

#### **Zurich-Basel Plant Science Center**

# **Guidelines 2023 to the PSC PhD Program Plant Sciences**

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# 1 PSC PhD Program in Plant Sciences

#### 1.1 Benefits

Welcome to the PhD Program in Plant Sciences of the Zurich-Basel Plant Science Center (PSC). Within the PSC PhD Program in Plant Sciences, you are embedded in a lively and international community of about 600 researchers.

As a graduate student, you make research your absolute priority. You will be expected to develop into an independent researcher, able to publish, present and communicate your work to a variety of audiences, including the public, to plan your research project and to get funding for your research.

PSC training provides an introduction to conceptual and technical approaches in research and also techniques and methodologies at the forefront of plant sciences. A special focus is on developing necessary digital skills for example in computation, programming, data analysis, data science including forefront areas as machine learning, automated intelligence and other.

Additionally, the PSC PhD Program in Plant Sciences supports you in aquiring transferable skills, for example in analyzing data, writing successful publication and grant proposals, being aware of your responsibilities as a researcher, open data management to collaborate with other researchers or to build up your own scientific network.

The PSC qualification framework aims to build transferable skills and competencies for a successful career in science and beyond. Completion of a structured PhD Program is expected by many potential future employers, both inside and outside academia. The guidelines should help you to plan your doctoral studies and tailor your training to your needs. The guide outlines the professional skills and interdisciplinary research competences you should develop during your doctoral studies (see competence matrix in Section 3). In the Course Catalogue, we present the wide range of workshops. To be awarded with the PSC PhD Program Certification, you must complete 12 ECTS during your 3-year doctoral study.

An opportunity to develop management skills is participating in our international PSC PhD symposium as part of the organization committee (bi-annual organized by doctoral students).

### 1.2 Governance of the Program

It is lead by one representative of PSC principal investigators (PI, director: Prof Ueli Grossniklaus, UZH), PSC head of studies (Dr. Melanie Paschke, PSC) and the PSC PhD program coordinator (Dr. Luisa Last, PSC) that is your contact point for questions. Two times per year, there is a board meeting of PhD programs at LSZGS.

Each PhD Program has the opportunity to elect one student's representative, giving the doctoral students a voice for decisions. The doctoral representatives from all LSZGS PhD programs elect four representatives who have voting rights during the board meetings of the LSZGS. The election will be reconfirmed every year.

# 2 Admissions, Registration and Regulations

## 2.1 Admission to the PSC PhD Program

The PhD Program is open to you if your research group has a membership within the PSC (overview of members: <a href="www.plantsciences.uzh.ch/aboutus/people.html">www.plantsciences.uzh.ch/aboutus/people.html</a>).

All PSC doctoral students must be enrolled at the University of Zurich (UZH), ETH Zurich (ETHZ) or at the University of Basel (UNIBAS). The candidate is conditionally accepted to the PhD Program after requirements are fulfilled. Final acceptance depends on the formal admission requirements of the UZH, ETHZ or UNIBAS.

There are two tracks to join the PSC PhD Program. Track I covers recruitment via the Life Science Zurich Graduate School (LSZGS). Track II concerns direct applications to the Principle Investigator (PI). To ensure an equal application process of Track I and Track II, both tracks require a formal admission interview between PI and their future doctoral students, in accordance with the rules of the LSZGS (as of January 2013). The interview should be conducted in presence of at least one other PI or faculty member, and the supervisor should fill out an interview protocol to be submitted to the program office. Contact your supervisor if you are a Track II student. Please find further information here: (https://www.plantsciences.uzh.ch/en/teaching/registration.html)

# 2.2 Registration for the PSC PhD Program

All necessary documents (incl. an overview of all necessary processes) can be downloaded on our webpage: <a href="http://www.plantsciences.uzh.ch/teaching/procedures.html">http://www.plantsciences.uzh.ch/teaching/procedures.html</a>

For registration to the program fill the form provided on our webpage within 3 months after the start of your PhD. We will then send you a welcome package with all necessary documents. Within the first year of your PhD you could also change to other PhD programs. Please contact us to guide you through the process.

Registered doctoral students are requested to use independent data and document management systems. At these databases you need to upload documents certifying the progress of your studies (for example thesis committee meeting protocols, certificates of courses, etc.).

