theory of the Collective Density Fluctuations in Liquids and Glasses
» Prof. Y Z[1] (1. University of Illinois at Urbana-Champaign)

Unraveling the atomistic origin of non-monotonic ageing in metallic glasses
» Prof. Yue Fan[1] (1. University of Michigan)

Atomic-level deformation of CuZr metallic glasses during shock compression
» Dr. Peng Wen[1], Dr. Brian Demaske[2], Prof. Simon Phillpot[3], Prof. Douglas Spearot[3] (1. Nanjing University of Science and Technology, 2. Sandia National Laboratories, 3. University of Florida)

4pm

V.5.2.D -
Deformation, strength, and resilience of structures
Simon Hall 023
Chaired by: Dr. Robert Ambrose and Dr. Dingyi Sun

Adaptive Computational Plasticity with a Composite Tetrahedral Element
» Dr. Brian Granzow[1], Dr. James Foulk III[1], Dr. Daniel Ibanez[1], Dr. Alejandro Mota[1], Dr. Jakob Ostien[1], Dr. Brandon Talamini[1] (1. Sandia National Laboratories)

Topology Optimization across scales: incorporating quasibrittle size-dependent strength in design.
» Mr. Vincenzo Vernacchio[1], Prof. Thomas Siegmund[1] (1. Purdue University)

Mechanical properties of irradiated metallic materials
» Mr. Long Yu[1], Prof. Huiling Duan[1] (1. Peking University)

Continued from **Monday, 14 October**

Improving the Mechanical Properties of Magnesium Alloy AZ31B Through Heat Treatment and Cold Rolling

» Mr. Sultan Alzoabi[1], Mr. Shenggang Zhou[1], Prof. Omar Es-Said[1], Prof. Natalie Schaal[1], Mr. Xiaodong Sun[1], Mr. Nathan Santos[1], Mr. John Manganiello[1], Mr. Finn Lynch[1], Mr. Salim Es-Said[1], Mr. Aseel Rajab[1], Mr. Fawaz Aladwani[1], Mr. Abdullah Abukhalaf[1], Mr. Mohammad Alfadhli[1], Mr. Spencer Chan[1], Mr. Shonnu Ba Thaung [1], Mr. Matthew Soriano[1], Prof. Ray Toal[1], Mr. Yongjun Li[1], Dr. Dingyi Sun[2] (1. Loyola Marymount University, 2. Brown University)

KEYNOTE: NASA's Robotic Solutions For Assisting Humans in Space

» Dr. Robert Ambrose[1] (1. NASA Johnson Space Center)

5:45pm **Session VI**

5:45pm **VI.1.1.D - Prager Medal Symposium**

Seigle Hall 301

Chaired by: Prof. Pedro Reis

KEYNOTE: A gradient-damage theory for fracture of quasi-brittle materials

» Dr. Lallit Anand[1], Mr. Sooraj Narayan[1] (1. Massachusetts Institute of Technology)

Hydrogen embrittlement in metallic nanowires

» Dr. Sheng Yin[1], Dr. Guangming Cheng[2], Dr. Gunther Richter[3], Prof. Yong Zhu[4], Prof. Huajian Gao[5] (1. University of California, Berkeley, 2. Princeton University, 3. Max Planck Institute for Intelligent Systems, 4. North Carolina State University, 5. Brown University)

Interfacial shear stress transfer at nanowire-polymer interfaces

» Dr. Felipe Poblete[1], Prof. Yong Zhu[1] (1. North Carolina State University)

KEYNOTE: Relation between blood pressure and pulse wave velocity for human arteries

» Prof. Yonggang Huang[1], Dr. Yinji Ma[2], Prof. John Rogers[1] (1. Northwestern University, 2. Tsinghua University)

5:45pm **VI.7.12.A - Advances in micromechanics of materials**

Simon Hall 017

Chaired by: Prof. Andrej Cherkaev

On the possibilities and limitations of the micromechanics of materials

» Prof. Mark Kachanov[1] (1. Tufts University)

Influence of Pore Structure on Failure Behavior of Geopolymer Composies

» Prof. Ange Therese Akono[1], Prof. Seid Koric[2], Prof. Waltraud Kriven[2] (1. Northwestern University, 2. University of Illinois at Urbana-Champaign)

Homogenization of Elastic Dielectric Composites with Rapidly Oscillating Passive and Active Source Terms

» Prof. Victor Lefevre[1], Prof. Oscar Lopez-Pamies[2] (1. Northwestern University, 2. University of Illinois at Urbana-Champaign)

Heterogeneous materials with anisotropic matrices

» Prof. Igor Sevostianov[1] (1. New Mexico State University)

How is slip nucleated at a frictional interface?

» Dr. Tom de Geus[1], Dr. Maro Popovic[1], Mr. Wencheng Ji[1], Dr. Alberto Rosso[2], Dr. Matthieu Wyart[1] (1. École polytechnique fédérale de Lausanne (EPFL), 2. Universite Paris-Sud)

Continued from **Monday, 14 October**

Multiscale micromechanical modeling of the elastic properties of dentin
» Dr. Seyedali Seyedkavoosi[1], Prof. Igor Sevostianov[1] (1. New Mexico State University)

5:45pm **VI.1.3.C -**
G. I. Taylor Medal Symposium
Seigle Hall 204
Chaired by: Prof. Yuri Bazilevs

Stabilized methods for transient solid dynamics: How ideas initially developed for fluid dynamics simulations can apply
» Prof. Guglielmo Scovazzi[1] (1. Duke University)

A Three-Scale Variational Multiscale Method for Free Surface Flows
» Dr. Ramon Calderer[1] (1. Intel Corportation)

A Stabilized Variational Multiscale DG Framework for Thermomechanical Contact Problems
» Dr. Pinlei Chen[1], Ms. Wan Wan[1] (1. The Pennsylvania State University)

An Adaptive Stabilized Finite Element Method Based on Residual Minimization
» Prof. Victor Calo[1], Prof. Alexandre Ern[2], Dr. Ignacio Muga[3], Dr. Sergio Rojas[1] (1. Curtin University, 2. Universite Paris-Est, 3. Pontificia Universidad Católica de Valparaíso)

Advances on the Computation of Turbomachinery flows with ALE and MRF Methods
» Prof. Guillermo Hauke[1], Dr. Diego Irisarri[1] (1. Escuela de Ingeniería y Arquitectura)

5:45pm **VI.2.1.D -**
Fatigue and fracture, a symposium in memory of Paul C. Paris
Seigle Hall L006
Chaired by: Prof. Herman Nied

KEYNOTE: A Comparative Study of Ti-6Al-4V Alloys Fabricated by Three Powder-Based Additive Manufacturing Technologies: Integrative Design for Fatigue Performance and New Methods for Rapid Material/Part Qualification
» Dr. Yuwei Zhai[1], Mr. Haize Galarraga[1], Dr. Robert Warren[1], Prof. Diana Lados[1] (1. Worcester Polytechnic Institute)

Use of mini-specimens to study ductile failure of engineering materials
» Ms. Chiraz Belhadj[1], Dr. Yazid Madi[1], Dr. Clement Soret[2], Dr. Jacques Besson[1] (1. MINES ParisTech, 2. GRTGaz)

Microstructural Predictions of Thermo-Mechanical Fracture of Crystalline Alloys
» Mr. Ismail Mohamed[1], Mr. T. Hasan[1], Prof. Mohammed Zikry[1] (1. North Carolina State University)

Virtual fracture testing of coatings using highly parallelized cohesive zone frameworks
» Prof. Matthew Begley[1], Mr. Stephen Sehr[1], Dr. J. William Pro[2] (1. University of California, Santa Barbara, 2. McGill University)

Interpretation of R-curves in metal foams: experiment versus prediction
» Dr. Harika Tankasala[1], Dr. Tiantian Li[1], Dr. Philipp Seiler[1], Prof. Vikram Deshpande[1], Prof. Norman Fleck[1] (1. University of Cambridge)

5:45pm **VI.3.6.F -**
Mechanics of growth, morphogenesis and evolution of biological solids
Seigle Hall 304
Chaired by: Prof. Zi Chen

Continued from **Monday, 14 October**

KEYNOTE: Tissue flow genetics: mapping the forces that shape organs

» Prof. Sebastian Streichan[1] (1. University of California, Santa Barbara)

Inhibition of TRPV4 Reduces Mechanically Induced Inflammation in a Lumbar Disc Organ Culture Model

» Mr. Garrett Easson[1], Dr. Simon Tang[1] (1. Washington University in St. Louis)

Murine bone adaptation to axial and transverse loading during growth

» Mr. Hyunggwi Song[1], Prof. Mariana Kersh[1] (1. University of Illinois at Urbana-Champaign)

The effect of changes in mineral density and bone area fraction on strain energy density in growing foals

» Ms. Sara Moshage[1], Dr. Annette McCoy[1], Prof. John Polk[1], Prof. Mariana Kersh[1] (1. University of Illinois at Urbana-Champaign)

YAP and TAZ Mediate Osteoprogenitor Mobilization for Primary Ossification Center Development

» Mr. Joseph Collins[1], Prof. Nathaniel Dyment[1], Prof. Joel Boerckel[1] (1. University of Pennsylvania)

5:45pm **VI.3.7.B -**

Mechanics of the brain

Seigle Hall L002

Chaired by: Prof. Yuan Feng and Dr. Curtis Johnson

KEYNOTE: The Mechanics of Traumatic Brain Injury in a Mouse Model

» Mr. Connor Bradfield[1], Dr. Liming Voo[2], Prof. KT Ramesh[1] (1. Johns Hopkins University, 2. Johns Hopkins Applied Physics Laboratory)

MRI-based measurements of strain and stiffness in the live, human brain

» Dr. Andrew Knutsen[1], Dr. Mihika Gangolli[1], Prof. Philip Bayly[2], Dr. John Butman[3], Dr. Dzung Pham[1], Dr. Curtis Johnson[4] (1. Henry M. Jackson Foundation for the Advancement of Military Medicine, 2. Washington University in St. Louis, 3. National Institutes of Health, 4. University of Delaware)

Simulation of Harmonic Shear Waves in the Human Brain and Comparison with Measurements from Magnetic Resonance Elastography

» Dr. Nitin Daphalapurkar[1], Mr. Yang Li[2] (1. Los Alamos National Laboratory, 2. Johns Hopkins University)

Effect of excitation location on harmonic wave propagation in the human brain

» Dr. Ruth Okamoto[1], Dr. Curtis Johnson[2], Prof. Philip Bayly[1] (1. Washington University in St. Louis, 2. University of Delaware)

5:45pm **VI.3.9.F -**

Multiscale modeling of molecular, cellular, tissue, and organ mechanics

Seigle Hall L003

Chaired by: Dr. Emma Lejeune

Tensile Failure and Damage of Mineralized Tissue

» Mr. Rizacan Sarikaya[1], Prof. Anil Misra[1] (1. University of Kansas)

Multiscale modeling of pregnant uterus

» Dr. Mengxue Zhang[1], Dr. Patricio La Rosa[2], Prof. Arye Nehorai[1] (1. Washington University in St. Louis, 2. Bayer Company)

Effect of Fatigue on Impact Loading of Rat Ulna

» Mr. Chenxi Yan[1], Prof. Stuart Warden[2], Prof. Mariana Kersh[1] (1. University of Illinois at Urbana-Champaign, 2. Indiana University-Purdue University Indianapolis)

Continued from **Monday, 14 October**

From active-gel theory of actomyosin cortex to dynamic vertex models of epithelial mechanics
» Dr. Sohan Kale[1], Mr. Adam Ouzeri[2], Dr. Alejandro Torres-Sánchez[2], Prof. Marino Arroyo[2] (1. Virginia Tech, 2. Universitat Politècnica de Catalunya)

Extracting Mechanical Properties of Bacterial Cells Using Inverse Analysis and Atomic-Force Microscopy
» Ms. Leah Ginsberg[1], Prof. Guruswami Ravichandran[1] (1. California Institute of Technology)

5:45pm **VI.3.3.B_VI.3.10.C -**
Cross-cutting workshop on the engineering of plants
Seigle Hall L004
Chaired by: Dr. Elizabeth Haswell and Dr. Erin Sparks and Dr. Douglas Cook

5:45pm **VI.7.4.B -**
Mechanics of electrochemically active materials: Modeling general
Simon Hall 018
Chaired by: Siva Nadimpalli

Chemomechanics of High-Performance Lithium-Ion and Sodium-Ion Battery Anodes
» Prof. Shuman Xia[1], Mr. Marc Papakyriakou[1] (1. Georgia Institute of Technology)

Mechanics of Metallic Lithium and Sodium Anodes
» Prof. Matt Pharr[1], Mr. Coleman Fincher[1] (1. Texas A&M University)

A nanoindentation approach to probe composition-dependent diffusion and stress regulation in a-Si
» Ms. Luize Vasconcelos[1], Mr. Rong Xu[1], Prof. Kejie Zhao[1] (1. Purdue University)

Modeling of Graphene-Anode Interface for Ion Battery Technology
» Ms. Vidushi Sharma[1], Dr. Kamalika Ghatak[1], Dr. Dibakar Datta[1] (1. New Jersey Institute of Technology)

5:45pm **VI.9.4.C -**
Controlling mechanical waves with metamaterials
Seigle Hall 109
Chaired by: Prof. Kathryn Matlack and Dr. Ramathasan Thevamaran

Transition waves in soft multistable materials with embedded magnets
» Ms. Lucia M. Korpas[1], Dr. Hiromi Yasuda[1], Dr. Jordan R. Raney[1] (1. University of Pennsylvania)

Discreteness Effects on the Stability of Transition Wave in Bistable Lattices
» Mr. Myungwon Hwang[1], Dr. Andres Arrieta[1] (1. Purdue University)

Topological Solitons in Substrate-free Metamaterials
» Dr. Romik Khajehtourian[1], Prof. Dennis Kochmann[1] (1. ETH Zurich)

Tailoring phonon wave propagation through buckling in nanoelectromechanical waveguides
» Mr. Sunphil Kim[1], Mr. Jonathan Bunyan[1], Prof. Alexander Vakakis[1], Prof. Sameh Tawfick[1], Prof. Arend van der Zande[1] (1. University of Illinois at Urbana-Champaign)

5:45pm **VII.Emerge -**
Fluids, Structures, and Interfaces
Seigle Hall 206
Chaired by: Dr. Nate Huebsch

KEYNOTE: Dynamically coupled, Hamiltonian models for bio-inspired underwater locomotion problems
» Prof. Banavara Shashikanth[1] (1. New Mexico State University)

Continued from **Monday, 14 October**

Study of vesicle migration in Couette flow with soft coated walls via divergence-conforming immersed boundary (DCIB) formulation

» Dr. Antonio Cerrato Casado[1], Dr. Hugo Casquero Penelas[2], Dr. Joan Josep Cerdà Pino[1], Dr. Carles Bona Casas[1] (1. Universitat de les Illes Balears, 2. Carnegie Mellon University)

Large Eddy Residual Based Variational Multi-Scale Turbulent Model for Low-Mach Number Variable Density Flow

» Mr. Lixing Zhu[1], Prof. Arif Masud[1] (1. University of Illinois at Urbana-Champaign)

Characterization of Ice-Aluminium Interface using the Blister Test

» Mr. Christopher Giuffre[1], Mr. Bishoy Dawood[1], Dr. Denizhan Yavas[1], Prof. Ashraf Bastawros[1] (1. Iowa State University)

Characterization of Multiaxial Interfacial Properties in Flexible Hybrid Electronics

» Ms. Sara Najafian[1], Prof. Scott Stapleton[1], Prof. Alireza Amirkhizi[1] (1. University of Massachusetts Lowell)

5:45pm

VI.8.4.C -

Theory and Simulation of Nanomaterials

Seigle Hall 106

Chaired by: Prof. Amartya Banerjee

KEYNOTE: Revealing the Full Spectrum Layered Materials with Super-human Predictive Abilities

» Ms. Gowoon Cheon[1], Prof. Evan Reed[1], Mr. Evan Antoniuk[1] (1. Stanford University)

Modeling of Moiré Patterns in Suspended Graphene

» Dr. Malena Espanol[1], Dr. Dmitry Golovaty[2], Dr. J. Patrick Wilber[2] (1. Arizona State University, 2. The University of Akron)

