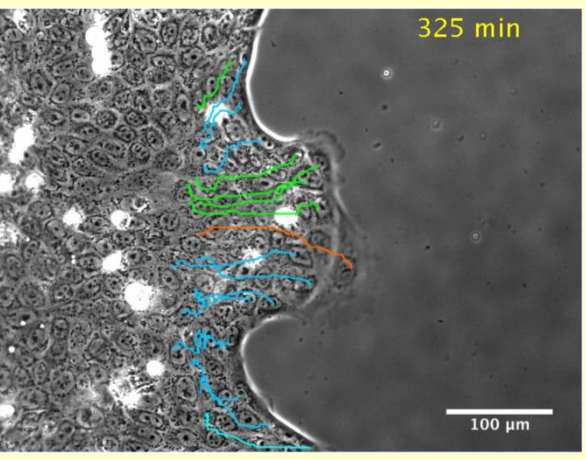
ZERNIKE INSTITUTE COLLOQUIUM

Thursday, January 12th, 2017

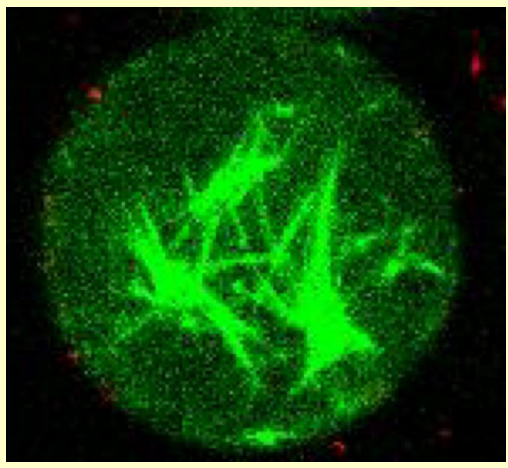
16:00h, Lecture Hall: 5111.0080 — Coffee and cakes from 15:30h

Mechanotransduction in Collective Cell Migration and its Synthetic Mimic

Joachim P. Spatz
Max Planck Institute for Medical Research
Department of Cellular Biophysics
University of Heidelberg
Department of Biophysical Chemistry
Germany



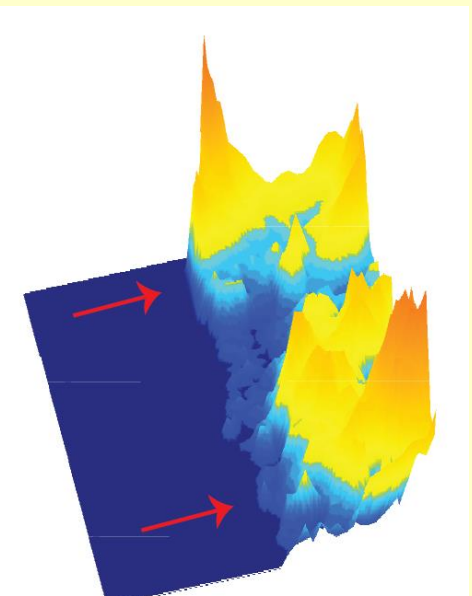
The collective movement of epithelial cells drives essential multicellular organization during various fundamental physiological processes like embryonic morphogenesis, cancer, and wound healing. Hallmarks of collective behavior in migrating cohesive epithelial cell sheets are the emergence of so called leader cells and the communication between adjacent cells to move correlated to each other. Here we discuss three phenomena of this natural phenomena and, fourth, how one can synthesis such behavior synthetically:



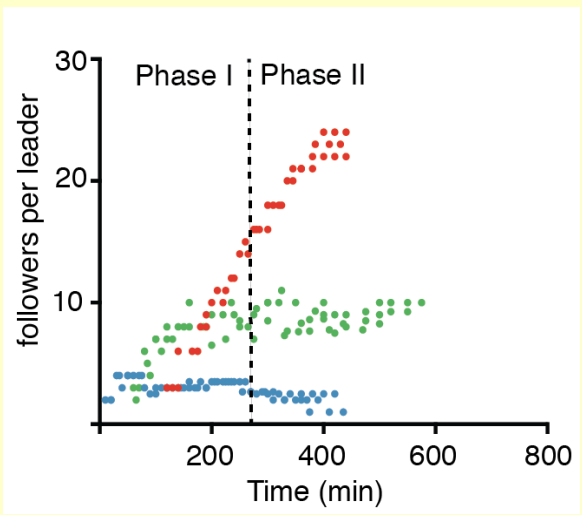
(i) Autonomy of leader cell appearance: emergence of leading individuals, who provide directional guidance for the group movement, is a ubiquitous and critical feature among collectively migrating biological entities. Here we discuss if the leader cells at the epithelial wound-margin appear through a non-cell autonomous or autonomous process.

(ii) Cellular hierarchy within collectively migrating cell layers: the margin of an epithelial wound contains the seed for the ensuing collective cell migration towards the wound closure. Of special significance, in this context, are the leader and non-leader hierarchy. Here we reveal distinct temporal phases of cellular dynamics at wound margin.

(iii) Molecular communication mechanism: within this cohesive group each individual cell correlates its movement with that of its neighbours. We investigate the distinct molecular mechanism that links intercellular forces to collective cell movements in migrating epithelia.



(iv) Synthetic approach of designing a cell like compartment by a strictly controlled bottom-up process.



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