

# PhD Guidelines of the Helmholtz Einstein International Berlin Research School in Data Science (HEIBRiDS)

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## 1. The HEIBRiDS Data Science School

The HEIBRiDS Data Science School was established in 2018 as a collaboration between six Helmholtz centers and ECDF partner universities. Collaborating Helmholtz Centers include the Alfred Wegener Institute for Polar and Marine Research (AWI), the Deutsches Elektronen-Synchrotron (DESY), the German Aerospace Center (DLR), the German Research Centre for Geosciences (GFZ), the Helmholtz Zentrum Berlin for Materials and Energy (HZB), and the Max-Delbrück Center for Molecular Medicine (MDC). ECDF partners in the program are Freie Universität Berlin (FU), Humboldt-Universität zu Berlin (HU), Technische Universität Berlin (TU), as well as Charité-Universitätsmedizin Berlin.

HEIBRiDS aspires to train young scientists in **Data Science** applications within a broad range of natural science domains, spanning from **Earth & Environment, Astronomy, Space & Planetary Research** to **Geosciences, Materials & Energy** and **Molecular Medicine**. It is our goal to educate a new generation of researchers, who are skilled data scientists that understand the demands and the challenges of the disciplines in which data science has become indispensable.

Doctoral researchers within the HEIBRiDS PhD Program conduct applied research within **Data Management, Machine Learning and Deep Learning, Imaging, Mathematical Modelling and High-throughput Data Analytics**. The training program applies the cotutelle training principle, which involves one supervisor from a Helmholtz partner and one from an ECDF partner. In addition, HEIBRiDS doctoral researchers have access to training opportunities within the Helmholtz and ECDF partners, according to their scientific and professional needs and interests. As part of the Helmholtz Information & Data Science Academy (HIDA), events, symposia and courses organized by HIDA are made available to HEIBRiDS doctoral researchers, as well as short-term stays to other Helmholtz Centers can be facilitated.

The PhD guidelines of the HEIBRiDS Data Science School are described in the following pages and shall facilitate and guarantee the productive and efficient progression of the PhD project. As the Helmholtz centers are not degree-awarding institutions, each researcher has to be admitted and enrolled at an ECDF partner university and has to meet - in addition to the present guidelines - the academic requirements of the degree-granting faculty and the standards of Good Scientific Practice. The PhD guidelines herein apply to all HEIBRiDS doctoral researchers.

## 2. Entry and Registration of Doctoral Researchers

Doctoral researchers enter the HEIBRiDS Data Science School by applying to the PhD program. The assessment procedure during the recruitment week consists of several elements, such as presentations, panel discussions and one-to-one interviews. Moreover, applicants have the opportunity to attend talks by recruiting group leaders presenting the available projects, or visit the labs of their interest. The selected applicants are automatically registered with the HEIBRiDS Data Science School as soon as they start their PhD project. All new HEIBRiDS doctoral researchers are invited to an orientation session, which gives an introduction to the HEIBRiDS Data Science School and training curriculum.

### 3. University Affiliation

In Germany, the right to award academic degrees resides exclusively with the university departments or faculties (Fachbereiche or Fakultäten). Doctoral researchers have to be admitted and enrolled at an ECDF partner university to receive their doctoral degree. The ECDF partner universities of HEIBRiDS are: Humboldt-Universität zu Berlin (HUB), Technische Universität Berlin (TU), Freie Universität Berlin (FUB) and Charité-Universitätsmedizin Berlin. The HEIBRiDS Office gives advice on the procedures of partner universities and supports the paper work for admission process. Doctoral researchers have to register with the ECDF partner university that one of their supervisors is affiliated with. In the case that the university supervisor is not the main project supervisor, doctoral researchers have to ensure that the writing, submission and publication of the doctoral thesis are in consultation and agreement with the main project supervisor.

