

WEDNESDAY 4/6

11:00	Welcome and Opening Remarks: Ryan Hurley, Conference Chair				
11:15	Plenary Lecture: Reuben Kraft, "Metaverse Mechanics: How the metaverse will save mechanics and mechanics will save the metaverse"				
12:15	Break				
	Session A Atomic to Continuum Scale Composite Mechanisms: Experiments and Modeling Investigating Multiscale Mechanical and Damage Response of Composites and Their Constituents	Session B Slip, Twins and Voids	Session C Real-time Characterization of Materials Under Dynamic Deformation	Session D Damage and Failure at High Strain Rates	Session E Mechanics of Biological and Biomimetic Soft Materials
12:45-1:05	ReaxFF Molecular Dynamics Investigation on Mechanical Properties and Damage Analysis of S-glass Fiber (J. Yeon, S. Chowdhury, J. Gillespie, Jr.)	High-Pressure Deformation of Metallic Nanocrystals and Lightweight Alloys (W. Gu, A. Parakh)	In situ neutron diffraction observations of steel deformation mechanisms (D. Magagnosc, K. Limmer, J. Lloyd, D. Field)	Modeling dynamic ductile failure: extensions of the TEPLA model and application to dynamic fracture of expanding cylindrical shell (T. Nguyen, D.J. Luscher, S. J. Fensin)	The role of tertiary bronchi in lung deformation due to impact trauma (M. Brannen, G. Kang, S. Dutrisac, R. Banton, J. Clayton O. Patel)
1:05-1:25	Developing Strain Rate Dependent Mode-I Traction Law for the Glass Fiber-Epoxy Interphase using Molecular Dynamics Method (S. C. Chowdhury, J. Gillespie, Jr.)				Subsurface high speed deformation and strain measurements of cavitation in soft matter (A. McGhee, J. Yang, E. Bremer, H. Cramer, C. Franck)
1:25-1:45	Moving window techniques to model shock wave propagation using the concurrent atomistic-continuum method (V. Agrawal, A. Davis, J. Lloyd)	The Competition of Pyramidal Slip and Compressive Twins in Magnesium (Y. Hollenweger)	Crush Gun Impact Testing: Analysis of Ignition Sites in Sensitive and Non Sensitive Explosives (N. Lease, M. D. Holmes, M. A. Englert-Erickson, L. M. Klamborowski, E. G. Francois V. W. Manner)	Analysis of dynamic necking instabilities by a statistical approach (S. El Mai, A. Molinari, S. Mercier)	Physics-Informed Data-Driven Constitutive Modeling of Strain Rate Sensitive Soft Materials (K. Upadhyay, J.N. Fuhg, N. Bouklas, K.T. Ramesh)
1:45-2:05	Atomic Simulations of Shock Wave Propagation Through Amorphous Polymers and Their Interfaces with Hard Materials (N. Dewapriya, R. Miller)	Cluster dynamics modeling of radiation-induced Cu cluster precipitation and hardening in bcc Fe (X. Bai)	Time-Resolved and Postmortem Observations of Dynamic Fragmentation in Boron Carbide (D. Mallick)	Ductile failure of piping subject to gaseous detonation loads (S. Offermanns, S. Weihe)	Survival Rate of Bacteria Following Pressure-Shear Plate Impact (L. Zhao, C. Perez-Fernandez, J. DiRuggiero, K.T. Ramesh)
2:05-2:25	A New Depth of Penetration Experimental Methodology in Determining the Rate Dependent Dynamic Crush Strength of S-2 Glass/Epoxy Composites (M. Kubota, B. Haque, J. Gillespie, Jr.)				Accelerating and supersonic dislocation in metals under extreme conditions (D. N. Blaschke, K. Dang, S. Fensin, J. Chen, B. Szajewski D.J. Luscher)
2:25-2:45	Break				
2:45-4:30	Poster Session				

