COLLEGE OF ENGINEERING, COMPUTER SCIENCE, & TECHNOLOGY

Seminar in Interdisciplinary STEM Research

September 26 – Thursday, 3:05-4:20 PM PST

Location: E&T C-256

HOSTED BY CREST-CATSUS AND SIKAND SITI CENTERS



Travis Hu, PhD

Research Group (Hu Group)

Bio-Nano Materials and Interfaces Lab (BNMI-Lab)

Dr. Travis Hu is an Associate Professor of Mechanical Engineering at Cal State LA, specializing in Applied Mechanics and Materials Science. As the 2024-25 STEM-NET Faculty Fellow, he represents Cal State LA across the 23-campus CSU system to advance STEM research and education. Before joining Cal State LA in 2016, Dr. Hu was a Teaching Assistant Professor at the University of Denver. He also held postdoctoral research positions at Case Western Reserve University, the University of Florida, and the University of Delaware, where he worked on multifunctional carbon, polymeric, and hybrid materials for energy, biomedical, and defense applications.

Nature's Secret to Stick: Unlocking the Future of Adhesive Technologies with Biomimicry

Abstract: Nature provides a rich source of inspiration for developing advanced adhesive materials, with organisms like geckos, tree frogs, octopuses, and mussels showcasing remarkable adhesive abilities. In this seminar, we will explore how the unique attachment systems of these creatures, rooted in specialized micro- and nanostructures, have inspired the development of innovative synthetic adhesives. We will begin by discussing the biological design principles and mechanisms that underlie natural adhesion, focusing on the relationship between structure, size, and function. This will be followed by an overview of recent advances in bioinspired adhesives, particularly gecko-like dry adhesives, and their emerging applications in fields such as robotics, healthcare, and manufacturing.

Additionally, we will delve into the challenges of replicating natural adhesion in artificial systems, including the development of stimulus-responsive smart surfaces with tunable properties. By examining case studies of engineered adhesive materials, we will highlight both the successes and the remaining hurdles in translating biological principles into real-world applications. The seminar will conclude with a discussion on future opportunities for innovation in biomimetic adhesives, offering insights into how these materials could revolutionize industries ranging from medicine to environmental technologies.

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