

PhD student in Biophysics (m/f/d)

International Max Planck Research School for Cell, Developmental, and Systems Biology (IMPRS-CellDevoSys)

Research Group Dr. Pierre Haas



APPLICATION DEADLINE: 31st March 2021

The IMPRS-CellDevoSys is an internationally renowned PhD Program that trains the future leaders in science in the fields of Biology, Physics, Chemistry, and Computer Science. Hallmarks of our program are cutting-edge research projects, a strong focus on interdisciplinarity, and a fine balance between dedicated mentorship and early independence. PhD students are hosted at the Max Planck Institute of Molecular Cell Biology and Genetics (MPI-CBG), the Center for Systems Biology Dresden (CSBD), or the Max Planck Institute for the Physics of Complex Systems (MPI-PKS), depending on the hosting research group. The IMPRS-CellDevoSys is part of the Dresden International PhD Program (DIIPP).

The Haas group is a new research group at MPI-PKS and MPI-CBG, based at CSBD. The Haas group is interested in the self-organization of multicellular systems. In close collaboration with experimental groups at MPI-CBG and beyond, it studies the mechanics of the deformations of cells and tissues during development. Using ideas from continuum mechanics and applied mathematics more generally, it develops theoretical models to describe these processes and thus answer biological questions.

We are looking for a highly motivated and skilled PhD student to join our IMPRS-CellDevoSys in the research group of Pierre Haas, working on the following PhD project:

Mechanics of Cell Intercalation

Cell sheet deformations are driven by processes including cell division, cell shape changes, and cell intercalation, but continuum descriptions of cell intercalation (during which cells change their neighbours) are still lacking. In a first step, this project will extend existing elastic models of cell sheets, such as those describing the inversion of the green alga *Volvox* [1,2], to include this cell intercalation. In a second step, in collaboration with Pavel Tomancák's group at MPI-CBG, this project will study cell intercalation during epiboly (epithelial sheet closure) in *Tribolium* [3]. In this way, this interdisciplinary project will combine continuum mechanics, numerical techniques, and analysis of biological data to elucidate, for example, the mechanical role of the heterogeneity of the actomyosin cable driving the process [3].

References:

- [1] S. Höhn *et al.*, Phys. Rev. Lett. **114**, 178101 (2015)
- [2] P. A. Haas *et al.*, PLoS Biol. **16**, e2005536 (2018)
- [3] A. Jain *et al.*, Nat. Commun. **11**, 5604 (2020)

Qualification of candidate

Successful candidates should hold a Master's degree in Mathematics or Physics. Previous exposure to continuum mechanics is desirable. Although this is primarily a theoretical project, there may be opportunities for a suitably qualified and inclined candidate to get involved in experimental work in Pavel Tomancák's group at MPI-CBG. An excellent command of English together with good communication skills and self-motivation are required.

Salary and duration

This full-time position is available immediately. The initial contract is typically for 2 years with the possibility of prolongation to up to 4 years in total. Please see <http://www.imprs-celldevosys.de/join/phd-students/funding-tuition/> for more details.

How to apply

All PhD students at MPI-CBG and CSBD are exclusively recruited via the IMPRS-CellDevoSys. Passing the Admission Committee interview is a pre-requisite for acceptance. Kindly refer to <http://www.imprs-celldevosys.de/join/phd-students/introduction/> for details on the application and admission process. Applications are only accepted through our online system.

More info

Please contact for questions concerning

- the scientific project: Pierre Haas at haas@maths.ox.ac.uk
- the PhD program, including the application and admission process: the PhD office at phd@mpi-cbg.de

The Max Planck Society is an equal opportunity employer: handicapped individuals are strongly encouraged to apply. The CSBD, the MPI-CBG, and the MPI-PKS aim to increase the number of women in scientific positions. Female candidates are therefore particularly welcome.

We look forward to receiving your application.