Symmetry-adapted ab-initio molecular dynamics of chiral carbon nanotubes

» Mr. Abhiraj Sharma[1], Prof. Phanish Suryanarayana[1] (1. Georgia Institute of Technology)

First principles simulations of large diameter nanostructures

» Dr. Swarnava Ghosh[1], Prof. Amartya Banerjee[2], Prof. Phanish Suryanarayana[3] (1. California Institute of Technology, 2. University of California, Los Angeles, 3. Georgia Institute of Technology)

5:45pm

VI.6.1.D -

Multiscale and multiphysics computations in geomechanics

Seigle Hall 303

Chaired by: Dr. Joseph Morris and Dr. Abigail Hunter

KEYNOTE: Recent Advances in Hydraulic Fracturing of Shale, Water and Gas Permeability, and Crack Branching

» Prof. Zdenek P. Bazant[1], Dr. Saeed Rahimi-Aghdam[1], Dr. Esteban Rougier[2], Dr. Gowri Srinivasan[2], Dr. Hari Viswanathan[2], Dr. Viet Chau[2], Mr. Hyunjin Lee[1], Mr. Hoang Nguyen[1], Dr. Satish Karra[2] (1. Northwestern University, 2. Los Alamos National Laboratory)

Multiscale Geomechanical Analysis of the Hydraulic Fracturing Test Site in the Wolfcamp Shale Formation

» Dr. Joseph Morris[1], Dr. Pengcheng Fu[1], Dr. Randolph Settgast[1], Dr. Jixiang Huang[1], Dr. Christopher Sherman[1], Dr. Hui Wu[1], Dr. Wei Fu[1], Dr. Yue Hao[1], Dr. Frederick Ryerson[1] (1. Lawrence Livermore National Laboratory)

Modeling of Multiphysics Crack Growth in Cement

» Dr. Reese Jones[1], Dr. Jessica Rimsza[1], Dr. David Littlewood[1], Dr. Tara LaForce[1] (1. Sandia National Laboratories)

Mesoscale inspired continuum modeling of rock masses with multiple compliant fluid saturated joint sets

» Dr. Oleg Vorobiev[1], Prof. Miles Rubin[2] (1. Lawrence Livermore National Laboratory, 2. Technion-Israel Institute of Technology)

Continued from **Monday, 14 October**

Investigation of drag effects in liquid-immersed granular media using modified GEM approach

» Mr. Hrachya Kocharyan[1], Dr. Nikhil Karanjgaokar[1] (1. Worcester Polytechnic Institute)

5:45pm **VI.7.2.D -**

Functional soft composites – Design, mechanics, and manufacturing

Seigle Hall 104

Chaired by: Dr. Xiao Kuang

KEYNOTE: The nexus of materialized sound, sonified material and artificial intelligence: Applications in soft material design

» Prof. Markus Buehler[1] (1. Massachusetts Institute of Technology)

Adaptive Multi-Material Topology Optimization with Material and Geometric Nonlinearities

» Prof. Xiaojia Shelly Zhang[1], Dr. Heng Chi[2], Prof. Glaucio Paulino[2] (1. University of Illinois at Urbana-Champaign, 2. Georgia Institute of Technology)

Fracture toughness of interpenetrating phase composite

» Dr. Tiantian Li[1], Dr. Philipp Seiler[1], Dr. Harika Tankasala[1], Prof. Yanyu Chen[2], Prof. Lifeng Wang[3], Prof. Vikram Deshpande[1], Prof. Norman A. Fleck[1] (1. University of Cambridge, 2. University of Louisville, 3. Stony Brook University)

The design of 3D printed architected materials for increased toughness and defect tolerance

» Mr. Stuart Montgomery[1], Dr. Xiao Kuang[1], Prof. Hang Qi[1] (1. Georgia Institute of Technology)

5:45pm **VI.7.3.F -**

Mechanics and physics of soft materials

Simon Hall 001

Chaired by: Dr. Yuhang Hu

Does diffusion describe creep relaxation in light-pressure polyacrylamide contacts?

» Mr. Christopher Johnson[1], Mr. Jiho Kim[1], Dr. Alison Dunn[2] (1. University of Illinois at Urbana-Champaign, 2. University of Illinois at Chicago)

Heterogeneous orientation and actuation in Liquid Crystal Elastomers

» Ms. Katelynn Harmon[1], Mr. Tyler Estrada[1], Mr. Oscar Mallet[1], Dr. Aurélie Azoug[1] (1. Oklahoma State University)

Analyzing the role of viscoelasticity in the residual stress in soft tissues: a case study on human aortas

» Dr. Will Zhang[1], Dr. David Nordsletten[1] (1. University of Michigan)

Microscale indentation and adhesion of soft PDMS networks

» Prof. Jonathan Pham[1], Mr. Justin Glover[1], Prof. Hans-Jürgen Butt[2], Dr. Michael Kappl[2] (1. University of Kentucky, 2. Max Planck Institute for Polymer Research)

Stable Fitting of Noisy Stress Relaxation Data

» Dr. Roger Rowe[1], Dr. Kenneth Pryse[1], Prof. Elliot Elson[1], Prof. Guy Genin[1] (1. Washington University in St. Louis)

Leveraging Full-field Imaging and Inverse Methods to Probe the Dynamic Response of Polyurethane Foams

» Dr. Stylianos Koumlis[1], Prof. Leslie Lamberson[1] (1. Colorado School of Mines)

5:45pm **VI.7.10.C -**

Physical and mechanical properties of metallic glasses; Surface/Interface Effects

Seigle Hall 103

Chaired by: Prof. Yue Fan and Prof. Katharine Flores

KEYNOTE: Metallic Glass Thin Films with Widely Varying Kinetic Stability

» Mr. Sachin Muley[1], Dr. Chengrong Cao[1], Prof. John Perepezko[1], Prof. Paul Voyles[1] (1. University of Wisconsin-Madison)

Continued from **Monday, 14 October**

Study of layer thickness effect on friction behaviors of Cu/amorphous-CuNb multilayers by nanoscratch technique
» Prof. Xinghang Zhang[1], Dr. Youfeng Zhang[2], Prof. Andreas Polycarpous[2], Prof. Hong Liang[2], Prof. Haiyan Wang[1] (1. Purdue University, 2. Texas A&M University)

Atomistic and Multiscale Computational Analysis of the Metallic Glass Instability Induced by the Continuous Dislocation Absorption at an Amorphous/Crystalline Interface
» Mr. Thanh Phan[1], Mr. Rigelesaiyin Ji[1], Prof. Ashraf Bastawros[1], Prof. Liming Xiong[1] (1. Iowa State University)

Revealing the Mechanisms of Amorphous Plasticity through Atomistic Simulations: Shear Flow, Slip Avalanches, and Creep
» Prof. Penghui Cao[1] (1. University of California, Irvine)

Shear-band structure: micron-size cavities, chemistry, and nanoscale density change
» Ms. Chaoyang Liu[1], Mr. Amlan Das[1], Dr. Stefan Kuechemann[1], Dr. Peter Kenesei[2], Dr. Zhonghou Cai[2], Dr. Vladimir Roddatis[3], Prof. Robert Maass[1] (1. University of Illinois at Urbana-Champaign, 2. Argonne National Laboratory, 3. University of Goettingen)

5:45pm **VI.5.2.E -**
Deformation, strength, and resilience of structures
Simon Hall 023
Chaired by: Prof. Pradeep Guduru and Dr. Jeffry Sundermeyer

KEYNOTE: Crack Propagation Sensitivity Index Concept of Engineering Structures Having Crack-like Defects
» Prof. László Toth[1] (1. Bay Zol)

KEYNOTE: Principal Component Analysis Applied to the Fatigue of Structural Systems
» Dr. Jeffry Sundermeyer[1] (1. Caterpillar, Inc.)

Harnessing Defects in Additive Manufacturing to Enhance Damage Resistance
» Mr. Chengyang Mo[1], Dr. Jordan R. Raney[1] (1. University of Pennsylvania)

An analytical basis and experimental method for the instantaneous evaluation of the DCB test specimen mode I crack driving force
» Mr. Joshua Gunderson[1], Ms. Michelle Wilber[2], Dr. Matthew Cullin[2], Dr. Anthony Paris[2] (1. Boise State University, 2. University of Alaska Anchorage)

6pm **Registration Closes**
Danforth University Center

7:15pm **Gala Reception & Dinner**
Bauer Hall and Knight Hall

Tuesday, 15 October

8am **SES Conference Desk Open 8 am - 6 pm: Information, Lost & Found, Mobile App Support**
Danforth University Center

8am **MOMS.6 -**
NSF MOMS Funding Opportunities
Seigle Hall 109

8am **Session VII**

Continued from **Tuesday, 15 October**

8am

VII.1.1.E -
Prager Medal Symposium
Seigle Hall 301
Chaired by: Dr. Rodrigo Bernal

KEYNOTE: Geometric Mechanics of Origami Patterns Exhibiting Poisson's Ratio Switch by Breaking Crease Assignment
» Prof. Glaucio Paulino[1], Dr. Phanisri Pratapa[2], Dr. Ke Liu[3] (1. Georgia Institute of Technology, 2. Indian Institute of Technology, Madras, 3. California Institute of Technology)

Multiscale Multiphase 3D Printing of Functional Devices
» Dr. Heming Wei[1], Mr. Abhishek Amrithanath[1], Prof. Sridhar Krishnaswamy[1] (1. Northwestern University)

Ruga Mechanics of Graphene Crinkles for Molecule/Nanoparticle Self-Assembly
» Prof. Kyung-Suk Kim[1], Dr. Ruizhi Li[2], Dr. Mrityunjay Kothari[1], Dr. Moon-Hyun Cha[1], Prof. Ou Chen[1], Prof. Victor Lefevre[3] (1. Brown University, 2. Beihang University, 3. Northwestern University)

Molecular Dynamic Simulation of Fracture Toughness of LixSi Alloys in Lithium Ion Battery
» Dr. Jianmin Qu[1] (1. Tufts University)

Electrochemically Reconfigurable Architected Materials
» Prof. Julia Greer[1], Dr. Xiaoxing Xia[1], Mr. Arman Afshar[2], Mr. Carlos Portela[1], Prof. Dennis Kochmann[3], Prof. Claudio Di Leo[2] (1. California Institute of Technology, 2. Georgia Institute of Technology, 3. ETH Zurich)

8am

VII.7.12.B -
Advances in micromechanics of materials
Seigle Hall 306
Chaired by: Prof. Igor Sevostianov

KEYNOTE: Guiding Stress with Discrete Networks
» Prof. Guy Bouchitte[1], Dr. Ornella Mattei[2], Prof. Graeme Milton[2], Prof. Pierre Seppecher[1] (1. Universite de Toulon, 2. University of Utah)

Nonlocal Brittle Fracture Modeling
» Prof. Robert Lipton[1], Dr. Prashant Jha[1] (1. Louisiana State University)

Modeling of damage spread and design of fault-tolerant beam lattices
» Prof. Andrej Cherkaev[1], Prof. Michael Ryvkin[2], Prof. Stephan Rudykh[3], Dr. Viacheslav Slesarenko[4] (1. University of Utah, 2. Tel Aviv University, 3. University of Wisconsin-Madison, 4. Technion-Israel Institute of Technology)

A geometric theory of wrinkling for confined elastic shells
» Dr. Ian Tobasco[1] (1. University of Illinois at Chicago)

Prediction and optimization of checkerboard composites using convolutional neural networks and genetic algorithm
» Mr. Diab Abueidda[1], Mr. Mohammad Almasri[1], Mr. Rami Ammourah[1], Dr. Umberto Ravaioli[1], Dr. Iwona Jasiuk[1], Dr. Nahil Sobh[1] (1. University of Illinois at Urbana-Champaign)

8am

VII.2.1.E -
Fatigue and fracture, a symposium in memory of Paul C. Paris
Seigle Hall L006
Chaired by: Dr. John Bassani

KEYNOTE: Cyclic fatigue properties of medical implant grade Nitinol
» Prof. Robert McMeeking[1] (1. University of California, Santa Barbara)

Soft network composite materials with deterministic and bio-inspired designs
» Prof. Yonggang Huang[1], Prof. Yihui Zhang[2], Prof. John Rogers[1] (1. Northwestern University, 2. Tsinghua University)

Continued from **Tuesday, 15 October**

Fracture of elastomeric materials
» Dr. Lallit Anand[1] (1. Massachusetts Institute of Technology)

Fracture resistance curves of tough hydrogels
» Dr. Chao Chen[1], Dr. Zhengjin Wang[1], Prof. John Hutchinson[1], Prof. Ronghou Xia[2], Prof. Zhigang Suo[1] (1. Harvard University, 2. Xi'an University of Technology)

Fatigue of hydrogels
» Dr. Ruobing Bai[1], Prof. Zhigang Suo[2] (1. California Institute of Technology, 2. Harvard University)

8am

VII.3.6.G -
Mechanics of growth, morophogenesis and evolution of biological solids
Seigle Hall 304
Chaired by: Dr. Andrej Kosmrlj

KEYNOTE: Epithelial tissue mechanics and morphogenesis during Drosophila development
» Prof. Karen Kasza[1] (1. Columbia University)

Phase-field Modeling of Fungal Infection in Zombie Ants: Understanding the Matrix Development
» Prof. Christian Peco[1], Mr. Farshad Ghanbari[1], Mr. Mohammad Jannesari[2], Prof. Francesco Costanzo[1], Prof. David Hughes[1] (1. The Pennsylvania State University, 2. Isfahan University of Technology)

Development of Three-Dimensional Electronic Scaffolds for Monitoring and Regulation of Multifunctional Hybrid Tissues
» Prof. Xueju "Sophie" Wang[1], Prof. Yonggang Huang[2], Prof. Tal Dvir[3], Prof. John Rogers[2] (1. University of Missouri, 2. Northwestern University, 3. Tel Aviv University)

Asymptotic Analysis of Sponge Spicules' Sensitivity to Geometric Imperfection Regarding to Buckling Instability.
» Mr. Wenqiang Fang[1], Dr. Michael Monn[1], Dr. Haneesh Kesari[1] (1. Brown University)

Three Dimensional Finite Element Simulation of Atherosclerosis via Morphoelasticity
» Mr. Navid Mohammad Mirzaei[1], Prof. Pak-Wing Fok[1] (1. University of Delaware)

8am

VII.3.7.C -
Mechanics of the brain
Seigle Hall L004
Chaired by: Dr. Gang Xu and Dr. Ruth Okamoto

KEYNOTE: Modeling of the brain in impact
» Mr. Shaoju Wu[1], Dr. Wei Zhao[1], Mr. Kianoosh Ghazi[1], Dr. Songbai Ji[1] (1. Worcester Polytechnic Institute)

An investigation of vibration and vibroacoustics of the human skull-brain system
» Dr. David Tan[1], Prof. Massimo Ruzzene[1], Prof. Alper Erturk[1] (1. Georgia Institute of Technology)

Mechanical Response of Porcine Brain Tissue Under Cyclic Compression
» Ms. Kali Sebastian[1], Mr. Matthew Register[1], Dr. Lauren Priddy[1], Dr. Raj Prabhu[1] (1. Mississippi State University)

8am

VII.9.2.C -
Mechanical metamaterials
Simon Hall 023
Chaired by: Prof. Sung Hoon Kang and Dr. Johannes Overvelde

Stretchable and Tough Mechanical Metamaterial Fibers
» Mr. Chris Cooper[1], Dr. Dishit Parekh[1], Dr. Ishan Joshipura[1], Mr. Justin Norkett[1], Prof. Russell Mailen[2], Prof. Victoria Miller[1], Prof. Jan Genzer[1], Prof. Michael Dickey[1] (1. North Carolina State University, 2. Auburn University)

Extreme mechanical resilience in nano-labyrinthine self-assembled materials
» Mr. Carlos Portela[1], Dr. A. Vidyasagar[1], Dr. Sebastian Krödel[2], Ms. Tamara Weissenbach[2], Mr. Daryl Yee[1], Prof. Julia Greer[1], Prof. Dennis Kochmann[2] (1. California Institute of Technology, 2. ETH Zurich)

Continued from **Tuesday, 15 October**

Extreme Impact Energy Trapping Metamaterials Based on Liquid Crystal Elastomers

» Dr. Seung-Yeol Jeon[1], Mr. Zeyu Zhu[1], Prof. Christopher Yakacki[2], Prof. Thao Nguyen[1], Prof. Sung Hoon Kang[1] (1. Johns Hopkins University, 2. University of Colorado Denver)

