

# Polymer Seminar

Friday, October 18, 2024

11:15 am Science 1 - Room 1002

*Coffee, Tea, and Cookies will be available at 11:00 am*



## Prof. Sunghee Lee

Biophysical/Analytical/Surface Chemistry

Iona University

Host: Mu-Ping Nieh

### Biomimetic Self-assembly: The Nanoliter Aqueous Microdroplet and Insights into Cell Membrane

**Abstract:** Amphiphilic molecules can spontaneously self-assemble into bilayer nanostructures at a liquid-liquid interface. This presentation features systems that mimic the structure and function of the cell membrane using self-assembly. These systems are constituted by the interface of a pair of contacting aqueous nanoliter droplets, each of which is covered with a lipid monolayer. These droplet interface bilayer (DIB) systems offer a powerful and controllable model for studying the fundamental physical chemistry of lipid bilayers, an essential component of cellular membranes. Using the DIB as a model biomembrane, we present studies on the interaction of model cell membranes with bioactive molecules, using a wide range of surface- and interfacial-science techniques. We found an intriguing ability of model membranes of diverse compositions to sensitively and variously respond to solutes such as drugs and phytochemicals by modulation of bilayer physicochemical properties, including transbilayer water permeability, and electrical, thermodynamic, and structural properties. These effects signal significant general insight into the mechanisms of interaction between bioactive molecules and cell membranes in a heterogeneous environment, potentially contributing to better understanding of relevant physiological processes and biotechnology applications.

This presentation is supported by the work of an all-undergraduate research group at Iona University, a PUI. The research group is called "Project Symphony" which corresponds to a vision in which all group members work together in harmony to achieve shared goals, while maintaining individual interests with support of each other, analogous to the orchestration of a musical symphony.