DEPARTMENT OF MATHEMATICS
THE CHINESE UNIVERSITY OF HONG KONG

Center for Mathematical Artificial Intelligence
CMAI

MATH-IMS Joint Applied Mathematics Colloquium Series
The Chinese University of Hong Kong

This MATH-IMS Joint Colloquium Series is organized by Center for Mathematical Artificial Intelligence (CMAI), under Department of Mathematics and Institute of Mathematical Sciences (IMS) at The Chinese University of Hong Kong. The colloquium series focuses on mathematics and applications of artificial intelligence, big data and related topics.

Date: Feb 26, 2021 (Friday)
Time: 10-11am (Hong Kong Time)
Zoom Link: https://cuhk.zoom.us/j/92775210812

Energetic Variational Approaches (EnVarA) for Active Materials and Reactive Fluids

Speaker: Professor Chun Liu, Illinois Institute of Technology

Abstract: Active materials and reactive fluids consists of those materials that consume or convert energy to generate motion and deformations. They are involved in most biological activities and in most time, the principle characteristics of living organisms. In this talk, we will present a derivation and generalization of the mass action kinetics of chemical reactions using an energetic variational approach. The method enables us to capture the coupling and competition of various mechanisms, including mechanical effects such as diffusion, viscoelasticity in polymerical fluids and muscle contraction, as well as the thermal effects. We will also discuss several applications under this approach, in particular, the modeling of wormlike micellar solutions. This is a joint work with Bob Eisenberg, Pei Liu, Yiwei Wang and Tengfei Zhang.

Bio: Professor Chun Liu obtained his BS degree in 1987 in Fudan University in China, M.S. degree from Duke University in 1991 and earned his Ph.D in mathematics at Courant Institute of Mathematical Sciences, New York University in 1995. Having been serviced at Penn State University and University of Minnesota, he is currently the Chair and Professor of Applied Mathematics at Illinois Institute of Technology, Chicago. His current research interests lie in partial differential equations, calculus of variations and applications in complex fluids. Prof. Liu has received numerous recognitions, grants and been on the editorial board for several prestigious journals.