



PhD Program *Cell Migration*

“Cell Migration in Immunosurveillance, Inflammation, Tumorigenesis and Metastasis”

Cell migration is a fundamental process of life. Unicellular organisms such as amoeba have to migrate to reach food and to mate. In multicellular organisms, cell migration of individual cells or coordinated multicellular migration is required for gastrulation, morphogenesis and organogenesis (e.g. angiogenesis). Furthermore, the entire homeostasis of multicellular organisms relies on processes of cell migration including the process of immunosurveillance. Finally, cell migration is a crucial process during inflammation and tissue repair and is an integral mechanism of many pathological processes such as chronic inflammatory diseases and tumor metastasis. Immune and tumor cell migration are therefore two topics of outmost biomedical significance.

The PhD Program Cell Migration (<https://cell-mig.ch>) is organized by a growing group of highly innovative and successful Swiss research groups in the field of cell migration in morphogenesis, immunosurveillance, inflammation and cancer. The presently participating institutions with their principal investigators bring together complementary scientific expertise and methodological skillsets in the field of cell migration that permit for embedding a cutting-edge Swiss training program on Cell Migration for highly qualified and motivated PhD and MD-PhD students in the fields of biology, biochemistry, (molecular) human and veterinary medicine, immunology, pharmaceutical sciences, chemistry, physics, bioinformatics and mathematics with a focus on life sciences.

Lecturers:

University	Faculty	Institution	Lecturer
University of Bern	Medical Faculty	Theodor Kocher Institute	Prof. Dr. Britta Engelhardt; Dr. Urban Deutsch; Dr. Giuseppe Locatelli; Prof. Dr. Ruth Lyck; Dr. Steven Proulx, Dr. Mykhailo Vladymyrov
	Vetsuisse Faculty	Department of Clinical Research and Veterinary Public Health	Prof. Dr. Anna Oevermann
	Science Faculty	Institute for Cell Biology	Prof. Dr. Olivier Pertz
University of Fribourg	Faculty of Science and Medicine		Prof. Curzio Rüegg, Prof. Jens Stein; Dr. Jun Abe; Dr. Melanie Bousquenaud, Dr. Jimmy Stalin, MSc. Sarah Cattin, MSc. Gregory Bieler
University of Geneva	Medical and Science Faculties		Prof. Carole Bourquin Prof. Christoph Scheiermann
Univeristá della Svizzera italiana	Facoltà die scienze biomediche	Institute for Research in Biomedicine (IRB)	Prof. Dr. Marcus Thelen Prof. Dr. Santiago F. Gonzalez, Prof. Dr. Mariagrazia Uguccioni
		Biotechnology Institute Thurgau (BITg)	Prof. Dr. Daniel Legler Dr. Jérémy Rossy

PhD Cell Migration Program

The formal teaching courses consist of lectures, practical courses, journal clubs where credit points are assigned. Each doctoral student has to collect a minimum of **10 credit points**; at least **3** of them must come from lecture courses, **2** from practical classes, **2** from the Webbased Journal and Literature Clubs or institutional Journal Clubs. The remaining 3 ECTS can be obtained by the attendance of the Module I in Animal Experimentation (LTK1), which we consider mandatory for the state-of-the art education of students performing experimental animal work in the context of cell migration, and/or any other suitable class as the selection of courses highly depends on the previous experience/training and the outline of the research project.

Teaching portfolio:

Lectures:

The lectures can be attended in person or via online platforms from the partner universities

- Dynamics of cellular contacts: Cell-cell contacts and cell motility, UNIBE (coordinated by B. Engelhardt) 3 ECTS
- Molecular Biology of Inflammation, UNIBE (coordinated by B. Engelhardt) 3 ECTS
- Hot topics in cancer research - Cancer metastasis, tumor microenvironment and inflammation, angiogenesis; UNIFR (coordinated by C. Rüegg) 3 ECTS
- Ask the expert – thematic modules Immunology; Replacement of Animal Experiments, UNIFR (coordinated by J. Stein, C. Rüegg) – 2 ECTS
- Seminar in Immunology and Cell Biology, BITg (coordinated by D. Legler), 1 ECTS
- Immunology from A to Z, UNIGE (coordinated by C. Bourquin and C. Scheiermann). Module 1: Basic Immunology, 2 ECTS, Module 2: Advanced Immunology, 2 ECTS
- Challenges in Clinical Oncology, UNIGE (coordinated by C. Bourquin), 2 ECTS
- Hot Topics in Immunology and Immunopharmacology, UNIGE (coordinated by C. Scheiermann and C. Bourquin), 1 ECTS
- Lecture/seminar series on selected topics of cell biology, IRB, 2 ECTS
- Lecture course IRB International PhD Program in Immunology, Cell Biology and Biochemistry” <https://www.irb.usi.ch/phd-program>, IRB, - 1 ECTS

