

DEPARTMENT OF CHEMICAL ENGINEERING

MILESTONE SEMINAR

3 PM, Thursday, May 25th, 2017
Reception to follow at 4 PM

1065 Kemper Hall



Mix (and Unmix) It Up with Biomembranes

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Abstract: Since the invention of the optical microscope in the 17th century it has been observed that biological membranes compartmentalize the cellular machinery of life. Then, nearly 100 years ago, it was concluded, through surface science, that the cell membrane is a lipid bilayer. Since that time, many observations and theories have been put forward to try to explain how complex behavior emerges in living systems from the ubiquitous lipid bilayer structure and its integrated proteins and carbohydrates. We are now in a period of time when some of the most important paradigms posited in the last several decades for emergence of complex behavior in living cell membranes are being tested and questioned. These include the membrane (or lipid) raft hypothesis and mechanisms for generation of membrane curvature and compositional asymmetry. An important outcome of this work may be the design of new micro- and nano-scale self-assembled systems and composites. This talk will focus upon our work in lipid demixing, crowding-induced mixing, sorting by nanoscale curvature, and bionanocomposites that may contribute toward the design of new biological membrane-inspired technology.

Biography: Marjorie (Margie) Longo received her bachelors and PhD degrees from the University of California, Santa Barbara in Biochemistry and Chemical Engineering, respectively. Her postdoctoral work was performed at Cornell University, Ithaca, New York. She is a Professor of Chemical Engineering at UC Davis, where she has been since 1996. Professor Longo uses, develops, and combines quantitative microscopy techniques to gain knowledge of the structure, transport, thermodynamics, and mechanics of synthetic lipid bilayer membrane and monolayer systems. These serve as models of real biological membranes, and in some cases have technological applications that are easily identified (e.g. drug delivery devices). She has received awards for her research including an NSF CAREER Award, UC Chancellor's Fellowship, and Engineering Dean's Outstanding MidCareer Research Award. She was the elected Chair of the Biophysical Society Membrane Structure and Assembly Subgroup for 2014/2015.