Damping in cellular materials with composite walls: connecting topology, viscoelastic properties and dynamic response

» Prof. Matthew Begley[1], Mr. Steven Wehmeyer[1], Prof. Brett Compton[2], Dr. J. William Pro[3] (1. University of California, Santa Barbara, 2. University of Tennessee, 3. McGill University)

Functionally two-dimensional energy dissipating architectured materials with symmetric honeycomb topologies

» Mr. Kristiaan Hector[1], Ms. Yunlan Zhang[1], Dr. Mirian Velay-Lizancos[1], Dr. David Restrepo[2], Dr. Nilesh Mankame[3], Dr. Louis Hector[3], Prof. Pablo Zavattieri[1] (1. Purdue University, 2. University of Texas at San Antonio, 3. General Motors)

8am

VII.8.2.A -

Mechanics of deformable, atomically-thin materials

Seigle Hall L003

Chaired by: Prof. SungWoo Nam

KEYNOTE: Moiré Mechanics of 2D Materials

» Prof. Harley Johnson[1], Dr. Shuze Zhu[1], Mr. Emil Annevelink[1], Dr. Pascal Pochet[2] (1. University of Illinois at Urbana-Champaign, 2. CEA-Grenoble/Université Grenoble-Alpes)

KEYNOTE: Fracture of Two-Dimensional Materials

» Prof. Jun Lou[1] (1. Rice University)

Modeling of Two-Dimensional Materials: Current Status and Future Directions

» Dr. Dibakar Datta[1] (1. New Jersey Institute of Technology)

Thermal Transport of Mechanically Deformed Two-dimensional (2-D) Materials and Applications to Sensor Design

» Prof. Baoxing Xu[1] (1. University of Virginia)

8am

VII.7.4.C -

Mechanics of electrochemically materials: Design/modeling

Simon Hall 018

Chaired by: Prof. Kejie Zhao

KEYNOTE: A multiphysics model for understanding the impact of mechanical constraints in lithium-ion batteries

» Dr. Xiaoxuan Zhang[1], Mr. Yitao Qiu[2], Dr. Sergei Chumakov[3], Dr. Xiaobai Li[3], Dr. Markus Klinsmann[3], Prof. Sun Ung Kim[4], Dr. Jake Christensen[3], Prof. Christian Linder[2] (1. University of Michigan, 2. Stanford University, 3. Bosch, 4. Washington State University Vancouver)

Nanostructured electrodes for Li-ion batteries: the impact of morphology on their coupled chemo-mechanical behavior.

» Dr. Peter Stein[1] (1. Technische Universitaet Darmstadt)

Stretchable Lithium Ion Batteries Based on Solid Polymer Electrolyte

» Prof. Haleh Ardebili[1], Dr. Mejdi Kammoun[1], Dr. Sean Berg[1], Dr. Taylor Kelly[1], Dr. Bahar Moradi[1] (1. University of Houston)

In Situ Measurement of Chemo-Mechanical Strains in Solid-State Batteries

» Dr. Behrad Koohbor[1], Ms. Minjeong Shin[1], Prof. Andrew Gewirth[1], Prof. Nancy Sottos[1] (1. University of Illinois at Urbana-Champaign)

Directing Cation Traffic: Defining and Modulating Diffusion Pathways in V2O5

» Mr. David Santos[1], Mr. Justin Andrews[1], Dr. Peter Stein[2], Prof. Bai-Xiang Xu[2], Dr. Sarbajit Banerjee[1] (1. Texas A&M University, 2. Technische Universitaet Darmstadt)

Continued from **Tuesday, 15 October**

8am

VII.9.4.D -
Controlling mechanical waves with metamaterials
Seigle Hall 104
Chaired by: Dr. Ramathasan Thevamaran and Prof. Kathryn Matlack

Nonlinear Mechanical Metamaterials with Periodic Rough Contact Interfaces
» Dr. Itay Grinberg[1], Prof. Kathryn Matlack[1] (1. University of Illinois at Urbana-Champaign)

Cnoidal wave propagation in an elastic metamaterial
» Mr. Jaspreet Singh[1], Prof. Prashant Purohit[1], Mr. Chengyang Mo[1] (1. University of Pennsylvania)

Damping, Instability, and Non-reciprocity in Elastodynamics of Rods on Modulated Elastic Substrates
» Prof. Ahmed Elbanna[1], Mr. Qianli Chen[1] (1. University of Illinois at Urbana-Champaign)

Dynamics of metamaterial beams consisting of periodically-coupled parallel flexural elements
» Ms. Setare Hajarolasvadi[1], Prof. Ahmed Elbanna[1] (1. University of Illinois at Urbana-Champaign)

KEYNOTE: Mechanical Metamaterials: Controllable localized deformation in a two-dimensional metamaterial
» Mr. Yafei Zhang[1], Prof. Quanshui Zheng[1], Prof. Guy Genin[2], Prof. Changqing Chen[1] (1. Tsinghua University, 2. Washington University in St. Louis)

8am

VII.9.1.B -
3D/4D printed functional materials and structures: 3D/4D printing of active structures
Seigle Hall 206
Chaired by: Prof. Kai Yu

KEYNOTE: Smart structures and 4D printing
» Prof. Daining Fang[1] (1. Beijing Institute of Technology)

Rapid volatilization induced mechanically robust shape-morphing structures
» Mr. Qiang Zhang[1], Dr. Xiao Kuang[1], Prof. Hang Qi[1], Prof. Daining Fang[2] (1. Georgia Institute of Technology, 2. Beijing Institute of Technology)

Leveraging Multi-Material Multi-Method (m4) 3D Printing for Printable Electronics and Soft Robotics
» Mr. Devin Roach[1], Dr. Xiao Kuang[1], Ms. Janet Wong[1], Mr. Craig Hamel[1], Prof. Hang Qi[1] (1. Georgia Institute of Technology)

Leveraging 4D Printing and Smart Materials for Reconfigurable Antenna
» Ms. Janet Wong[1], Mr. Devin Roach[1], Dr. Xiao Kuang[1], Prof. Hang Qi[1] (1. Georgia Institute of Technology)

Design Smart Materials via Additive Manufacturing
» Prof. Qiming Wang[1] (1. University of Southern California)

Towards High Power Density Solid/Liquid Metal Composite Actuators
» Mr. Jacob Mingear[1], Mr. Brent Bielefeldt[1], Prof. Darren Hartl[1] (1. Texas A&M University)

8am

VII.8.4.D -
Theory and Simulation of Nanomaterials
Seigle Hall 204
Chaired by: Dr. Swarnava Ghosh

Phase transformations and compatibility in helical structures
» Dr. Paul Plucinsky[1], Dr. Fan Feng[1], Prof. Richard James[1] (1. University of Minnesota)

Nanoscale Self-Healing Mechanisms in Shape Memory Ceramics
» Prof. Ning Zhang[1], Prof. Mohsen Asle Zaeem[2] (1. University of Alabama, 2. Colorado School of Mines)

Continued from **Tuesday, 15 October**

Thermal vibration contribution to atomic-level stress
» Dr. Ranganathan Parthasarathy[1], Prof. Anil Misra[2] (1. Tennessee State University, 2. University of Kansas)

8am

VII.6.1.E -
Multiscale and multiphysics computations in geomechanics
Seigle Hall 303
Chaired by: Dr. Kane Bennett and Dr. Abigail Hunter

KEYNOTE: A micromechanically-inspired elastoplastic constitutive model for damage and breakage of cemented granular materials at finite deformations
» Ms. Kateryna Oliynyk[1], Prof. Claudio Tamagnini[1] (1. University of Perugia)

Creep-induced strain localization in shale
» Dr. Ronaldo Borja[1], Mr. Qing Yin[1], Mr. Yang Zhao[1] (1. Stanford University)

Particle-fluid-particle stress in slurries
» Dr. Duan Zhang[1] (1. Los Alamos National Laboratory)

On hyper-elastoplastic porosity-damage relations for geomaterials at large strain
» Dr. Kane Bennett[1], Dr. Ronaldo Borja[2] (1. Los Alamos National Laboratory, 2. Stanford University)

8am

VII.8.3.C -
Mechanics of nanomaterials and nanocomposites
Seigle Hall L002
Chaired by: Dr. Wendy Gu and Prof. Xiaoyan Li

KEYNOTE: Flexible Composites with Programmed Electrical Anisotropy Using Acoustophoresis
» Prof. Daniel Gianola[1], Mr. Drew Melchert[1], Dr. Rachel Collino[1], Prof. Tyler Ray[2], Dr. Neil Dolinski[1], Ms. Leanne Friedrich[1], Prof. Matthew Begley[1] (1. University of California, Santa Barbara, 2. University of Hawaii at Manoa)

Theoretical modelling of the transient behavior of ultrathin long-lived biofluid barriers for flexible electronic implants
» Prof. Rui Li[1] (1. Dalian University of Technology)

Mechanics of the graphene-metal interface
» Mr. Kaihao Zhang[1], Ms. Mitisha Surana[1], Prof. Sameh Tawfick[1] (1. University of Illinois at Urbana-Champaign)

Adjustable transparent conductive film based on graphene/AgNW/graphene sandwich structure
» Mr. Yanxiao Li[1] (1. Missouri University of Science and Technology)

Mechanisms of Interfacial Load Transfer in Graphene based Nanocomposites
» Mr. Soumendu Bagchi[1], Prof. Huck Beng Chew[1] (1. University of Illinois at Urbana-Champaign)

8am

VII.7.3.G -
Mechanics and physics of soft materials
Simon Hall 001
Chaired by: Dr. Meredith Silberstein

A Mathematical Model for Amorphous Polymers
» Dr. Lixiang Yang[1] (1. University of Cincinnati)

Compressive constitutive model of hydrogels in solution
» Prof. Liqun Tang[1] (1. South China University of Technology)

A constitutive model for thermo-oxidative aging in polymers
» Dr. Trisha Sain[1], Ms. Shabnam Konica[1] (1. Michigan Technilogical University)

Continued from **Tuesday, 15 October**

Modeling of fiber-reinforced polymeric gels

» Mr. Nikola Bosnjak[1], Dr. Shuolun Wang[2], Mr. Daehoon Han[3], Prof. Howon Lee[3], Dr. Shawn Chester[1] (1. New Jersey Institute of Technology, 2. University of Illinois at Chicago, 3. Rutgers University)

Continuum Hyperplastic Modelling of Mechanical Response of the Cornea

» Dr. Shuolun Wang[1], Prof. Hamed Hatami-Marbini[1] (1. University of Illinois at Chicago)

Cryoprotectant enables structural control of porous scaffolds for exploration of cellular mechano-responsiveness in 3D

» Mr. Shumeng Jiang[1], Mr. Cheng Lyu[2], Prof. Guy Genin[1], Prof. Yanan Du[2] (1. Washington University in St. Louis, 2. Tsinghua University)

8am **VII.6.2.C -**

Multi-scale mechanics of granular media

Seigle Hall 103

Chaired by: Dr. Payam Poorsolhjouy

KEYNOTE: Nonlinear acoustic resonance and wave-induced softening in dense granular matter through flow heterogeneities

» Dr. Charles Lieou[1], Dr. Jerome Laurent[2], Dr. Paul Johnson[1], Prof. Xiaoping Jia[2] (1. Los Alamos National Laboratory, 2. ESPCI)

Ultrasound wave propagation in granular materials

» Dr. Chongpu Zhai[1], Dr. Eric Herbold[2], Prof. Ryan Hurley[1] (1. Johns Hopkins University, 2. Lawrence Livermore National Laboratory)

Tunable Bandgaps in Materials with Granular Microstructure

» Mr. Nima Nejadsadeghi[1], Prof. Anil Misra[1] (1. University of Kansas)

FE verification of chiral metamaterial designed using granular micromechanics

» Mr. Michele De Angelo[1], Mr. Nima Nejadsadeghi[1], Prof. Anil Misra[1] (1. University of Kansas)

8am **VII.9.5.A -**

Robotic materials: leveraging mechanics & soft materials to achieve unprecedented capabilities

Seigle Hall 106

Chaired by: Prof. Maurizio Chiaramonte

KEYNOTE: Reconfigurable surfaces with controlled stretching and shearing: from biological templates to 3d-printed prototypes

» Prof. Marino Arroyo[1], Dr. Giovanni Noselli[2], Prof. Antonio DeSimone[3] (1. Universitat Politècnica de Catalunya, 2. SISSA–International School for Advanced Studies, 3. Scuola Superiore Sant'Anna)

Harnessing shell snapping for jumping

» Dr. Benjamin Gorissen[1], Mr. David Melancon[1], Mr. Nikolaos Vasios[1], Dr. Mehdi Torbati[1], Prof. Katia Bertoldi[1] (1. Harvard University)

Multiple outputs through bistability: smart inflatable origami actuators

» Dr. Antonio Elia Forte[1], Mr. David Melancon[1], Dr. Benjamin Gorissen[1], Prof. Katia Bertoldi[1] (1. Harvard University)

Programmable stiffness in 3D-printable systems

» Mr. Luke Gockowski[1], Dr. Elliot Hawkes[1], Dr. Megan Valentine[1], Dr. Noy Cohen[2] (1. University of California, Santa Barbara, 2. Technion-Israel Institute of Technology)

Programming the temporal behavior of self-morphing shells

» Mr. Ruslan Guseinov[1], Mr. Connor McMahan[2], Dr. Jesus Perez[1], Prof. Chiara Daraio[2], Prof. Bernd Bickel[1] (1. Institute of Science and Technology Austria, 2. California Institute of Technology)

9:30am **Coffee Break**

Continued from **Tuesday, 15 October**

9:45am **Session VIII**

9:45am **VIII.1.1.F -**
Prager Medal Symposium
Seigle Hall 301
Chaired by: Glaucio Paulino

KEYNOTE: The Arapaima Scale: A Tough Flexible Biological Material
» Prof. Marc Meyers[1], Dr. Wen Yang[1], Mr. Haocheng Quan[1], Prof. Robert Ritchie[2] (1. University of California, San Diego, 2. University of California, Berkeley)

Characterization of elastic knots through X-ray tomography and mechanical testing
» Prof. Pedro Reis[1] (1. École polytechnique fédérale de Lausanne (EPFL))

Hierarchical biological materials – structure, design and synthesis
» Prof. Markus Buehler[1] (1. Massachusetts Institute of Technology)

Ultra-tough and impact resistant glasses with bioinspired architectures
» Mr. Zhen Yin[1], Mr. Florent Hannard[1], Prof. Francois Barthelat[1] (1. McGill University)

Uncovering new mechanisms in biological and engineering architectured materials
» Prof. Pablo Zavattieri[1] (1. Purdue University)

9:45am **VIII.7.12.C -**
Advances in micromechanics of materials
Seigle Hall 306
Chaired by: Prof. Robert Lipton

KEYNOTE: Micromechanics of Optimal Multiscale Composites: Uncertainty and Symmetry
» Prof. Elena Cherkaev[1], Prof. Andrej Cherkaev[1] (1. University of Utah)

Modeling branching microstructure and measuring interfacial energy in shape memory alloys
» Dr. Paul Plucinsky[1], Dr. Hanus Seiner[2], Prof. Richard James[1] (1. University of Minnesota, 2. Czech Academy of Sciences)

Effect of an applied T-stress on crack interaction with inclusions
» Mr. Bo Ni[1], Dr. Kai Guo[1], Prof. Huajian Gao[1] (1. Brown University)

Influence of thermomechanical loads on precipitation in magnesium alloys
» Dr. Swarnava Ghosh[1], Prof. Kaushik Bhattacharya[1] (1. California Institute of Technology)

High order combined asymptotic modeling of conducting composite materials with thin coatings and films
» Ms. Svetlana Baranova[1], Prof. Sofia Mogilevskaya[1], Ms. Thi Hoa Nguyen[2], Prof. Dominik Schillinger[2] (1. University of Minnesota, 2. Leibniz University Hannover)

9:45am **VIII.2.1.F -**
Fatigue and fracture, a symposium in memory of Paul C. Paris
Seigle Hall L006
Chaired by: Dr. Ashok Saxena

KEYNOTE: Debonding of an Axially-Loaded, Semi-Infinite Cord from a Half-Space Matrix
» Dr. Anthony Paris[1] (1. University of Alaska Anchorage)

