

Ph.D. position “Modelling the Dynamic Mechanical Properties of Cytoskeletal Networks”, 4 years.

University of Groningen, Faculty of Mathematics and Natural Sciences, Zernike Institute for Advanced Materials, Department of Applied Physics, Micromechanics of Materials group.



The mechanical properties of biological cells are to a large extent controlled by the cytoskeleton. Experimental and theoretical research during the last decade has started to forge the link between the properties of the individual biopolymers involved and the networks comprising the cytoskeleton. While much attention has been given to mean-field descriptions, the most recent numerical simulations in our group have highlighted the importance of the complex architecture of the networks. This has led to an alternative explanation of the intriguing strain stiffening of biophysical networks attributing this to network re-arrangements.

The project aims at developing a three-dimensional model of actin, cross-linked by a variety of physiological realistic cross-links, and to systematically study the dependence of the network performance on their properties, and induced network architecture. While starting out with a study of the nonlinear elastic properties, the project will then make the challenging step towards the visco-elasticity of networks.

Candidates should have a university-degree in biology, physics, materials science or mechanical engineering, with a strong affinity for theoretical/numerical modelling. For information and applications contact Patrick Onck, P.R.Onck@rug.nl, tel. +31 (0)50 3638039, or Erik van der Giessen, E.van.der.Giessen@rug.nl, tel. +31(0)503638046.

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