The Department of Mechanical Engineering
College of Engineering and Applied Sciences
Stony Brook University

Mechanical Engineering Seminar

Huanyu Cheng
Assistant Professor, Department of Engineering Science and Mechanics
Pennsylvania State University

Lecture Title: Wearable Tattoo Electronics Capable of Dissolving in the Human Body

Friday, October 7, 2016 at 1:30 PM, Room 173 Light Engineering Building

Abstract

Recent advances in electronics enable powerful biomedical devices that have greatly reduced therapeutic risks by monitoring vital signals and providing means of treatment. Implantable devices can help us better understand the behavior and effects of various diseases. However, an additional procedure is required to remove the device after an initial implantation. Conventional electronics today form on the planar surfaces of brittle wafer substrates and are not compatible with the complex topology of body tissues. Therefore, stretchable and absorbable electronics are the two missing links in the design process of implantable monitors and in-vivo therapeutics. This talk presents the challenges, mechanics, and design strategies, behind a potential medical device that (a) integrates with human physiology, and (b) dissolves completely after its effective operation. Implanted devices will provide a much better understanding of organ functions and offer more time efficient treatments for serious diseases such as heart failure.

Biography

Dr. Huanyu Cheng was appointed an Assistant Professor of Engineering Science and Mechanics (ESM) and Materials Research Institute (MRI) at The Pennsylvania State University in Aug 2015, and was awarded the Dorothy Quiggle Career Development Professor in Sep 2015. He earned a Ph.D. and a Master's degree from Northwestern University in 2015 and 2011 respectively, and a Bachelor's degree from Tsinghua University (China) in 2010. Prior to joining Penn State, Dr. Cheng also worked as a Visiting Research Fellow with Prof. John A. Rogers at the University of Illinois at Urbana-Champaign on wearable and dissolvable electronics. Throughout Dr. Cheng's research career, he has worked on mechanics design and manufacturing of biologically inspired electronics with applications in robotics, biomedicine, and energy. Dr. Cheng has co-authored over 50 peer-reviewed publications, and his work has been recognized through the reception of awards including election to the Global Young Academy, a Haythornthwaite Research Initiation Grant from ASME (2016-2018), Finalist for Forbes 30 Under 30 list in Manufacturing/Industry in 2016, Howard Hughes Medical Institute (HHMI) International Student Research Fellowship, Best Paper Award in ASME Applied Mechanics Division Student Paper Competition, International Institute for Nanotechnology Outstanding Researcher Award, Chinese Government Award for Outstanding Self-financed Students Abroad, and many others.

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