#### ETHZ.

- → **Dissertation Go (DissGo)**: <a href="https://www.dissgo.uzh.ch/login">https://www.dissgo.uzh.ch/login</a> (for documentation of course work carried out in the program. You will receive your login after having sent the registration form for the PhD Program.
- → ETH MyStudies (https://myStudies.ethz.ch) is the central application for <u>all</u> students to administrate their studies, but independent from DissGo.

#### **UZH MNF**

→ StudentAdmin: <a href="https://studentadmin.mnf.uzh.ch/">https://studentadmin.mnf.uzh.ch/</a>, You will receive your login after successful matriculation at the UZH.

#### **UNIBAS**

→ Dissertation Go (DissGo): <a href="https://www.dissgo.uzh.ch/login">https://www.dissgo.uzh.ch/login</a> (for documentation of course work carried out in the program. You will receive your login after having sent the registration form for the PhD Program.

# University of Zurich (UZH), Faculty of Science (MNF)

All doctoral students must register for a structured PhD Program with the signed registration form and the signed protocol from the admission interviews. Templates for both documents are available here:

https://www.plantsciences.uzh.ch/en/teaching/procedures.html

Furthermore, doctoral students must register to the UZH MNF by using the following link: Registration Doctoral Studies

http://www.mnf.uzh.ch/en/studium/phd/anmeldung.html.

For more information on the Graduate Schools and Doctoral Studies at the MNF, please visit the following website <a href="http://www.mnf.uzh.ch/en/studium.html">http://www.mnf.uzh.ch/en/studium.html</a>.

#### ETH Zurich (ETHZ)

PhD students must be enrolled at ETHZ via the ETHZ Admission for Doctorate first (<a href="https://www.ethz.ch/en/doctorate/registration-admission.html">https://www.ethz.ch/en/doctorate/registration-admission.html</a>). The PhD Program in Plant Sciences has been accepted as a structured program at the D-USYS and D-BIOL. As such it supports doctoral students to acquire the 12 ECTS within their regular doctoral studies (mandatory for all doctoral students).

All doctoral students must register for the PhD Program with the signed registration form and the signed protocol from the admission interviews. Templates for both documents are available here:

https://www.plantsciences.uzh.ch/en/teaching/procedures.html

# **University of Basel (UNIBAS)**

Doctoral students must register to the UNIBAS, Philosophisch-Naturwissenschaftliche Fakultät by using the following link:

https://philnat.unibas.ch/de/forschung/promotionphd/immatrikulation-ab-hs-2016-registered-fall-semester-2016-or-later/.

All doctoral students must register for the PhD Program with the signed registration form. The template for the registration form is available here:

https://www.plantsciences.uzh.ch/en/teaching/procedures.html

# 2.3 Institution-specific regulations during your PhD study

You need to carry out your doctoral studies in accordance with the regulations of your home institution (ETHZ, UZH or UNIBAS), where the host laboratory is academically affiliated, and the research work is carried out. Please refer to the regulations for doctoral students of ETHZ, UZH or UNIBAS in the first and of your home department/faculty in second level. In the third level, you need to comply with the regulations of the PhD Program that are aligned with the regulations at the host organisations. On our website you'll find an overview table as a checklist of documents to be submitted during your doctoral studies: <a href="https://www.plantsciences.uzh.ch/en/teaching/procedures.html">https://www.plantsciences.uzh.ch/en/teaching/procedures.html</a>

# University of Zurich (UZH), Faculty of Science (MNF)

For more information on the Graduate Schools and Doctoral Studies at the MNF, please visit the following website <a href="http://www.mnf.uzh.ch/en/studium.html">http://www.mnf.uzh.ch/en/studium.html</a>.

<u>Teaching requirements:</u> The doctoral student must complete the "Planning teaching hours" form from the Department (Fachbereich) of Biology for the fulfilment of a <u>minimum</u> of 150 teaching hours and <u>maximum</u> of 420 hours. considering additional Department-dependent regulations. Planned teaching activities need to be submitted to UZH MNF StudentAdmin. Please consult the following website for details of the teaching requirements: <a href="https://www.biologie.uzh.ch/de/Studium/Doktorat.html">https://www.biologie.uzh.ch/de/Studium/Doktorat.html</a>.