KEYNOTE: Impurity-Induced Interfacial Decohesion
» Dr. John Bassani[1] (1. University of Pennsylvania)

Fracture at atomic scale with in-situ transmission electron microscopy
» Prof. Scott Mao[1] (1. University of Pittsburgh)

Continued from **Tuesday, 15 October**

Toughness of interfaces in the body
» Prof. Guy Genin[1] (1. Washington University in St. Louis)

9:45am **VIII.9.3.A -**
Non-linear response of highly deformable structures
Seigle Hall 204
Chaired by: Prof. Joseph Paulsen and Prof. Jie Yin

KEYNOTE: The Extreme Mechanics of Balloons: From Interfacial Films to Inflated Membranes and Back
» Prof. Joseph Paulsen[1] (1. Syracuse University)

The energy landscapes of cylindrical shell buckling
» Mr. Jack Panter[1], Mr. Junbo Chen[2], Dr. Teng Zhang[2], Dr. Halim Kusumaatmaja[1] (1. Durham University, 2. Syracuse University)

Effects of boundary conditions on snap-through instabilities
» Dr. Mingchao Liu[1], Prof. Dominic Vella[1] (1. University of Oxford)

Mechanical response of wrinkled structures
» Mr. Sijie Tong[1], Dr. Andrej Kosmrlj[1] (1. Princeton University)

Mechanics of Extreme Buckling Driven Delamination in Thin Films
» Prof. Jie Yin[1], Dr. Qiuting Zhang[2] (1. North Carolina State University, 2. Temple University)

9:45am **VIII.3.11.A -**
Vascular biomechanics in development and disease: Vascular biomechanics
Seigle Hall 303
Chaired by: Prof. Jessica Wagenseil and Prof. Craig Goergen

KEYNOTE: Extracellular Matrix Contribution to Tissue Mechanics
» Dr. Robert Mecham[1], Prof. Jessica Wagenseil[1] (1. Washington University in St. Louis)

Effects of hypertension and aging on central artery structure, function, and mechanics
» Prof. Jay Humphrey[1], Dr. Marcos Latorre[1] (1. Yale University)

Vascular outcomes of chronic cigarette smoking
» Ms. Yasmeen Farra[1], Prof. Chiara Bellini[1] (1. Northeastern University)

How Structural Inhomogeneity Shape Local ECM Mechanics
» Prof. Katherine Zhang[1] (1. Boston University)

Extracellular Stiffness Influences Vascular Smooth Muscle Cell Mechanical Properties
» Ms. Elizabeth Shih[1], Prof. Victor Barocas[1], Dr. Andrew Grande[1], Prof. Patrick Alford[1] (1. University of Minnesota)

9:45am **VIII.9.4.E -**
Controlling mechanical waves with metamaterials
Seigle Hall 104
Chaired by: Prof. Kathryn Matlack and Dr. Ramathasan Thevamaran

Controlling the Formation of Exceptional Point Degeneracies via Engineered Environment
» Dr. Victor Dominguez-Rocha[1], Dr. Ramathasan Thevamaran[2], Prof. Fred Ellis[1], Prof. Tsampikos Kottos[1] (1. Wesleyan University, 2. University of Wisconsin-Madison)

PT-Symmetric Fractal Architectures for Controlling Mechanical Wave Propagation
» Mr. Yanghao Fang[1], Prof. Tsampikos Kottos[2], Dr. Ramathasan Thevamaran[1] (1. University of Wisconsin-Madison, 2. Wesleyan University)

Inverse Design of Quantum Spin Hall-Based Phononic Topological Insulators
» Dr. Nanthakumar Subbiah[1], Prof. Xiaoying Zhuang[1], Prof. Harold Park[2], Mr. Chuong Nguyen[1], Prof. Yanyu Chen[3], Prof. Timon Rabczuk[4] (1. Leibniz University Hannover, 2. Boston University, 3. University of Louisville, 4. Bauhaus-University Weimar)

Continued from **Tuesday, 15 October**

Reduced Order Modeling of 3D Printable Mechanical Metamaterials
» Prof. Alireza Amirkhizi[1], Mr. Weidi Wang[1] (1. University of Massachusetts Lowell)

Lattice Cloaks for In-Plane Elasticity: Design and Simulation
» Dr. Hussein Nassar[1], Dr. Yangyang Chen[1], Prof. Guoliang Huang[1] (1. University of Missouri)

9:45am **VIII.9.2.D - Mechanical metamaterials**
Simon Hall 023
Chaired by: Dr. Johannes Overvelde

KEYNOTE: Active and Shape Changing Metamaterials
» Prof. Jonathan Hopkins[1] (1. University of California, Los Angeles)

Deployable mechanical structures using transition waves
» Dr. Ahmad Zareei[1], Mr. Bolei Deng[1], Prof. Katia Bertoldi[1] (1. Harvard University)

Nonlinear tensile deformation of periodic polyhedral units induced by three-dimensional rotation
» Dr. Hiro Tanaka[1], Mr. Kaito Suga[1], Prof. Yoji Shibutani[1] (1. Osaka University)

Morphing on target of Kirigami bimaterials under temperature
» Prof. Damiano Pasini[1] (1. McGill University)

Multiscale Computational Studies of Properties and Plastic Deformation Mechanisms of Two-Dimensional Titanium Carbide/Nitride based MXenes
» Prof. Ning Zhang[1], Dr. Yu Hong[2], Prof. Mohsen Asle Zaeem[2] (1. University of Alabama, 2. Colorado School of Mines)

9:45am **VIII.8.2.B - Mechanics of deformable, atomically-thin materials**
Seigle Hall L003
Chaired by: Dr. Dibakar Datta

KEYNOTE: Giant tunability of graphene inter-layer friction by alkali ion interactions
» Prof. Teng Li[1] (1. University of Maryland)

Mechanical Instability-driven Architecturing of Atomically-thin Materials
» Prof. SungWoo Nam[1] (1. University of Illinois at Urbana-Champaign)

Kinematics of pull and release of graphene nanoribbons
» Prof. Amit Singh[1] (1. Indian Institute of Technology Bombay)

Dislocation structure and relaxation in van der Waals materials
» Mr. Emil Annevelink[1], Prof. Elif Ertekin[1], Prof. Harley Johnson[1] (1. University of Illinois at Urbana-Champaign)

Asymptotic Models of Curvature Localization in Multi-Layer Graphene
» Dr. Mrityunjay Kothari[1], Dr. Moon-Hyun Cha[1], Prof. Kyung-Suk Kim[1], Prof. Victor Lefevre[2] (1. Brown University, 2. Northwestern University)

9:45am **VIII.7.4.D - Mechanics of electrochemically active materials: Reaction electrodes/Large volume**
Simon Hall 018
Chaired by: Shuman Xia

KEYNOTE: Resolving local electrochemistry of lithium-ion battery electrode materials at nanoscale via electrochemical strain microscopy
» Prof. Yunya Liu[1], Prof. Chi Hou Lei[2], Mr. Aolin Li[1], Prof. Jiangyu Li[3] (1. Xiangtan University, 2. Saint Louis University, 3. Washington University in St. Louis)

Continued from **Tuesday, 15 October**

Effect of stress on Li diffusivity in Large Volume Expansion Electrode Materials

» Prof. Siva Nadimpalli[1], Mr. Subhajit Rakshit[1], Mr. Akshay Pakhare[1], Mr. Igor Bezsonov[1] (1. New Jersey Institute of Technology)

Using time-scaling approach to obtain atomistic insights into plasticity and void growth of amorphous Li-Si

» Dr. Xin Yan[1], Dr. Pradeep Sharma[2] (1. Beihang University, 2. University of Houston)

A Thermodynamically Consistent Gradient Theory for Deformation-Diffusion-Reaction in Conversion-Type Electrodes

» Mr. Arman Afshar[1], Dr. Claudio Di Leo[1] (1. Georgia Institute of Technology)

Sensitivity Study of Non-uniformities in the Structured Silicon Anode on the Mechanical Performances

» Dr. Zhuoyuan Zheng[1], Mr. Bo Cheng[1], Mr. Nathan Fritz[1], Mr. Yashraj Gurumukhi[1], Dr. John Cook[2], Dr. Mehmet Ates[2], Dr. Nenad Miljkovic[1], Dr. Paul Braun[1], Dr. Pingfeng Wang[1] (1. University of Illinois at Urbana-Champaign, 2. Xerion Advanced Battery Corporation)

9:45am

VIII.5.1.C -

Damage localization, fracture and size-effect in composites

Seigle Hall L004

Chaired by: Dr. Marco Salviato and Dr. Gianluca Cusatis

Size effect of RC beams strengthened in flexure and shear with externally bonded composite sheets

» Dr. Ahmet Abdullah Dönmez[1], Dr. Mohammad Rasoolinejad[1], Prof. Zdenek P. Bazant[1] (1. Northwestern University)

RKPM modeling of fluid-induced fracture and damage in fracking and landslide processes

» Prof. J. S. Chen[1], Dr. Haoyan Wei[1] (1. University of California, San Diego)

Bolted joint failure in a laminate made from ultra-high molecular weight polyethylene fibres

» Mr. Simon Peter Hald Skovsgaard[1], Prof. Henrik Myhre Jensen[1], Prof. Norman A. Fleck[2] (1. Aarhus University, 2. University of Cambridge)

Damage Identification Method for Lattice Truss Core Sandwich Panels

» Dr. Jie Zhou[1], Prof. Zheng Li[1] (1. Peking University)

9:45am

VIII.5.4.D -

Non-classical and non-local continuum mechanics and constitutive theories

Seigle Hall 208

Chaired by: Prof. Somnath Ghosh and Dr. Albert Romkes

KEYNOTE: Existence of rotational waves in thermoelastic solid continua described using non-classical continuum mechanics based on internal rotations

» Prof. Karan Surana[1], Mr. Jacob Kendall[1], Prof. J.N. Reddy[2] (1. University of Kansas, 2. Texas A&M University)

Discrete Kirchhoff shells: a geometrically inspired model

» Mr. Bensingh Dhas Pancras[1], Prof. Debasish Roy[1] (1. Indian Institute of Science)

Determination of the Fatigue Limit for Carbon/Epoxy Composites through Self Heating Methodology and validation using a Continuum Model

» Mrs. Deepika Sudevan[1], Dr. Parag Ravindran[1], Dr. Laurent Gornet[2], Dr. Patrick Rozycki[2] (1. Indian Institute of Technology, Madras, 2. Ecole Centrale de Nantes)

A Nonlinear Theory of Heat Conduction

» Dr. Aaron Joy[1], Mr. Benjamin Thompson[1], Dr. Justin Lapp[1] (1. University of Maine)

Dissipation potentials from elastic collapse

» Prof. Joe Goddard[1], Prof. Ken Kamrin[2] (1. University of California, San Diego, 2. Massachusetts Institute of Technology)

Continued from **Tuesday, 15 October**

9:45am **VIII.7.10.D -**

Physical and mechanical properties of metallic glasses; Modeling & Theory II

Seigle Hall 103

Chaired by: Prof. Yue Fan and Prof. Katharine Flores

KEYNOTE: Ideal metallic glass and potential energy landscape

» Prof. Takeshi Egami[1] (1. University of Tennessee)

Sampling Complex Energy Landscapes using Self-Evolving Atomistic Kinetic Monte Carlo

» Prof. Haixuan Xu[1] (1. University of Tennessee)

Universal structural signature at the saddle states of beta relaxations in Cu64Zr36 metallic glasses

» Dr. Neng Wang[1], Dr. Jun Ding[2], Prof. Lin Li[1] (1. University of Alabama, 2. Lawrence Berkeley National Laboratory)

Energy dissipation rate and kinetic equations for Eshelby transformations

» Dr. Manish Vasoya[1], Dr. Babak Kondori[2], Prof. Ahmed Amine Benzerga[1], Prof. Alan Needleman[1] (1. Texas A&M University, 2. Exponent)

Large versus small slips in Bulk Metallic Glasses

» Mr. Andrew Long[1], Prof. Wendelin Wright[2], Dr. Xiaojun Gu[2], Prof. Karin Dahmen[3] (1. Massachusetts Institute of Technology, 2. Bucknell University, 3. University of Illinois at Urbana-Champaign)

9:45am **X.9.1.C -**

3D/4D printed functional materials and structures: 3D printing for bio-applications I

Seigle Hall 206

Chaired by: Prof. Lijie Grace Zhang

KEYNOTE: Microscale light-based 3D printing of functional scaffolds for precision tissue engineering

» Prof. Shaochen Chen[1] (1. University of California, San Diego)

Development of 3D Printed Gamma-Aminobutyric Acid (GABA) Modified Gelatin-Methacrylate Scaffolds for Improving Neural Stem Cell Function

» Mr. Timothy Esworthy[1], Dr. Xuan Zhou[1], Dr. Haitao Cui[1], Mr. Se-Jun Lee[1], Mr. Sung Yun Hann[1], Dr. Lijie Grace Zhang[1] (1. The George Washington University)

Three-Dimensional Electronic Scaffolds for Monitoring and Regulation of Multifunctional Hybrid Tissues

» Prof. Xueju "Sophie" Wang[1], Prof. Yonggang Huang[2], Prof. Tal Dvir[3], Prof. John Rogers[2] (1. University of Missouri, 2. Northwestern University, 3. Tel Aviv University)

3D Printed Bioactive Polyetheretherketone (PEEK) Nanocomposite for Bone Implant Applications

» Prof. Kumar Shanmugam[1], Dr. Fahad Alam[1] (1. Khalifa University of Science and Technology)

9:45am **VIII.8.3.D -**

Mechanics of nanomaterials and nanocomposites

Seigle Hall L002

Chaired by: Dr. Wendy Gu and Prof. Xiaoyan Li

Coarse-grained Atomistic Measurement of the Dislocation Mobility in High-Peierls-Barrier Metals and High Entropy Alloys at Finite Temperature

» Mr. Rigelesaiyin Ji[1], Mr. Thanh Phan[1], Prof. Youping Chen[2], Prof. Liming Xiong[1] (1. Iowa State University, 2. University of Florida)

Helium irradiation induced ultra-high strength nanotwinned Cu with nanovoids

» Dr. Cuncai Fan[1], Dr. Qiang Li[1], Dr. Jie Ding[1], Dr. Yanxiang Liang[2], Dr. Zhongxia Shang[1], Prof. Di Chen[3], Prof. Yongqiang Wang[4], Prof. Jian Wang[2], Prof. Haiyan Wang[1], Prof. Xinghang Zhang[1] (1. Purdue University, 2. University of Nebraska-Lincoln, 3. University of Houston, 4. Los Alamos National Laboratory)

Continued from **Tuesday, 15 October**

Ultra-high toughness nanoreinforced ceramics via ion-implantation

» Dr. Christos Athanasiou[1], Dr. Tomonori Baba[2], Dr. Cristina Ramirez[1], Mr. Xing Liu[1], Dr. Hongliang Zhang[2], Dr. Wei Zhang[1], Prof. Huajian Gao[1], Prof. Nitin Padture[1], Prof. Izabela Szlufarska[2], Prof. Brian Sheldon[1] (1. Brown University, 2. University of Wisconsin-Madison)

Size-dependent Mechanical Behavior of Semi-crystalline Polymer Thinfilms under High-speed Micro-projectile Impacts

» Dr. Jizhe Cai[1], Mr. Samuel Hossain[1], Dr. Ramathasan Thevamaran[1] (1. University of Wisconsin-Madison)

9:45am **VIII.7.3.H -**

Mechanics and physics of soft materials

Simon Hall 001

Chaired by: Dr. Meredith Silberstein and Prof. Sung Hoon Kang

A theory of photoactive nematic liquid crystal elastomers

» Dr. Ruobing Bai[1], Prof. Kaushik Bhattacharya[1] (1. California Institute of Technology)

A Visco-hyperelastic Constitutive Model for Strain Rate Sensitive Soft Materials

» Mr. Kshitiz Upadhyay[1], Prof. Ghatu Subhash[1], Prof. Douglas Spearot[1] (1. University of Florida)

Hyperelastic Constitutive Modeling of Agarose Hydrogel Based on Primary Deformation Modes

» Prof. Ghatu Subhash[1], Mr. Kshitiz Upadhyay[1], Prof. Douglas Spearot[1] (1. University of Florida)

A simple explicit homogenization solution for the macroscopic response of isotropic porous elastomers

