THE CHINESE UNIVERSITY OF HONG KONG

**Department of Physics**

SEMINAR

# Beyond 2D: Collective Patterning and Jamming in Epithelial Cell Migration

*by*

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ALL INTERESTED ARE WELCOME
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## Abstract

Collective behaviors emerge from coordinated cell–cell interactions during the morphogenesis of mammalian tissues and tumors. For instance, cells may display density-dependent phase transitions from a fluid-like “unjammed” phase to a solid-like “jammed” phase, while different cell types can “self-sort”. We use comprehensive single cell tracking to elucidate these spatially and temporally heterogeneous behaviors in the context of self-organizing patterns. First, we consider co-cultured mixtures of sheet-forming epithelial cells and dispersed mesenchymal cells, which show a composition-dependent “unjamming” transition. Second, we consider a gelation-like mechanism whereby cells at very subconfluent densities organize into spanning network architectures. Finally, we analyze the disorganization and dissemination of cells cultured in 3D matrix, which exhibit both collective and individual invasion phenotypes with distinct topological and traction signatures. These complex behaviors exhibit striking analogies with non-living systems, suggesting that these physical concepts may be applicable to understand human development and disease.

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