

## **LSZGS PH.D. PROGRAM**

### **“Molecular and Translational Biomedicine” (MTB)**

#### **MISSION STATEMENT**

The Ph.D. program “Molecular and Translational Biomedicine” (MTB) of the Competence Center for Personalized Medicine (CC-PM) imparts knowledge, concepts and modern technologies in basic and applied biomedical research. Ph.D. students have the opportunity to work on a broad spectrum of topics including energy homeostasis, metabolism, aging, cell growth and differentiation, stem cells, inflammation and cell signaling pathways. In their projects they will apply modern approaches in (epi)genetics, genomics, systems- and molecular cell biology. The Ph.D. program provides a modern teaching curriculum and an international research environment to advance our molecular knowledge in cell, tissue and organ function in physiological and disease states with the goal to improve genomic-based patient care.

#### **PROGRAM OVERVIEW**

The Ph.D. Program “Molecular and Translational Biomedicine” is a 3-4 year MSc. (or equivalent) to Ph.D. program. It is part of the Life Science Zurich Graduate School. Participating students can choose from a broad selection of research topics and participate in cutting edge research. Enrollment into the program is decided by an admission committee.

To graduate, students need to fulfill the following requirements:

- Participation in at least two student retreats of the program, including (poster)-presentation
- Submission and defense of a Ph.D. thesis describing the student’s original research work
- Other requirements imposed by the host institution (University of Zurich (UZH) or ETH Zurich) which also include the acquisition of at least 12 credit points (ECTS) that the MTB program offers the curriculum for.

The final degree is conferred by either the University of Zurich or the ETH Zurich, depending on the academic affiliation of the host laboratory.

## TERMINOLOGY AND BASIC REGULATIONS

We offer a brief general explanation to the Ph.D. student's affiliations in a city with two universities and several institutes, competence centers and graduate schools:

- Once Ph.D. Students will be accepted by a professor to his research group they have to register at the professor's University (UZH or ETH). The Professor is affiliated with either a given "faculty" at University of Zurich (UZH) or a given "department" at ETH. Examples are:
  - UZH: Faculty of Medicine, faculty of Natural Sciences;
  - ETH: Department of Biology (D-BIOL), Department of Health, Science and Technology (D-HEST)
- The professor's research group will be hosted by one of the various institutes in the different fields of research at UZH and ETH. Only few institutes host groups from UZH and ETH.
- The Competence Centre for Personalized Medicine (CC-PM) brings together research groups from both, UZH and ETH. Therefore, the MTB graduate school has students from many faculties/departments.
- The MTB is an international Ph.D. program of the CC-PM under the umbrella of the large [Life Science Zurich Graduate School](#).
- Regulations regarding the written thesis and defense to obtain the Ph.D. are determined by the dean's offices of the Universities and faculties/ departments.
- Acquisition of credit points is required by both universities.
- The curriculum to obtain these is provided by the graduate school.

# REGULATIONS FOR THE Ph.D. PROGRAM

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## 1. Admission

Applicants should hold a Master's degree or equivalent from a university before starting the MTB Ph.D. program, but applications can be submitted before obtaining the degree. You should, however, obtain your degree within six month after the application deadline. Students of the Life Sciences, (Bio)Informatics, Mathematics, Medical Sciences or (Bio)Engineering are invited to apply via the Life Science Zurich Graduate School. Admission to any graduate school is a prerequisite for enrollment and obtaining a doctoral degree at the University of Zurich but not ETH.

### **1.1. Track I and Track II**

You can either apply directly at the MTB program through the Life Science Zürich Graduate School, LSZGS, (Track I) or first apply with a group leader and upon admission to his or her group apply at the MTB Program 6 Months into your work (Track II). For a Track II application, you should also use the software of the LSZGS but won't have to do the interview process. You will not be able to change graduate schools after application.

### **1.2. Applications**

Application deadlines for the MTB Program are December 1<sup>st</sup> or July 1<sup>st</sup>.

Candidates have to apply via a software provided by the Life Science Zurich Graduate School (LSZGS).

In STEP I of their application process, you can select the MTB graduate school as a program preference. For further information please refer to the website of the LSZGS.

### **1.3. Interviews**

Applications are evaluated by an MTB admissions committee consisting of three to six group leaders from UZH and ETH. Based on their written applications, students will be selected and informed no later than 4 weeks after the application deadline. Selected candidates will be invited for an interview taking place in Zurich in early February and in early September, for the application deadlines of December 1st and July 1st, respectively. There, candidates will have the opportunity to meet with group leaders of their choice to discuss possible areas of research. The official language of the program is English. The interviews will determine whether the candidate's English is sufficient for scientific communication.