» Mr. Bhavesh Shrimali[1], Prof. Victor Lefevre[2], Prof. Oscar Lopez-Pamies[1] (1. University of Illinois at Urbana-Champaign, 2. Northwestern University)

KEYNOTE: Particulate neo-Hookean composites in finite deformation

» Prof. Gal deBotton[1], Mr. Gidon Weil[1] (1. Ben-Gurion University of the Negev)

9:45am **VIII.7.3.L -**

Mechanics and physics of soft materials

Simon Hall 017

Chaired by: Dr. Shawn Chester and Dr. Noy Cohen

Moisture adsorption in PEG-treated wood biopolymers: a molecular dynamics study

» Mr. Ali Shomali[1], Mr. Chi Zhang[1], Dr. Eleanor Schofield[2], Dr. Dominique Derome[3], Prof. Jan Carmeliet[1] (1. ETH Zurich, 2. The Mary Rose Trust, 3. Empa)

Modeling the onset of macroscopic fiber kinking in soft composites with fiber plasticity

» Ms. Fernanda F. Fontenele[1], Prof. Michalis Agoras[2], Prof. Nikolaos Bouklas[1] (1. Cornell University, 2. University of Thessaly)

A Facile, Robust and Versatile Finite Element Implementation to Study the Time-Dependent Behaviors of Responsive Gels

» Prof. Hanqing Jiang[1], Dr. Xu Wang[1], Mr. Zirui Zhai[1] (1. Arizona State University)

Investigating Organometallic Crosslinked Polymers with Density Functional Theory

» Mr. Michael Buche[1], Mr. Zachary Sparrow[1], Dr. Yuval Vidavsky[1], Dr. Robert DiStasio[1], Dr. Meredith Silberstein[1] (1. Cornell University)

9:45am **VIII.9.5.B -**

Robotic materials: leveraging mechanics & soft materials to achieve unprecedented capabilities

Seigle Hall 106

Chaired by: Yiğit Mengüç

KEYNOTE: Motion via non-linear waves

» Prof. Katia Bertoldi[1], Mr. Bolei Deng[1], Mr. Liyuan Chen[1], Dr. Donglai Wei[1] (1. Harvard University)

Continued from **Tuesday, 15 October**

Architected Sheets with Controllable Stiffness Based on Granular Jamming

» Dr. Yifan Wang[1], Dr. Douglas Hofmann[2], Prof. Chiara Daraio[1] (1. California Institute of Technology, 2. NASA Jet Propulsion Laboratory)

JAMoEBA: A Continuum, Compliant, Configurable Soft Robot with Rigid Phases Emerging from Granular Jamming

» Mr. Declan Mulroy[1], Mr. Koki Tanaka[1], Mr. Mohammad Amin Karimi[1], Mr. Amir Ashkan Mokhtari[1], Prof. Mathew Spenko[1], Prof. Ankit Srivastava[1], Mr. Qiyuan Zhou[1] (1. Illinois Institute of Technology)

Lateral Undulation Aids Soft Earthworm Robot Anchoring and Locomotion in Heterogeneous Environments

» Dr. Yasemin Aydin[1], Mr. Bangyuan Liu[1], Prof. Frank L. Hammond III[1], Prof. Daniel I. Goldman[1] (1. Georgia Institute of Technology)

Tuning the response of strain-sensing threads for robotic materials

» Dr. Cindy Harnett[1] (1. University of Louisville)

11:30am **Session IX**

11:30am **IX.1.1.G -**
Prager Medal Symposium
Seigle Hall 301
Chaired by: Prof. Alberto Corigliano

In situ atomic-scaled mechanics on deformation in metallic nanowires

» Prof. Scott Mao[1] (1. University of Pittsburgh)

Multi-scale structural and mechanical characteristics of beetle elytra: how nature deals with size effect

» Dr. Meisam Asgari[1], Mr. Ryan Benavides[2], Dr. Alireza Zaheri[1], Dr. Cheryl Hayashi[3], Prof. Horacio Espinosa[1] (1. Northwestern University, 2. University of Texas at Austin, 3. American Museum of Natural History)

An Integral Approach for the Study of Wear Mechanisms in Animal Teeth towards Bio-inspired Engineering Applications

» Mr. Nicolas Alderete[1], Dr. Alireza Zaheri[1], Mr. Hoang Nguyen[1], Prof. Horacio Espinosa[1] (1. Northwestern University)

Extreme Fatigue of Graphene

» Mr. Teng Cui[1], Dr. Sankha Mukherjee[1], Dr. Guillame Colas[2], Mr. Jason Tam[1], Dr. Pulickel Ajayan[3], Dr. Chandra Veer Singh[1], Dr. Yu Sun[1], Prof. Tobin Filleter[1] (1. University of Toronto, 2. Institut de Recherche Femto-St Sciences and Technologies, 3. Rice University)

Strain transfer between aligned nanowire films and flexible substrates

» Dr. Rodrigo Bernal[1], Mr. Tyler Wettstein[1] (1. University of Texas at Dallas)

A Multiscale Model of Graphene Oxide-Polymer Nanocomposite

» Mr. Hoang Nguyen[1], Mr. Xu Zhang[1], Dr. Rafael Soler Crespo[1], Prof. Horacio Espinosa[1] (1. Northwestern University)

11:30am **IX.7.12.D -**
Advances in micromechanics of materials
Seigle Hall 306
Chaired by: Prof. Mark Kachanov

Energy Absorption in AM Ti6Al4V Thin Walled Cylinders

» Mr. Yarden Markoviz[1], Dr. Shmuel Osovski[1] (1. Technion-Israel Institute of Technology)

Multiscale Perspective of Deformation Twinning in Hexagonal Metals

» Dr. Jian Wang[1], Mr. Mingyu Gong[1], Mr. Shun Xu[1] (1. University of Nebraska-Lincoln)

Continued from **Tuesday, 15 October**

Modeling dislocation-mediated nucleation of cracks under high-rate loading
» Dr. Nitin Daphalapurkar[1], Dr. Darby Luscher[1] (1. Los Alamos National Laboratory)

Determination of Power-Law Creep Parameters From Indentation
» Mr. Yupeng Zhang[1], Prof. Alan Needleman[1] (1. Texas A&M University)

Atomistic simulations of interactions between dislocations and {1122} twins in Titanium
» Mr. Mingyu Gong[1], Mr. Shun Xu[1], Mr. Carlos Tome[2], Mr. Laurent Capolungo[2], Dr. Jian Wang[1] (1. University of Nebraska-Lincoln, 2. Los Alamos National Laboratory)

11:30am **IX.2.1.G -**
Fatigue and fracture, a symposium in memory of Paul C. Paris
Seigle Hall L006
Chaired by: Prof. Guy Genin

KEYNOTE: Fracture Testing of Fiber Composites: Recent Advances
» Prof. Zdenek P. Bazant[1], Dr. Gianluca Cusatis[1], Dr. Marco Salviato[2], Dr. Weixin Li[3] (1. Northwestern University, 2. University of Washington, 3. Johns Hopkins University)

3D Augmented Finite Element Analysis of Coupled Ply Cracking and Delamination in Non-Planar Composite Laminates
» Dr. Qingda Yang[1] (1. University of Miami)

Modelling Fracture in Networked Materials: A Quasi-Continuum Approach
» Prof. Ahmed Elbanna[1], Mr. Ahmed Ghareeb[1], Mr. Darin Peetz[1] (1. University of Illinois at Urbana-Champaign)

Computing Stress Intensity Factors Along the Front of a Three-Dimensional Crack on Unstructured Meshes
» Prof. Adrian Lew[1], Mr. Benjamin Grossman-Ponemon[1], Prof. Leon Keer[2] (1. Stanford University, 2. Northwestern University)

Nanofribril-mediated damage tolerance of bone
» Dr. Ottman Tertuliano[1], Mr. Bryce Edwards[2], Prof. Lucas Meza[3], Prof. Vikram Deshpande[4], Prof. Julia Greer[2] (1. Stanford University, 2. California Institute of Technology, 3. University of Washington, 4. University of Cambridge)

11:30am **IX.9.3.B -**
Non-linear response of highly deformable structures
Seigle Hall 204
Chaired by: Ms. Yousra Timounay

Actuator optimization for adaptive origami structures
» Dr. Ann Sychterz[1], Prof. Evgueni Filipov[1] (1. University of Michigan)

The designs and deformations of generalized Miura origami
» Dr. Paul Plucinsky[1], Dr. Fan Feng[1], Prof. Richard James[1] (1. University of Minnesota)

Icosahedral hinge elastegrity matrix for light-weight structural components for mechanical applications
» Prof. Eleftherios Pavlides[1], Dr. Zhao Qin[2], Mr. Christopher Norcross[1] (1. Roger Williams University, 2. Syracuse University)

Sculpting liquid surfaces with ultrathin shells
» Ms. Yousra Timounay[1], Mr. Vincent Demery[2], Prof. Joseph Paulsen[1] (1. Syracuse University, 2. ESPCI)

11:30am **IX.3.11.B -**
Vascular biomechanics in development and disease: Vascular imaging
Seigle Hall 303
Chaired by: Prof. Jay Humphrey and Dr. Alison Marsden

Continued from **Tuesday, 15 October**

4D Ultrasound of Murine Abdominal Aortic Aneurysms and Dissections

» Ms. Hannah Cebull[1], Mr. Daniel Romary[1], Ms. Alycia Berman[1], Prof. Craig Goergen[1] (1. Purdue University)

Modeling Fetal Cardiac Anomalies From Prenatal Echocardiography using 3D Printing and 4-Dimensional Flow Magnetic Resonance Imaging

» Prof. Alejandro Roldán-Alzate[1] (1. University of Wisconsin-Madison)

Aortic Tortuosity and Aneurysms

» Mr. Shawn Pavey[1], Mr. Ramin Balouchzadeh[1], Prof. James Quirk[1], Prof. Joel Garbow[1], Prof. Hiromi Yanagisawa[1], Prof. Jessica Wagenseil[1] (1. Washington University in St. Louis)

Imaging brain hemodynamics in cerebrovascular disease with 4D flow MRI

» Dr. Susanne Schnell[1] (1. Northwestern University)

Imaging and modeling blood flow dynamics in intracranial aneurysms

» Dr. Vitaliy Rayz[1] (1. Purdue University)

Accuracy improvement of MRI estimation of wall shear stress using multi-scale perturbation techniques

» Dr. Monalisa Munsi[1], Dr. Alric P. Rothmayer[2], Dr. Paul Sacks[2] (1. Saint Louis University, 2. Iowa State University)

11:30am **IX.9.4.F -**

Controlling mechanical waves with metamaterials

Seigle Hall 104

Chaired by: Prof. Kathryn Matlack and Dr. Ramathasan Thevamaran

Anomalous Collisions of Elastic Vector Solitons in Mechanical Metamaterials

» Mr. Bolei Deng[1], Dr. Vincent Tournat[2], Dr. Pai Wang[3], Prof. Katia Bertoldi[1] (1. Harvard University, 2. Le Mans Universite, 3. University of Utah)

Focusing and Mode Separation of Elastic Vector Solitons in a 2D Soft Mechanical Metamaterial

» Mr. Bolei Deng[1], Mr. Chengyang Mo[2], Dr. Vincent Tournat[3], Prof. Katia Bertoldi[1], Dr. Jordan R. Raney[2] (1. Harvard University, 2. University of Pennsylvania, 3. Le Mans Universite)

Non-linear dynamic behaviour of mechanical metamaterials based on bistable shallow arches

» Mr. Gabriele Librandi[1], Dr. Eleonora Tubaldi[2], Prof. Katia Bertoldi[1] (1. Harvard University, 2. University of Arizona)

Plane wave propagation in periodic viscoelastic-elastic metamaterials

» Mr. Aimane Najmeddine[1], Prof. Maryam Shakiba[1] (1. Virginia Tech)

Wave Propagation Behavior of a 1-Dimensional Phase Transforming Cellular Materials

» Dr. David Restrepo[1], Mr. Camilo Valencia[2], Dr. Nilesh Mankame[3], Prof. Pablo Zavattieri[4], Prof. Juan Gomez[2] (1. University of Texas at San Antonio, 2. Universidad EAFIT, 3. General Motors, 4. Purdue University)

11:30am **IX.9.2.E -**

Mechanical metamaterials

Simon Hall 023

Chaired by: Prof. Lucas Meza

Tiling Patterns and the Mechanical Properties of Topologically Interlocked Materials

» Mr. Andrew Williams[1], Prof. Thomas Siegmund[1] (1. Purdue University)

Continued from **Tuesday, 15 October**

A next generation auxetic reinforced self-confining conrete metamaterial

» Prof. Simos Gerasimidis[1], Prof. Andrew Gross[2], Prof. Katia Bertoldi[3] (1. University of Massachusetts Amherst, 2. University of South Carolina, 3. Harvard University)

Stochastic metamaterials with tunable anisotropy: characterization and design using deep learning

» Dr. Siddhant Kumar[1], Prof. Dennis Kochmann[1] (1. ETH Zurich)

A Systematic Design of High-Strength Multicomponent Metamaterials

» Prof. Kasra Momeni[1], Dr. Mehdi Mofidian[1], Dr. Hamzeh Bardaweel[1] (1. Louisiana Tech University)

Anomalous Strain Energy Transformation Pathways in Mechanical Metamaterials

» Dr. Eduard Karpov[1], Dr. John Klein[1] (1. University of Illinois at Chicago)

11:30am **IX.8.2.C -**

Mechanics of deformable, atomically-thin materials

Seigle Hall L003

Chaired by: Prof. Baoxing Xu

KEYNOTE: Interfacial Slip and Deformation in 2D Electromechanical Systems

» Prof. Arend van der Zande[1] (1. University of Illinois at Urbana-Champaign)

Ultrasoft slip-mediated bending in few-layer graphene

» Mr. Jaehyung Yu[1], Mr. Edmund Han[1], Mr. Emil Annevelink[1], Dr. Jangyup Son[1], Prof. Elif Ertekin[1], Prof. Pinshane Huang[1], Prof. Arend van der Zande[2] (1. University of Illinois at Urbana-Champaign, 2. University of Illinois at Chicago)

All-2D electronics from crumpled van der Waals heterostructures

» Mr. Mohammad Hossain[1], Prof. Arend van der Zande[2] (1. University of Illinois at Urbana-Champaign, 2. University of Illinois at Chicago)

Conversion dynamics of multilayer graphene to the diamond structure using molecular dynamics method

» Prof. Kasra Momeni[1], Mr. Shiddartha Paul[1] (1. Louisiana Tech University)

Enhanced Strength of Layered h-BN with defects via Molecular Simulation

» Mr. Brian Thomas[1], Mr. Michael Kotthoff[1], Prof. Chi Hou Lei[1] (1. Saint Louis University)

11:30am **IX.7.4.E -**

Mechanics of electrochemically active materials: Damage/fracture

Simon Hall 018

Chaired by: Prof. Matt Pharr

KEYNOTE: Storage particle cracking, redox kinetics, interface roughening, and solid electrolyte cracking in lithium-ion batteries

» Prof. Robert McMeeking[1] (1. University of California, Santa Barbara)

Simulation of Fracture Behaviour in Active Particle with Influence of Binder

» Dr. Zhansheng Guo[1] (1. Shanghai University)

Heterogeneous damage in Li-ion batteries: Experimental analysis and theoretical modeling

» Prof. Kejie Zhao[1] (1. Purdue University)

Capturing the scale dependence of fracture in Si electrodes during electrochemical cycling

» Prof. Katerina Aifantis[1], Mr. Utkarsh Ahuja[1], Mr. Bo Wang[1], Dr. Pu Hu[1] (1. University of Florida)

Continued from **Tuesday, 15 October**

Fracture Toughness Improvements in Nanocomposite Ceramic Electrolytes

» Dr. Christos Athanasiou[1], Ms. Mok Yun Jin[1], Dr. Cristina Ramirez[1], Prof. Nitin Padture[1], Prof. Brian Sheldon[1] (1. Brown University)

11:30am **IX.7.7.A -**

Mechanics of multifunctional materials for sensing, actuation, adaptation, and remodeling

Seigle Hall L004

Chaired by: Dr. Caterina Lamuta and Prof. Sameh Tawfick

Visually Imperceptible Liquid-Metal Circuits for Transparent, Stretchable Electronics with Direct Laser Writing

