

*Department of Mathematics,  
University of California San Diego*

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# Math 218 - Joint Seminar on Mathematics for Complex Biological Systems and Analysis

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## Degenerate FCH Functional and Defects in Amphiphilic Structures

**Abstract:**

Amphiphilic structures such as cell membranes and lipid vesicles play essential roles in biological applications. In this talk, we will first introduce the functionalized Cahn-Hilliard (FCH) model for the free energy of amphiphilic mixtures. The FCH model admits local minimizers corresponding to amphiphilic bilayers, filaments, micelles, and other defect structures. We will describe the geometric motion of bilayers, filaments, and their competition. To capture the coexistence and localization of amphiphilic structures, we introduce a degenerate FCH functional as a modified model for the free energy of amphiphilic mixtures. We prove that the degenerate FCH functional admits geometrically localized minimizers, which correspond to localized amphiphilic structures. Specifically, we identify the leading order profile of bilayers under the assumption that the geometrically localized minimizers have bounded variations along the tangential directions.

Host: Bo Li

**Thursday, May 17, 2018  
2:00 PM**

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