

2024 Aerospace Composite Materials Program Review

Capt Derek Barbee | March 11-13, 2024 | Arlington, VA - hybrid

Basic Research Innovation Collaboration Center (BRICC)
4100 N Fairfax Drive, Suite 450 | Arlington, VA 22203

Agenda Day 1 | Monday, March 11, 2024

Time	Topic	Speaker
0800-0815	Check-in / Login	
0815-0830	Introduction	Capt Derek Barbee, AFOSR
0830-0900	Design of Energy Absorbing Ceramics for Rotating Detonation Engines	Dr. Rodney Trice, Purdue
0900-0930	Forming True Blends: Developing New Processing Routes for Polymer-Based Nano-Composites	Dr. Marilyn Minus, Northeastern
0930-1000	Dynamic Growth Behavior in Directed Laser Deposited UHTC Fibers	Dr. Gregory Thompson, Alabama
1000-1015	BREAK	
1015-1100	Deep Reinforcement Learning for de novo Thermosetting Polymer Design	Dr. Ying Li, UConn
1100-1130	Uncertainty quantification and processing optimization for UHTC manufacturing through an ICME framework	Dr. Scott McCormack, UC Davis
1130-1200	Investigating the Role of Interfaces on Multi-Scale Mechanics of Additively Manufactured Aerospace Polymer Composites	Dr. Mehran Tehrani, UTA
1200-1315	LUNCH	
1315-1345	Physics-based process modeling for high-temperature and high-strength composites	Dr. Marianna Maiaru, UMass Lowell
1345-1415	Fundamental Understanding and Synthesis of Polymer Derived High Temperature Ceramic Nanocomposites	Dr. Kathy Lu, VPI
1415-1445	Design and Processing of High-Performance Architected Polymer Blends	Dr. Thao Nguyen, Johns Hopkins
1445-1500	BREAK	
1500-1530	Unravel Processing-Mechanics Relations in Vitremer Composites with Thermally-Driven Bond Exchanges via Molecular Engineering	Dr. Mohammad Naraghi, TAMU
1530-1600	Discovery of High Entropy Ultra High Temperature Ceramics through Entropy Forming Ability	Dr. Alejandra Castellanos, UT El Paso

	Descriptor and Hume-Rothery rules via machine learning	
1600-1630	High-Temperature Liquid-Crystalline and Semi-Crystalline Polyimide-Based Thermosetting Systems with Improved Melt-Rheology and Enhanced Interfacial Interactions.	Dr. Christopher Crouse, AFRL/RX
MEETING ADJOURN		

Day 2 Tuesday, March 12, 2024		
Time	Topic	Speaker
0800-0815	Check-in / Login	
0815-0845	High-Temperature Polymer Matrix Composites Design through Sensitivity Analyses of Microstructures	Dr. Maryam Shakiba, VPI
0845-0915	Interfacial Reinforcement through Hierarchical Polymer Nanofiber Interfaces	Dr. Henry Sodano, UMich
0915-0945	Morphology Control in Ceramics - The Design of Unique Brick-like Grain Shapes in Carbide Materials	Dr. Olivia Graeve, UCSD
0945-1015	Stabilization of Silica Bubbles in Ultra High Temperature Ceramic Nanocomposites	Dr. Ian McCue, Northwestern
1015-1030	BREAK	
1030-1100	Exploiting Extreme Molecular-Confinement in Hybrids for Enhanced Mechanical and Thermal Behavior	Dr. Reinhold Dauskardt, Stanford
1100-1120	Combining first principles calculations, oxidation kinetics, and experiments to understand the effect of rare-earth oxide dopants in zirconium diboride on survivability in extreme environments	Dr. Lisa Rueschhoff, AFRL/RX
1120-1150	Ultra tough Lightweight High-Temperature Nanofibers for Aerospace Composites	Dr. Yuris Dzenis, Nebraska
1150-1300	LUNCH	
1300-1330	Mechanically Robust and Reconfigurable Epoxy Nanocomposite by Dynamic Covalent Reactions	Dr. Dhriti Nepal, AFRL/RX
1330-1400	Geopolymer-Organic Composite Hybrids, Investigations of Microstructure, chemical Interactions, and Resulting thermo-mechanical Attributes (GeO-CHIMIRA)	Dr. William Monzel, AFRL/RX

1400-1430	Understanding Constituent Effects on the Properties of Preceramic Polymer Grafted Nanoparticles and Ceramics Made Thereof	Dr. Matthew Dickerson, AFRL/RX
1430-1445	BREAK	
1445-1515	Leveraging silicon solidification to engineer residual stresses in ceramic matrix composites for optimal toughness	Dr. Ashley Hilmas, AFRL/RX
1515-1545	Design of an Additively Manufactured Composite with Embedded Sensing	Dr. Matthew Cherry, AFRL/RX
1545-1630	Discussion: Emerging Opportunities in Composite Processing and Interface Chemistry	Capt Derek Barbee, AFOSR
	MEETING ADJOURN	

Day 3 Wednesday, March 13, 2024		
Time	Topic	Speaker
0800-0815	Check-in / Login	
0815-0845	Dynamic Chemistry for Resin Transfer Molding Composites	Dr. Meredith Silberstein, Cornell
0845-0915	Pixelized Composites with Programable Stiffness Distribution for Acoustic Wave Manipulation	Dr. Renee Zhao, Stanford
0915-0945	Multiscale modeling of radiation response of fiber-based composites	Dr. Chaitanya Deo, Georgia Tech
0945-1015	Oxidation Mechanisms of Refractory Materials in Ultra-High Temperature Molecular and Dissociated Oxygen	Dr. Elizabeth Opila, UV
1015-1030	BREAK	
1030-1100	Self-reporting Self-healing Vitrimers Nanocomposites	Dr. Lei Zhu, Case Western
1100-1130	Integrated Multifunctionality in Pixelated Polymer Nanocomposites	Dr. Timothy White, CU
1130-1200	Reactive Wetting of HF Alloy Melts into B4C Packed Bed Forming Ceramic Composites	Dr. Arturo Bronson, UT El Paso
1200-1315	LUNCH	
1315-1345	NANocomposite Core-Rim structures for Enhanced toughness and Strength at extreme temperatures (NACREOUS)	Dr. William Fahrenholtz, Mizzou

1345-1415	Confinement Effects on Polymer Degradation in Nanocomposites	Dr. Reika Katsumata, UMass
1415-1445	Tuning Polymer Dynamics and Properties via Chain Structural Heterogeneity	Dr. David Simmons, Princeton
1445-1500	BREAK	
1500-1530	Characterization of Fusion Welding in SiC-based Ceramic Composites: An Integrated Experimental and ICME-based Approach	Dr. Arezoo Emdadi, Mizzou
1530-1600	Processing and Properties of Polymer-Grafted Nanoparticle Monolayers	Dr. Daniel Hallinan, FAMU
1600-1630	Removing the Guesswork in Compositionally Complex Ceramics through Atomic-Scale Structural Characterization and Modelling	Dr. Nicholas Bedford, New South Wales
1630-1645	Closing Remarks	
1645	MEETING ADJOURN	