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

This Colloquium Series in Pure Mathematics is organized by the Department of Mathematics and the Institute of Mathematical Sciences (IMS) at The Chinese University of Hong Kong. The series focuses on all areas of pure mathematics together with theoretical developments and applications.

Date: March 3, 2023 (Friday)
Time: 4:30PM-5:30PM (Hong Kong Time)
Zoom Link: https://cuhk.zoom.us/j/98846779826

Small scale formations in fluid equations with gravity

Speaker: Professor Yao Yao
National University of Singapore

Abstract: In this talk, we discuss some PDEs that describe fluid motion under the influence of gravity, including the incompressible porous media equation and incompressible Boussinesq equation in two dimensions. Using an interplay between various monotone and conserved quantities, we construct rigorous examples of small scale formations as time goes to infinity. These growth results work for a broad class of initial data, where we only require certain symmetry and sign conditions. As an application, we also construct solutions to the 3D axisymmetric Euler equation whose velocity has infinite-in-time growth. (Based on joint works with Alexander Kiselev and Jaemin Park).

Bio: Professor Yao received her PhD degree in 2012 from UCLA, and she is currently an Associate Professor of Mathematics at the National University of Singapore. Her research focuses on the analysis of partial differential equations arising in mathematical biology and fluid dynamics, especially on equations with a nonlocal transport term. She was a recipient of the NSF CAREER Award in 2018 and Sloan Research Fellowship in 2020.