

Innovative Healthcare is in the Palm of Your Hand
Friday, March 25, 2016 from 10:00am – 12:00pm
Woodward 255

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Abstract

In this talk, I will present how to see the world's healthcare crisis and the fundamental problems of current medicine in a grain of *iSAND* (integrative Science, Arts, Nanomedicine, and Digital technology), and find solutions in nature for preventive medicine and healthy environment. Since the future of healthcare is in the palm of our hands, a few examples of creative healthcare innovations will be discussed along with the vision of smart digital healthcare in both developing and developed countries: smart mobile integrated molecular diagnostic systems (iMDx) for personalized precision medicine and microphysiological analysis platforms (iMAPs) for drug discovery and regenerative medicine. The smart mobile iMDx comprises three key elements of *precision medicine on chip*: ultrafast multiplexed photonic PCR for the early detection of DNA and RNA biomarkers in blood, signal amplifications of protein markers, and a self-contained sample preparation from whole blood on chip, which allows a sample-to-answer readout platform with smart analytics. The progress on patient-specific iPSCs-based iMAPs, pancreatic islets and mini-brains *in silicone* for molecular pathogenesis will be discussed along with the vision of preventive medicine via precision engineering in medicine.



Prof. Lee received both his BA and PhD from UC Berkeley. He joined the faculty at the UC Berkeley in 1999, and then became the Lester John and Lynne Dewar Lloyd Distinguished Professor of Bioengineering in 2005. He also served as the Chair Professor in Systems Nanobiology at the Swiss Federal Institute of Technology (ETH, Zürich) from 2006 to 2007. He became Arnold and Barbara Silverman Distinguished Professor in 2010 and reappointed again 2015. His work at the interface of biological, physical, and engineering sciences for medicine has been recognized by many honors that include the HoAm Prize, the IEEE William J. Morlock Award, NSF Career Award, and Fulbright Scholar Award. He is a Fellow of the Royal Society of Chemistry and the American Institute of Medical and Biological Engineering (AIMBE). His current research interests are nanoscale biophotonics in living cells, molecular diagnostics of infectious and neurodegenerative diseases, bioinspired neural interfaces and organs on a chip, and *in vitro* molecular neuropathogenesis, with a focus both on studying fundamental quantum nanobiology and on solving ill-defined problems of healthcare.