The doctorate procedure is comprised of three parts:

1. Admission of the research project with a university supervisor and enrollment at the university
2. Submission of thesis and doctorate examination. This includes the appointment of the examination panel and the public defense of the thesis, disputation, or viva
3. Publication of thesis and submission to university library

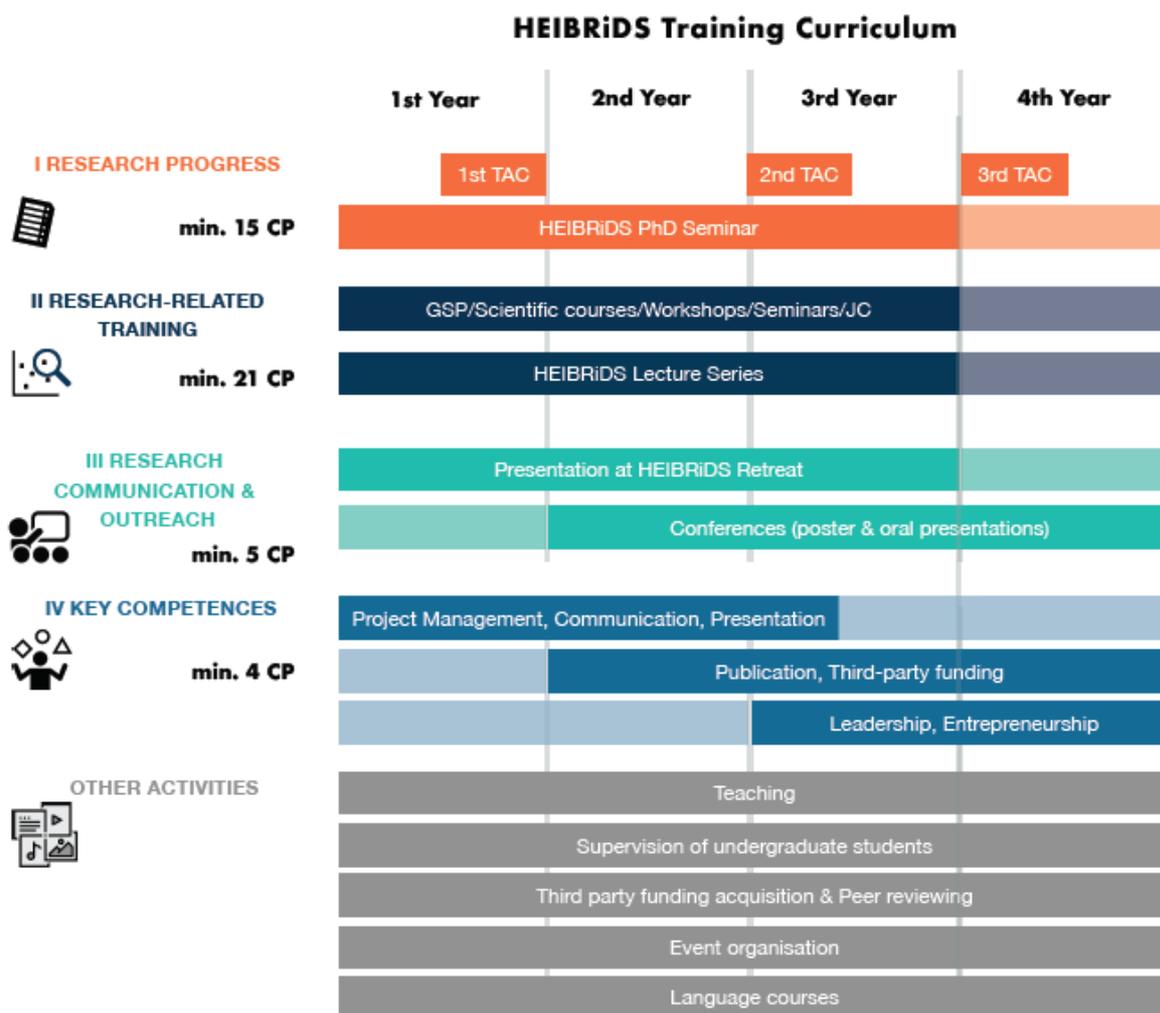
Each university department or faculty has its own Doctorate Regulations (Promotionsordnung). They set out eligibility criteria, curriculum requirements, how the thesis should be submitted and published and how the oral examination (viva voce) should be organized. The doctorate will be completed in accordance with the Doctorate Regulations of the respective universities.

