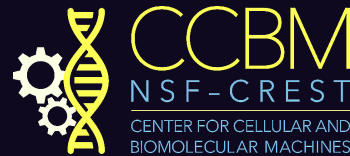




Soft Living Active and Adaptive Matter



Geometry, topology and soft matter: Emerging complex behavior of matter with disorder

Danilo B. Liarte
Cornell University

Abstract:

Geometry, disorder, and topology have a central role in condensed matter. Their interplay and synergy lead to some of the most intriguing phenomena in soft-matter physics. I will show how to use the mathematics of martensites (iron, shape-memory alloys) to study focal conic domains — the most iconic defect of smectic liquid crystals displaying Lorentz invariance and neat arrangements of ellipses and hyperbolas. I will also describe periodic lattices whose topology is crafted to model the elastic properties of disordered solids near jamming (a ubiquitous transition describing many systems from molecular glasses and granular media to dislocation tangles and biological tissues). Finally, I will show how we can use and extend our models of disordered elastic networks to describe varied systems, from colloidal suspensions and metamaterials to strange quantum liquids.

Date:
4/12/2021

Time:
9:00 AM-10:15 AM

About the speaker:

Dr. Danilo Liarte is a Research Associate working with Dr. James P. Sethna and Dr. Itai Cohen at Cornell University. His research focuses on several areas of hard and soft condensed matter physics, including superconductivity, liquid crystals, spin glasses and jamming.



Dr. Liarte received his Ph.D. degree in Physics at the University of Sao Paulo, Brazil, where he employed microscopic statistical models with disorder to characterize emerging critical behavior of complex fluids and spin glasses. He is currently developing phenomenological and effective-medium theories for disordered viscoelastic matter near rigidity transitions, with relevance for systems ranging from colloidal gels and metamaterials to strange quantum liquids.

For more information, contact: Daniel Beller, Madhuvanathi Athani
dbeller@ucmerced.edu, mathani@ucmerced.edu

