

Physics Colloquium

**Prof. Megan Valentine
Department of Mechanical Engineering
University of California**

“New frontiers in the development of micro-structured materials”

Microscale structures and phases often critically influence the mechanical properties of soft materials. Such micro-structured materials are ubiquitous in biological systems, where they impart superior mechanical properties including high toughness and strength. Despite the importance of such microstructures in natural and commercial material systems, understanding how to controllably formulate and optimize such multiphase, hierarchical materials remains challenging. In this talk, I will present my group’s recent work on developing new methods for the design, manufacture, and micromechanical analysis of heterogeneous material systems, with applications ranging from in situ force sensing to the formulation of phase separating complexes to the on-demand manufacture of polymer composites. We prioritize the use of high-throughput methods and incorporate data science approaches to develop rapid design-build-test-learn cycles and accelerate soft materials discovery.

Megan T. Valentine is a Professor of Mechanical Engineering and Co-Director of the California NanoSystems Institute at the University of California, Santa Barbara. Her interdisciplinary research group investigates many aspects of biological and bioinspired materials, with an emphasis on understanding how forces are generated and transmitted in living materials, how these forces control cellular outcomes, and how the extraordinary features of living systems can be captured in manmade materials. This highly interdisciplinary experimental work lies at the intersection of engineering, physics, biology and chemistry, and advances diverse application areas, ranging from marine-inspired materials to mechanobiology to soft robotics. Megan received her B.S from Lehigh University, M.S. from UPenn and Ph.D. from Harvard, all in Physics. She completed a postdoctoral fellowship at Stanford in the Department of Biological Sciences, where she was the recipient of a Damon Runyon Cancer Research Postdoctoral Fellowship, and a Burroughs Wellcome Career Award at the Scientific Interface. In 2008, she joined the faculty at the University of California, Santa Barbara, where she now serves as a co-leader of an IRG on Resilient Multiphase Soft Materials within the UC Santa Barbara Materials Research Laboratory, an NSF MRSEC. In 2013, she was awarded an NSF CAREER Award for her work on neuron mechanics, and in 2015 was awarded a Fulbright to study adhesion mechanics in Paris, France. She is a Fellow of the American Physical Society and American Institute for Medical and Biological Engineering.

Thursday, April 14, in LL 316 at 4:25 PM

For Zoom participation, please see information below:

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