**All researchers are expected to complete the admission and enrollment process until their first Thesis Advisory Committee (TAC) meeting.**

### 4. Training Curriculum

Over the period of research work, doctoral researchers need to complete the training curriculum of the HEIBRiDS Data Science school. A broad spectrum of lectures, seminars, courses and other training activities allows all doctoral researchers to customize their curriculum based on research interest and personal needs. All training activities shall be decided in dialogue with the supervisors. The mandatory elements of the HEIBRiDS Training Curriculum sum up to 45 credit points (CP) and are clustered into four modules, as visualized

below and, in more detail, in Annex I:



## I. Research Progress

The HEIBRiDS doctoral researchers are mentored by a **tandem** of a **primary supervisor** and a **co-supervisor**. The close day-to-day supervision is complemented with the Thesis Advisory Committee (TAC), consisting of the two project supervisors and at least one independent scientist from the Helmholtz centers or the ECDF partner universities.

All HEIBRiDS doctoral researchers are required to participate in annual TAC meetings, which provide a platform for monitoring and ensuring the quality of the research project. The TAC offers feedback on the project proposal in the first year, and reviews the progress and personal development in the following years.

The organization of the TAC meetings is the responsibility of the doctoral researcher and shall follow the following schedule:

- Presentation & discussion (30min)
- Committee resumes in the absence of the PhD researcher (5min)
- Committee members receive feedback from doctoral researcher in the absence of the direct supervisors (15min)

- Feedback including advise on training activities (10min)

Complementary to tandem supervision and the TAC, HEIBRiDS doctoral researchers receive peer feedback at the bi-monthly PhD Seminar.

### **1st TAC Meeting: Research proposal (within months 6-12)**

Doctoral researchers prepare a written project proposal in consultation with their supervisors. The project proposal must be sent to all members of the TAC and to the HEIBRiDS Office at least one week before the meeting, alongside with the admission letter from the university.

The TAC evaluates the feasibility of the proposal for a four-year project, and further overviews training requirements and accomplishments to recommend extension of the project after the first year. The doctoral researcher receives feedback after the Committee's discussion and summarizes the conclusions and recommendations in the TAC meeting protocol, which will be signed by the supervisors and sent to the HEIBRiDS Office within three weeks of the meeting.

### **2nd TAC Meeting: Progress report (within months 24-30)**

The project progress is presented to the TAC at the end of the second or beginning of the third year. The written report shall not exceed ten pages, excluding references. The report shall be sent to the members of the TAC and the HEIBRiDS Office at least one week before the meeting.

The main responsibilities of the TAC are to review the project progress over the last year, to discuss the time management plan, and to outline the research objectives and activities for the following year. Additional training requirements, including research training and soft skills courses shall be considered and determined in dialogue with the committee. The doctoral researcher receives feedback after the Committee's discussion and summarizes the conclusions and recommendations in the TAC meeting protocol, which has to be signed by the supervisors and sent to the HEIBRiDS Office within three weeks after the meeting.

### **3rd TAC Meeting: Final report (within months 36-42)**

At the beginning of the fourth year the doctoral researcher shall prepare a time management plan for the completion of the doctorate and the submission of the thesis, which shall be presented to the Committee during the third TAC meeting. In addition, the final report shall

include a thesis content outline and a suggestion for the composition of the Thesis Defense Committee. The report should be sent to the members of the TAC and the HEIBRiDS Office at least one week before the meeting.

The Committee shall evaluate the feasibility for completing the project work and writing the thesis within the time specifications. If the submission cannot be accomplished within the fourth year, the TAC can suggest an additional extension of six months. In the event of an extended sick leave, parental leave etc., the contract is entitled to be extended accordingly. Additional training requirements, including research training and soft skills courses shall be considered and determined in dialogue with the committee.

Extension of the employment status beyond four and a half years requires that the doctoral researcher and the project supervisors develop a completion strategy which is reviewed by the HEIBRiDS Program Committee at least six months before the end of the contract. After evaluation of the proposal, the HEIBRiDS Program Committee recommends conditions for a final contract extension to the host institution.