Practical classes, courses

- GCB course Cell Migration, TKI at UNIBE with BITg, 5 days, 2 ECTS
- GCB course Vascular Biology, TKI at UNIBE, 5 days, 2 ECTS
- Transgenic animals in research, TKI at UNIBE, 1.5 days, 0.5 ECTS
- Model approaches to image analysis, IRB at UNIBE, 3 days 1 ECTS
- In vivo imaging (Luciferase, Fluorescence) UNIFR, 1 day, 0.5 ECTS
- “From animal to cell analysis” (cell isolation, flow cytometry) – UNIFR, 3 days, 1 ECTS
- Single Cell RNAseq, UNIFR, 2 days, 1 ECTS
- Microscopy Applications for Immunological Research, IRB, 3 days, 1.5 ECTS
- Chemokines and Chemokine Receptors, IRB; 1.5 days, 0.5 ECTS
- Course on multicolour flow cytometry, IRB, 3 days, 1 ECTS
- Principles and Application of Flow Cytometry & Cell Sorting, UniKN, 2 ECTS
- Writing, presentation and communication; UNIFR, C. Rüegg, 0.5 ECTS
- Scientific writing, UniKN, 1.5 ECTS
- Speaking with confidence, UniKN, 2 ECTS
- Statistical Literacy, UniKN, 1 ECTS
- Gene expression and protein purification, UniKN, 1 ECTS
- MATLAB, UniKN, 2 ECTS
- Bioimaging, UniKN, 3 days full time course
- Frontiers in Bioimaging, UniKN, 3 days full time course
- Proteomics, UniKN, 3 days full time course

- Scientific networking: how to promote your career while drinking coffee, UNIGE, 0.5 ECTS
- Ask the expert workshop, UNIGE, 0.5 ECTS
- Advanced Flow Cytometry workshop, UNIGE, 1 day, 0.5 ECTS

Tutorials, Literature and Journal Clubs

The Cell Migration doctoral students will be brought up to date with the current literature in the field.

- Immunology Tutorial – coordinated by GCB UNIBE– 1 ECTS
- Journal Club in Cell Biology and Immunology, BITg, 1 ECTS
- Journal Club – NeuTraVas *Neuroinflammation, Cell Trafficking and Vascular Biology*, TKI, 1 ECTS
- Journal Club in Cancer Immunology, coordinated by UNIGE, 1 ECTS
- *E-Literature Club*: On a monthly basis the PIs will upload a seminal publication or review to an e-reading platform (e.g. Perusall; <https://perusall.com>) allowing for shared reading of this paper – 1 ECTS
- *Faculty of Students*: Following the “Faculty of 1000” scheme each PhD student will be assigned 1-3 relevant scientific journals and is asked on a weekly basis to recommend publications with a short comment to the internal webportal – - coordinated by UNIBE, 1 ECTS
- Journal Club in Cell Biology and Immunology, weekly, IRB, 1 ECT

Additional parts of the program – ECTS depending on activity and time

Laboratory Rotations

To support cross-disciplinary approaches, the program supports short-term laboratory rotations, in which interested PhD students have the opportunity to carry out up to two laboratory rotations in another laboratory of the participating PIs in the program.

Annual Cell Migration Retreat

An important highlight of the program will be the annual retreat where all students present their work in short talks and posters. Moreover, students will receive independent feedback on their individual research project from invited international experts in the field. These retreats have proven to foster cross-disciplinary networking amongst the students and research groups working on cell migration in Switzerland.

Cytomeet

The Cytomeet is a well-established one-day meeting for the Swiss scientific community interested in mechanisms of cell migration in vivo and in vitro. It takes place on a Tuesday in January of each year in Bern and is organized by Britta Engelhardt, Daniel Legler and PIs of the PhD Cell Migration program.

Soft skills and interdisciplinary courses

The program will advise students in participating in courses covering novel technologies, such as ‘omics’ approaches in life sciences and medicine, computational data analysis, including machine learning and Artificial Intelligence which are already offered across the disciplines of the participating institutions.

