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CHEMISTRY SEMINAR 291

Standing, Lying, and Sitting: Transforming the Cell Membrane to Interface with Synthetic Nanomaterials

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Date: **11/2/18**
Time: **3:00 PM**
Location: **COB1 267**

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ABSTRACT

A surprisingly broad array of problems in modern materials chemistry relate to creating interfaces with two distinct, well-structured chemical environments at near-molecular scales. For instance, positioning nm-wide metal and semiconductor features with a pitch of 5-7 nm in a nonconductive matrix represents a central requirement for next-generation nanoelectronic devices. Controlling interfacial chemical structure at scales from 5-10 nm is difficult using conventional lithographic patterning techniques. At the same time, a 6-nm pattern forms the cross-section of biological cell membranes, with distinct chemical environments created by a bilayer of phospholipids. We find powerful functions of phospholipid chemistry are preserved when the molecules are instead assembled in striped phases, in which the alkyl tails lie flat on a surface and the headgroups form 1-nm-wide stripes with a pitch of ~6 nm. We will discuss the relationship between structure and function at these interfaces, and useful material properties that emerge from the unusual surface chemistry; these include assembly of inorganic nanocrystals and crystallization of functional organic molecules.

BIO:

Shelley Claridge received undergraduate degrees in mathematics and biochemistry from Texas A&M University, and subsequently worked as a software engineer for six years prior to completing a Ph.D. at UC Berkeley with Paul Alivisatos and Jean Fréchet. After a postdoctoral fellowship with Paul Weiss at UCLA, she joined the faculty at Purdue University in 2013. Her research at Purdue has been recognized with Young Investigator awards from NSF, DARPA, 3M, and DuPont (one of 8 globally), and received emerging investigator recognitions from *Journal of the American Chemical Society, Chemical Communications, Analytical Methods, and Analytical and Bioanalytical Chemistry.*