

PhD Project: Memory imprints during cell migration

Supervisor:

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Partners or collaborations :

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Dr. Raphael Voituriez (Sorbonne University, Paris, France)

Prof. Vahid Sandoghdar (Max Planck Institute for the Science of Light, Erlangen, Germany)

The newly founded Chair of Biophysics Professor Benoit Ladoux (Alexander von Humboldt professor) is looking for a PhD candidate in biophysics or cell and molecular biology (m, f, d) to start in September. The chair is located in the new building of the Max Planck Center for Physics and Medicine in Erlangen.

Project description : By combining physical tools and concepts with cell biology approaches, we identified unanticipated roles of memory effects in single and collective movements of cells. Single cell motion has been studied for a long time by physicists, but our team recently challenged the previous cell migration models by providing evidence that a motile cell might interact with its own ‘footprints’ (d’Alessandro et al., Nature Communications 2021). By bringing together experimental advances in single cell analysis and theoretical modelling, we highlighted memory-induced effects on cell migration paths. Our study uncovers a new mechanism based on the fact that cells remember their own path by leaving long-lived physicochemical footprints along their way. We will thus study the nature of this footprints, the behavior of different cell types, the impact on collective cell dynamics and how such a mechanism can help to revisit previous works. This self-attracting mechanism may have important implications in directed motions in the context of morphogenesis, wound healing, and cancer invasion.

We will combine quantitative assessment of mechanical forces, real time microscopy, fixed and live cell imaging image analysis, and micropatterning. Our *in vitro* **multidisciplinary, quantitative approach** is expected to provide insight into **the relationship between extra-cellular matrix remodeling and cell migration**.

Profile: The candidate should have a master degree in biophysics or cell biology with possibly a prior experience in microscopy and quantitative imaging. The successful candidate is expected to work in an interdisciplinary and international environment. We are looking for highly motivated graduate students with an interest in multidisciplinary science. Positions will be related to experimental approaches including microscopy, cell culture, and microfabrication.

Job location: Lehrstuhl für Biophysik (Prof. Ladoux), FAU Erlangen-Nürnberg at the new building of Max-Planck-Zentrum für Physik und Medizin (<https://mpzpm.mpg.de/>)

Please send your application documents (application letter, CV, training and employment references) in electronic form (as ONE PDF-file) to Benoit.Ladoux@fau.de

The application deadline is: 31/07/2024