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Analytical Seminar

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“ Monitoring Electrochemistry with Light “

Our lab has been developing a new analytical imaging technique, fluorescence-enabled electrochemical microscopy (FEEM), into a tool that can be applied to a wide range of problems in electrochemistry, analytical chemistry, electrocatalysis, and neuroscience. FEEM is a fluorescence-based electrochemical imaging technique invented in our lab that works by converting an electrochemical signal into an optical fluorescence signal using a bipolar electrode. This enables the simultaneous, highly sensitive detection of redox species on very large electrode arrays (i.e. $>10^6$ ultramicroelectrodes). These arrays can then be used to image and characterize electrochemical processes with very high spatial and temporal resolution. We are currently focused on developing FEEM down two pathways: 1) a tool for studying single entity (i.e. molecule, nanoparticle, and enzyme) electrochemistry and 2) a tool to image and map concentration profiles of redox-active molecules with nanoscale spatial resolution. In this seminar, I will discuss the principles of FEEM and present our recent research efforts toward further development of the technique.