# CELLULAR BIOPHYSICS
# (5 ECTS, 2nd semester)

## Contents:

1. SELF-ORGANIZATION IN BIOLOGICAL PROCESSES
    a. Self-assembly and self-organization. Active systems
    b. Pattern formation. Turing mechanism
    c. Excitability. Dynamics of cardiac tissue

2. MEMBRANES
    a. Membrane physics
    b. Biological membranes. Rafts. Active transport
    c. Morphology and biological function. Vesiculation and tubulation

3. CYTOSKELETON AND CELL MECHANICS
    a. Structure and physics of the cytoskeleton. Force generation and deformation
    b. Intracellular traffic. Microtubule-mediated transport
    c. Mechanics of cell division

4. CELL MOTILITY
    a. Hydrodynamics of cell movements
    b. Cilia and flagella
    c. Actin-based motility

## Bibliography:


• Dennis Bray, *Cell Movements: From Molecules to Motility*, Graland Publishing (1992)
• Jonhaton Howard, *Mechanics of Motor Proteins and the Cytoskeleton*, Sinauer (2001)
• Ral Jones, *Soft Condensed Matter*, Oxford University Press (2002)
• Philip Nelson, *Física Biológica*, Reverte (2005)
• David Boal, *Mechanics of the Cell*, Cambridge University Press
• Alberts et al. *Molecular biology of the cell,* Garland Science (2002) 4th Edition