



Time: 3:00 pm, 19 October 2018 (Friday)

Venue: Room 702, William M W Mong Engineering Building, CUHK

## Multiscale elucidation of “bio-nano” interactions



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### **Abstract**

Bionanomaterials refer to materials composed partially or completely of biomolecules (e.g., sugars, nucleic acids, and proteins) with a dimension of 1–100 nm. Over the past decade or two, researchers developed methods to fabricate bionanomaterials with precise control over the types and amounts of biomolecular building blocks and their positions in 3D space. Advances in nanomaterials fabrication spurred the clinical application of bionanomaterials as carriers of therapeutic or imaging agents to various biological destinations for managing different diseases. Rapid and specific delivery of bionanomaterials to target destinations necessitates the fundamental interactions between nanoparticles and the living system (or “bio-nano” interactions”) be comprehensively delineated.

In this talk, we present our recent investigations into “bio-nano” interactions, spanning the vast biological length scales of organs, tissues, cells, organelles, and molecules. Our talk focuses on non-cationic bionanomaterials that are made of oligonucleotides, hydrocarbons, polydopamine, and plasmonic nanoparticles. For in vitro studies, we cover the mechanisms for the endocytosis, intracellular trafficking, and exocytosis of nanoparticles at the cell, organelle, and molecule levels. For in vivo studies, we dissect the distribution of nanoparticles at the organ, tissue, and cell levels in biological sites not easily accessible via an intravenous injection, such as atherosclerotic plaques and fibrotic kidneys. Our results will inform design rules for constructing more effective carriers for targeted delivery.

### **Biography**

C. H. Jonathan Choi is the Assistant Dean (Student Affairs) of the Faculty of Engineering and an Assistant Professor in the Department of Biomedical Engineering and School of Life Sciences (by courtesy) at The Chinese University of Hong Kong (CUHK). He obtained his B.S. and M.S. degrees in Chemical Engineering from Stanford University in 2005 and 2006, respectively. He completed his PhD studies in Chemical Engineering from the California Institute of Technology in 2011. He was a Croucher Foundation postdoctoral fellow at Northwestern University from 2011 to 2013. His research interests include non-cationic bionanomaterials, nanomedicine, targeted delivery, and “bio-nano” interactions. Dr. Choi served as a Globex Faculty Fellow at Peking University in 2014. In 2016, he received a Croucher Innovation Award in the amount of HKD 5 million, given to top young investigators from all branches of science, engineering, and medicine in Hong Kong. In 2017, he received a Dean’s Exemplary Teaching Award from the CUHK Faculty of Engineering.

**\*\*\* ALL ARE WELCOME \*\*\***

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