



Chemistry Seminar

Studying Molecular Interactions Using Micro Free Flow Electrophoresis

Dr. Michael T. Bowser

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Wednesday, October 14
12:00 p.m.

Wick Science Bldg 122

In free flow electrophoresis (FFE) a thin stream of sample is continuously introduced into a planar flow chamber. An electric field is applied perpendicularly to the flow through the separation chamber. Analytes are deflected laterally in the electric field according to their electrophoretic mobility giving rise to individual stream paths. FFE has recently been miniaturized into a microfluidic format (μ FFE), requiring less sample and reagents, a simplified flow profile and better heat dissipation.

The continuous nature of μ FFE separations suggests a number of novel analytical applications. A single separation can be monitored over long periods of time for high sensitivity measurements. We have demonstrated a 20-fold improvement in signal to noise by averaging 500 images over a 2 minute period. μ FFE can also be used to continuously monitor a dynamically changing sample. We have demonstrated how introducing a buffer gradient into the μ FFE device can be used to efficiently optimize a range of separation conditions or estimate dissociation constants in as little as five minutes. We have also explored introducing a gradient at the sample channel. For example, we have titrated a fluorescently labeled aptamer with increasing concentrations of its protein target. Due to the continuous nature of gradient μ FFE, complete coverage of the binding curve is possible in as little as five minutes. Lastly, continuous μ FFE separations offer a number of advantages for microscale preparative applications such as aptamer isolation and subcellular organelle analysis.

Dr. Bowser will be available to meet with
students from 1:00 to 1:30 in WSB-344.