» Mr. Chengfeng Pan[1], Dr. Kitty Kumar[1], Dr. Jianzhao Li[2], Dr. Eric Markvicka[1], Prof. Peter Herman[2], Prof. Carmel Majidi[1] (1. Carnegie Mellon University, 2. University of Toronto)

Laser-based Metamaterial Fabrication of Flexible THz Optics

» Mr. Qinghua Wang[1], Dr. Caterina Lamuta[1], Prof. Fatima Toor[1], Prof. Mark Arnold[1], Prof. Hongtao Ding[1] (1. University of Iowa)

Force-directed patterning of polymers and composites using frontal polymerization

» Mr. Leon Dean[1], Mr. Allen Guo[1], Prof. Mostafa Yourdkhani[2], Prof. Nancy Sottos[1] (1. University of Illinois at Urbana-Champaign, 2. Colorado State University)

Thermodynamic Potential Analysis and Phase Field Simulations of Barium Zirconate Titanate Solid Solutions

» Mr. Kianoosh Sattari[1], Prof. Yunya Liu[2], Prof. Chi Hou Lei[1] (1. Saint Louis University, 2. Xiangtan University)

11:30am **IX.5.4.E -**

Non-classical and non-local continuum mechanics and constitutive theories

Seigle Hall 208

Chaired by: Prof. Debasish Roy and Dr. Amirtham Rajagopal

KEYNOTE: Phase Field Approach to Interaction between Phase Transformations and Dislocation Evolution at Large Strains

» Prof. Valery Levitas[1] (1. Iowa State University)

An energy-based theory of elastoplastic fatigue damage using reaction kinetics

» Mr. Brandon Zimmerman[1], Dr. Gerard Ateshian[1] (1. Columbia University)

Estimation of Modeling Errors in Local Quantities of Interest in the Elastostatic Analysis of Heterogeneous Solids

» Dr. Albert Romkes[1], Mr. Austin Kaul[1] (1. South Dakota School of Mines & Technology)

Thermodynamically Consistent Plate and Shell Formulations for Thermoelastic behavior derived based on Classical and Non-Classical Continuum Mechanics Incorporating Internal Rotations

» Prof. Karan Surana[1], Mr. Sri Sai Charan Mathi[1], Prof. J.N. Reddy[2] (1. University of Kansas, 2. Texas A&M University)

On the Use of Laplace Stretch in Mechanics

» Prof. Alan Freed[1] (1. Texas A&M University)

11:30am **IX.7.10.E -**

Physical and mechanical properties of metallic glasses; Integration of Experiment and Modeling

Seigle Hall 103

Chaired by: Prof. Yue Fan

KEYNOTE: Exploring the nanoscale origins of structure-property relationship of metallic glasses by combining modeling with 4D STEM

» Dr. Pengyang Zhao[1], Prof. Jinwoo Hwang[1], Prof. Yunzhi Wang[1] (1. The Ohio State University)

KEYNOTE: Atomistic details of metallic glass deformation

» Prof. Michael Atzmon[1], Ms. Tianjiao Lei[1], Dr. JongDoo Ju[2], Mr. Luis Rangel DaCosta[1] (1. University of Michigan, 2. Ford Motor Company)

Continued from **Tuesday, 15 October**

Structure and Mechanical Behavior of Nearly Monoatomic Metallic Glass

» Dr. Wendy Gu[1], Mr. Mehrdad Kiani[1] (1. Stanford University)

Atomic-scale Homogeneous Plastic Flow of Bulk Metallic Glass

» Prof. Jiaxin Yu[1], Dr. Amit Datye[2], Mr. Zheng Chen[2], Mr. Chao Zhou[2], Dr. Omur E. Dagdeviren[2], Prof. Jan Schroers[2], Prof. Udo Schwarz[2] (1. Southwest University of Science and Technology, 2. Yale University)

11:30am **IX.9.1.D -**

3D/4D printed functional materials and structures: 3D printed metamaterials/architected materials

Seigle Hall 206

Chaired by: Dr. Jordan R. Raney

From stretching to bending dominated lattice materials

» Dr. Jochen Mueller[1], Prof. Katia Bertoldi[1], Prof. Jennifer A. Lewis[1] (1. Harvard University)

Liquid Metal Lattice Materials through Hybrid Design and Manufacturing

» Prof. Pu Zhang[1], Mr. Fanghang Deng[1], Mr. Quang Nguyen[1] (1. Binghamton University (SUNY))

Additive Manufacturing and Characterization of Brittle Cellular Materials

» Ms. Sirui Bi[1], Mr. Enze Chen[1], Prof. Stavros Gaitanaros[1] (1. Johns Hopkins University)

Freestanding 3D Mesostructures, Functional Devices, and Shape-Programmable Systems Based on Mechanically Induced Assembly

» Prof. Xueju "Sophie" Wang[1], Prof. Yonggang Huang[2], Prof. Yihui Zhang[3], Prof. John Rogers[2] (1. University of Missouri, 2. Northwestern University, 3. Tsinghua University)

Shape-shifting structured lattices via multi-material 4D printing

» Prof. John Boley[1], Prof. Wim van Rees[2], Dr. Charles Lissandrello[3], Prof. Mark Horenstein[1], Dr. Ryan Truby[4], Ms. Arda Kotikian[4], Prof. Jennifer A. Lewis[4], Prof. Lakshminarayanan Mahadevan[4] (1. Boston University, 2. Massachusetts Institute of Technology, 3. The Charles Stark Draper Laboratory, Inc., 4. Harvard University)

11:30am **IX.8.3.E -**

Mechanics of nanomaterials and nanocomposites

Seigle Hall L002

Chaired by: Dr. Wendy Gu and Prof. Xiaoyan Li

It Slices! It Dices! The Copper "Cutting" Capacity of Carbyne

» Dr. Steve Cranford[1] (1. Matter/Cell Press)

Biomimetic Approach to the development of damage tolerant structural ceramics.

» Prof. Shankar Sastry[1] (1. Washington University in St. Louis)

Environment assisted cracking of graphene

» Dr. Alireza Tabarraei[1], Mr. Mohan Surya Raja Elapolu[1] (1. University of North Carolina at Charlotte)

Using glass-graded zirconia to increase interfacial fracture resistance of zirconia-based dental structures

» Prof. Yu Zhang[1], Prof. Herzl Chai[2] (1. New York University, 2. Tel Aviv University)

Mechanical and electronical properties of two-dimensional van der Waals heterostructures---A first-principles calculations

» Dr. Xiaobao Li[1] (1. Hefei University of Technology)

MD-Phase-field Interpretation of Anisotropic Fracture Behavior of MXene

» Mr. Congjie Wei[1], Dr. Chenglin Wu[1] (1. Missouri University of Science and Technology)

Continued from **Tuesday, 15 October**

11:30am **IX.7.3.I -**
Mechanics and physics of soft materials
Simon Hall 001
Chaired by: Prof. Qiming Wang

Programming impulsive deformation with flexible metamaterial
» Dr. Xudong Liang[1], Prof. Alfred Crosby[1] (1. University of Massachusetts Amherst)

The Mechanical Behavior of an Airfoil-Shaped Brain Surrogate under Shock Wave Loading
» Ms. Ling Zhang[1], Mr. William Jackson[1], Dr. Sarah Bentil[1] (1. Iowa State University)

Wave propagation in ultrasoft solids at low Reynolds numbers
» Prof. Jasper van der Gucht[1], Mr. Jan Maarten van Doorn[1], Prof. Joris Sprakel[1] (1. Wageningen University)

Shear wave propagation and anisotropic parameter estimation in a nonlinear material
» Mr. Zuoxian Hou[1], Dr. Ruth Okamoto[2], Prof. Philip Bayly[2] (1. Washington University in St.Louis, 2. Washington University in St. Louis)

Shear shock formation in incompressible soft solids
» Mr. Chockalingam Senthilnathan[1], Prof. Tal Cohen[1] (1. Massachusetts Institute of Technology)

High Strain Rate Characterization of Soft Materials via Laser Induced Inertial Microcavitation Rheometry
» Dr. Jin Yang[1], Mr. Harry Cramer III[2], Ms. Selda Buyukozturk[2], Prof. Christian Franck[1] (1. University of Wisconsin-Madison, 2. Brown University)

11:30am **IX.7.3.M -**
Mechanics and physics of soft materials
Simon Hall 017

Nonlinear Elastic Inclusions in Anisotropic Solids
» Mr. Ashkan Golgoon[1], Prof. Arash Yavari[1] (1. Georgia Institute of Technology)

A phyto-inspired, osmosis-mediated, dynamic soft composite
» Ms. Amrita Kataruka[1], Prof. Shelby Hutchens[1] (1. University of Illinois at Urbana-Champaign)

Phase behavior and morphology of multicomponent mixtures
» Dr. Sheng Mao[1], Mr. Derek Kuldinow[2], Dr. Mikko Haataja[1], Dr. Andrej Kosmrlj[1] (1. Princeton University, 2. Yale University)

How to reinforce fibrous materials: stochastic fiber networks with inclusions
» Dr. Mohammad Islam[1], Prof. Catalin Picu[1] (1. Rensselaer Polytechnic Institute)

Mechanics of Liquid Metal/Elastomer Composites as Super Soft, Stretchable, and Tough Conductors
» Prof. Sulin Zhang[1], Mr. Tianwu Chen[1], Mr. Bin Yao[1], Prof. Qing Wang[1] (1. The Pennsylvania State University)

Nanocomposite Tissue Scaffolds Based on Plant Cell Wall Constituents
» Dr. Derrick Dean[1], Dr. Hanxiao Huang[1], Dr. Sonia DSouza[1] (1. Alabama State University)

11:30am **IX.9.5.C -**
Robotic materials: Leveraging mechanics & soft materials to achieve unprecedented capabilities
Seigle Hall 106
Chaired by: Prof. Katia Bertoldi

Continued from **Tuesday, 15 October**

KEYNOTE: Simulating Contact in Deformable Origami Structures

» Mr. Yi Zhu[1], Prof. Evgueni Filipov[1] (1. University of Michigan)

A Discrete Differential Geometry Approach to Simulation of a Soft Robot

» Mr. Xiaonan Huang[1], Mr. Weicheng Huang[2], Prof. Mohammad Khalid Jawed[2], Prof. Carmel Majidi[1] (1. Carnegie Mellon University, 2. University of California, Los Angeles)

Analyzing the Mechanics of Bending in Soft Robot Arms

» Ms. Gina Olson[1], Dr. Yigit Menguc[1] (1. Oregon State University)

How Inhomogeneous Zipping Increases the Force Output of Peano-HASEL Actuators

» Dr. Philipp Rothemund[1], Mr. Nicholas Kellaris[1], Prof. Christoph Keplinger[1] (1. University of Colorado Boulder)

Bioinspired HASEL actuators for fast, soft actuated joints

» Mr. Nicholas Kellaris[1], Mr. Garrett Smith[1], Mr. Shane Mitchell[1], Prof. Christoph Keplinger[1] (1. University of Colorado Boulder)

12pm **Lunch Available 12 pm - 2 pm**

Umrath Hall and Danforth University Center

2pm **Session X**

2pm **X.1.1H -**

Prager Medal Symposium

Seigle Hall 301

Chaired by: Prof. Neelesh Patankar

KEYNOTE: Computational biophysics of esophageal physiology

» Prof. Neelesh Patankar[1] (1. Northwestern University)

On the mechanical properties of functionalized graphene-based materials

» Mr. Xu Zhang[1], Mr. Hoang Nguyen[1], Dr. Jianguo Wen[2], Dr. Rafael Soler Crespo[1], Dr. Lily Mao[1], Prof. Jiaxing Huang[1], Prof. SonBinh Nguyen[1], Prof. Horacio Espinosa[1] (1. Northwestern University, 2. Argonne National Laboratory)

Surface Strengthening of Metallic Multilayers using High Power Pulse Laser Treatment

» Dr. Zhou Yang[1], Ms. Melicent Stossel[1], Prof. Junlan Wang[1] (1. University of Washington)

Combined Numerical and Experimental Investigation of Localized Electroporation-Based Cell Transfection and Sampling

» Mr. Prithvijit Mukherjee[1], Dr. S. Shiva P. Nathamgari[1], Dr. John Kessler[1], Prof. Horacio Espinosa[1] (1. Northwestern University)

Piezo-Micro-Ultrasound-Transducers for air-coupled arrays: modelling and experiments in the linear and nonlinear regimes

» Mr. Gianluca Massimino[1], Mr. Alessandro Colombo[1], Prof. Raffaele Ardito[1], Mr. Fabio Quaglia[2], Mr. Francesco Foncellino[2], Prof. Alberto Corigliano[1] (1. Politecnico di Milano, 2. STMicroelectronics)

2pm **X.7.12.E -**

Advances in micromechanics of materials

Seigle Hall 306

Chaired by: Dr. Tom de Geus

On the Hall effect in three-dimensional metamaterials

» Dr. Christian Kern[1], Prof. Martin Wegener[2], Prof. Graeme Milton[1] (1. University of Utah, 2. Karlsruhe Institute of Technology)

Exploring the fracture toughness of tessellated materials with the discrete-element method

» Mr. Najmul Abid[1], Dr. Florent Hannard[1], Dr. J. William Pro[1], Prof. Francois Barthelat[1] (1. McGill University)

Continued from **Tuesday, 15 October**

Effect of demineralization on the microstructure and mechanical properties of dentin

» Mr. Thomas Cisneros[1], Dr. Seyedali Seyedkavoosi[1], Prof. Igor Sevostianov[1] (1. New Mexico State University)

2pm

X.3.2.A -

Biomaterial-based in-vitro disease models in drug and toxicology screening applications

Seigle Hall 208

Chaired by: Dr. Silviya Zustiak and Dr. Era Jain

KEYNOTE: Tissue Engineered Cancer Models for Drug Screening Applications

» Dr. Elizabeth Lipke[1] (1. Auburn University)

Hydrogel-based in vitro Glioblastoma Spheroid Models

» Ms. Lindsay Hill[1], Mr. Joey Bruns[1], Dr. Mozhdeh Imaninezhad[1], Dr. Grant Kolar[1], Mr. Kyle Vogt[1], Dr. Silviya Zustiak[1] (1. Saint Louis University)

KEYNOTE: Assaying ECM-conferred chemoresistance on orthogonal gradient hydrogel systems

» Dr. Jennifer Young[1], Ms. Ximeng Hua[1], Prof. Yu Suk Choi[2], Prof. Joachim Spatz[1] (1. Max Planck Institute for Medical Research, 2. University of Western Australia)

Morphological Adaptations in Breast Cancer Cells as a Function of Prolonged Passaging on Compliant Substrates

» Ms. Sana Syed[1], Ms. Alexandra Blanco[1], Dr. Joseph Schober[2], Dr. Silviya Zustiak[1] (1. Saint Louis University, 2. Southern Illinois University Edwardsville)

2pm

X.9.3.C -

Non-linear response of highly deformable structures

Seigle Hall 204

Chaired by: Prof. James Hanna and Prof. Tetsuo Yamaguchi

Geometric Stiffening and Softening of an Indented Floating Thin Film

» Ms. Monica Ripp[1], Dr. Teng Zhang[1], Dr. Vincent Démery[2], Prof. Joseph Paulsen[1] (1. Syracuse University, 2. Universite de Lyon)

Swelling and warpage of orthotropic plates

» Prof. James Hanna[1], Mr. Harrison Wood[2] (1. University of Nevada, Reno, 2. Moog, Inc.)

