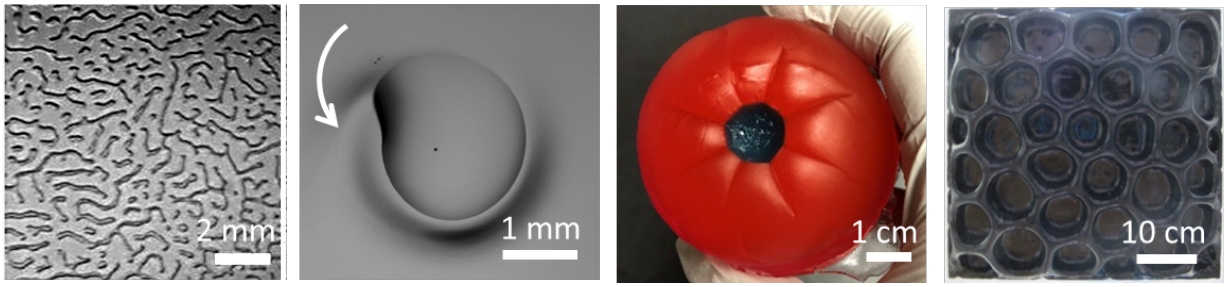
UNIVERSITY
OF MIAMI

PHYSICS COLLOQUIUM
11 am, Wednesday, December 9, 2020
(Zoom link to be provided)

Understanding and Controlling Pattern Formation of Soft Materials



Soft elastic solids, such as elastomers and hydrogels, are used in many practical applications ranging from adhesives to biocompatible scaffolds for tissue engineering. Biological cells and tissues have very similar mechanical properties as those of soft materials. Such solids undergo large deformations and can respond to forces such as interfacial tension, gravity, and residual stresses due to growth by swelling. Understanding how soft solids destabilize to external fields are crucial to avoid failure and aid engineering of materials of targeted geometries and properties, as well as inform us about morphogenesis in soft biomatter. My research focuses on understanding fundamental principles of how joint roles of surface tension, elasticity, gravity interact with geometric length scales of soft solids to exhibit interfacial and bulk pattern formation, as well as drive self-assembly of patterns in soft bio-interfaces. Soft, porous solids also interact with liquids to give rise to interesting self-excitable phenomena. I will discuss my research with a few examples of how patterns and motions are observed in soft elastic solids, with the motivation of learning fundamental principles of deformability of soft materials as well as harnessing them for diverse engineering applications.

Aditi Chakrabarti

Harvard University

Biography: Dr. Aditi Chakrabarti is currently a postdoctoral fellow in the group of Professor L. Mahadevan in the School of Engineering and Applied Sciences at Harvard University. Her research interests are at the interface of physics and mechanics of soft materials and its implications in both engineering and biological systems. Prior to this, Aditi received her Ph.D. in Chemical Engineering from Lehigh University in 2017, working on problems related to large deformation and elastocapillarity of soft elastic solids, in the group of Professor Manoj K. Chaudhury. She was awarded the Elizabeth V. Stout Dissertation Award at Lehigh University for the best dissertation in the P.C. Rossin College of Engineering and Applied Science in 2017. In 2019, she was named one of the MIT Rising Stars in Chemical Engineering.