

# CARNEGIE MELLON UNIVERSITY

## BME 2023 SPRING SEMINAR SERIES

### Applications of Micro- and Nanotechnology in Extracellular Vesicle Research



#### PRESENTED BY

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#### SCHEDULE

**Hall of Arts (HOA) 160**

**Thursday,  
February 23, 2023  
(11:00AM-12:00PM)**

Extracellular vesicles (EVs) are heterogeneous micro and nanoscale particles that are released by all cells and circulate in all bodily fluids. While EVs have shown significant promise over the past decade in diagnostic, mechanistic, and therapeutic applications, several obstacles exist which continue to limit their clinical translation such as their scalable production, selective isolation, and efficient characterization. In this seminar, I will highlight several approaches to overcoming or mitigating these issues including EV production using commercially available bioreactors, selective EV isolation using antibody-functionalized microfluidic devices and aptamer-functionalized conductive nanofibers, and nanoplasmonic sensors combined with machine learning to classify EVs based on their Raman spectra. These versatile platform technologies have been developed primarily for cancer engineering applications but have also recently been applied to infectious and reproductive diseases. In combination, we demonstrate the incredible potential of applying micro-nanofabrication strategies to EV research, as well as significant progress in using machine learning to unravel the inherent heterogeneity of EVs from diverse sources.



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