

Cornell University Biophysics Colloquium  
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**Lipid-Protein Interactions at Interfaces:  
From Lung Surfactant to Poloxamer**

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Many functions crucial to life are carried out by membrane proteins bound to or embedded in lipid bilayers. Conversely, a wide variety of diseases result from deficient or abnormal lipid-protein interactions. Study of these interactions can, therefore, help elucidate the normal functions of these proteins, and the mechanisms by which toxicity is introduced in the case of a disease. Using two-dimensional monolayers as well as supported bilayers as model systems, we have applied isotherm measurements, optical microscopy, scanning probe microscopy, x-ray and neutron scattering techniques to address fundamental questions concerning lipid-protein or lipid-polymer interactions: What is the effect of the protein or polymer on the stability of the phases of the lipid film? How does the protein alter the surface morphology of the system? How does the protein or polymer change the ordering of the host lipid layer? To what extent and how does the protein or polymer associate with membrane lipids? How are the observed phenomena related to biological functions? To illustrate the capability of these techniques, their applications to the understanding of (1) the collapse mechanism in lung surfactant, and (2) the use of poloxamer as a membrane sealant will be discussed.