

Physics Colloquium

8th of October 2019 at 1.00 pm

Coffee at 12.45 pm

Campus Limpertsberg

Bâtiment des Sciences –room BS 0.15

Talk by Prof. Rhoda Hawkins

University of Sheffield, UK

Invited by Physics Research unit.

Modelling cell mechanics and movement

The mechanics of biological cells is dominated by the polymer protein network known as the cytoskeleton. In this talk I will outline ways in which we model the cytoskeleton using both analytical theory and simulations in combination with experimental data. My goal is to obtain a more profound understanding of the physics of this fascinating, complex, active matter. Furthermore we seek to comprehend how this out of equilibrium material not only affects cell mechanics but also drives cell shape change and movement. I will focus on two examples, both involving the cytoskeletal protein actin. The first involves stochastic simulations of force generation by actin polymerisation in phagocytosis, which is a biological process important in the immune system. The second involves continuum hydrodynamic models of contractile actomyosin and its role in cell migration in complex confining environments.



Biography: Rhoda Hawkins is currently a senior lecturer at the University of Sheffield, UK. She studied physics at the University of Oxford and did her PhD at the University of Leeds on single molecule protein dynamics. She then performed postdoctoral research at AMOLF in Amsterdam, Université Pierre et Marie Curie à Paris and the University of Bristol in the UK. During her postdoctoral years her research became more at the cellular level and her main interests now are on the role of the cytoskeleton in cell mechanics, deformation and migration. She started as a lecturer at the University of Sheffield in 2011 where she now has her own group of 4 PhD students. She has supervised two PhD students to successful graduation. They and her former postdoc have now moved on to other places (UK, France, Germany) for postdoctoral/research fellowship positions. She has recently been appointed director of postgraduate research students for the faculty of science at the University of Sheffield.