<u>Thesis Committee</u>: The doctoral student and the supervisor select the thesis committee six months after the beginning of the PhD project. The composition of the committee has to be as following: at least three members, including the supervisor. Two members of the committee (including the chairperson) are from the MNF with "Promotionsrecht"

(Professors with the right to confer a PhD). The thesis committee composition **must be communicated to the program office** and the UZH MNF via UZH MNF StudentAdmin. Members with "Promotionsrecht" can be consulted on the following website: <a href="https://www.mnf.uzh.ch/en/fakultaet/fakultaetsangehoerige/promotionsrechtler.html">https://www.mnf.uzh.ch/en/fakultaet/fakultaetsangehoerige/promotionsrechtler.html</a>.

The first Thesis Committee meeting should be held 6 – 12 months after the beginning of the PhD. Subsequent meetings are held at least every 12 months. At least three members of the thesis committee (including thesis supervisor) have to be present. Participation of external members can also be arranged by using video conference systems. It is the responsibility of the doctoral student to set up the composition of the thesis committee, arrange the yearly thesis committee meetings, and document the activities. The thesis committee meeting protocol, signed by all participants, is to be submitted to UZH MNF StudentAdmin within eight weeks after the meeting took place.

The doctoral candidate can be disqualified by the Dean of Studies, if the thesis committee finds at the yearly meeting that the progress of the PhD candidate is not sufficient.

All templates are available at:

https://www.plantsciences.uzh.ch/en/teaching/procedures.html

For details see: http://www.mnf.uzh.ch/en/studium/reglemente.html#4

Exam Registration and Doctoral Examination: The final degree is conferred by your home institution. For your registration to the examination, have a look at: (https://www.mnf.uzh.ch/en/studium/phd/checkliste-fuer-doktorierende.html)

#### ETH Zurich

# Supervision: All doctoral students that have started the PhD after 01.01.2022 have to follow the new regulations of ETH Zurich.

Doctoral students at ETHZ are supervised by at least two persons. The (1) official supervisor of the doctoral thesis (professor at the Department) and (2) the second advisor (an adjunct professor or Privatdozent/in, provided that (a) she or he works full-time at the ETHZ, and (b) both institutes have agreed). The second supervisor must be defined latest till submission of the doctoral plan. The doctoral administration (doktorat@ethz.ch) must be notified of the second advisor before the aptitude colloquium. Doctoral students have the right throughout the doctoral study to request another person to be available for additional professional or nonprofessional advice and support as needed.

Information about your doctoral studies at ETHZ and particular requirements of different ETHZ departments are available here: <a href="https://ethz.ch/students/en/doctorate.html">https://ethz.ch/en/doctorate.html</a>; <a href="https://ethz.ch/en/doctorate/legal-basis.html">https://ethz.ch/en/doctorate/legal-basis.html</a>.

Template for registration of second supervisor is available here: https://ethz.ch/students/en/doctorate/second-advisor.html

#### **Departments D-USYS and D-BIOL**

#### **Doctoral Plan (replaces Research Plan):**

A written research proposal, including the research plan and teaching requirements, is to be defined minimum 15 working days before the Aptitute Colloquium (D-USYS) and latest 10 months (D-BIOL) after registration. Should a thesis be carried out outside the ETHZ domain, it should be specified in the doctoral plan. The doctoral plan needs to be submitted to the aptitude committee and the doctoral studies panel (Deadline, see ETHZ MyStudies).

Aptitude Colloquium: The aptitude colloquium is an oral defense of the research plan to be held latest 12 months after registration at ETHZ (see MyStudies). The defense lasts around 60 minutes including a presentation by the doctoral student (max 30 minutes) and a discussion between the doctoral student and the aptitude committee about the doctoral plan. The aptitude committee is composed of the chairperson and the Thesis Committee. The chairperson must be (a) a member of the doctoral studies panel (Doktoratsausschuss) or (b) a person appointed by the doctoral studies panel who must be a full or associate professor at ETHZ department. The PhD-Student is responsible to organize the aptitude colloquium, which can be conducted with partial or full physical presence of the aptitude committee and the doctoral student or entirely by video conference.

