
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

PhD Position in Microbial Evolution & Active Granular Materials

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) at the MPL. 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 be given the opportunity to independently design and conduct microbial evolution experiments aimed to unravel how collective phenomena shape the evolutionary dynamics of dense cellular populations. To this end, you will genetically engineer new yeast strains tailored to the specific scientific question. This may include optogenetically induced synthetic mutations as well as dynamic DNA barcodes employing novel CRISPR/Cas9 technologies, such as prime editing. Multi-scale time-lapse imaging will allow you to track evolutionary dynamics from single-cell resolution to the scale of the entire population. The insights gained will form the basis for a new physical model of evolution aiming to quantitatively understand complex adaptive dynamics in dense cellular populations.

Your qualifications

We are looking for highly motivated candidates with a background in biophysics, microbial biology, molecular medicine or a related field. You should have an excellent academic record and prior lab experience in a biophysics or microbial biology related project. Familiarity with fluorescence microscopy and molecular biology techniques is essential, previous experience with yeast and/or bacteria is a plus. You should have a basic knowledge of either MATLAB- or python-based image analysis. An added interest in machine learning would be ideal. 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 as well as microbial and molecular biology infrastructure. Giving you the opportunity to develop independent research experience for your future 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, a copy of your transcripts and the contact details of 1-2 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.