UNIVERSITY of HOUSTON | ENGINEERING

Department of Biomedical Engineering

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Date	Friday, October 4, 2024
Location	SEC 201
Time	12:00 to 1:00 PM

"Electrokinetic Exploration of Cellular Heterogeneity:
From Stem Cells to Cancer Cells"

Abstract: My research group uses electrokinetic techniques, such as dielectrophoresis (DEP) and electrical impedance spectroscopy (EIS), combined with microfluidic platforms to examine the heterogeneity of human mesenchymal stem cells and prostate cancer cell populations. DEP and EIS use non-uniform electric fields to polarize cells and offer a label-free approach to assessing biological samples. These techniques uncover distinct electrical signatures that provide valuable insights into cellular behavior and phenotype changes, allowing us to identify biomarkers such as membrane capacitance and cytoplasm conductivity. We also employ light-induced DEP, an innovative variation of DEP that leverages virtual electrodes to create non-uniform electric fields, offering a versatile approach for characterizing and patterning cells and manipulating biomaterials. Our work ranges from characterizing and sorting human mesenchymal stem cells for regenerative medicine to examining the phenotypic shifts and effects of different culture conditions on prostate cancer cells, particularly in the context of the epithelial to mesenchymal transition. Additionally, we explore the behaviors of biomaterials in non-uniform electric fields. In this talk, I will discuss how our multi-faceted approach enhances our understanding of cellular heterogeneity and biomaterial interactions, which could support the development of new therapeutic strategies.

Dr. Tayloria N.G. Adams graduated from Virginia Commonwealth University with a B.S. in Chemical and Life Science Engineering and a B.S. in Applied Mathematics. She earned her M.S. and Ph.D. in Chemical Engineering from Michigan Technological University. Dr. Adams completed her postdoctoral training at the University of California, Irvine (UCI) in the Department of Neurology and the Stem Cell Research Center. She is now an Assistant Professor and Henry Samueli Career Development Chair in UCI's Chemical and Biomolecular Engineering Department. Dr. Adams has been recognized with several awards, including the Faculty Innovation in Teaching-Early Career Award from UCI's School of Engineering (2019-2020), the NSF CAREER Award (2021-2026), the University of California Cancer Research Coordinating Committee Award (2021-2023), and the Chao Family Comprehensive Cancer Center Pilot Award funded by the Anti-Cancer Challenge (2024-2025). She is a former NSF Research Postdoctoral Fellow in Biology (2016-2018) and UCI Chancellor's ADVANCE Postdoctoral Fellow (2016). In addition to her research, Dr. Adams was honored with UCI's Black Leadership Advancement Coalition Gala Community Service Award (2022-2023) and the Woman of Excellence Award from the Faculty Women of Color in the Academy National Conference (2024) for her leadership and contributions to advancing the development of women of color in academia. Dr. Adams is an active member of the National Society of Black Engineers, the Society of Women Engineers, the Biomedical Engineering Society, the AES Electrophoresis Society, and the American Society for Engineering Education.