DEPARTMENT OF MECHANICAL ENGINEERING COLLOQUIUM

UNIVERSITY OF CALIFORNIA
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The Department of
Mechanical Engineering
PRESENTS

Hyowon "Hugh" Lee, Ph.D.

Assistant Professor of Biomedical Engineering
Purdue University

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WCH Room 205/206
11:10-12:00PM

Engineering a smarter and a more reliable implantable devices using micro- and nanoscale sensors and actuators

Abstract:
Developing a chronically reliable implantable device is an enormous challenge in biomedical engineering with significant economic and clinical implications. Implantable biomedical devices often suffer from substantial performance degradation and premature failures due to various abiotic and biotic failure modes. For example, neurostimulation microelectrodes are known to suffer from electrode dissolution that can degrade its charge-injection performance over time. Moreover, many indwelling catheters, pacemakers, orthopedic implants, and biosensors experience biofouling-induced device failures. In this talk, I will discuss our latest efforts to engineer more reliable implantable devices for neurological and other clinical applications. In particular, I will share our efforts to develop a more safe, reliable, and functionally superior neurostimulation electrodes. I will also discuss the application of microscale actuators and sensors to improve treatment for post-hemorrhagic hydrocephalus, spinal cord injury, and glaucoma.

About the Speaker:
Hyowon (Hugh) Lee received his B.A. in neuroscience from Colorado College in 2004 and his M.S. and Ph.D. degrees in biomedical engineering from the University of California, Los Angeles, in 2008 and 2011, respectively. Before joining Purdue, he worked as a senior engineer for St. Jude Medical's Implantable Electronics Systems Division where he focused on using advanced technologies to overcome manufacturing challenges associated with implantable electronic devices such as pacemakers, ICDs, DBS, and other neurostimulation devices. At UCLA, he trained in the areas of neuroengineering and microfabrication under Jack Judy to develop novel implantable magnetic microactuators for hydrocephalus treatment. His current research interests include rapid prototyping of implantable sensors and actuators, multifunctional smart implants, and safety and reliability of implantable devices.