Contribution ID: **10** Type: **not specified**

Multiscale Simulation of Biomembranes: bridging the gap between simple models and complex reality

Thursday 26 September 2024 09:00 (45 minutes)

Biomembranes are integral part of the cell, the basic building block of all life. They are a two- dimensional fluid, composed of myriad proteins and lipid species, which provide identity to the cell and to many internal organelles. An intriguing aspect of membranes is their ability to assume a variety of shapes, which is crucial for many cellular processes such as food update, waste disposal, energy generation and cell division. Uncovering the mechanisms that control biomembrane shapes are essential for understanding their function in cells, dysfunction in disease and for many biotechnological purposes such as the rational design of drug delivers vehicles and vaccine development.

In this talk, I will first present our recent advances in building multiscale computer simulations to explore biomembrane spatial organizations. I will discuss how simulations can provide detailed insight into these processes and provide predictions for experimental validation. Then I will show why emerging forces at the mesoscale (10-100 nm) such as membrane-mediated interactions and curvature instability are essential for controlling biomembrane shapes. Finally, I will discuss how close we are to simulating realistic cellular membranes and sketch a possible way ahead.

Presenter: PEZESHKIAN, Weria (University of Copenhagen)

Session Classification: Multiscale Models in Cell Biology II (Chair: Sebastian Thallmair)