Information on the Doctoral Plan and Aptitude Colloquium: <a href="https://ethz.ch/students/en/doctorate/doktoratsplan.html">https://ethz.ch/students/en/doctorate/doktoratsplan.html</a> <a href="https://ethz.ch/en/doctorate/legal-basis.html">https://ethz.ch/en/doctorate/legal-basis.html</a>

Information for submission of the Doctoral Plan:

D-BIOL: <a href="https://biol.ethz.ch/en/doctoral-studies/doktoratsplan---">https://biol.ethz.ch/en/doctoral-studies/doktoratsplan---</a>

eignungskolloquium.html

D-USYS: <a href="https://usys.ethz.ch/en/doctorate.html">https://usys.ethz.ch/en/doctorate.html</a>

<u>Progress report (replaces Thesis Committee Meeting Protocol):</u> All doctoral students must complete progress reports. This is due after the appointment of a second supervisor. The PSC recommends involving external partners or supervisors. The progress report must be completed annually. The progress report forms the basis for the annual status conversation. The document must be kept for the entire duration of the doctorate. The duty of safekeeping is incumbent on the persons involved (doctoral students, dissertation supervisors, second advisors)!

**Annual status conversation**: All doctoral students must have an annual status conversation with the supervisor of their doctoral thesis. This is due after the appointment of the second supervisor. The supervisor of the doctoral thesis will determine the date. It consists of 2 parts and covers the following topics: Part 1 (Scientific Progress) and Part 2 (performance)

assessment, career and personal development).

The minutes of the status conversation must be kept for the entire duration of the doctorate. The duty to keep the minutes is incumbent on the persons involved (doctoral students, dissertation supervisors, second advisors)!

<u>Exam Registration and Doctoral Examination</u>: The final degree is conferred by your home institution. For your registration at the doctoral administration, have a look at: <a href="https://ethz.ch/students/en/doctorate/doktorpruefung.html">https://ethz.ch/students/en/doctorate/doktorpruefung.html</a>

# UNIBAS, Philosophisch-Naturwissenschaftliche Fakultät

<u>Thesis Committee:</u> The doctoral committee consists of a First Supervisor, a Second Supervisor, external members (e.g., experts and other experts, subject to application). The thesis committee composition must be communicated to the PhD Program office by submitting the Doctoral Agreement (i.e., UNIBAS Doktoratsvereinbarung) to DissGo.

The first <u>Thesis Committee Meeting</u> should be held 6 – 12 months after the beginning of doctoral studies. Subsequent meetings take place at least once a year. The signed thesis committee meeting protocol (i.e., UNIBAS Doktoratsvereinbarung) must be submitted to DissGo within eight weeks after the meeting took place. You can find the templates for the protocol on the following webpage of the PSC:

https://www.plantsciences.uzh.ch/en/teaching/procedures.html

For further description, please refer to:

https://philnat.unibas.ch/fileadmin/user\_upload/philnat/3 Forschung/14.12.21 II Doctora l studies - Guidelines Version 11.2021 english.pdf

<u>Exam Registration and Doctoral Examination:</u> The final degree is conferred by your home institution. Please study the document provided by the faculty: <a href="https://philnat.unibas.ch/de/forschung/promotionphd/immatrikulation-ab-hs-2016-registered-fall-semester-2016-or-later/">https://philnat.unibas.ch/de/forschung/promotionphd/immatrikulation-ab-hs-2016-registered-fall-semester-2016-or-later/</a>

#### 2.4 Admission to Courses

We accept PhD students from LSZGS programs into our courses, provided that spaces are available. PSC students registered in the PSC PhD Programs (i.e. Plant Sciences or Science & Policy) have enrolment priority. For PhD students registered in LSZGS programs, all courses of the PSC PhD Programs are fully recognized. PhD students select their individual course work in agreement with their PhD supervisor or their PhD thesis committee.

# 2.5 Confidentiality

It is an important goal that the participants of the PhD Program exchange their scientific results between different institutes and their host institution. Any such results shall be kept strictly confidential by all participants of the program and shall not be disclosed to persons outside of the program if the results are not published by the author/originator of the results. No participant of the PhD Program shall use any scientific result to the detriment of one of the host institutions. No participant shall impair a host institution's right to seek protection for intellectual property contained in such results by a way of a premature publication or other premature disclosure of results.

# 3 Curriculum, Certification, Course Catalogue

#### 3.1 Curriculum

The PSC PhD Program in Plant Sciences allows to acquire 12 ECTS (at ETHZ and UZH and 18 ECTS at UNIBAS to complete their regular doctoral studies:

- In total, 12 credits (ECTS) acquired from lectures, courses, workshops or summer schools that are accredited in our regular curriculum. 1 ECTS is equal to 25-30 learning hours (this equals either a lecture of 1 hour per week during one semester or a full two-to three-day workshop including homework and preparatory work).
- Mandatory course participation during one semester in the colloquium "Challenges in Plant Sciences" (2 ECTS). If you have already participated in the colloquium during your Master's studies you can choose your 12 ECTS freely from other courses organized or accredited by the PSC.
- <u>Course on Research Integrity</u>: All students of ETHZ, UZH and UNIBAS must attend a lecture/course of research integrity and responsible conduct in research.