Regulations of the PhD Program Cell Migration

1. Who can apply?

- PhD students accepted at any of the participating Universities and Institutes
- PhD students enrolled in the GCB of the University of Bern
- PhD students with a focus on cell migration in their PhD project
- PhD students benefiting in their PhD thesis project from skills obtained in this program

2. How do PhD students get to know the PhD program Cell Migration?

- recommendation through their supervisor
- recommendation through the staff of the GCB of the University of Bern or comparable programs at the participating Universities
- recommendation by their GCB mentor, co-supervisor and/or supervisor
- information on the GCB homepage
- information on the appropriate homepages of the partner Universities and Institutions

3. Process for getting enrolled

- Students contact the Coordinator of the Program – Prof. Britta Engelhardt (bengel@tki.unibe.ch) and Marianne Schori (marianne.schori@tki.unibe.ch)
- Students receive the information about the program and the mandatory courses as well as i) the registration form and ii) the form for their individual curriculum, which they have to complete continuously.
- Students return the completed and signed registration form to Prof. Britta Engelhardt (bengel@tki.unibe.ch) and Marianne Schori (marianne.schori@tki.unibe.ch) accompanied by documentation of their enrollment in the GCB or acceptance as PhD student in any of the participating Universities
- Enrollment in the PhD Program Cell Migration will be decided by the program coordinator, Prof. Britta Engelhardt.

Registration for the PhD Program *Cell Migration*

“Cell Migration in Immunosurveillance, Inflammation, Tumorigenesis and Metastasis”

1. Personal data

Last name		First name	
Supervisor		E-mail	
Co-Advisor		E-mail	
Mentor		E-mail	
Starting date of PhD studies			
Thesis Title			
Institute			
Office address			
Zip code		City	
Phone		Mobile	
E-mail		Matriculation no.	

The PhD Program *Cell Migration* cooperates with the Graduate School for Cellular and Biomedical Sciences of the University of Bern ([GCB](http://gcb.unibe.ch)). PhD students in this program benefit from an interdisciplinary education organized by national experts in the field (<https://cell-mig.ch>). Students enrolled in the PhD program *Cell Migration* gain **10 ECTS** to graduate from the GCB and to fulfill the requirements of the PhD program *Cell Migration*. The certificate of the PhD program *Cell Migration* will be issued after graduation from the GCB and is valid only in combination with the graduation certificate of the GCB of the University of Bern.¹

2. Signatures

PhD Student

- With my signature, I agree on the exchange of personal data between GCB and the PhD program cell migration.
- A short description about the role of cell migration for my PhD project is enclosed (max 500 words).

Place, date		Signature	
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Supervisor and Mentor

Supervisor		Mentor	
Place, date		Place, date	

Please send to **Britta Engelhardt** (bengel@tki.unibe.ch) and **Marianne Schori** (marianne.schori@tki.unibe.ch) with a cc: to info@gcb.unibe.ch

¹ Currently, the PhD program Cell Migration is granted until end of 2022. A continuation of the funding by the University of Bern can be expected.

Individual Curriculum for *(first name, family name):*

starting the PhD program Cell Migration on *(insert the appropriate date):*

This document is continuously updated by the students themselves. Students are obliged to complete this form and send it to Prof. Britta Engelhardt (bengel@tki.unibe.ch) and Marianne Schori (marianne.schori@tki.unibe.ch) before completing the PhD program Cell Migration.

The dates of the mid-term and final exams as well as the thesis defense must be forwarded to Prof. Britta Engelhardt (bengel@tki.unibe.ch) and Marianne Schori (marianne.schori@tki.unibe.ch) at least four weeks in advance.

Mandatory Courses

Semester Date	General Courses outside of PhD Cell Migration Curriculum (up to 3 ECTS)	ECTS

Date	PhD Cell Migration Curriculum – Lecture Courses (at least 3 ECTS).	ECTS

Date	PhD Cell Migration Curriculum – Practical Classes (at least 2 ECTS).	ECTS

Date	PhD Cell Migration Curriculum – Journal Clubs (at least 2 ECTS).	ECTS

Additional lectures, seminars, courses, workshops

Date	Description

Meetings / Conferences

Date	Description

Presentations

Date	Description

Comments: *(type your comments)*

Date:

Signature: