Seminar/Talk

Frisbi

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Host:

Quantifying material properties of cell monolayers by analyzing integer topological defectsMonolayers of anisotropic cells exhibit long-ranged orientational order and topological defects. During the development of organisms, orientational order often influences morphogenetic events. However, the linkage between the mechanics of cell monolayers and topological defects remains largely unexplored. Here, we build on the physics of liquid crystals to determine material parameters of cell monolayers. In particular, we use a hydrodynamical description of an active polar fluid to study the steady-state mechanical patterns around integer topological defects. We apply our approach to C2C12 cell monolayers in small circular confinements, which form isolated aster or spiral topological defects. By analyzing the velocity and orientational order fields in spirals as well as the forces and cell number density fields in asters, we determine mechanical parameters of C2C12 cell monolayers. Our work shows how topological defects can be used to characterize the mechanical properties of biological materials. At the end of the presentation, I will discuss how these findings can help one interpreting the temporal evolution of C2C12 cell monolayers to complex 3D structures, such as localized cell differentiation and formation of cell mounds.

Friday, April 16, 2021 03:00pm - 04:00pm
Online Event ()

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