University of Minnesota
Driven to Discover℠

Department of Chemistry

Special Seminar

4:30 p.m. Wednesday, April 6 • 331 Smith Hall

Assistant Professor

Dennis Hore

Department of Chemistry
University of Victoria

Amino acids, polymers, and water: a bottom-up approach to understanding protein adsorption at surfaces

Research interests:
solving structural problems in biophysical chemistry and materials science, including elucidating the structure of membranes and adsorbed proteins, and understanding how polymer surface structure evolves from bulk structure.

Website: http://www.chemistry.uvic.ca/people/dkh.php

Abstract

Understanding the orientation and conformation of biomolecules adsorbed onto solid surfaces is an important aspect in designing biocompatible materials, in the immobilization of enzymes for biosensors, and in chromatography. Experiments and simulations have provided evidence that the surface-adsorbed structure of biomolecules may be very different from that in solution, particularly when the surface is hydrophobic. But what is the adsorbed structure? The primary challenge in answering this question is to gather detailed structural information with enough specificity so as to exclude contributions from adjacent bulk phases. Furthermore, the unique surface structure is due to three interdependent phenomena: the nature of the biomolecule, nature of the substrate surface, and the concerted arrangement of the solvent molecules. The central aim of our group is to provide a complete structural description of the adsorbed state by monitoring each of these aspects. We use Stokes vector and Mueller matrix ellipsometry to characterize the bulk phases and to monitor the kinetics of the adsorption process. Visible-infrared sum-frequency generation spectroscopy is used to characterize the adsorbed molecules and solvent structure. Finally, we compare our experimental results with those from molecular dynamics simulations to gain additional insight into fine structural features.

Host: Assistant Professor Aaron Massari
Refreshments will be served prior to the seminar.