University of Houston - Biomedical Engineering Seminar

Friday, February 26, 2021, 12 noon

Via Zoom: https://uofh.zoom.us/j/92470065206

Unraveling Rare Cell Analysis….A Billion Cells at a Time

Shana Kelley, Ph.D.

Abstract

The analysis of heterogeneous ensembles of rare cells requires single-cell resolution to allow phenotypic and genotypic information to be collected accurately. We developed a new approach for high-throughput cell sorting and profiling, Magnetic Ranking Cytometry, that uses the loading of individual cells with functionalized magnetic nanoparticles as a means to report on biomarker expression at the single cell level. This approach can be used to profile circulating tumor cells in blood and provides a high-information content liquid biopsy in a single measurement. It profiles both protein (*Nature Nanotechnology*, 2017, *Nature Biomedical Engineering*, 2021) and nucleic acid (*Nature Chemistry*, 2018) analytes at the single cell level. Recently, we have used this approach to perform high-throughput, phenotypic CRISPR screens at the whole genome level (*Nature Biomedical Engineering*, 2019) and are now using this platform as a tool for therapeutic target discovery.

Biosketch

Dr. Shana Kelley, University Professor at the University of Toronto, received her Ph.D. from CalTech and was a NIH postdoctoral fellow at theScripps. Her team works in a variety of areas spanning biophysical/bioanalytical chemistry, chemical biology and nanotechnology, and has pioneered new methods for tracking molecular and cellular analytes with unprecedented sensitivity. She has received many awards including one of “Canada’s Top 40 under 40”, the Steacie Prize, the Brockhouse Prize, ACS Inorganic Nanoscience Award, a NSF CAREER Award, and a “Top 100 Innovator” byMIT’s Technology Review. Dr. Kelley has over 50 patents, and founded GeneOhm Sciences (acquired by BectonDickinson), Xagenic Inc. (acquired by General Atomics), and Cellular Analytics. Dr. Kelley serves as a Board Director for Ontario Genomics and a Board Trustee for the Fight Against Cancer Innovation Trust. She is an Associate Editor for *ACS Sensors*, and an Editorial Advisory Board Member for the *Journal of the American Chemical Society* and *ACS Chemical Biology*.