School of Molecular Sciences
Arizona State University

SMS Spring 2023 Seminar Series

Friday Feb 3 | 3pm | Biodesign Auditorium

Lipid Membrane Systems for Bioanalytical and Biophysical Studies: Lipid-Protein Interactions and Vesicle Nanoarrays

Dr. Wittenberg will be describing how his group uses model membrane systems, such as liposomes, supported lipid bilayers (SLBs), giant unilamellar vesicles (GUVs), and synthetic lipid droplets to study a variety of biological phenomena. Protein-conjugated SLBs have been used to investigate membrane-membrane interactions governed by the binding of myelin-associated glycoprotein (MAG) to ganglioside lipids. MAG is expressed in the nervous system and is one of the proteins responsible for crucial myelin-neuron interactions. Using quartz crystal microbalance with dissipation monitoring (QCM-D) and fluorescence microscopy, Dr. Wittenberg's group determined interaction kinetics and apparent affinities for MAG-ganglioside interactions. They also show that monoclonal antibodies, similar to those present in Guillain-Barré syndrome, as well as cholesterol, can inhibit MAG-ganglioside interactions. Dr. Wittenberg will also describe how his group created high-density nanoarrays of liposomes and bacterial outer membrane vesicles (OMVs) using liftoff nanocontact printing. Fluorescence imaging of individual OMVs revealed that an OMV-associated toxin (leukotoxin A) is preferentially sorted to larger OMVs, while smaller OMVs are mostly toxin-free.

Nathan Wittenberg, PhD

Assistant Professor, Lehigh University

Nathan Wittenberg is an Assistant Professor in the Chemistry Department at Lehigh University. He received his B.S. in chemistry from the University of Minnesota, and a Ph.D. in chemistry from Penn State University. After postdoctoral appointments at the University of Edinburgh, the University of Minnesota, and the Mayo Clinic, Dr. Wittenberg began his independent career at Lehigh University in 2016. His group's research is focused on lipids and membranes, specifically, lipid-protein interactions, the consequences of lipid oxidation on membrane structure, and analysis of small, membrane-bound particles, such as extracellular vesicles.

**ZOOM option available: https://asu.zoom.us/j/87081218152*