

# CHEMICAL ENGINEERING

## SEMINAR SERIES



DANIEL FLETCHER

**Monday, April 02, 2018**

Department Chair, Bioengineering  
Purnendu Chatterjee Chair in Bioengineering & Biophysics  
UC Berkeley

## When push comes to shove: Physical segregation of molecules at cell-cell contacts

**ABSTRACT:** Membrane interfaces formed at junctions between cells are often associated with characteristic patterns of membrane protein organization, such as in epithelial tissues and the immune system. While receptor clustering, lipid domain formation, and cytoskeleton dynamics can influence the homogeneity of membranes at cell-cell junctions, the gap between two membranes can directly contribute to spatial organization of membrane proteins at interfaces and the communication between cells. Using in vitro systems of giant unilamellar vesicles and synthetic proteins, we are investigating how fluid membrane interfaces linked by adhesion proteins can drive segregation of non-adhesive proteins. We find that the extent of protein segregation can be tuned by modifying protein size, protein density, and membrane rigidity, as well as lipid composition. We have recently extended this work to test the role of physical segregation of proteins at membrane interfaces in immune signaling and cell-cell fusion.

**BIOGRAPHY:** Dr. Dan Fletcher is the Chatterjee Professor of Bioengineering & Biophysics at UC Berkeley, where he also serves as Chair of the Bioengineering Department. He and his laboratory study the mechanics of cell motility and signaling, the biology of infectious diseases, and the development of optical and microfluidic technologies. Dr. Fletcher received a B.S. from Princeton University, a D.Phil. from Oxford University where he was a Rhodes Scholar, and a Ph.D. from Stanford University as an NSF Graduate Research Fellow. His bioengineering and biophysics research has been recognized with an NSF CAREER Award, a Tech Award from the San Jose Tech Museum, and a "Best of What's New," citation by Popular Science magazine. He is a Chan-Zuckerberg Biohub Investigator, an elected Fellow of the American Institute for Medical and Biological Engineering, and also served as a White House Fellow in the Office of Science and Technology Policy at the beginning of the Obama administration.

**RECEPTION 3:30 • LECTURE 4:00 – 5:00**  
**PHYSICS ASTRONOMY BLDG. PAA A 118**

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