



Departamento de
Física de la
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Deciphering morphogenesis with physical models and simulations

Abstract

Morphogenesis, the emergence of biological form, is often framed in terms of genes and biochemical signals, yet it is equally a mechanics problem: how forces are generated, transmitted, and organised across scales to shape matter. I will begin by outlining how stresses arise and propagate in tissues, focusing on how cells generate forces through the cytoskeleton, an active material that self-organises into dynamic stress fibres. I will then turn to organ morphogenesis, using the heart to illustrate how mechanical instabilities, such as fracture and buckling, can drive large-scale remodelling.

Bio

Since 2022, I lead a research group at EMBL-Barcelona studying the physical principles of tissue organisation across scales using mathematical models and computer simulations. Previously, I carried out postdoctoral research at Universitat Politècnica de Catalunya (UPC), the Francis Crick Institute, and the Institute for Bioengineering of Catalonia on active matter and cell and tissue mechanics. I completed my PhD at UPC on the mechanics of biomembranes, after bachelor's degrees in physics (Universidad de Zaragoza) and mathematics (UNED), and a master's degree in theoretical physics and complex systems (Université de Cergy-Pontoise).

Con la colaboración de:



7 mayo

HORA: 12:30

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