A Discrete Geometric Based Simulation for Elastic Ribbon

» Dr. Weicheng Huang[1], Mr. Xilai Zhang[1], Prof. Mohammad Khalid Jawed[1] (1. University of California, Los Angeles)

From Föppl-von Kármán plates to enhanced one dimensional non-linear rods

» Prof. Antonino Favata[1] (1. Sapienza Università di Roma)

Stick-slip friction of gels with controlled asperities

» Prof. Tetsuo Yamaguchi[1] (1. Kyushu University)

Extreme enhancement of interfacial adhesion by bulk patterning of sacrificial cuts

» Mr. Ahmed Ghareeb[1], Prof. Ahmed Elbanna[1] (1. University of Illinois at Urbana-Champaign)

2pm

X.3.11.C -

Vascular biomechanics in development and disease: Vascular modeling

Seigle Hall 303

Chaired by: Dr. Vitaliy Rayz and Prof. Chiara Bellini

Tissue and Organ Scale Cardiovascular Modelling Across Fidelities and Modalities

» Prof. Ethan Kung[1] (1. Clemson University)

A framework for patient-specific fluid solid growth simulations in pediatric applications

» Dr. Alison Marsden[1], Dr. Ju Liu[1], Ms. Erica Schwarz[1], Dr. Stephanie Lindsay[1], Prof. Jay Humphrey[2], Dr. Christopher Breuer[3] (1. Stanford University, 2. Yale University, 3. Nationwide Children's Hospital)

Continued from **Tuesday, 15 October**

Precision Medicine Starts in Preclinical Studies: For the Vascular System, This Includes Understanding Biomechanics from Mouse to Human
» Dr. Olivia Palmer[1], Dr. A. Colleen Crouch[1], Dr. Ulrich Scheven[1], Dr. Joan Greve[1] (1. University of Michigan)

Role of vascular biomechanics in coronary atherosclerosis progression and treatment in the clinical setting – Can computational studies guide patient management?
» Dr. Lucas Timmins[1] (1. University of Utah)

Flow-induced cardiovascular adaptations during development
» Dr. Sandra Rugonyi[1] (1. Oregon Health Sciences University)

Modeling local transport processes in arterial blood clots using particle methods.
» Prof. Debanjan Mukherjee[1] (1. University of Colorado Boulder)

2pm **X.9.4.G -**
Controlling mechanical waves with metamaterials
Seigle Hall 104
Chaired by: Dr. Ramathasan Thevamaran and Prof. Kathryn Matlack

Tunable acoustic non-reciprocity in nonlinear asymmetric waveguides
» Mr. Alireza Mojahed[1], Mr. Jonathan Bunyan[1], Prof. Sameh Tawfick[1], Prof. Alexander Vakakis[1] (1. University of Illinois at Urbana-Champaign)

Acoustic binary phase gratings for direction selection
» Dr. Chu Ma[1], Prof. Nicholas Fang[2] (1. University of Wisconsin-Madison, 2. Massachusetts Institute of Technology)

Passive Wave Redirection in Weakly Coupled Nonlinear Lattices due to Landau-Zener Effect in Space
» Mr. Chongan Wang[1], Prof. Sameh Tawfick[1], Prof. Alexander Vakakis[1] (1. University of Illinois at Urbana-Champaign)

Mechanical topological effects in elastic materials
» Mr. Hui Chen[1], Dr. Hussein Nassar[1], Prof. Guoliang Huang[1] (1. University of Missouri)

2pm **X.9.2.F -**
Mechanical metamaterials
Simon Hall 023
Chaired by: Prof. Lucas Meza

KEYNOTE: Mechanical and Acoustic Metamaterials
» Dr. Andrea Alu[1] (1. CUNY Advanced Science Research Center)

Multifunctional Elastic Wave Control with Programmable Metasurfaces
» Dr. Yangyang Chen[1], Mr. Xiaopeng Li[1], Dr. Hussein Nassar[1], Prof. Guoliang Huang[1] (1. University of Missouri)

Dynamic Mechanical Metamaterials
» Mr. David Dykstra[1], Mr. Joris Busink[1], Dr. Bernard Ennis[2], Dr. Corentin Coulais[1] (1. University of Amsterdam, 2. Tata Steel Europe R&D)

Mechanical Metamaterials with Absolute Zero Stiffness for Mechanical Vibration Isolation
» Prof. Hanqing Jiang[1], Dr. Lingling Wu[2], Prof. Yong Wang[3] (1. Arizona State University, 2. Wuyi University, 3. Zhejiang University)

Dispersion relations of elastic waves in the nano or microscale of multi-layered composites of piezoelectric semiconductor
» Dr. Xiao Guo[1], Prof. Peijun Wei[1] (1. University of Science and Technology Beijing)

2pm **X.8.2.D -**
Mechanics of deformable, atomically-thin materials
Seigle Hall L003
Chaired by: Dr. Qing Tu

Continued from **Tuesday, 15 October**

KEYNOTE: Mechanics of Nano-Bubbles and Nano-Tents Formed by 2D Materials

» Prof. Nanshu Lu[1] (1. University of Texas at Austin)

Understanding the Growth Mechanism of Transition Metal Dichalcogenides Heterostructures Using Molecular Dynamics Approach

» Mr. Jatin Kashyap[1], Dr. Dibakar Datta[1] (1. New Jersey Institute of Technology)

Stress Modulated Phase Transition of Monolayer 2D TMDC

» Mr. Arman Ghasemi[1], Prof. Wei Gao[1] (1. University of Texas at San Antonio)

Flexoelectricity induced electromechanical response of two-dimensional transition metal dichalcogenides

» Mr. Md Farhadul Haque[1], Dr. Hyung Jong Bae[1], Mr. Jin Myung Kim[1], Mr. Chullhee Cho[1], Dr. Michael Cai Wang[1], Prof. SungWoo Nam[1] (1. University of Illinois at Urbana-Champaign)

In-situ Characterization of Nonlinear Mechanical Behavior of Multilayer MXenes

» Mr. Yanxiao Li[1], Mr. Congjie Wei[1], Ms. Shuohan Huang[1], Dr. Chenglin Wu[1], Dr. Vadym Mochalin[1] (1. Missouri University of Science and Technology)

2pm

X.7.4.F -

Mechanics of electrochemically active materials: Other phenomena

Simon Hall 018

Chaired by: Prof. Matt Pharr

KEYNOTE: Piezoelectric Phenomena in Batteries: Coupling Factors, Strain Derivatives and Energy Harvesting

» Prof. Craig Arnold[1] (1. Princeton University)

Shape Reconfigurable Liquid Metal Controlled Via Electrochemical Oxidation

» Ms. Minyung Song[1], Dr. Collin Eaker[1], Prof. Karen Daniels[1], Prof. Michael Dickey[1] (1. North Carolina State University)

Mechanism of strengthening of battery resistance under dynamic loading

» Dr. Juner Zhu[1], Dr. Hailing Luo[2], Dr. Wei Li[2], Dr. Tao Gao[1], Prof. Yong Xia[2], Prof. Tomasz Wierzbicki[1] (1. Massachusetts Institute of Technology, 2. Tsinghua University)

Atomistic study of grain boundary degradation under intergranular electrochemical attack

» Dr. Denizhan Yavas[1], Mr. Thanh Phan[1], Prof. Liming Xiong[1], Prof. Kurt Hebert[1], Prof. Ashraf Bastawros[1] (1. Iowa State University)

Chemo-mechanical modeling of LiXCoO2 for energy and information storage

» Dr. Neel Nadkarni[1], Mr. Dimitrios Fraggedakis[1], Mr. Tingtao Zhou[1], Dr. Tao Gao[1], Prof. Martin Bazant[1] (1. Massachusetts Institute of Technology)

2pm

X.7.7.B -

Mechanics of multifunctional materials for sensing, actuation, adaptation, and remodeling

Seigle Hall L004

Chaired by: Prof. Sameh Tawfick and Dr. Caterina Lamuta

KEYNOTE: Self-adaptable material systems inspired by bone

» Prof. Santiago Orrego[1], Mr. Zhezhi Chen[2], Mr. Decheng Hou[2], Ms. Urszula Krekora[2], Prof. Sung Hoon Kang[2] (1. Temple University, 2. Johns Hopkins University)

Twisted Spiral Artificial Muscles for Texture and Shape Modulation

» Dr. Caterina Lamuta[1], Mr. Honglu He[2], Mr. Kaihao Zhang[2], Mr. Michael Rogalski[2], Prof. Nancy Sottos[2], Prof. Sameh Tawfick[2] (1. University of Iowa, 2. University of Illinois at Urbana-Champaign)

Continued from **Tuesday, 15 October**

Tunable Energy Trapping and Deterministic Snap-through Buckling in Axially-loaded Notched Shells for Compliant Building Blocks

» Mr. Yinghao Zhao[1], Mr. Amal Jerald Joseph M[2], Mr. Zhiwei Zhang [2], Mr. Chunping Ma[2], Prof. Nan Hu[2] (1. South China University of Technology, 2. The Ohio State University)

An Overview of Shape Memory Alloy Applications at Boeing

» Mr. Micheal Bass[1], Mr. James Mabe[1], Dr. Tad Calkins[1], Dr. Douglas Nicholson[1] (1. The Boeing Company)

Laser Chemical Processes to Tune Metal Surface Wettability

» Mr. Avik Samanta[1], Mr. Qinghua Wang[1], Prof. Scott Shaw[1], Prof. Hongtao Ding[1] (1. University of Iowa)

2pm

X.7.11.A -

Regularized models of fracture for hard and soft solids

Seigle Hall 103

Chaired by: Prof. Blaise Bourdin and Prof. Oscar Lopez-Pamies

Anisotropy of the effective toughness of layered media

» Dr. Stella Brach[1], Prof. Zubaer Hossain[2], Prof. Blaise Bourdin[3], Prof. Kaushik Bhattacharya[1] (1. California Institute of Technology, 2. University of Delaware, 3. Louisiana State University)

Phase-Field Fracture Mechanics Modeling of the Toughening Induced by Bouligand Structures in Natural Materials

» Dr. Sheng Yin[1], Dr. Wen Yang[2], Mr. Junpyo Kwon[1], Dr. Amy Wat[1], Prof. Marc Meyers[2], Prof. Robert Ritchie[1] (1. University of California, Berkeley, 2. University of California, San Diego)

A variational phase-field model for fracture in soft elastic materials with surface stress

» Dr. Bin Li[1], Prof. Nikolaos Bouklas[1] (1. Cornell University)

Examining the relation between model parameters and crack growth resistance in phase field models of elastic-plastic fracture

» Dr. Brandon Talamini[1], Dr. Michael Tupek[1], Dr. Jakob Ostien[1], Dr. Andrew Stershic[1] (1. Sandia National Laboratories)

Benchmarks problems for variational phase-field models of fracture.

» Prof. Blaise Bourdin[1], Dr. Andrea Jokisaari[2], Prof. Peter Voorhees[3] (1. Louisiana State University, 2. Idaho National Laboratory, 3. Northwestern University)

2pm

VIII.9.1.E -

3D/4D printed functional materials and structures: Mechanics of 3D printed materials

Seigle Hall 206

Chaired by: Prof. Qiming Wang

Finite Element Simulation on Strength of Single Weld Formed by Fused Filament Fabrication Additive Manufacturing Process

» Mr. Zheliang Wang[1], Dr. Jonathan Seppala[2], Prof. Kevin Hemker[1], Prof. Mark Robbins[1], Prof. Peter Olmsted[3], Prof. Sung Hoon Kang[1], Prof. Thao Nguyen[1] (1. Johns Hopkins University, 2. National Institute of Standards and Technology, 3. Georgetown University)

Programmable 4D micro-structures for untethered soft robotics

» Ms. Qianying Chen[1], Dr. Pengyu Lv[1], Prof. Jianyong Huang[1], Prof. Huiling Duan[1] (1. Peking University)

A Reaction-Diffusion Model for Material Property Resolution in Digital Light Processing 3D Printing

» Mr. Craig Hamel[1], Dr. Xiao Kuang[1], Prof. Hang Qi[1] (1. Georgia Institute of Technology)

Design for 4D Printing by Enabling Eigenstrains

» Prof. David Rosen[1], Prof. Sang-In Park[2], Dr. Yunlong Tang[3], Dr. Yi Xiong[3] (1. Georgia Institute of Technology, 2. Incheon National University, 3. Singapore University of Technology and Design)

Continued from **Tuesday, 15 October**

Failure of Soft Fiber Composites with Spatially-Controlled Orientation

» Mr. Chengyang Mo[1], Dr. Yijie Jiang[1], Dr. Jordan R. Raney[1] (1. University of Pennsylvania)

Effect of moisture absorption on mechanical properties of 3D printed composites

» Prof. Asha-Dee Celestine[1], Mr. Craige LeGrand[1], Mr. Adedotun Banjo[1] (1. Auburn University)

2pm

X.8.3.F -

Mechanics of nanomaterials and nanocomposites

Seigle Hall L002

Chaired by: Prof. Xiaoyan Li and Dr. Wendy Gu

KEYNOTE: Ultralight, high strength 3D porous structure composed of Ag nanowire/cellulose nanofiber composite

» Prof. Seung Min Han[1], Dr. Taegeon Kim[1], Mr. Jongbeom Kim[1], Prof. Rashid Abu Al-Rub[2] (1. Korea Advanced Institute of Science and Technology, 2. Khalifa University of Science and Technology)

Multiscale Modeling Of Crystalline Cellulose Microfibril Interface

» Mr. Chi Zhang[1], Dr. Dominique Derome[2], Prof. Jan Carmeliet[1] (1. ETH Zurich, 2. Empa)

Impact of soliton dynamics in van der Waals interfaces on 2D material nanoelectromechanical systems

» Mr. Sunphil Kim[1], Mr. Emil Annevelink[1], Mr. Edmund Han[1], Mr. Jaehyung Yu[1], Prof. Pinshane Huang[1], Prof. Elif Ertekin[1], Prof. Arend van der Zande[1] (1. University of Illinois at Urbana-Champaign)

Fast Prediction of the Natural Frequencies of Proteins by a Machine Learning (ML) Model

» Dr. Zhao Qin[1], Prof. Markus Buehler[2] (1. Syracuse University, 2. Massachusetts Institute of Technology)

Using Gold Nanoparticles to Investigate Biological Obstacles in Nanomedicine

» Dr. Lucas Lane[1] (1. Nanjing University)

2pm

X.7.3.J -

Mechanics and physics of soft materials

Simon Hall 001

Chaired by: Dr. Yuhang Hu

Chemical-Mechanical Interactions of a Hydrogel in a Porous Alkaline Medium

» Prof. Ali Ghahremaninezhad[1], Dr. Khashayar Farzanian[2] (1. University of Miami, 2. Yale University)

A general result for the magnetoelastic response of isotropic suspensions of iron and ferrofluid particles in rubber

» Prof. Victor Lefevre[1], Prof. Kostas Danas[2], Prof. Oscar Lopez-Pamies[3] (1. Northwestern University, 2. Ecole Polytechnique, 3. University of Illinois at Urbana-Champaign)

Homogenization of time-dependent dielectric composites containing space charges, with applications to polymer nanoparticulate composites

» Mr. Kamalendu Ghosh[1], Prof. Oscar Lopez-Pamies[1], Mr. Jinlong Guo[1] (1. University of Illinois at Urbana-Champaign)

Coupling phenomena in elastomeric balloons

» Dr. Shengqiang Cai[1] (1. University of California, San Diego)

Designing soft pyroelectric and electrocaloric materials by using electrets and its application for snakes infrared detection

» Ms. Faezeh Darbaniyan[1], Dr. Kaushik Dayal[2], Dr. Liping Liu[3], Prof. Pradeep Sharma[1] (1. University of Houston, 2. Carnegie Mellon University, 3. Rutgers University)

Continued from **Tuesday, 15 October**

Nonlinear bending deformation of soft electrets and prospect for engineering flexoelectricity and transverse (d31) piezoelectricity

» Mr. Amir Hossein Rahmati[1], Dr. Shengyou Yang[1], Prof. Siegfried Bauer[2], Prof. Pradeep Sharma[1] (1. University of Houston, 2. Johannes Kepler University)

2pm **X.7.3.N -**

Mechanics and physics of soft materials

Simon Hall 017

Chaired by: Dr. Noy Cohen

The effect of flexoelectricity on the entropic force between fluctuating biological membranes

» Ms. Kosar Mozaffari[1], Dr. Fatemeh Ahmadpoor[2], Prof. Pradeep Sharma[1] (1. University of Houston, 2. Brown University)

Injectable Cell-Adhesive Polyethylene Glycol Cryogel Scaffolds

» Mr. Joey Bruns[1], Dr. Silviya Zustiak[1] (1. Saint Louis University)

Mechanical Response of Bacterial Biofilms as Living Engineering Materials

» Dr. Korhan Sahin[1], Mr. Hanwei Liu[1], Prof. David Tirrell[1], Prof. Guruswami Ravichandran[1] (1. California Institute of Technology)

Allosteric interactions in a birod model of DNA.

