



**The Hong Kong University of Science and  
Technology**

**Department of Mathematics**

**Seminar on Applied Mathematics**

**Phase-Field Force Convergence**

*by*

***Prof. Bo LI***

***University of California, San Diego***

**Abstract**

Phase-field descriptions of interfacial structure are based on the van der Waals--Cahn--Hilliard functional that consists of a gradient-square term and a double-well term, both properly scaled. It has long been known that such functionals converge in some sense to the surface area of the limiting sharp interface as the size of the interfacial layer tends to zero. The variation of such a functional defines the interfacial force. We prove the convergence of such force to the mean curvature which is the variation of surface area. This work was motivated by the study of a phase-field model for molecular solvation, in which the functional includes additionally the electrostatic free energy and the solute-solvent van der Waals dispersive interaction energy. I will summarize the main results on the convergence of such free energies and corresponding forces to their sharp-interface counterparts. This is joint work with Shibin Dai and Jianfeng Lu.

**Date: Wednesday, 05 December 2018**  
**Time: 3:00p.m. – 4:00p.m.**  
**Venue: Room 4582, Academic Building,  
(Lifts 27, 28), HKUST**

***All are welcome!***