**The salary of the doctoral researcher during the fourth year of studies, as well as during any further extension of the contract is to be covered by the main supervisor.**

## **II. Research-related Training**

The research-related training module includes a wide range of courses, lectures, seminars, and workshops to enhance scientific skills and expertise. In addition to the research-related training organized by the HEIBRiDS Data Science School, each university and research center offers its own set of research-related courses. Due to the interdisciplinary nature of the HEIBRiDS program, the scientific training shall complement the background of the doctoral researcher, e.g., researchers with strong data science background shall select courses primarily from the particular application domain, whereas those with a strong application domain background should select courses on data science. Research-related training shall be decided after agreement with the supervisors.

## **III. Research Communication and Outreach**

Doctoral researchers shall present their research project at the annual HEIBRiDS Retreat. The HEIBRiDS Retreat is an important part of the curriculum, fostering scientific cross-disciplinary exchange and interaction. This event is organized with the active support of doctoral researchers, providing valuable lessons in organization and communication skills.

In addition, doctoral researchers shall present their research findings at international conferences at least twice.

## **IV. Key Competences**

Soft skills training and career development for early-career researchers is an integral part of the broader range of activities supported by the HEIBRiDS Data Science School. In addition to soft skills training organized by the HEIBRiDS Data Science School, HEIBRiDS doctoral researchers can attend courses offered by the Helmholtz Association, all partner Helmholtz

Centers, and the Berlin University Alliance.

### Other Activities

Doctoral researchers are strongly encouraged to play an active role in the scientific community, e.g., contribute to university teaching and supervision of BSc and MSc students, organize meetings and colloquia, etc.

## 5. HEIBRiDS Transcripts and Certificates

Training records, thesis reports and TAC meeting protocols are maintained at the HEIBRiDS Office. Doctoral researchers may review their academic record and information upon request.

An official transcript containing the research-related training program and personal development achievements and the HEIBRiDS certificate is prepared by the HEIBRiDS Office after submission of the thesis to the corresponding university.

## 6. Change of Research Group, Withdrawal and Dismissal

If a doctoral researcher wishes to change research group or if a supervisor seeks to dismiss a researcher, the HEIBRiDS Office shall be contacted ensuring that both are aware of pending action.

### Change of Supervisor

In the case of change of one or more of the supervisors, Helmholtz Research Group or University affiliation, the doctoral researcher must submit a short, written statement to the HEIBRiDS Office. A change can be approved only before the first meeting of the Thesis Advisory Committee. In case of such a change, the first Thesis Advisory Committee meeting with the new group will be postponed by six months. The first meeting must take place within 15 months of beginning of the contract. After successful presentation of the new research proposal, the contract will be continued until three years of HEIBRiDS funding are completed. **The new supervisor shall guarantee continued funding after expiration of HEIBRiDS funding to completion of the research project.**