All students of **UZH and UNIBAS** must visit the LSZGS introduction event "Introductory Lecture to Good Scientific Practice and Scientific Integrity" (2 hours, no ECTS). Within the event you will sign the declaration of "Good scientific practice" that will become a part of your DissGo (UNIBAS) or MNF StudentAdmin (UZH) documents. Please, register via the LSZGS website: <a href="https://www.lifescience-graduateschool.uzh.ch/en/courses.html">https://www.lifescience-graduateschool.uzh.ch/en/courses.html</a>. NEW! Please generate a login (register) on the Participant Homepage (see previous link) first!

Alternatively, students of **UZH and UNIBAS** can register for the spring term course "Ethics and Scientific Integrity for Doctoral Students (701-5001-00L)" via Daylight. Here, places are reserved for PSC members (i.e., UZH and UNIBAS).

All doctoral students of **ETHZ** must visit a course on "Research Integrity" at ETHZ (1 ECTS) offered every term in your department. The PSC offer is linked to "Ethics and

Scientific Integrity for Doctoral Students (D-USYS, 701-5001-00L)". Please register via MyStudies.

- 1 ECTS can be earned for active participation at international conferences, presentation and posters, but needs a confirmed accreditation through the PSC office. <a href="https://www.plantsciences.uzh.ch/en/teaching/procedures.html">https://www.plantsciences.uzh.ch/en/teaching/procedures.html</a>
- Maximum of 1 ECTS can be accredited for active participation in committee at ETHZ when serving one year.
- 1 ECTS can be earned for active participation in one of the GreenLabs projects at UZH, refer to the PSC website for detailed information: <a href="https://www.plantsciences.uzh.ch/en/teaching/coursecatalogue.html">https://www.plantsciences.uzh.ch/en/teaching/coursecatalogue.html</a>
- If you join the committee for organizing the PSC PhD symposium (all 2 years) you can accredit 2 ECTS.

**UNIBAS:** Doctoral students must complete mandatory and elective course work to acquire **18** ECTS. Participants need to accomplish additionally 6 ECTS to the curriculum specified above: Choice of seminars, colloquia and lectures at UNIBAS (Promotionsfach - Botanik).

<u>PSC Summer Schools</u>: Our summer schools allow students to engage in cutting-edge plant science topics and to meet the experts from all over the world. The summer schools address the biggest challenges currently facing science and society. Example topics from recent years are listed here and can be found under following link: <a href="https://www.plantsciences.uzh.ch/en/teaching/pastsummerschool.html">https://www.plantsciences.uzh.ch/en/teaching/pastsummerschool.html</a>

- 2022 PSC Summer School: Application of Machine Learning in Plant Sciences
- 2021 RESPONSE Summer School: Responsible Research, Innovation and Transformation in Food, Plant and Energy Sciences
- 2018 PSC Summer School: Responsible Research and Innovation in Plant Sciences

Note that, all ECTS acquired outside of ETHZ, UZH, UNIBAS or associated PhD Programs need a confirmed accreditation through the PSC office. Fill the form to get the accreditation of external ECTS:

https://www.plantsciences.uzh.ch/en/teaching/phdsciencepolicy/procedures.html

#### Table 1. Curriculum.

Activities	ECTS
<ul> <li>Compulsory Activity:</li> <li>Colloquium "Challenges in Plant Sciences"</li> <li>Research Integrity At ETHZ: 1 ECTS through visiting a course on Research Integrity in your department. Register in MyStudies. At UZH and UNIBAS: In minimum the LSZGS "Introductory Lecture to Good Scientific Practice and Scientific Integrity" (0 ECTS) must be visited. For details, see section "Course on Research Integrity".</li> </ul>	2 - 3
<ul> <li>Core Elective Activity:</li> <li>Technical Courses in all areas of Plant Sciences: Intensive workshops on skills, methods and techniques used in plant science research. Especially also courses on digital skills in the Plant Sciences.</li> <li>Statistical Methods</li> <li>Transferable Skill Courses (Communicating and Disseminating Science / Professional Conduct in Research / Research Management / Professional and Career Development / Finance, funding and resources etc) organized by PSC* or LSZGS</li> </ul>	4 - 10
<ul> <li>Elective Activity: Remainder of 12 ECTS may be chosen from:</li> <li>Participation in international scientific symposium with own scientific contribution (oral or poster presentation) (max. 1 ECTS)</li> <li>Engagement in green labs (only UZH, max. 2 ECTS)***</li> <li>Organization of PSC PhD Symposium (2 ECTS)</li> </ul>	
	12**

<sup>\*</sup> A wide range of technical courses and on transferable skills for PhD students are available within the the PSC PhD Program Plant Sciences.