Accommodation and travel expenses are reimbursed by the program committee. For selected students traveling from outside of Europe, the selection interview will be conducted using Skype and it will take place already three weeks after the application deadline. Accepted candidates of either interview sessions are informed shortly after the interviews and should start their work within six months of acceptance to the program.

Applicants accepted for the program will then have to register for student status with a given faculty of the University of Zurich or a given department at ETH Zurich, depending on the affiliation of their future research group.

## **2. Thesis Committee**

The thesis committee consists of three or four persons

- The direct thesis supervisor (program member)
- At least one additional member of the Ph.D. program
- One external member (not a member of the Ph.D. program) is recommended

The student selects the members of his/her thesis committee members after consultation and in agreement with the PI any time before handing in the research proposal 6 months into the Ph.D..

One of the members – but not the student’s supervisor - will chair the thesis committee. At least two members of the committee have to have the right to award doctorates at the Faculty of Sciences (Mathematisch-Naturwissenschaftliche Fakultät).

The chair:

- Guides through the meeting (students may prepare a short agenda beforehand)
- Checks that the committee members have obtained the proposal or progress report in advance
- Gives the student the opportunity to speak to the committee in absence of the supervisor
- Gives the supervisor also the opportunity to speak to the rest of committee in absence of the student
- Checks that the report written by the student circulates among the committee members allowing them to provide additional comments.
- Once all members agreed the chair signs the form and forwards the feedback form with additional attachments to the program coordinator.

With regard to the thesis committee, the Ph.D. Program “Molecular and Translational Biomedicine” complies with the ETH Zurich and University of Zurich regulations.

## **3. Project/Research Proposal**

Within the first six months, the student writes a project or research proposal describing her/his PhD project in the format of a short grant application. It should contain the background of the research field, preliminary results, the specific aims

and planned experiments (max. 3000 words excluding references). Please include the title page that is provided by the MTB. After the first meeting (see below), the proposal has to be submitted to the program administrator and be signed by all committee members. This document is the doctoral agreement and has to fulfill the requirements of the faculty (UZH) or department (ETH) the student is enrolled with. The students have to hand in the research proposals to the faculty/department and MTB administrators.

#### **4. Thesis Committee Meetings and Reports**

The students are responsible for organizing the meetings. At least three members (including the thesis supervisor) have to be present. The students have to make sure their department's (UZH) or faculty's (ETH) requirements regarding progress reports and committee meetings are met additionally to the MTB's you find below.

As a rule the first committee meeting is held between month 6 and 12 of the PhD. Subsequent meetings are held every 12 months. However, the last meeting should take place at least a few – but not more than 18 – months before the defense.

The research proposal should be sent to all members of the thesis committee not later than two weeks before the meeting. During the first meeting the student has to present and defend the proposal, giving a short presentation followed by a discussion with the committee members.

In case of unsatisfactory performance, the students can repeat the defense after three months. If the students should fail a second time, they will be expelled from the program.

For the second and third meeting, students have to send a progress report to all members of the thesis committee not later than two weeks before the meeting. This report includes the results of the project and an outlook over the remaining period of the Ph.D. project (see below for specific requirements). Please include the report sheet that is provided by the MTB. After every meeting, the project proposal or progress report including the date of the meeting, names and affiliations of attendees, should be updated with significant comments or recommendations of the committee by the student and should be submitted to the MTB program administrator by the chair of the committee.

The following requirements for the reports apply:

**Title page, proposal only:** Please use the provided template

**Report-form, subsequent committee meetings:** Please use the provided template

Content:

- an introduction (suitable for 'general biologists')
- descriptions of the questions/hypotheses/goals that the dissertation will address
- the experimental approach/strategy
- preliminary data obtained in the period until submission of the proposal/the most important results of the time passed
- a time schedule (what should be achieved when and by which means)
- a list of relevant references, cited in the text

Should the student repeatedly fail to comply with the regulations regarding the organization of thesis committee meetings, he or she may be excluded from the program by the chair of the Ph.D. program.

## **5. Coursework within the Ph.D. Program**

### **5.1. Credit points**

The program includes a curricular part of at least 12 ECTS credits. The curricular part is determined individually by each doctoral student. At least two visits of the yearly retreat of the MTB Ph.D. program over the course of the Ph.D. are compulsory. The regular participation in compulsory courses, elective compulsory courses and courses of choice (min. 12 ECTS Credits) is obligatory. A maximum of 3 ECTS can be acquired by organizing scientific events. Figure 1 illustrates a possible curriculum for all students as suggested by the directors of the program. Students with a biology background that work on the interface to systems biology are encouraged to take "Introduction to Mathematical Models" and students with a Mathematical/Informatics background are encouraged to take the "Introduction to Biology" before taking the advanced mandatory course "Technologies and Systems Approaches in Biology".

