



THE HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY

Department of Mathematics

SEMINAR ON PDE

**Phase separation and free boundary problems for
aggregation-diffusion phenomena**

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Abstract

We investigate phase separation phenomena that arise as a result of the competition between nonlocal attraction and local repulsion in classical aggregation-diffusion models (we will mainly discuss the Patlak-Keller-Segel model). We will present some recent results showing that when a large population of organisms is observed at some appropriate scales (in time and space), a sharp interface appears, separating regions of high and low density. The derivation of free boundary problems to describe the motion of this interface shows that the collective dynamics is driven, at macroscopic scales, by surface tension and contact angle phenomena as in classical models of fluid dynamics.

Date: 28 March 2025 (Friday)

Time: 9:30am

Zoom Meeting: <https://hkust.zoom.us/j/99111484217> (Passcode: 600657)

All are Welcome!