Details and registration: <a href="https://www.plantsciences.uzh.ch/en/teaching/coursecatalogue.html">https://www.plantsciences.uzh.ch/en/teaching/coursecatalogue.html</a>. Transferable skill courses are also offered by the Life Science Zurich Graduate School:

http://www.lifescience-graduateschool.ch/graduate-courses/transferable-skill-courses.html, by the Graduate Campus (GRC), UZH: <a href="http://www.ueberfachliche-kompetenzen.uzh.ch/index.html">http://www.ueberfachliche-kompetenzen.uzh.ch/index.html</a> and by GRACE, UNIBAS: <a href="https://www.unibas.ch/de/Forschung/Graduate-">https://www.unibas.ch/de/Forschung/Graduate-</a>

<u>Center/Doktorierende/Training-Coaching-und-Beratung/Transferable-Skills.html</u> (NOTE for GRC courses: ETHZ and UNIBAS students: Contact the PSC PhD Program Coordination Office (<u>psc\_phdprogram@ethz.ch</u>) if you want to register for these courses. We have to confirm your PhD program registration.)

<sup>\*\*</sup> At UNIBAS, a total of 18 ECTS are requested.

<sup>\*\*\*</sup> If you want to get science communication or green lab activities accredited have a look at our specialized guidelines.

## 3.2 Research, Digital and Transferrable Skills

All courses of the PSC have been developed to advance the acquisition of research skills, digital skills and transferable skills that will serve you both in and outside of academia.

Please check the course catalogue at:

https://www.plantsciences.uzh.ch/en/teaching/coursecatalogue.html

#### **Technical Skills**

Technical skills of the program are developed in all areas from molecular sciences to ecology and system approaches. The courses are developed to allow an understanding and mastering of relevant research methodologies and techniques and their appropriate application within the following topics: Microscopy and 3D microscopy, chlorophyll fluorescence, DNA sequencing, RNA biology, functional genomics, plant phenotyping, microbiomics, QTL analysis, genome-wide association studies, genetic diversity techniques and analysis, plant phylogeny, alpine ecology, introduction to transdisciplinarity and to sustainability etc.

#### **Digital Skills**

Currently the PhD Program is enhancing the curriculum with courses that are related to digital skills and competencies.

#### PhD education: Extended curriculum digital skills New offers Machine Classification Forecasting Deep learning Summer School ML learning · Intro ML Advanced ML ML & image Structural Regression Clustering Data mining equation modelling Intro Regression • Intro SEM Data Using R for Data Visualization visualization Scientific Value Statistics & Data Programming modelling computing sensitivity management R Markdown & Shiny Advance DM Tutorial: Work in clusters · Intro Phyton Compositional data analysis and manipulation · Reproducibility **ETH** zürich 13 02 2023 Zurich-Basel Plant Science Center

The Digital Skill Curriculum in the PhD Program Plant Sciences

#### Programming

Introduction to UNIX/Linux and Bash scripting BIO609, 1 ECTS, FS

Introduction to R, 1 ECTS, HS

Genetic Diversity: Techniques (2 ECTS, HS) and Analysis (2 ECTS, FS)

Crosslinked: Introduction to Phyton

#### **Data Management**

Reporting using Markdown (and Shiny) applications, 1 ECTS, biannually in FS Advanced Data Management and Manipulation using R, 1 ECTS, annually in FS

#### Reproducibility

Crosslinked: Get R\_eady: Dynamic Reporting & Reproducibility in Research

Crosslinked: Open and Reproducible Science: Dependable Computations and Statistics

#### Computation

New: Tutorial on how to work with clusters; no ECTS, will start in HS23

#### **Imaging**

Advanced course on 3D plant microscopy and image processing, 1 ECTS, FS Machine learning and image processing in plant sciences and related disciplines, 1 ECTS, start in HS 23

