



**Postdoctoral Positions on Precision Diagnostics for Personalized Medicine**

Precision Measurements and Machine Learning Applications for

Infectious Diseases, Cancer, and Microbiome

Applications are invited for postdoctoral positions at the Systems Biology and Bioengineering Group of Professor Savas Tay, at the Institute for Molecular Engineering, **University of Chicago** ([taylab.uchicago.edu](http://taylab.uchicago.edu/)).

Our overall goal is to apply ultrasensitive molecular assays (i.e. digital PCR, single cell sequencing, single cell proteomics) and machine learning to develop accurate, predictive, rapid diagnostic tools for Infectious Diseases (i.e. Sepsis), Autoimmunity, and Cancer. These technologies will be used for early diagnosis of diseases and monitoring of treatment response in individual patients.

Our laboratory has expertise in molecular assays, single cell analysis, microfluidics and computational methods:

1. We recently developed an ultra-sensitive assay for quantification of proteins (i.e. inflammatory cytokines) from blood and single cells (Molecular Cell 61, 914-924, 2016) and combined it with machine learning for prediction of therapy outcomes. In collaboration with our clinical partners at the University of Chicago Medicine, we applied our method to prediction of **SEPSIS** outcomes in patients. This method can predict patient outcomes (early recovery, late recovery, death) with over 90% accuracy in this devastating disease. We will further validate this method in a clinical study and extend this method to other diseases like cancer.
2. We are developing **microfluidic organoid cancer models** for personalized drug testing. These automated systems culture and monitor patient derived organoids and test their response to hundreds of drugs and their combinations. Deep-learning based image processing allows automated tracking and quantification of drug responses. This project is in collaboration with Tempus, a personalized medicine company, and University of Chicago Medicine.
3. We are developing high-throughput culture and analysis systems for individual **microbiome** testing. In one project, we engineered a droplet-based culture system that can generate 1 million microbial cultures and test their interactions. In a second project, we are developing a system for automated, in-situ and personalized microbiome monitoring at the patients home. This project is in collaboration with BiomeSense, a start-up company we founded which is focused on microbiome analytics.

Applications from a range of backgrounds including Biology, Physics, Chemistry, Engineering and Computer Science are invited. 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](http://www.ime.uchicago.edu)) and Institute for Genomics and Systems Biology (<http://www.igsb.anl.gov/>).

Highly motivated candidates with a strong track record of publications should send an application package with research interests, full CV with experimental and computational skills listed in detail, names and contact information of 3 references to Savas Tay (savas.tay@gmail.com).

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