

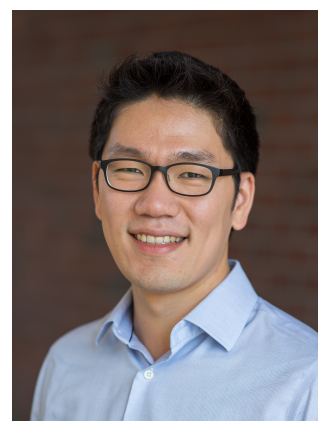
**ICB seminar series 2018/19**

chairman: Prof. Dr. Chih-Jen Shih

# HOLISTIC MOLECULAR IMAGING AND RAPID PHENOTYPING OF COMPLEX BIOLOGICAL SYSTEMS

**Prof. Dr. Kwanghun Chung**

Department of Chemical Engineering,  
Massachusetts Institute of Technology



**ETH Hönggerberg, HCI J 7**  
**Wednesday, 22/05/2019, 17.00 h**

**Abstract:** Holistic measurement of diverse functional, anatomical, and molecular traits that span multiple levels, from molecules to cells to an entire system, remains a major challenge in biology. In this talk, I will introduce a series of technologies including CLARITY (Nature, 2013), SWITCH (Cell, 2015), MAP (Nature Biotechnology, 2016), stochastic electrotransport (PNAS, 2015), and SHIELD (Nature Biotechnology, 2018) that enable integrated multiscale imaging and molecular phenotyping of both animal tissues and human clinical samples. I will discuss how we engineer (1) the physicochemical properties of brain tissues, (2) molecular interactions, and (3) molecular transport all together to achieve integrated brain-wide molecular phenotyping at unprecedented speed and resolution. I will also discuss how these tools can be deployed synergistically to study a broad range of biological questions. We hope that these new technologies will accelerate the pace of discovery in biomedical research.

**Bio:** Kwanghun Chung completed his undergraduate studies at Seoul National University in 2005, majoring in Chemical and Biological Engineering. He then went to Georgia Institute of Technology and completed his thesis work in 2009 under the mentorship of Hang Lu. After completing collaborations stemming from his PhD work, he then joined Karl Deisseroth Lab at Stanford University for post-doctoral training in 2010. In 2013, he joined MIT to start his own lab as an Assistant Professor at the Institute for Medical Engineering and Science (IMES) and the Department of Chemical Engineering. He is also a principal investigator of the Picower Institute of Learning and Memory.