### Withdrawal and Dismissal

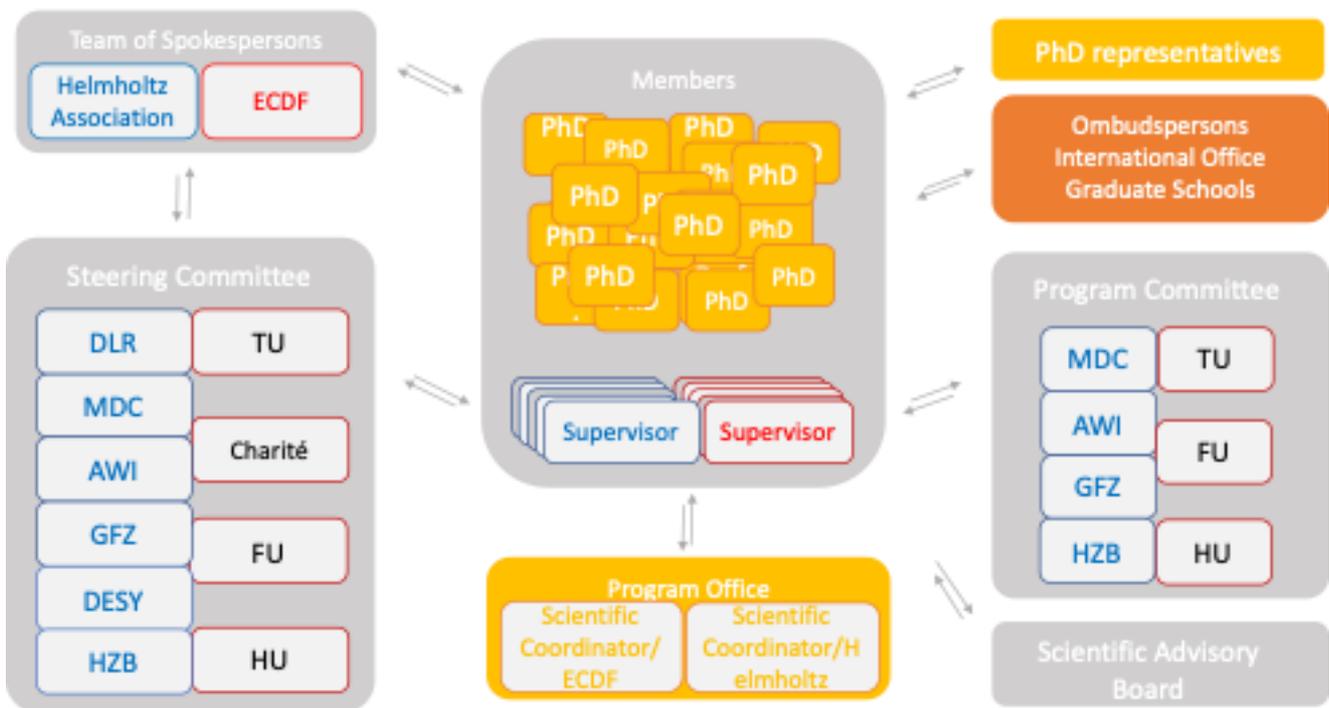
If a doctoral researcher wishes to abort the doctoral project, a short, written statement must be submitted to the HEIBRiDS Office. The project supervisors must also submit a short, written statement.

## 7. Responsible Research Conduct and Academic Standard

Every doctoral researcher is expected to be familiar and comply with the rules of Good Scientific Practice of the respective host institution. All documents presenting research data have to be discussed with the project supervisors, including the doctoral thesis.

HEIBRiDS adheres to principles of responsible research, good scientific practice, openness, and transparency, and is committed to setting a good example as a scientific environment where scientists can flourish and grow, independently of their national or ethnic background, functional variation, sex/ gender identity/alignment/orientation, family configuration, or other such feature of their persons or contexts.

## 8. Governance and Structure of the HEIBRiDS Data Science School



### HEIBRiDS Research Community

All HEIBRiDS doctoral researchers and supervisors are **members** of the HEIBRiDS Data Science School.

### Assembly of doctoral researchers, PhD representatives and Ombudspersons

All doctoral researchers make up the general **PhD Assembly** and are represented by two elected **PhD Representatives**. The PhD Representatives give the PhD assembly a formal voice in the operation of the HEIBRiDS Data Science School and communicate all relevant subjects to the Program Committee. The PhD Representatives are further involved in

planning of researcher events and networking opportunities, and in supporting the integration of international researchers. The PhD representatives are elected by the doctoral body. Every PhD Representative shall be in office for the duration of 12 - 24 months.

The **Ombudspersons** of the respective universities and Helmholtz partners are available to doctoral researchers of HEIBRiDS for consultation. Ombudspersons support doctoral researchers upon request and can help them to resolve misunderstandings, express concerns, manage conflicts, and learn more productive ways of communication. In case of disagreement on terms of employment, discrimination, harassment, or problems with colleagues or supervisors, doctoral researchers may contact the PhD Ombudspersons under strict confidentiality.

### Steering Committee

The **Steering Committee** is responsible for all structural, scientific and financial decisions. It is comprised of 13 members representing all partner Helmholtz centers and ECDF universities. The committee meets whenever the governance policy requires its intervention, but at least biannually. Three members of the Steering Committee are members of the **Executive Board** and represent the HEIBRiDS Data Science School as spokespersons.

### Program Committee

The **Program Committee** acts as an advisory board and supports management. It suggests projects for funding, develops the study program, and prepares admission decisions for the Steering Committee. The Program Committee consists of all active PhD project supervisors and meets biannually. Permanent guests of the Program Committee are the two PhD Representatives and the HEIBRiDS Office.