» Mr. Jaspreet Singh[1], Prof. Prashant Purohit[1] (1. University of Pennsylvania)

Rate control of blister inflations and the skin patterns

» Mr. Tong Shen[1], Dr. Eduard Benet Cerda[1], Dr. Franck Vernerey[1] (1. University of Colorado Boulder)

Computational modeling of nanoindentation induced damage in ganoid fish scale

» Prof. Arunachalam Rajendran[1] (1. University of Mississippi)

2pm **X.9.5.D -**

Robotic materials: Leveraging mechanics and soft materials to achieve unprecedented capabilities

Seigle Hall 106

Chaired by: Dr. Tianshu Liu

KEYNOTE: Programmable Robotic Structures from Multistable Metastructures

» Mr. Janav Udani[1], Dr. Andres Arrieta[1] (1. Purdue University)

Responsive and mechanically programmable sequential actuation of fluid-driven soft actuators

» Mr. Luuk van Laake[1], Dr. Johannes Overvelde[1] (1. Amolf)

A tubular origami design for programmable, functional and packable robotic structures

» Mr. Bin Wang[1], Ms. Maria Redoutey[2], Prof. Changqing Chen[1], Prof. Evgueni Filipov[2] (1. Tsinghua University, 2. University of Michigan)

Production and characterization of biomimetic vibrissae for tactile sensory system

» Mr. Connor Turley[1], Mr. David Collinson[2], Prof. L. Catherine Brinson[1] (1. Duke University, 2. Northwestern University)

KEYNOTE: Existence of rotational waves in thermoelastic solid continua described using non-classical continuum mechanics based on internal rotations

» Prof. Karan Surana[1], Mr. Jacob Kendall[1], Prof. J.N. Reddy[2] (1. University of Kansas, 2. Texas A&M University)

3:30pm **Coffee Break**

3:45pm **Session XI**

Continued from **Tuesday, 15 October**

3:45pm **XI.1.4_1.5_1.6.A -**
Rice Medal, Young Investigator Medal, and SES Fellow Lectures
Seigle Hall 301
Chaired by: Prof. Hang Qi

YOUNG INVESTIGATOR MEDAL KEYNOTE: Level Excursion Analysis of Quasibrittle Fracture
» Prof. Jia-Liang Le[1], Mr. Zhifeng Xu[1] (1. University of Minnesota)

SES FELLOW KEYNOTE: Elastodynamic Transformation Cloaking
» Prof. Arash Yavari[1], Mr. Ashkan Golgoon[1] (1. Georgia Institute of Technology)

RICE MEDAL KEYNOTE: Emergent magnetoelectricity in soft materials, wireless energy harvesting and detection of magnetic fields by animals
» Dr. Pradeep Sharma[1] (1. University of Houston)

3:45pm **XI.3.2.B -**
Biomaterial-based in-vitro disease models in drug and toxicology screening applications
Seigle Hall 208
Chaired by: Dr. Silviya Zustiak and Dr. Era Jain

KEYNOTE: In vitro studies of the synergy between mechanical loading and genetics within human induced pluripotent stem cell derived micro-scale engineered heart tissues
» Dr. Nathaniel Huebsch[1] (1. Washington University in St. Louis)

High-throughput Extracellular Matrix Composition Screen Reveals Novel Microenvironment-dependent Impact on Liver Stellate Cell Behavior
» Mr. Aidan Brougham-Cook[1], Ms. Ishita Jain[1], Mr. David Kukla[2], Dr. Salman Khetani[2], Dr. Gregory Underhill[1] (1. University of Illinois at Urbana-Champaign, 2. University of Illinois at Chicago)

Controlling osteoblast activity with copper-free azide-alkyne cycloaddition of integrin binding peptides to alginate hydrogels
» Ms. Sydney Neal[1], Dr. Era Jain[1], Ms. Rama Balasubramaniam[1], Dr. Nathaniel Huebsch[1], Dr. Lori Setton[1] (1. Washington University in St. Louis)

Small molecule sensing
» Mr. Nianyu Jiang[1], Prof. Pranav Shrotriya[1] (1. Iowa State University)

3:45pm **XI.9.3.D -**
Non-linear response of highly deformable structures
Seigle Hall 204
Chaired by: Prof. Matthew Begley

Models for buckling of viscoelastic, angled struts: a pathway to designing programmable non-linear materials
» Prof. Matthew Begley[1], Prof. Thomas Begley[2] (1. University of California, Santa Barbara, 2. California Polytechnic State University)

Bistability of creases under removal of singularities
» Mr. Tian Yu[1], Prof. James Hanna[2] (1. Virginia Tech, 2. University of Nevada, Reno)

Exploiting Structural Instability to Design Architected Materials Having Essentially Nonlinear Stiffness
» Mr. Jonathan Bunyan[1], Prof. Sameh Tawfick[2] (1. University of Illinois at Chicago, 2. University of Illinois at Urbana-Champaign)

3:45pm **XI.7.1.A -**
Self-healing structural materials
Seigle Hall 303
Chaired by: Prof. Nima Rahbar

Coupled Hyperelastic-Plastic Model for Fluid Induced Aging in Elastomers
» Dr. Viraj Singh[1], Dr. Alireza Zolfaghari[1], Dr. Haitao Zhang[1], Dr. Jushik Yun[1] (1. Schlumberger)

Continued from **Tuesday, 15 October**

KEYNOTE: When Bacteria Meet Mechanics: Microbially Enabled Ceramic Healing
» Prof. Qiming Wang[1] (1. University of Southern California)

KEYNOTE: Enzymatic Self-Healing Concrete
» Ms. Jessica Rosewitz[1], Ms. Suzanne Scarlata[1], Prof. Nima Rahbar[1] (1. Worcester Polytechnic Institute)

Improvement of Physical Properties of Fine Recycled Concrete Aggregate via Microbial Carbonate Biodeposition
» Prof. Ange Therese Akono[1], Ms. Mimi Zhan[1], Prof. Surendra Shah[1] (1. Northwestern University)

3:45pm **XI.9.2.G -**
Mechanical metamaterials
Simon Hall 023
Chaired by: Prof. Lucas Meza

Lessons from a comprehensive characterization of common truss-lattice materials
» Prof. Andrew Gross[1] (1. University of South Carolina)

New rules for fracture limited design in micro-architected cellular solids
» Mr. Angkur Shaikeea[1], Mr. Huachen Cui[2], Dr. Mark O'Masta[3], Prof. Xiaoyu Zheng[2], Prof. Vikram Deshpande[1] (1. University of Cambridge, 2. Virginia Tech, 3. HRL Laboratories, LLC)

Investigating the time-dependent response of three dimensional truss lattices treated as local generalized continua
» Mr. Raphael Glaesener[1], Prof. Dennis Kochmann[1] (1. ETH Zurich)

Mechanical Response of Hierarchical Net-like 3D Lattice Architectures
» Mr. Widianto Moestopo[1], Mr. Carlos Portela[1], Dr. Arturo Mateos[1], Mr. Ritchie Fuller[2], Prof. Julia Greer[1] (1. California Institute of Technology, 2. Independent Artist)

Parameter identification for minipantographs
» Mr. Michele De Angelo[1], Mr. Nima Nejadsadeghi[1], Prof. Emilio Turco[2], Prof. Francesco dell'Isola[3], Prof. Anil Misra[1] (1. University of Kansas, 2. University of Sassari, 3. University of L'Aquila)

3:45pm **XI.8.2.E -**
Mechanics of deformable, atomically-thin materials
Seigle Hall L003
Chaired by: Dr. Kamalika Ghatak

KEYNOTE: Fluid Interfaces with Crumpled 2D Materials
» Prof. Narayana Aluru[1] (1. University of Illinois at Urbana-Champaign)

Size Dependent Stability and Thermal Motion of Moiré in Twisted Bi-layer Graphene
» Mr. Soumendu Bagchi[1], Prof. Harley Johnson[1], Prof. Huck Beng Chew[1] (1. University of Illinois at Urbana-Champaign)

Influence of Thermal Fluctuations on the Mechanical Properties of 2D Anisotropic Materials
» Mr. Mohamed El Hedi Bahri[1], Dr. Andrej Kosmrlj[1] (1. Princeton University)

Fabrication and electronic transport of 3D deformed graphene
» Ms. Preetha Sarkar[1], Prof. Nadya Mason[1] (1. University of Illinois at Urbana-Champaign)

In-Plane Mechanical Properties and Strain Engineering of 2D Hybrid Organic-Inorganic Perovskites
» Dr. Qing Tu[1] (1. Northwestern University)

3:45pm **XI.7.4.G -**
Mechanics of electrochemically active materials: Metal anodes/solid-state/plating
Simon Hall 018
Chaired by: Dr. Claudio Di Leo

Continued from **Tuesday, 15 October**

KEYNOTE: On modeling plating and stripping at a Li/solid-electrolyte interface in a lithium metal solid-state-battery
» Dr. Lallit Anand[1], Mr. Sooraj Narayan[1] (1. Massachusetts Institute of Technology)

Modeling the electro-chemo-mechanically modulated interfacial instability in solid-state electrolytes
» Prof. Sulin Zhang[1], Mr. Tianwu Chen[1] (1. The Pennsylvania State University)

In situ observation and phase field simulation of lithium dendrites
» Ms. Ruidie Zhu[1], Mr. Jiemin Feng[1], Dr. Zhansheng Guo[1] (1. Shanghai University)

3:45pm **XI.7.7.C -**
Mechanics of multifunctional materials for sensing, actuation, adaptation, and remodeling
Seigle Hall L004
Chaired by: Dr. Caterina Lamuta and Prof. Sameh Tawfick

KEYNOTE: Neural Network Enhanced Multiscale Modeling and Its Application in Spatially Tailored Materials
» Prof. Shaoping Xiao[1] (1. University of Iowa)

Rapid Manufacturing of Vascular Polymers and Composites
» Mr. Mayank Garg[1], Ms. Polette Centellas[1], Mr. Evan Lloyd[1], Prof. Nancy Sottos[1], Prof. Jeffrey Moore[1], Prof. Mostafa Yourdkhani[2] (1. University of Illinois at Urbana-Champaign, 2. Colorado State University)

Dynamic Twisting of Hair by Elastocapillarity
» Ms. Lauren Kovanko[1], Prof. Sameh Tawfick[1] (1. University of Illinois at Urbana-Champaign)

Synergistic Modeling, Characterization, and Design of Embedded Phase Transforming Sensory Particles
» Dr. Mirmilad Mirsayar[1], Prof. Darren Hartl[1] (1. Texas A&M University)

Enabling Mechano-Responsive Functionality in a Glassy Polymer
» Mr. Steven Yang[1], Dr. Yuval Vidavsky[1], Prof. Meredith Silberstein[1] (1. Cornell University)

3:45pm **XI.7.11.B -**
Regularized models of fracture for hard and soft solids
Seigle Hall 103
Chaired by: Prof. Blaise Bourdin

KEYNOTE: A phase-field approach to quasistatic evolution for a cohesive fracture model
» Dr. Flaviana Iurlano[1] (1. Sorbonne Université)

Phase Field Approach to Crack Propagation and Coupling between Fracture and Phase Transformation
» Mr. Hossein Jafarzadeh[1], Prof. Valery Levitas[2], Prof. Gholam Hossein Farrahi[1], Prof. Mahdi Javanbakht[3] (1. Sharif University of Technology, 2. Iowa State University, 3. Isfahan University of Technology)

Phase-field models for brittle and ductile fatigue
» Dr. Ata Mesgarnejad[1], Prof. Alain Karma[1] (1. Northeastern University)

The poker-chip experiments of Gent and Lindley (1959) explained
» Mr. Aditya Kumar[1], Prof. Oscar Lopez-Pamies[1] (1. University of Illinois at Urbana-Champaign)

Revisiting Nucleation in the Phase-Field Approach to Brittle Fracture
» Prof. Oscar Lopez-Pamies[1], Mr. Aditya Kumar[1], Prof. Blaise Bourdin[2], Prof. Gilles Francfort[3] (1. University of Illinois at Urbana-Champaign, 2. Louisiana State University, 3. Courant Institute of Mathematical Sciences)

Continued from **Tuesday, 15 October**

3:45pm **XI.9.1.F -**
3D/4D printed functional materials and structures: 3D printing for bio-applications II
Seigle Hall 206
Chaired by: Prof. Kai Yu and Prof. Lijie Grace Zhang

3:45pm **KEYNOTE: Bioprinting: Implementation, Process Dynamics, and Process-Induced Cell Injury**
» Prof. Yong Huang[1] (1. University of Florida)

4pm **Highly Conformal 3D Substrates for Human Body Surface as Wearable Device Platforms**
» Dr. Wen See Tan[1], Mr. Muhammad Aidil Juhari[1], Mr. Win Tun Han[1], Dr. Qian Shi[1], Dr. Domenico Campolo[1], Dr. Juha Song[1] (1. Nanyang Technological University)

4:15pm **Self-Adaptive Cardiovascular Pediatric Conduits to Accommodate Growth**
» Dr. Ozan Erol[1], Mr. Emilio Bachtiar[1], Ms. Runhan Tao[1], Mr. Azra Horowitz[1], Prof. Narutoshi Hibino[1], Prof. Lewis Romer[1], Prof. David Gracias[1], Prof. Sung Hoon Kang[1] (1. Johns Hopkins University)

4:30pm **4D printed transformable cell-culture insert for a standard well plate for rapid target validation and drug evaluation in patient derived organoids**
» Mr. Chen Yang[1], Dr. Mechelle Chadwick[1], Prof. Hatem Sabaawy[1], Prof. Howon Lee[1] (1. Rutgers University)

4:45pm **Implementing a commercially available self-locking screw system in additively manufactured medical Implants**
» Mr. Ralf Fischer[1], Mr. Jan Klasen[2], Prof. Bart Prorok[1] (1. Auburn University, 2. Voxelmed, Inc.)

3:45pm **XI.7.3.K -**
Mechanics and physics of soft materials
Simon Hall 001
Chaired by: Dr. Shengqiang Cai

Chemomechanics Of Gels
» Dr. Yuhang Hu[1] (1. Georgia Institute of Technology)

Magnetic Symmetry-breaking Actuation for Shape Morphing and Soft Robotics
» Mr. Shuai Wu[1], Dr. Qiji Ze[1], Mr. Rundong Zhang[1], Prof. Nan Hu[1], Mr. Yang Cheng[1], Prof. Fengyuan Yang[1], Prof. Ruike Zhao[1] (1. The Ohio State University)

Optimal design of thin magneto–elastic actuators
» Mr. Jacopo Ciambella[1], Prof. Giuseppe Tomassetti[2] (1. Sapienza Università di Roma, 2. Università di RomaTre)

Photo-Motile Structures
» Mr. Kevin Korner[1], Dr. Basile Audoly[2], Prof. Kaushik Bhattacharya[1] (1. California Institute of Technology, 2. Ecole Polytechnique)

3:45pm **XI.9.5.E -**
Robotic materials: Leveraging mechanics and soft materials to achieve unprecedented capabilities
Seigle Hall 106
Chaired by: Dr. Yifan Wang

KEYNOTE: Liquid Metals for Soft Robotics
» Prof. Michael Dickey[1] (1. North Carolina State University)

Hybrid Liquid Metal-Microelectronics Electronic Skin Integration for Soft Robots
» Mr. Kadri Bugra Ozutemiz[1], Ms. Tess Hellebrekers[1], Dr. James Wissman[2], Ms. Jessica Yin[1], Prof. Burak Ozdoganlar[1], Prof. Carmel Majidi[1] (1. Carnegie Mellon University, 2. U.S. Naval Research Laboratory)

Adaptive and self-learning robotic matter
» Mr. Luuk van Laake[1], Mr. Giorgio Oliveri[1], Dr. Johannes Overvelde[1] (1. Amolf)

Continued from **Tuesday, 15 October**

Temperature-induced Recovery Phase Transforming Cellular Materials

» Ms. Yunlan Zhang[1], Dr. Mirian Velay-Lizancos[1], Dr. David Restrepo[2], Dr. Nilesh Mankame[3], Prof. Pablo Zavattieri[1] (1. Purdue University, 2. University of Texas at San Antonio, 3. General Motors)

Adaptable Stiffness Metastructures from Local Bistability for Reconfigurable Robotics

» Mr. Janav Udani[1], Dr. Andres Arrieta[1] (1. Purdue University)

5:30pm **P.7 -**
Closing Plenary of the Paul Paris Symposium
Graham Chapel

CLOSING PLENARY LECTURE: Huajian Gao

» Huajian Gao (Brown University)

6pm **P.8 -**
Student Paper Awards and Closing Ceremony
Graham Chapel