



THE CHINESE UNIVERSITY OF HONG KONG  
**Department of Physics**  
SEMINAR

# Chiral and Odd Dynamics in Living Matter

*by*

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*Date: May 17, 2022 (Tuesday)*

*Time: 3:30 - 4:30 p.m*

*Join ZOOM Meeting: <https://bit.ly/3KYJprP>*



ALL INTERESTED ARE WELCOME

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## Abstract

Chiral signatures manifest themselves at all biological scales, ranging from intrinsic molecular handedness to left-right symmetry breaking in multicellular systems. How chirality propagates across different scales and generates new emergent phenomena remain an exciting open question. In this talk, I will address two distinct aspects of chiral dynamics in living systems. In the first part, I will show how rotating starfish embryos spontaneously assemble into a living chiral crystal through hydrodynamic interactions. Remarkably, non-reciprocal force and torque exchanges between the embryos lead to emergence of chiral waves and anomalous defect strain field, consistent with predictions of odd elasticity theory. In the second part, I will show how multicellular organoids can spontaneously rotate through interplay between tissue mechanics and polarity alignment. Intriguingly, cell shape orientation field exhibits spontaneous chiral symmetry breaking, suggesting a generic physical mechanism for left-right symmetry breaking in multicellular organisms. Taken together, these works demonstrate the surprising role of chiral dynamics in determining the emergent material properties and functions in living systems.