

# 2021 Aerospace Composite Materials Program Review

Dr. Ming-Jen Pan | August 9-11, 2021 | Arlington, VA - Hybrid

## Agenda Day 1 | MONDAY, AUGUST 9

Time	Topic	Speaker
9:00-9:30	Zoom login	
9:30-9:45	OPENING REMARKS	
Composite Design and Performance Prediction - Chair: Dr. Tim Pruyn		
9:45-10:30	Stochastic Self-Consistent Clustering Theory for Composite Performance Prediction: from Extreme Value Microstructure Attributes to Design of Interphase for Toughness	Cate Brinson Duke University
10:30-11:00	Understanding Enhancement of Strength in CNT/GNP-based Structural Composites	Gary Seidel Virginia Tech
11:00-11:30	An Experimental-Computational Study of Length-scale Based Toughness Enhancement in Graphene/Epoxy Nanocomposites for Structural Light-weighting	Samit Roy University of Alabama
11:30-12:00	Fundamentals of Strengthening Mechanisms in Carbon nanotube (CNT)/ Graphene Nanoplatelet (GNP) reinforced Metal Matrix Composites for Aerospace Structural Applications	Tushar Bokar Cleveland State University
12:00-1:00	LUNCH BREAK	
Composite Design and Performance Prediction (Cont'd) - Chair: Dr. Jaimie Tiley		
1:00-1:30	High-Temperature Polymer Matrix Composites Design through Sensitivity Analyses of Microstructures	Maryam Shakiba Virginia Tech
1:30-2:00	Exploiting Extreme Molecular-Confinement in Low-Density Hybrids for Enhanced Mechanical and Thermal Behavior	Reinhold Dauskardt Stanford University
2:00-2:15	COFFEE BREAK	
Complex Composite Architecture - Chair: Dr. Jaimie Tiley		
2:15-2:45	Microtexture Development in Additive-Manufactured Hybrid Materials	Charles Browning University of Dayton
2:45-3:15	Design of Lightweight Cellular Glass: Lessons from Nature	Ling Li Virginia Tech
3:15-3:45	Lightweight, Elastic Inorganic Metamaterials: Controlling Flexibility and Fracture Toughness	Rayne Zheng Virginia Tech / UCLA

	through Hierarchical Nano-architectures	
<b>3:45-4:00</b>	Integrated Multifunctionality in Pixelated Polymer Nanocomposites	Tim White University of Colorado
<b>4:00-4:15</b>	Reactive Wetting of HF Alloy Melts into B4C Packed Bed Forming Ceramic Composites	Arturo Bronson University of Texas El Paso
<b>MEETING ADJOURN</b>		



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## Agenda Day 2 | Tuesday, AUGUST 10

Time	Topic	Speaker
9:00-9:30	Zoom login	
Novel Polymers - Chair: Dr. Vikas Varshney		
9:30-10:00	High Performance Aerospace Matrix Resins for Advanced Manufacturing of Light Weight Structures with Programmable Melt Rheology and Cure Chemistry	Hilmar Koerner AFRL/RX
10:00-10:30	Forming True Blends: Developing New Processing Routes for Polymer-Based Nano-Composites	Marilyn Minus Northeastern University
10:30-11:00	Deep Reinforcement Learning for de novo Thermosetting Polymer Design	Ying Li University of Connecticut
11:00-11:30	The Design, Synthesis and Conversion of Pre ceramic Polymers using Modular Chemistry	Tim Pruyn - AFRL/RX Nick Bedford – University of New South Wales
11:30-12:00	Self-healable Lightweight Cellular Structures: Additive Manufacturing and Multifunctionality	Qiming Wang USC
12:00-1:00	LUNCH BREAK	
New Reinforcement Materials – I - Chair: Dr. Dhriti Nepal		
1:00-1:30	Understanding Carbon Nanotube Synthesis via Autonomous Research Systems	Benji Maruyama AFRL/RX

1:30-2:30	Synthesis, Purification, Characterization, and Liquid Phases of BNNTs as Lightweight Multi-functional Precursor for Aerospace Fibers and Films	Matteo Pasquali Rice University
	Synthesis, Purification, Characterization, and Liquid Phases of BNNTs as Lightweight Multi-functional Precursor for Aerospace Fibers and Films	Yeshayahu Talman Technion R&D Israel
2:30-2:45	COFFEE BREAK	
New Reinforcement Materials – II - Chair: Dr. Lisa Rueschhoff		
2:45-3:15	Robust Nanoporous Materials Morphology Design	Ajit Roy AFRL/RX
3:15-3:45	Nanotube assemblies for structural applications: modeling the key behaviors and emergent nanostructures	Boris Yakobson Rice University
3:45-4:15	Ultratough Lightweight High-Temperature Nanofibers for Aerospace Composites	Dzenis, Yuris University of Nebraska
	MEETING ADJOURN	

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<b>Agenda Day 3   Wednesday, AUGUST 11</b>		
<b>Time</b>	<b>Topic</b>	<b>Speaker</b>
<b>9:00-9:30</b>	<b>Zoom login</b>	
<b>High Temperature Ceramics &amp; Composites - Chair: Dr. Craig Przbyla</b>		
<b>9:30-10:00</b>	Elucidating the Influence of Interfacial Interactions on the Structure and Properties of Preceramic Polymer-Based Hairy Nanoparticles and Their Derived Materials	Matthew Dickerson Kara Martin AFRL/RX
<b>10:00-10:20</b>	Electromagnetic Properties of Conductive Ceramic Composites Made of Ultra-High-Temperature and Polymer-Derived Ceramics	Cheryl Xu North Carolina State Univ.
<b>10:20-10:40</b>	Fundamental Understanding and Synthesis of Polymer Derived High Temperature Ceramic Nanocomposites	Kathy Lu Virginia Tech

10:40-11:00	Oxidation Mechanisms of Refractory Materials in Ultra-High Temperature Molecular and Dissociated Oxygen	Beth Opila University of Virginia
11:00-11:20	Morphology Control in Ceramics - The Design of Unique Brick-like Grain Shapes in Carbide Materials	Olivia Graeve UC San Diego
11:20-11:40	Physics-Based Process Modeling for High Temperature and High Strength Composites	Marianna Maiaru Univ. Massachusetts Lowell
11:40-12:00	Functionally Graded Ultra-High Temperature Composites as Next Generation Hypersonic Materials	Lisa Rueschhoff AFRL/RX
12:00-1:00	LUNCH BREAK	
Interface Phenomena - Chair: Dr. Kara Martin		
1:00-1:30	Mechanisms and Properties of Molecular Self-assembly and Load Transfer in Large-scale CNT Assemblages and CNT/ Carbon Fiber Hybrid Materials	Richard Liang Florida State University
1:30-2:00	Interfacial Reinforcement through Hierarchical Polymer Nanofiber Interfaces	Henry Sodano University of Michigan
2:00-2:30	Investigating the Role of Interfaces on Multi-Scale Mechanics of Additively Manufactured Aerospace Polymer Composites	Mehran Tehrani UT Austin
	ADJOURNED	
2:30-4:00	Government Only Discussion	Ming-Jen Pan
	MEETING ADJOURN	