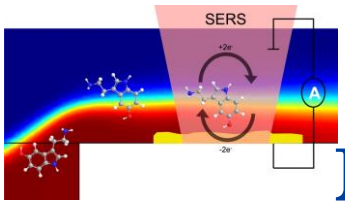
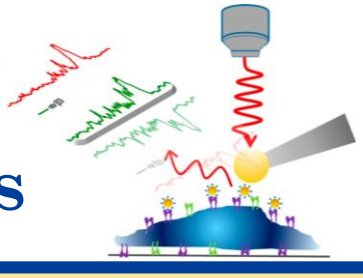



# *Analytical Chemistry*
# McElvain Seminar Series



## Dr. Zachary Schultz

### Illuminating complexity: Enhanced Raman Scattering for Bioanalysis

**Thursday, February 22nd, 12:15 pm, Rm 1315, Chemistry Bldg.**

The identification and quantification of molecules in biological samples is key for understanding mechanisms associated with health and disease. While a number of techniques are routinely used, these techniques focus attention on certain molecules that are readily characterized, leaving many molecules unexplored. New techniques that provide complementary analysis may lead to the diagnostic and prognostic tools for tomorrow.

The enhancement of Raman signals by nanostructures, surface enhanced Raman scattering (SERS), provides a sensitive label-free method of chemical analysis. The combination of SERS with fluid dynamics, an approach we call sheath-flow SERS, enables ultrasensitive and high-throughput Raman characterization. Using sheath-flow SERS as a detector for capillary electrophoresis and liquid chromatography separations enables high throughput Raman characterization in biological fluids at relevant concentrations.

In other work we utilize Raman enhancements from nanostructures on the apex of atomic force microscope tips, so called tip enhanced Raman scattering (TERS), for highly selective investigations of protein receptors in cellular membranes. In protein-ligand binding experiments, our results show signals characteristic of the receptor's binding site, which enable investigation of ligand recognition by membrane receptors in cells that are important for drug targeting. Overall, our work provides insight into the origin and utility of enhanced Raman signals for ultrasensitive bioanalysis.

**Department of Chemistry & Biochemistry**