



Thursday, February 3
12:15 p.m. - Room 1315

ANALYTICAL SEMINAR

Professor Emily Smith

Iowa State University

Ph.D. w/Prof. Rob Corn of UW-Madison

“Fluorescence and Raman Measurements of Cell Membrane Receptor Organization and Cellular Factors Affecting Membrane Reorganization”

We are developing fluorescence- and Raman-based methods to unravel the complex, dynamic organization of cell membrane receptors. These methods can provide vital information about interactions that take place in the cell membrane that affect cell signaling and cellular function. Noninvasive fluorescence resonance energy transfer (FRET) measurements that do not require attaching fluorescent tags to the receptor are used to measure changes in receptor microclustering. We are elucidating the role of extracellular, membrane and intracellular proteins and small molecules in altering integrin microclustering. Integrins are ubiquitous membrane proteins that are involved in cell signaling inside and outside of the cell. Several proteins with a role in increasing or decreasing integrin microclustering have been identified. Additionally, the affect of membrane cholesterol on integrin microclustering has been determined. The FRET studies are complemented by single particle tracking measurements to identify heterogeneous responses in receptor clustering, which are averaged in the bulk FRET measurements and scanning angle total internal reflection (SA-TIR) Raman microscopy depth profiling measurements. The role of extracellular, membrane and intracellular proteins in altering microclustering is different for integrin mutants compared to wild-type integrins. Experiments with well-studied integrin mutants can reveal the molecular mechanism of receptor organization in the cell membrane.