

CARNEGIE MELLON UNIVERSITY

BME 2020 FALL SEMINAR SERIES



Advancing DNA Analysis and Diagnostics by Micro- and Nano-technologies



PRESENTED BY

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SCHEDULE

Thursday,
October 29, 2020
(10:00 AM-11:00AM)

Molecular analysis of biomarkers including genetic and epigenetic markers underpins modern disease detection and diagnostics. This talk will introduce three technology platforms that advance DNA analysis for clinical diagnostic applications. I will first describe a highly sensitive single-molecule fluorescence spectroscopy system and its application to detection of genetic mutation and analysis of telomeres and cell-free DNA. Subsequently, I will present the implementation of silica nanomaterials for improving DNA sample preparation. Two examples will be introduced including an integrated DNA extraction and bisulfite conversion method for enhanced methylation detection of cancer in liquid biopsy, and an ultrahigh molecular weight DNA extraction method for long read DNA sequencing application. Finally, I will describe a droplet magnetofluidic technology that facilitates fully integrated sample preparation and DNA detection on a portable device for point-of-care diagnostic applications exemplified by detection of infectious diseases.

