



BME Spring 2023 Seminar Series

Micro- and Nanofluidic Systems for Molecular Biosensing, Mechanobiology, and Optogenetics

Dr. Ke Du

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Friday March 24, 2023 12pm – 1pm in MCHU 101

WebEx: Join [here](#)



Abstract: Micro- and nanofluidic systems coupled with biochemistry, microscopy, nanomaterials, and machine learning components are powerful tools being used in numerous biomedical applications such as molecular diagnosis, biophysics, and optogenetics. In this talk, we highlight a quantum dot-labeled CRISPR assay and a portable microfluidic chip for the simple and rapid detection of viral genomes without the needs of manual pipetting. A computer vision program is created, showing an accuracy of ~100% for identifying both positive and negative samples in the chip, which is ideal for on-site detection in low-resource settings. We then introduce our recent efforts to understand the interactions of nanomaterials and eukaryotic organisms with a deformable microfluidic platform and molecular dynamic simulation, and discuss a variety of clinical applications such as in vivo bioimaging with optofluidics, dentine hypersensitivity, and synthetic biology.

Biography: Dr. Ke Du is an assistant professor of chemical and environmental engineering at UC-Riverside and leads the Nanobiosensing, Nanomanufacturing, and Nanomaterials (3N) Lab. He started his independent career at the Rochester Institute of Technology in 2018 after post-doctoral training at UC-Berkeley with Richard A. Mathies. In the fall of 2022, Du and his 3N Lab moved back to the State of California and joined UC-Riverside. Du's research interests include in vitro molecular diagnostics, in vivo bioimaging, mechanobiology, and nanomanufacturing. He is recipient of numerous awards and honors such as the NIH Maximizing Investigators' Research Award (2021), the Burroughs Wellcome Fund (BWF) Collaborative Travel Grant (2019), the James H. Potter Award for the outstanding Ph.D. students (2014), and the NSF Graduate Student Fellowship (2012). He has been recognized as a global rising star in sensing by ACS Sensors and a finalist for the MINE 2020 Young Scientists Award. Du's research is supported by NIH, NSF, USDA, DOE, BWF, the UNYTE Translational Research Network, and industry partners such as L3Harris, Mammoth Biosciences, Colgate Palmolive, and Biological Mimetics.