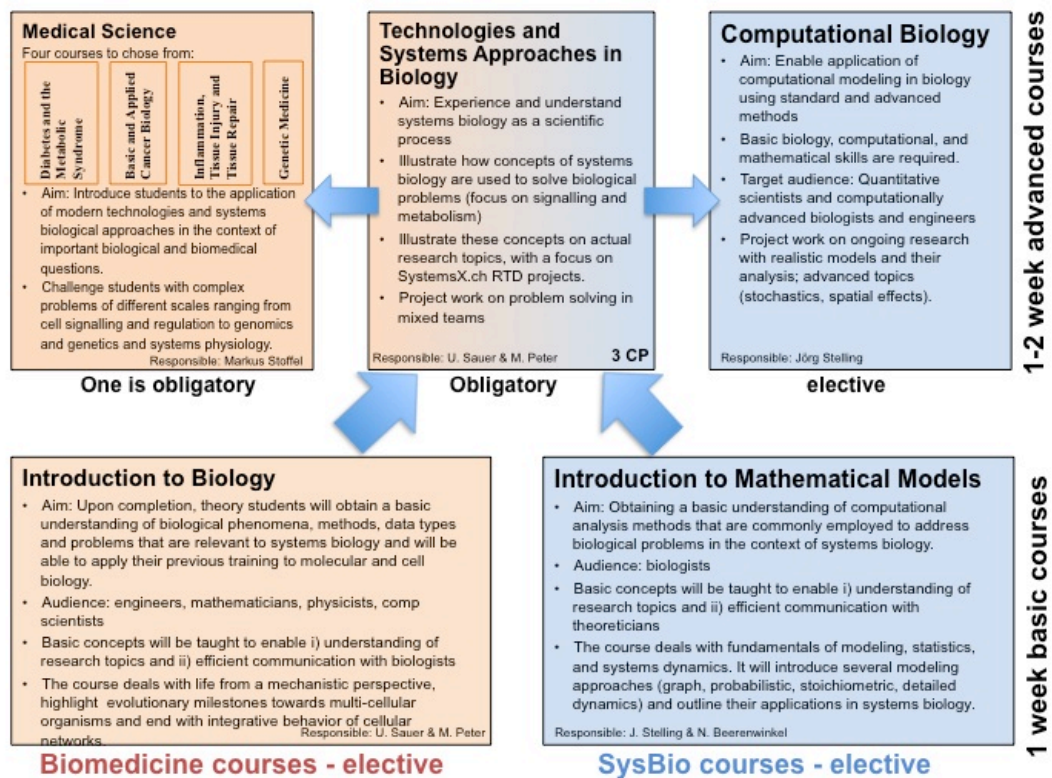


Figure 1: Suggested curriculum; Biomedicine courses in red, Systems Biology courses in blue

## 5.2. Thematic Block Courses

The Ph.D. Program “Molecular and Translational Biomedicine” offers the following advanced courses

- a) **A compulsory course** on “Technologies and Systems Approaches in Biology” (10-day course). The goal of this course is to introduce the students to the application of modern technologies and systems biological approaches in the context of important biological and biomedical questions. Moreover, this course challenges the students with complex problems of different scales ranging from cell signaling and regulation to genomics and genetics and systems physiology.
- b) Four one-week courses on different aspects of modern molecular and translational biomedicine with focus on
  - (i) “Diabetes and the Metabolic Syndrome”,
  - (ii) “Basic and Applied Cancer Biology”,
  - (iii) “Inflammation, Tissue Injury and Tissue Repair”,
  - (iv) “Genomic Medicine”.

**It is compulsory to take one of the courses (i)- (iv).**



Furthermore, an elective course **“Computational Biology”** (3 ECTS) is offered in cooperation with the Ph.D. program “Systems Biology” and highly recommended to our students which intend to work at the interface to systems biology.

Courses/Events	ECTS
<p><i>Compulsory courses:</i></p> <ul style="list-style-type: none"> <li>- Technologies and Systems Approaches in Biology (10 days)</li> <li>- 2 MTB Retreats (each year, 2 days per year)</li> </ul>	<p>3</p> <p>2-3</p>
<p><i>Elective compulsory courses, 1 week each, one is compulsory:</i></p> <ul style="list-style-type: none"> <li>- Diabetes and the Metabolic Syndrome</li> <li>- Basic and Applied Cancer Biology</li> <li>- Stem cells and Regeneration</li> <li>- Genomic Medicine</li> </ul>	<p>2</p>
<p><i>Elective courses - Examples:</i></p> <ul style="list-style-type: none"> <li>- Introduction to Biology/ Mathematical Models</li> <li>- Computational Biology (advanced)</li> <li>- Good Clinical Practice (GCP)</li> <li>- Next Generation Sequencing (NGS)</li> <li>- Course on handling of laboratory animals (LTK1)</li> <li>- Regular attendance at seminars in the group and Institute</li> <li>- Presentations at congresses relevant to the field of research</li> <li>- Summer Schools</li> <li>- Courses of the LSZGS (see 5.3.)</li> </ul> <p>For other courses you would like to visit in agreement with your supervisor: send an Email request to the MTB director (Prof. C. Wolfrum) with Information on your curriculum, course details and ECTS. Courses have to be conform with faculty/department regulations (responsibility of the student).</p>	<p>variable</p>
<p>Total</p>	<p>min. 12</p>

