BIOENGINEERING & PHYSICS COLLOQUIUM: Self-organization and Shape Change in Anisotropic Biopolymer Assemblies

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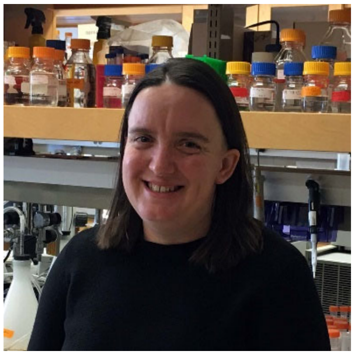
Date:
12/3/2021

Time:
10:30 AM-11:50 AM

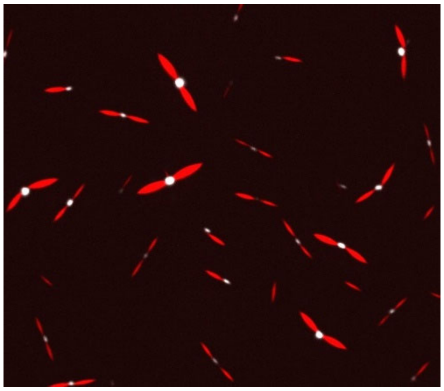
Link:
Please contact snsgradstaff@ucmerced.edu for the zoom information.

About The Speaker:



Kim Weirich is an interdisciplinary researcher in experimental soft matter and biological materials, particularly interested in self-organization and unusual mechanics in soft materials inspired by biology. She has a Ph.D. in Biomolecular Science and Engineering and undergraduate degrees in Physics and Linguistics from the University of California, Santa Barbara. Before joining the Materials Science & Engineering department at Clemson University, she was a Postdoctoral Scholar at the University of Chicago in the James Franck Institute and the Pritzker School of Molecular Engineering.

Abstract:



Complex mixtures of macromolecules self-organize to form the soft and active biological materials that structure the cellular cytoplasm. Ordered assemblies of cytoskeletal filaments, such as stress fibers and mitotic spindles, orchestrate the complex mechanical behavior of cells. Key to understanding these exquisite mechanics is elucidating the physical principles of self-organization in these systems.

We recently reported dense condensates of cytoskeletal filaments that form liquid crystal condensed phases, where structure arises from the anisotropy of the filaments. Here, we discuss emergent self-organization and shape changes that result from forming composites of these liquid crystals with biological polymers of different rigidities and activity. Our results highlight the role of anisotropy in the self-organization of biological materials and suggest physical mechanisms of controlling shape change in bio-inspired, soft materials.

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