Nanoplasmonic Optofluidic Biosensors for Immune Functional Analysis towards Personalized Immune Therapy towards Precision Medicine

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LECTURE ABSTRACT

Abstract: Rapid and accurate quantification of cytokine-based immune fingerprints plays a decisive role in effectively treating immune-related diseases especially at point-of-care, where an immediate decision on treatment is needed upon precise determination of individual patient's immune status. This raises an emerging demand for transformative cytokine biosensors that offer unprecedented sensing performance with high sensitivity, throughput, multiplexing capability, as well as short turnaround time at low system complexity. In this talk, I will present several nanomaterials based opto-microfluidic sensing platforms for monitoring functional immune response from whole blood to single-cell level. The multi-scale research both experimentally and theoretically will bridge the gap in fundamental understanding of immune system and enhance the applicability, diagnosis and prediction power for immune diseases. These results would ultimately gear the biologists and clinicians with capability to real-time monitor the immune status of patients, a transformative achievement that has immense potential towards safe, effective and personalized immune therapy.

SPEAKER BIOSKETCH

Biography: Pengyu Chen received his B.S. in Materials Science and Engineering from Nanjing University in 2006. He obtained M.S. in Materials Science and Engineering (2009) and Ph.D. in nanomaterials and biophysics (2012) from Clemson University, where his work centered on nano-plasmonic materials and their environmental and biological applications. He then worked as a research fellow in Mechanical Engineering at the University of Michigan, focusing on the development of optofluidic sensor platforms for disease diagnosis. He joined Materials Engineering Program in Department of Mechanical Engineering at Auburn University as an assistant professor in 2016. He was the recipients of Ginn Faculty Achievement Fellow, NIH Maximizing Investigators' Research Award and NSF CAREER Award. Chen's research focuses on advanced nanomaterial based biosensors for biomarker detection, single cell secretion imaging, and cellular communication. He has a broad interest in Biophysics, Nano-Biosensing, Nanomedicine, and Immunology.