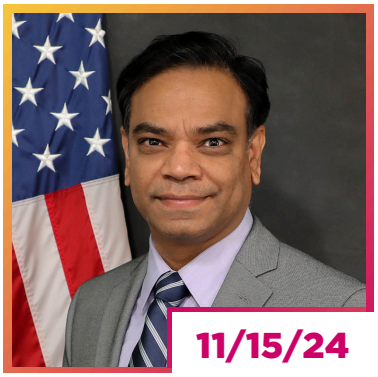
FIU Engineering & Computing
Department of Biomedical Engineering

Wallace H. Coulter Foundation
Biomedical Engineering Seminar Series

VIKAS VARSHNEY, PHD, is a senior research scientist in polymer matrix composites branch at Materials and Manufacturing Directorate, Air Force Research Laboratory (AFRL), Wright-Patterson Air Force Base, OH, United States. Prior to joining AFRL, he obtained his undergraduate degree from Indian Institute of Technology, Delhi (2002) and Ph.D. from The University of Akron (2006) in Polymer Science. He has over 80 peer-reviewed publications and 7000+ citations (Google Scholar). His research interests focus on developing multi-scale modeling and machine learning frameworks to develop novel materials for next-generation aerospace structural and functional applications, including but not limited to, 2D materials, in-situ sensing of external stimuli in structural composite during their processing/performance, thermos-oxidative stability of high-temperature structural resin systems, materials discovery of new monomer/polymer chemistries, self-healing (vitrimers) polymeric composites, and discovering processing-structure-performance linkages.



11/15/24

Dr. Vikas Varshney

Research Chemist
Wright-Patterson Air Force Base

Friday, November 15th | 9:00 AM | EC 2300

Investigating Polymer Behavior through Molecular Dynamics Simulations: From Polymerization to Degradation and Structure-Property Relationships

ABSTRACT:
Molecular dynamics (MD) simulations offer invaluable insights into the fundamental behavior of polymers, empowering the design of next-generation materials. This presentation will showcase the versatility of MD simulations through diverse applications, encompassing:

- Polymerization: Simulating the growth of thermoplastic and thermoset polymers from their monomeric constituents, aiding the development of tailored materials.
- Degradation: Modeling the pyrolysis of polymers, contributing to the understanding of char formation and thermal stability.
- Structure-Property Relationships: Investigating key thermo-physical and mechanical properties, including glass transition temperature, thermal expansion, moduli, strength, and creep, enabling the prediction of material performance under various conditions.
- Furthermore, a brief overview of the Air Force Research Laboratory's Materials and Manufacturing Directorate, its mission, and potential collaboration and internship opportunities for faculty and students will be provided.

Through the generous support of the Wallace H. Coulter Foundation, the Department of Biomedical Engineering facilitates weekly lectures each year during academic terms. Experts in all areas of Biomedical Engineering are invited to provide a research seminar and to meet with faculty and students to discuss the latest developments and research in Biomedical Engineering.

Friday, November 15th, 2024 | 9:00AM - 10:00AM | EC 2300
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