Abstract
Poroelastic material is a two-phase system consisting of a porous solid skeleton filled with liquid. Of particular interest is a class of soft poroelastic materials, the solid part of which is consisted of polymeric networks. These materials are often called gels. Gels have broad applications in many engineering fields but are difficult to characterize through mechanical tests because of their soft and brittle characters. In this talk, I will show that within the theory of poroelasticity, the force relaxation curves from indentation can be obtained in remarkably simple forms, enabling indentation to be used with ease as a method for determining the elastic constants and diffusivity of gels. In the more applied direction of research, we take bio-inspired approach to design and fabricate new poroelastic materials with multifunctionalities. For example, I will demonstrate that a mechanically actuated poroelastic film can simultaneous control its transparency and manipulate various low-surface tension droplets from free-sliding to pinned. These novel properties of poroelastic materials can benefit many industrial and biomedical applications.

Bio
Dr. Yuhang Hu joined the faculty of Department of Mechanical Science & Engineering at University of Illinois Urbana-Champaign in 2015. She obtained her Ph.D. in Engineering Sciences at Harvard University, and was a postdoctoral fellow in the biomimetic lab at Harvard. Dr. Hu’s research focuses on the mechanics of soft materials and bioinspired materials. Her study involves both theory and experiments. Dr. Hu is a recipient of the NSF CAREER Award (2016), Haythornthwaite research initiation award from ASME Applied Mechanics Division, Winston Chen’s fellowship from Harvard, and Gold Medal of Defence Science and Technology Agency of Singapore.