



Department of Engineering
Seminar Program
Wednesday, Mar 22, 2017
Shanahan Teaching and Learning Center
Lecture Hall 1430, 4:15pm

“BioMEMS Applications for Non-Invasive Drug Delivery and Point of Care Diagnostics”

Prof. Kiana Aran, KGI

Summary:

Bio-microelectromechanical systems (bioMEMS) have the potential to greatly impact the quality of healthcare because they can be exploited as innovative therapeutics and diagnostic tools. For example, needle-free immunization technologies have emerged as an attractive therapeutic option to enable mass immunizations during pandemics in the developing world. This talk will first highlight the development of a MEMS-based pill, designed to effectively and non-invasively deliver a vaccine to stimulate mucosal and systemic immunity. This pill can be easily fabricated using 3D printing technology and has been shown to impart immunogenic effects in rabbits, suggesting immense promise in the delivery of existing vaccine formulations for mass immunization against human diseases.

In the second portion of the talk, a secondary bioMEMS will be highlighted that was developed as a potential point of care diagnostic tool capable of measuring levels of reactive oxygen species (ROS). This POC-biosensor features both bioMEMS technology and polymer and material science to create a novel ROS-responsive polymer-based electrode that was able to detect Tylenol-induced liver injury as a function of oxidative stress in the blood.

Bio:

Dr. Aran received her undergraduate degree in electrical engineering at the City University of New York in 2007 and her Ph.D in biomedical engineering at Rutgers University in 2012. She then continued her postdoctoral studies in bioengineering at the University of California Berkeley and was a recipient of National Institutes of Health (NIH) postdoctoral training fellowship at the Buck Institute for Age Research in 2015. She joined the Keck Graduate Institute of Applied Life Sciences (KGI) in 2017 as an Assistant Professor. Dr. Aran’s research focuses on the development of biomedical microelectromechanical system (bioMEMS) devices for point of care (POC) clinical diagnostics and therapeutic applications. Her research integrates multiple engineering disciplines including electrical, mechanical, chemical, and bioengineering to create novel device solutions for biomedical applications in attempts to reach unmet clinical needs.

After the seminar there will be an informal dinner and conversation with the speaker in the Mudd PDR at Hoch-Shanahan Dining Hall. If you are not on the meal plan, we will have a signup sheet. If you are interested in attending, please RSVP with Sydney Torrey at storrey@hmc.edu.