

The Kayser lab at the Max-Planck-Zentrum für Physik und Medizin (MPZPM) and the Max-Planck-Institute for the science of light (MPL) in Erlangen has an open

Postdoctoral Position in Multicellular Dynamics & Evolution

The MPZPM is a newly established interdisciplinary center for research at the interface between physics and medicine. It is conceived as a joint effort between the Max Planck Institute for the Science of Light (MPL), the Friedrich Alexander University (FAU) and the FAU University Hospital in Erlangen.

About us

The Cellular Evolution Group (Jona Kayser) is embedded into the highly interdisciplinary Biological Optomechanics Division (Jochen Guck). We study how system-level evolutionary dynamics in dense cellular populations, such as microbial biofilms or solid tumors, emerge from the fundamental biophysical interactions between the constituent cells. We aim to establish a new conceptual framework that describes dense cellular populations as evolving active granular materials with the goal to better understand and predict clinically relevant consequences of evolution, such as oncogenesis and the emergence of drug resistance.

Job description

You will spearhead the development of a genetically tailored, 3d tumoroid model system to investigate the impact of collective dynamics and cell mechanics on tumor evolution. To this end, you may leverage a diverse set of advanced genetic tools, ranging from optogenetically induced synthetic mutations to dynamic CRISPR/Cas9-based DNA barcodes. Based on this system, you will independently design and conduct cellular evolution experiments combining results from state-of-the-art microscopy assays with DNA-barcode sequencing data. In-house access to advanced biophotonics techniques, including Brillouin microscopy and optical diffraction tomography, will furthermore facilitate a time-resolved *in situ* quantification of mechanical population characteristics. These studies, in conjunction with single-cell mechanical data obtained via real-time deformability cytometry, will inform the development of a new physical model of multicellular dynamics and evolution. The ultimate goal of this project will be to provide new insights into the intricate interplay between cell-mechanical population structure, tumor progression and resistance to treatment.

Your qualifications

We are looking for highly motivated candidates with a background in biophysics, biology or a related field. You should have a strong academic track record and prior experience in cell biology, molecular biology and fluorescence microscopy. A background in 3-dimensional cell culture and/or CRISPR/Cas9 based genetic engineering would be ideal. Additional familiarity with related concepts from biophysics, DNA-barcode sequencing, MATLAB or python-based image analysis and/or machine learning is a plus. Proficiency in written and spoken English is required.

What we offer

We offer a highly dynamic, interdisciplinary work environment with access to state-of-the-art imaging, cell culture and molecular biology infrastructure. Giving you the opportunity to develop academic independence for a future scientific career will be a priority. Salary and social benefits will be in accordance with the regulations of the German TVöD Bund (salary agreement for public service employees). Additional information can be found at <https://mpl.mpg.de/divisions/guck-division/junior-research-groups/kayser-group/>

Your application

Please submit your complete application including a short statement of motivation, your CV, your list of publications and the contact details of at least two academic references to Jona Kayser (jona.kayser@mpl.mpg.de).

The Max Planck Society strives for gender and diversity equality. We welcome applications from all backgrounds. Furthermore, the Max Planck Society is committed to increasing the number of individuals with disabilities in its workforce and therefore encourages applications from such qualified individuals.