

Soft Active Materials

Zhigang Suo

Allen E. & Marilyn M. Puckett Professor of Mechanics and Materials
School of Engineering and Applied Sciences

Harvard University

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(Host: George A. Kardomateas, AE)

<http://www.me.gatech.edu/SMSS>

Abstract

Soft materials can be made *active* in that they can greatly change shape and volume in response to diverse stimuli. For example, an elastomer *may* strain more than 100% under an electric field. As another example, in response to a change in pH, a gel *may* imbibe solvent molecules to swell many times its initial volume. These soft active materials have broad applications in drug delivery, tissue engineering, microfluidics, and the oil industry. My group has recently started to study the mechanics of soft active materials. We attempt to formulate theories that address commonly asked questions. How do stress, electric field, and chemical potential interplay to cause large deformation? Why do abrupt changes, or instabilities, occur? In this talk I'll outline the basic theories and several specific phenomena arising in applications, focusing on large deformation and instability.

Bio-Sketch

Zhigang Suo is Allen E. and Marilyn M. Puckett Professor of Mechanics and Materials at Harvard University. He earned a bachelor degree from Xi'an Jiaotong University in 1985, majoring in Engineering Mechanics. Upon earning a Ph.D. degree in Engineering Science from Harvard University, in 1989, Suo joined the faculty of the University of California at Santa Barbara, and established a group studying the mechanics of materials and structures. The group moved to Princeton University in 1997, and to Harvard University in 2003. Professor Suo teaches courses in solid mechanics and applied mathematics. His research centers on the mechanical behavior of materials and structures. Basic processes include fracture, deformation, polarization, and mass transport, driven by various thermodynamic forces (e.g., stress, electric field, electron wind, chemical potential). Applications are concerned with microelectronics, large-area electronics, and active materials. With Teng Li, Professor Suo co-founded *iMechanica*, the web of mechanics and mechanicians. *iMechanica* now has over 11,500 registered users and over 12,000 entries. He is a member of the Executive Committee (2005-2010) of the Applied Mechanics Division, of the American Society of Mechanical Engineers (ASME), and is a member at large of the US National Committee on Theoretical and Applied Mechanics (2006-1010). Professor Suo won the Pi Tau Sigma Gold Medal and the Special Achievement Award for Young Investigators in Applied Mechanics, both from ASME. He is a member of The US National Academy of Engineering.

If you are interested in scheduling a time to meet Professor Suo, please contact Cecelia Jones at cecelia.jones@me.gatech.edu or George Kardomateas at george.kardomateas@ae.gatech.edu

