Department of Mathematics

University of Houston

Scientific Computing Seminar

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Numerical simulation of flows and phase separation on surfaces

Thursday, April 18, 2019 1:30 PM- 2:30 PM Room 646 PGH

Abstract: Interfacial processes, such as decomposition of a lipid bilayer into liquid and gel phases, involve two-dimensional flow of matter on the curved interface between bulk phases. These and other processes can be modeled in terms of PDE's posed on 2D surfaces embedded in \mathbb{R}^3 . Furthermore, a system of PDE's posed on a surface can be coupled with a geometric flow that defines the surface evolution. In this talk, we address the numerical simulation of interfacial phenomena modeled by the surface Navier-Stokes and surface Allen-Cahn-Hilliard equations. For this purpose, we apply the trace finite element method, which relies on a fixed, surface-independent background mesh, thereby allowing for an efficient resolution of the surface evolution and the PDE's. Theoretical and numerical results are presented to illustrate key features of our approach.

• This is a joint work with with Dr. Olshanskii and Dr. Quaini.

This seminar is easily accessible to persons with disabilities. For more information or for assistance, please contact the Mathematics Department at 743-3500.