Soft Living Active and Adaptive Matter

CCBM NSF-CREST CENTER FOR CELLULAR AND BIOMOLECULAR MACHINES

Cross sections of doubly curved sheets as confined elastica

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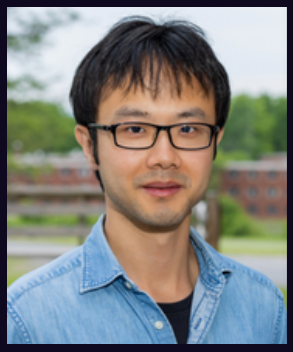
Abstract:

Thin, flat films are commonly shaped into doubly bent structures, resulting in a multi-scaled appearance with the overall shape and fine features. Current approaches usually adopt a separation of scales by focusing only on the gross structure or the fine features. However, a dichotomy of gross and fine is not always justifiable, and the relationship between the gross shape and fine features remains unclear. Here, we use a thin-membraned balloon as a model to consistently combine the analyses of gross and fine. We proposed a minimal model for a representative balloon cross-section that reproduces experimental observations. This research offers a new approach to analyzing buckled structures over enclosed surfaces that could inform the design of inflatable structures and provide insights into biological patterns.

Date:
04/10/2023

Time:
9:00 AM-10:15 AM (PT)

About the speaker:



Mengfei He is a Postdoctoral Research Associate in the Physics Department at Syracuse University. Mengfei obtained his PhD in Physics at the University of Chicago in 2019, where he studied capillarity and fluid thin films advised by Prof. Sidney R. Nagel. He then joined Prof. Joseph Paulsen's Lab at Syracuse University to study morphologies of slender solids including elastic fibers and thin membranes.

Mengfei's various interests share the common theme of revealing unexpected complexities rooted in simple underlying principles in soft interfacial systems.

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Sign up at physics.ucmerced.edu/slaam/ to be included in the mailing list to receive a Zoom link.

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