THURSDAY 4/7

11:00	Plenary Lecture: Wei Chen, “Data-Driven Adaptive Discovery and Design of Microstructural Material Systems”				
12:00	Break				
	Session A Atomic to Continuum Scale Composite Mechanisms: Experiments and Modeling Investigating Multiscale Mechanical and Damage Response of Composites and Their Constituents	Session B Dynamic Fracture of Heterogeneous Composites	Session C Mechanics of Biological and Biomimetic Soft Materials	Session D Real-time Characterization of Materials Under Dynamic Deformation	Session E AI for Materials in Extreme Conditions
12:30-12:50	Quantification of Surface Defects in S2 Glass Fibers Using a Novel Flexural Test Method (A. Abu Obaid, J. Gillespie, Jr., R. Ganesh)	Phase field fracture modeling and experimentation on spark plasma sintered ceramic composites (J. Clayton, J. Knap, D. Casem, B. Leavy, J. Ligda T. Scharf)	Nonlinearity in the coefficient of thermal expansion of brain tissue (A. Dagro)	Decoding microstructure statistics from diffractograms via atomistic simulations and machine learning (R. Dingreville)	On the structure-property linkages in hexagonal material for data-driven damage-tolerant materials engineering (S. P. Joshi)
12:50-1:10	Mechanical response of glass fiber-reinforced composites under dynamic triaxial compression (W. Chen, J. Gao, Garam Kim, Junyu Wang)	Optimal Structures for Failure Resistance Under Impact (A. Akerson, K. Bhattacharya)	Hybrid Experimental Modeling Computational (HEMC) Skull Simulation: Elemental to Layer Simplification and Application to Microstructural Stochasticity (T. Weerasooriya)		Impact analysis of Lithium-ion battery module using machine learning (K. Prasath Logakannan, F. Zhu)
1:10-1:30	Improving durability (delamination resistance) and damage-tolerance (stiffness retention) in plain weave S-2 glass/SC15 epoxy thick-section composites using interlayer films (P. Dason Samuel, B. Haque, J. Gillespie, Jr.)	Continuum Elastic and Fracture Response of Low-Frequency Resonant Microstructured Media to Impact Loading (R. Abedi, G. Huynh, W. Cheney, W. Wang, A. Amirkhizi)	Measurement of Brain Simulant Deformation in Human Surrogate Head under blunt Impact Loading (A. Singh, S. Ganpule)	Real-time observation of twinning-detwinning in shock compressed magnesium via time-resolved in-situ synchrotron XRD experiments (C. Williams)	Recurrent neural-operator for multi-scale material behavior (B. Liu, K. Bhattacharya, A. Stuart)
1:30-1:50	Ballistic Performance of Functionally Graded S-2 glass/Epoxy Composites (M. Kubota, T. Lake, B. Haque, J. Gillespie, Jr., G. Palmese D. O'Brien)		An investigation into impact and strain-linked changes to the synapses in ex vivo porcine brain tissues (G. Kang, B. Hoffe, G. Kang, R. Banton, M. Holahan O.E. Patel)	Real-time characterization of phase and twin variants in dynamically deformed microstructures (A. Mishra, K. Ma, A. Dongare)	Deep learning model to predict stress tensor field in fiber-reinforced composite materials with application in multiscale materials modeling (A. Gupta, A. Bhaduri, L. Graham-Brady)
1:50-2:10	Mesoscale modeling of ballistic impact experiments on a single layer of plain weave composite (C. Meyer, B. Haque, D. O'Brien, J. Gillespie, Jr.)				AI assisted, high-speed multispectral monitoring of process anomalies in laser additive manufacturing (M. Alemohammad, M. Pekala, C. Stiles, S. Storck, M. Foster)
2:10	Break				

	Session A Machine Learning Methods in Materials Design, Characterization and Modeling	Session B Slip, Twins and Voids	Session C Particulate Materials Under Extreme Conditions and Particle-based Methods for Describing Them	Session D Damage and Failure at High Strain Rates	Session E Mechanics of Irradiated Materials
2:30- 2:50	Data-driven discovery of materials for extreme environments (S. Bavdekar, R. Hennig, G. Subhash)	Migrating Twins and Growing Voids (S. P. Joshi)	Multiscale Simulation of Particulate Material Undergoing Large Deformation (D. Zhang, M. Wang, P. Barclay)	Understanding the implications of finite specimen size in normal and combined pressure-shear plate impact experiments (B. Zuanetti, D.J. Luscher, K. Ramos, C. Bolme)	Probing Nanoscale Damage Gradients in Irradiated Metals using Nano-mechanical Test Techniques (S. Pathak)
2:50- 3:10	Graph Neural Network Framework to Emulate Multiple Crack Propagation, Crack Coalescence, and Stress Evolution in Brittle Materials (R. Perera Aguiar, V.Agrawal, D. Guzzetti)			High-throughput laser-driven micro-flyer spall failure investigations of ECAE-processed Mg-Al alloys (C. DiMarco, S. Lezcano, D. Mallick, L. Kecskes, T. Weihs K.T. Ramesh)	
3:10- 3:30	Exploring the structure-property-performance linkage of energetic materials via physics-aware recurrent convolutions (P. Nguyen, J. Choi, Y-T. Nguyen, S. Baek, H.S. Udaykumar)	Determining the Role of a Micro-scale Dislocation Slip in the Atomic-level Phase Transformation and Twinning (L. Xiong)	Sand Under Pressure: New In-Situ Quantification of High Pressure Triaxial Tests (R. Hurley, G. Shahin)	Spall of Tin and its Sensitivity to Microscale Behaviors – A Computational Study (K. Alidoost, N. Barton, G. Maskaly, F.Najjar)	Characterizing and Testing High Dose Neutron Irradiated Materials for Cladding Applications (S. Maloy, B. Eftink, T. Saleh, M. Toloczko, D. Hoelzer, T.S. Byun)
3:30- 3:50	Optimization of Energy Attenuation Through Micro-Structured Mechanical Metamaterials Using Genetic Algorithm and Bayesian Optimization (A. Amirkhizi, Joshua Morris, J. Morris, W. Cheney, W. Wang, T. Plaisted)	Twins in Ti (N. Mitra)	A Hybrid Multiphysics Approach to address Damage and Failure at High Strain Rates (E. Rougier, K. Bennett, S. Boyce, E. Knight)	Spall strength of polycarbonate measured by laser driven micro-flyer plate impact (J. Diamond, K.T. Ramesh)	Atomistic simulation of plastic deformation in nickel containing helium bubbles (T. Yan Liu, M.J. Demkowicz)
3:50- 4:10		Phase-field Modeling of Deformation Twinning in Polycrystalline Solids (E. Ocegueda, K. Bhattacharya)	Studying fracture and yield surfaces of granular systems using mesoscale particle-based models (J. Clemmer, D. Bolintineanu, J. Brown, J. Lechman)	Numerical simulation of multi-layer ceramic protection elements from optimized B4C – SiC-based composite material (T. Prikhna, B. Karpinos, P. Barvitskyi, M. Karpets, R. Haber)	