#### **Machine Learning**

Introduction to machine learning methods in plant sciences (Module 1 & 2), 3 ECTS, HS Planned 2023: Deep learning methods in image processing, 1 ECTS, HS

#### Statistic, Modelling

Statistical modelling, 1 ECTS, FS

Compositional data analysis, 1 ECTS, biannually FS

Introduction to Genome-Wide Association Studies (GWAS), 1 ECTS, bi-annually in HS Next generation sequencing and its Application using Machine Learning 1, 1 ECTS, HS Next generation sequencing 2, 1 ECTS, FS

General linear and linear mixed models in R, 1ECTS, crosslinked, FS Introduction to structural equation modeling, 1 ECTS, crosslinked, HS Planned 2023: Bayesian Statistics and Application

#### Visualisation

Scientific visualisation using R, 1 ECTS, HS

Research Ethics: Value-based design processes in emerging technologies; 1 ECTS

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#### Transferable Skills

The PhD Program is offering training in a wide range of transferable skills, for example:

#### Communicating and Disseminating Science

- Scientific Writing 1 & 2
- Managing your Publication Workflow and Open Data
- Scientific Presentation Practice
- Scientific Communication Practice
- Professional Conduct in Research
- Ethics and Scientific Integrity for Doctoral Students
- Writing a Post-doctoral Grant
- Filmmaking for Scientists
- Teaching Science at University
- Creative Science Communication
- Wissenschaftskommunikation und Exkursionsleitung im Botanischen Garten der Universität Basel (in German)

#### Research Management

Project Management in Research

All our classes also include training on the most forefront technologies for example the sustainable and responsible use of generative AI in the working processes of publishing and data analysis.

#### Funding and Resources

• Project Management in Research

#### 3.3 PSC PhD Certification

The PSC issues a PhD Program certification (= diploma supplement incl. a transcript of all records) after all requirements have been fulfilled and the Doctoral Degree Certificate of your home university has been awarded. Successful completion is based on fulfilling the curriculum (see also point 3. Curriculum):

For receiving the PSC PhD Program certificate, please upload all certificates (pdfs) of training activities to DissGo (ETHZ, UNIBAS) or UZH MNF StudentAdmin (UZH) and send a copy of your Doctoral Degree Certificate to the PhD Program coordinator via E-Mail (pdf).

# 4 Reimbursement of Travel Expenses

Doctoral students from UNIBAS enrolled in our PSC programs can ask for reimbursement of their travel expenses (bus or train ticket, 2nd class) to PSC training events. Contact your secretariat and present your ticket/receipt for reimbursement.

# 5 Legal basis for the PhD Program regulations at the home institutions

#### **UZH**

- Verordnung über die Promotion an der Mathematisch-naturwissenschaftlichen Fakultät der Universität Zürich (Promotionsverordnung) vom 31. Januar 2011.
- Doktoratsordnung für die Promotion an der Mathematischnaturwissenschaftlichen Fakultät der Universität Zürich vom 13.12.2012.

#### **ETHZ**

- Ordinance on Doctoral Studies at the Swiss Federal Institute of Technology Zurich (Ordinance on Doctoral Studies ETH Zurich of 21<sup>st</sup> November 2021 (Version: 01. Jan 2022) (<a href="https://rechtssammlung.sp.ethz.ch/Dokumente/340.31en.pdf">https://rechtssammlung.sp.ethz.ch/Dokumente/340.31en.pdf</a>).
- D-USYS: Department of Environmental Systems Science (D-USYS) Detailed regulations for Doctoral Studies D-USYS (as of 01 Januar 2022).
- D-BIOL: Department Biology (D-BIOL) Detailed Regulations for Individual Doctoral Studies D-BIOL (as of 27 Januar 2022).
- Detailed regulations for individual doctoral studies (further ETH Departments) are available online: <a href="https://ethz.ch/en/doctorate/legal-basis.html">https://ethz.ch/en/doctorate/legal-basis.html</a>.

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#### **UNIBAS**

 Promotionsordnung der Philosophisch-Naturwissenschaftlichen Fakultät der Universität Basel vom 15. September 2015

(https://www.unibas.ch/dam/Oeffentliche-

Dokumente/Rechtserlasse LegalRegulations/Phil.-

Nat.Fakultaet FacultyofScience/Promotion Doctorate/446 730 P Phil Nat 00.pdf).