### Scientific Advisory Board

The **Scientific Advisory Board** consists of five international leading scientists with experience in interdisciplinary research and graduate education, who offer their advice on the development of the educational curricula (element of quality assurance). Members of the Scientific Advisory Board are invited to participate in events and meetings organized by the HEIBRiDS Data Science School at regular intervals.

## **Administration and Management**

Administration and management of the academic program is in the responsibility of the HEIBRiDS Office, which assumes the following tasks:

- a. Administrative management of the HEIBRiDS PhD Program
- b. Guidance to doctoral researchers on all matters concerning the HEIBRiDS PhD program, including curriculum, training activities, travel grants, Thesis Advisory Committees and support admission to university
- c. Liaison to local universities and close collaboration with other graduate and research schools
- d. Developing and implementing training and events for the doctoral community
- e. Advising on external grants, professional and career development
- f. Managing the HEIBRiDS PhD program including international recruitment and marketing
- g. Registration, recording and monitoring of all activities and providing statistical analysis to faculty and directorate on academic matters
- h. Ensuring the development, revision and implementation of policies and strategies together with the Program and Steering Committees
- i. Fostering of national and international cooperation

The HEIBRiDS Office works in close collaboration with the coordinators of other graduate schools, research schools and local partners to guarantee the highest standard of structured education to all doctoral researchers at HEIBRiDS.

## **9. Associated HEIBRiDS Doctoral Researchers**

Doctoral researchers, who are pursuing their dissertation with one of HEIBRiDS' core scientific areas (molecular medicine, geosciences, astronomy, earth & environment, space & planetary research and materials & energy), can apply to associate with HEIBRiDS and participate in the HEIBRiDS PhD Training Program. Essential for acceptance to the program is that the PhD project has a strong data science element. When this is not already in place, it can be incorporated by affiliating to the project a HEIBRiDS mentor with data science expertise.

Interested doctoral researchers complete the registration form and submit an application to the HEIBRiDS Office including the following documents:

- Completed form "Request for Association"
- Letter of Motivation for joining HEIBRiDS
- CV including education details, publications, honours, etc.
- Abstract of the dissertation project (1-2 pages)
- Letter of support from the main supervisor
- Statement of approval from the potential data science mentor

Requests for association are accepted all year round. Project proposals are evaluated by the

HEIBRiDS Program Committee. The Committee decides on the basis of the scientific quality and interdisciplinarity of the proposed project, as well as the competence and motivation of the doctoral researcher.

**Associated HEIBRiDS doctoral researchers have access to the workshops and seminars organized by HEIBRiDS, and are invited to participate in the annual HEIBRiDS Retreat. However, they are not expected to fulfil in the mandatory training curriculum.**

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## Annex I

### Mandatory Training Components

<i>Module</i>	<i>When?</i>	<i>Min. mandatory CP</i>	
<b>I. Research Progress</b>			
Thesis Advisory Committee (TAC) Meeting (including report and minutes)	Once a year	3/yr	9
HEIBRiDS PhD Seminar	Years 1-3	2/yr	6
<b>II. Research-related Training*</b>			
Good Scientific Practice	Year 1	0,5/day	
Scientific courses	Years 1-3	5 (4hr/week/semester)	
Workshops	Years 1-3	0,5/day	
Seminars, Journal Clubs	Years 1-3	0,1/event (attendance)	15
HEIBRiDS Lecture Series	Years 1-3	0,5/event (presentation) 2/yr	6
<b>IV. Research Communication &amp; Outreach</b>			
Presentation at HEIBRiDS Retreat	Years 1-3	1/year	3
Poster/oral presentation at international, scientific conferences	Years 2-4	1/presentation	2
<b>IV. Key Competences*</b>			
Recommended to select courses within:			
i) Project Management, communication, presentation	Years 1-2	0,5/day	4
ii) Publication, third-party funding	Years 2-4		
iii) Leadership, entrepreneurship	Years 3-4		
<b>Other (no credit points)</b>			
Teaching			
Supervision of undergraduate students			
Third-party funding acquisition & Peer-reviewing			
Event organization			
Language courses			
<b>Total Minimum Mandatory CP</b>			<b>45</b>

\* Courses organized especially for the HEIBRiDS students are mandatory, unless an equivalent course has already been followed.