

**University of Houston - Biomedical Engineering Seminar**  
**Friday, February 14 at 12 noon, Room Science 105**



**Qingrong He**

**Biased-Alternating Current  
Electrophoresis Method to Enrich the  
Biomolecules on paper**

**Abstract**

Point-of-Care (POC) molecular and proteomic diagnostics often require target enrichment for optimal detection. Current methods, such as field amplification stacking, isoelectric focusing, and ion concentration polarization, rely on factors like buffer composition and specialized membranes, adding complexity. We propose Biased Alternating Current Electrophoresis (b-ACEP) as a rapid, affordable, and simple solution for protein and DNA enrichment on paper substrates. B-ACEP uses spatially non-uniform AC electric fields to transfer charged species. In our experiments, xylene cyanol, a DNA gel electrophoresis marker, was enriched sevenfold on cellulose paper using screen-printed carbon electrodes and a 50 V, 100 Hz sine wave. These results highlight the potential of paper-based b-ACEP for sensitive, cost-effective assays, advancing POC diagnostics for pathogen and disease detection

**Biosketch**

Qingrong He (Cyan) is a second-year PhD student in Dr. An's lab at the University of Houston. She got her Master's degree from the University of Western Australia and is currently conducting research on microfluidic electrophoresis and biomolecule enrichment on paper-based platforms. Cyan expertise includes seepage fluid mechanics and microfluidic device fabrication, and she is also developing skills in cell culture techniques to expand her research capabilities. Cyan's work aims to advance Point-of-Care diagnostic technologies through innovative and cost-effective solutions.