Seminar/Talk

Collective rotations: experiments and theory

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Host: Edouard Hannezo

Cells, tissues and organs can rotate spontaneously in vivo and in vitro. These motions are remarkable for their robustness and for their potential functions. However, physical mechanisms coordinating these dynamics are poorly understood.I will present two examples of spontaneous rotation with experiments synergized with theory (1,2). In a first study (1), we report that rings of epithelial cells can undergo spontaneous rotation below a threshold perimeter. We demonstrate that the tug-of-war between cell polarities together with the ring boundaries determine the onset to coherent motion. The principal features of these dynamics are recapitulated with a Vicsek model. In a second study (2), we show that cell doublets rotate in a 3D matrix and we identify mesoscopic structures leading the movement. Our theoretical framework integrates consistently cell polarity, cell motion, and interface deformation. We also report that the Curie principle is verified in its symmetry rules. Altogether both examples could set generic rules to quantify and predict generic motion of tissues and organs. 1- S. Lo Vecchio et al. Nature Physics 20:322–331 (2024).2- L. Lu et al. Nature Physics 20:1194–1203 (2024).

Thursday, April 24, 2025 11:00am - 12:00pm

Moonstone Bldg / Ground floor / Seminar Room F (I24.EG.030f)

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