

Title: Enabling Micro/NanoSystems for Precision Cancer Medicine

Author: Yong Zeng, PhD

Abstract: Cancer medicine is entering the era of precision medicine where better tools for risk assessment, early diagnosis, and monitoring therapy response are needed to optimal personalized treatment. Developing liquid-biopsy based cancer biomarkers is critical for advancing non-invasive early diagnosis, disease prognosis, and targeted molecular therapy. Biomarkers of interest are often present at very low concentration levels in bodily fluids, especially at the early stages of disease, making the quantitative measurements in the complex biometrics very challenging. Our group has been focused on the development of micro/nanoscale bioanalysis systems that afford new capabilities for sensitive and quantitative biomarker analysis for clinical diagnosis and treatment of cancer. Specifically, I will discuss new microfluidic and nanomaterial-inspired biomedical platforms that enable high-performance analysis of circulating exosomes as a new paradigm of liquid biopsy for non-invasive cancer diagnosis and monitoring. Compared to the conventional methods, the new technologies provide unmatched sensitivity, accuracy, and speed with minute sample consumption, opens new opportunities to better elucidating basic biology and clinical value of exosomes. The feasibility of translating these systems into biomedical research and clinical utilities will be demonstrated. Overall, these micro/nanosystems would provide transformative capabilities of quantitative bioanalysis to promote precision clinical oncology.