Seminar Topic:

Neutron Scattering in the Characterization of Biological Membrane Components

by Mathias Lösche
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Abstract

Surface-sensitive scattering of neutrons or x-rays is a well-established method to determine the atomic-scale structures of lipid bilayers (i.e., the fabric component of biological membranes) and proteins or protein complexes embedded in such lipid bilayers. Neutrons are specularly reflected at the surface of Si wafers that bear such membranes, and the variation of the neutron-optical index due to the interfacial films produces interference patterns that can be interpreted in terms of the film structure. At the NIST Center for Neutron Research, we developed a comprehensive infrastructure for biological reflectometry that includes sample environment, optimized measurement capabilities, data modeling and a rigorous assessment of the significance of results. These facilities provide a unique and powerful toolbox to characterize, optimize and fine-tune sensoric platforms for drug discovery or the design of novel biomedical devices. The also permit fundamental studies of biological processes, for example in cell signaling or viral assembly, which so far were impossible to analyze in atomistic detail. In this seminar, I will discuss the technique and its application to a few selected problems.

About the Speaker

Mathias Lösche obtained his PhD in biophysics at the Technical University in Munich (Germany). Currently, he directs a biological physics group at Carnegie Mellon and holds a courtesy appointment in Carnegie Mellon’s Dept. of Biomedical Engineering. He also is a NIST Associate at the National Institute of Standards and Technology where he served as the director of the CNBT research consortium that developed neutron scattering facilities for biological research at the NIST Center for Neutron Research. Prior to that he was the head of the biomembrane physics group at the University of Leipzig in Germany.

29-June-2017 ǁ Time: 2 p.m. ǁ Venue: MSE Meeting Room (N4.1-01-28)
Hosted by: Prof Cho Nam-Joon