

The Department of Mechanical Engineering
Presents

Beth L. Pruitt, Ph.D.

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Departments of Mechanical Engineering, and
Molecular & Cellular Physiology
Stanford University

Friday, April 4
11:10 AM - 12:00 PM
Winston Chung Hall 205/206



Engineering Biological Function and Form

Abstract:

Quantitative experiments in cellular biomechanics and mechanotransduction assays demand novel measurement and analysis systems with appropriately tuned mechanical environments and imaging access. We design and fabricate our own tools and systems to address specific measurement needs and are concerned with robust manufacturing and ease of operation for biological research. Biological questions of interest include the mechanisms and forces of cell adhesion and tissue development in response to physiological mechanical stimuli. These studies require deformable culture systems designed with appropriate cell-substrate interfaces, cell-cell interactions, and embedded force metrologies compatible with live cell imaging. We deploy deformable cell culture environments and microsystems to apply strain to cells cultured in 2D monolayers or encapsulated in 3D scaffolds. Multi-well and micropatterned devices enable testing multiple conditions such as strain magnitude, biaxial or uniaxial strains in one experiment for high throughput screening of parameters. I will discuss the design and application of quantitative and fundamental biophysical assays to open questions of mechanobiology in cell physiology, stem cells, and biology together with our collaborators.

About the Speaker:

Dr. Pruitt is from Massachusetts and received the B.S.M.E. in 1991 from the Massachusetts Institute of Technology (MIT). She was in Navy ROTC at MIT where she learned sailing, leadership, and perseverance and later served as an officer in the US Navy. She received an M.S. in Manufacturing Systems Engineering in 1992 from Stanford University then served as an officer in the U.S. Navy, first at the engineering headquarters of the nuclear program then as a teaching Systems Engineering and offshore sailing at the U.S. Naval Academy. She earned her Ph.D. in Mechanical Engineering in 2002 at Stanford University where she specialized in MEMS and small-scale metrologies for electrical contacts. She was a postdoctoral researcher at the Swiss Federal Institute of Technology Lausanne (EPFL) from 2002-2003 where she worked on polymer MEMS. Beth Pruitt joined the Mechanical Engineering faculty of Stanford in Fall 2003 and founded the Stanford Microsystems Lab which currently includes 12 trainees. She was a visiting professor in the Lab for Applied Mechanobiology in the Department of Health Sciences and Technology at ETH, Zurich in 2012. She lives in San Francisco with her husband and a friendly vizsla.