Table 1 Overview on courses and ECTS

### 5.3. Courses of the Life Science Zurich Graduate School

Students may attend courses organized by the Life Science Zurich Graduate School on:

- a) **Scientific Writing:** The course contains issues such as how to write an abstract, a paper, a grant application.
- b) **Research Ethics** The course will give an introduction to methods and tools to identify, understand and address ethically significant problems that arise during scientific work.
- c) **Patenting:** The course provides a general overview on intellectual property, specifically on the patent system. Special regard is paid to details and specialties of patents in biology.

Courses b) and c) are either offered as one block or as two separate courses.

- d) **Other “soft skill” Courses:** The Life Science Zurich Graduate School will offer additional courses (e.g. on project management, team working, time management, entrepreneurship) which students can attend voluntarily.
- e) **Courses of other Programs in the Life Science Zurich Graduate School:** Students are free to take courses of other graduate programs of the Life Science Zurich Graduate School (the number of participants might be limited)

### 5.4. Seminar Series

The students should visit seminar series of their host institute and of other institutes either at the University of Zurich or at ETH.

Few examples are:

Institute of molecular life sciences: <http://www.imls.uzh.ch/services/seminars.html>

Brain Research Institute: <http://www.hifo.uzh.ch/events/MondaySeminar.html>

Institute of Microbiology: <http://www.micro.biol.ethz.ch/lectures/Microbiology>

### 5.5. Advanced Courses

Advanced courses also outside Zurich, such as summer schools, are encouraged throughout the Ph.D. program. All courses have to fulfill MNF/ETH requirements and if not listed here have to be approved by MTB Director Prof. Christian Wolfrum. Provide him with detailed information on your curriculum and the course.

## **6. Off-Site Meeting, annual Retreat**

Students are expected to attend at least two of the annual retreats of the MTB program and have to present their work. Everyone submits an abstract. Some will be chosen to give a talk, all others will present their work in poster sessions. It is not guaranteed that everyone gets a chance to give a talk throughout their participation in the program.

## **7. Teaching**

It is obligatory for Ph.D. students of the MNF (UZH) only to assist with teaching according to the documents "Teaching requirement for PhD students" (please refer to [www.biologie.uzh.ch/Studium/Doktorat.html](http://www.biologie.uzh.ch/Studium/Doktorat.html)).

Ph.D. students of the MNF have to teach at least 100 hours and a maximum of 420 hours during their Ph.D.. Aside from teaching at the institutes (teaching and supervising Bachelor- and Master-students, supervision and grading of exams etc.) it is also possible to teach at the Science Education Center in life science subjects.

## **8. Written Thesis**

At the end of the Ph.D. the students have to write a dissertation in cumulative format (several publications) or thesis format about their own independent scientific research project. This is usually completed in three to four years (full-time).

It is the student's responsibility to learn about the regulations regarding the format and procedure of completing the Ph.D. at the department (ETH) or faculty (UZH) where they are registered. Usually, information is available on the web pages (i.e. deadlines, where to hand it in, how many copies, a specific front page etc.).

The Ph.D. students are required to strictly apply the rules of correct citation in their scientific work.

## **9. Thesis Defense**

After handing in the thesis, there will be an exam led by the professors of the examination committee (or doctoral committee) chosen by the student. The thesis defense will follow the rules established by faculty (UZH) or department (ETH) at which the candidate is registered as a student due to the Ph.D. supervisor's affiliation\*). Differences lie in the format of the exam, as the length of the presentation and exam part or whether it is public or not. A chair for the exam will be provided by the department or faculty.

## **10. Publications and Presentations**

Any publications with a Ph.D. student as author or co-author should mention the “Competence Center for Personalized Medicine” in the author’s affiliations. Students should mention the Ph.D. program “Molecular and Translational Biomedicine” in the author’s affiliation. The center (including the logo) or the Ph.D. program should also be mentioned on posters and in the acknowledgements of scientific talks.

## **11. Confidentiality**

One important aspect of the Ph.D. program is the exchange of scientific data and results between the different institutes of the cooperating Universities. These results are to be treated with confidentiality and cannot be communicated to individuals outside of the program as long as the results are not published by the author or originator of the data.

Participants of the Ph.D. program cannot use scientific results to the disadvantage of the Universities involved and no participant should obstruct the universities’ right to intellectual property by premature publication or other premature announcement of results

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