PhD Student Positions on Cellular Information Processing and Single-Cell Analysis

Applications are invited for two openings at the new Systems Biology and Bioengineering Group with Professor Savas Tay, at the Institute for Molecular Engineering, University of Chicago (see http://ime.uchicago.edu/savas_tay/ and www.microfluidics.ethz.ch).

Our group does research on two fronts: 1) Systems and Quantitative Biology and 2) Bioengineering. Applications to both tracks are welcome. On the scientific front, we want to understand how immune networks process dynamical signaling inputs and how they interact with biological noise, at the single-cell level. For this purpose, we are developing high-throughput single-cell analysis methods and integrated microfluidic devices ("total analysis systems") to improve functionality, accuracy and precision of biological measurements. We use our high-throughput quantitative data to computationally model signaling networks. On the engineering side, we are particularly interested in developing multiplexed proteomic, transcriptomic and genomic methods at the single-cell level, with applications to immunity and cell signaling. The following sample papers describe our research program:

- Noise facilitates transcriptional control under dynamic inputs. Kellogg & Tay. **Cell** 160, 381 (2015)
- High-content characterization of single-cell immune dynamics. M. Junkin, A. Kaestli, F. Zhang, A. Hoffmann, S. Tay. **Cell Reports** 15, 1 (2016)
- Digital quantification of proteins and mRNA in single mammalian cells. C. Albayrak, C. Jordi, C. Zechner, C. Bichsel, M. Khammash, S. Tay. **Molecular Cell** 61, 914 (2016)
- Digital signaling decouples activation probability and population heterogeneity. Kellogg, Tian, Lipniacki, Quake, Tay. **eLife** 4:e08931 (2015)
- Single-cell NF-kB dynamics reveal digital activation and analogue information processing. Tay, et al. **Nature** 466, 267 (2010)

Our laboratory is located at the Knapp Center at the University of Chicago, and we are affiliated with the Institute for Molecular Engineering (www.ime.uchicago.edu) and Institute for Genomics and Systems Biology (http://www.igsb.anl.gov/).

Applications from a range of backgrounds including Biology, Engineering, Physics, Chemistry and Computer Science are welcome. Highly motivated students should send research interests, full CV with experimental and computational skills described in detail, and contact information of 3 references to: Savas Tay (savas.tay AT gmail.com).