FRIDAY 4/8

11:00	Plenary Lecture: Tao Sun, “Structure dynamics in laser additive manufacturing revealed by high-speed x-ray imaging”				
12:00	Break				
	Session A Particulate Materials Under Extreme Conditions and Particle-based Methods for Describing Them	Session B Slip, Twins and Voids	Session C Damage and Failure at High Strain Rates	Session D Hypervelocity Impact Phenomena	Session E Mechanics of Irradiated Materials
12:30 - 12:50	Micromorphic Continuum Model derived from Granular Micromechanics (A. Misra)	NSF Funding and Collaboration Opportunities: Materials and Structures in Extreme Environments (A. Lewis)	Criterion for dynamic crack penetration vs. deflection at material interfaces (K. Kirane, Y. Lam, T. Abdullah)	Experimental Observations of Optical Flash and Early Time Ejecta Formation in Hypervelocity Impacts on Metals (G. Simpson)	Dislocation-Obstacle interactions: the influence of obstacle size and distribution on the Orowan bypass stress. (B. A. Szajewski, J. Crone, J. Knap)
12:50- 1:10			A stochastic perturbation study for 2D brittle fractures via a weighted-variational model (L. Daniel Blanco Cocom, M. A. Capistrán, J. Knap, J. Andres Christen)	Modeling of projectile impact in brittle ceramics using a multi-mechanism constitutive framework (N. Mitra, K.T. Ramesh)	The Quantification of Uncertainty in Elastic Constants of Silicon Carbide Composite Tubes (H. Thandaga Nagaraju, J. Nance, B. Sankar, N. Kim, G. Subhash)
1:10- 1:30	A multiscale variational principle for material nonlinearity based on pseudo-granular microstructure (E. C. Bryant, K. Bennett, N. Miller, A. Misra)	In situ Atomic Scale studies of Microstructural Evolution During Material Synthesis and Material Degradation (A. Devaraj)	Shear localization as a damage mechanism in pore collapse (Z. Lovinger, R. Kositski)	Comparison of the Impact Performance of Silicon Doped, Carbon Free and Hot Pressed Variations of Boron Carbide (P. Malhotra, A. Zare, J. Moreno, M. Shaeffer, K.T. Ramesh)	Low Temperature Localized Deformation Mechanisms in Irradiated Alloys (J. Wharry, C. Yang, C. Clement, H. Qu, Y. Zhao K. Mao)
1:30- 1:50	Calibration of Micromorphic Constitutive Models from Variationally Filtered Direct Numeric Simulations (N. Miller, R. Regueiro)		New insights into the role of porous microstructure on dynamic shear localization (M. Marvi-Mashhadi, J. C. Nieto-Fuentes, J. A. Rodriguez-Martinez)	Calibrated Radiometric Data of Hypervelocity Impact Debris (T. Rosch, D. Graninger, P. King, E. Hawkins, H. Darlington, L. Wray)	
1:50- 2:10	The Effect of Force-Chain Buckling and Fabric on Bulk Stiffness and Stress Response in Granular Media (A. Gupta, K.T. Ramesh, R. Hurley)	Differential homogenization estimates for the macroscopic response and field statistics of elasto-viscoplastic polycrystals (S. Das, P. Ponte Castañeda)			
2:10- 2:30	CLOSING REMARKS / CONFERENCE ADJOURN				