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PH.D. NOTE

# European XFEL Ph.D. Student Programme Guidelines

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# Revisions

| Version | Date | Description |
|---|---|---|
| 1.7 | 8 Feb. 2021 | Updated:<br>■ Chapter 7, “Ph.D. committee”<br>■ Chapter 8, “Tutors”<br>■ Chapter 10, “Ph.D. projects funded through the European XFEL R&D programme”<br>■ Appendix C, “Ph.D. committee members for 2021” |
| 1.6 | 25 May 2020 | Converted from Internal Note to Ph.D. Note |
| 1.5 | 18 May 2020 | Updated:<br>■ Appendix A, “Ph.D. proposal”<br>■ Appendix E, “Ph.D. agreement” |
| 1.4 | 7 Apr. 2020 | Updated:<br>■ Chapter 5, “Commitment of supervisor and group leader”<br>■ Chapter 11, “Ph.D. projects not funded through the European XFEL R&D programme”<br>■ Appendix A, “Ph.D. proposal”<br>■ Appendix B, “Summary of stages in a Ph.D. contract”<br>Added Appendix E, “Ph.D. agreement”. |
| 1.3 | 26 Mar. 2020 | Updated:<br>■ Chapter 7, “Ph.D. committee”<br>■ Chapter 10, “Ph.D. projects funded through the European XFEL R&D programme”<br>■ Chapter 11, “Ph.D. projects not funded through the European XFEL R&D programme” |
| 1.2 | 17 Mar. 2020 | Updated Appendix C, “Ph.D. committee members for 2020” |
| 1.1 | 20 Feb. 2020 | Updated:<br>■ Chapter 6, “Ph.D. student spokesperson and Ph.D. self-organized activities”<br>■ Chapter 7, “Ph.D. committee”<br>■ Chapter 8, “Tutors”<br>■ Chapter 10, “Ph.D. projects funded through the European XFEL R&D programme”<br>■ Appendix A, “Ph.D. proposal”<br>■ Appendix B, “Summary of stages in a Ph.D. contract”<br>■ Appendix C, “Ph.D. committee members for 2021” |
| 1.0 | 15 Jan. 2020 | First release |

# Contents

# 1 Introduction

These guidelines have the scope to structure the existing European XFEL Ph.D. student programme to better respond to our students' expectations. They focus on improving supervision and protection of our Ph.D. students (Milestone I) and creating a European XFEL student population with a common identity and culture (Milestone II). Overall, these guidelines aim at giving our students, through their Ph.D. programme at European XFEL, the best possible launch pad for their future scientific career.

Milestone I will be achieved by the implementation of

- "Ph.D. committee"
- Tutor
- Yearly presentations and short reports
- Student Day

Milestone II will be achieved in a second step, after having defined the requirements and skills we expect from our Ph.D. students, in terms of

- Basic knowledge of X-ray optics, detection, beamline alignment, data analysis, etc.
- Soft skills (oral and poster presentations, scientific writing, preparation for recruitment interview)

In this context, we will coordinate our initiatives with those at existing graduate programmes, many of which we are already engaged with: Center for Ultrafast Imaging-Advanced of Imaging Material (CUI-AIM), International Max Planck Research Schools (IMPRS), Partnership for Innovation, Education and Research (PIER), Datascience in Hamburg (DASHH). These offer lecturing, soft skill courses, and expertise from which we and the students can greatly benefit.

This document presents guidelines for achieving Milestone I. It will be complemented to include Milestone II. It will then be regularly updated when necessary.

# 2 Scope of the European XFEL Ph.D. programme

The European XFEL Ph.D. programme aims at training the next generation of scientists within X-ray free-electron laser (X-ray FEL) science areas and thereby disseminating the expertise and know-how acquired at European XFEL to other scientific institutions and to society. Engaging in the Ph.D. student programme will also enable European XFEL scientists and engineers from all divisions to strengthen their research activities and their soft skills in supervision and mentoring. It will allow the facility and its staff to increase their scientific goals and productivity. It will foster a closer relationship between the students and supervisors. Beyond that, it will enable European XFEL staff and students to establish a closer link to universities, research institutes and other facilities. Finally, it will contribute to the establishment of long-term identification with European XFEL.

All the traditional science areas of application of X-ray FEL radiation are concerned (physics, chemistry, biology, materials, engineering) and are open to completely new areas such as applied mathematics and computational science (data techniques and advanced learning algorithms). Research on instrumentation specific to X-ray FELs (FEL science and technology, detection, lasers, synchronization and data transfer reduction and storage) is a specific part of this programme. Research in the theoretical fields of photon fields generated by FELs is also encouraged.

Ph.D. projects will be articulated around the in-house research topic of the supervisor. The supervisor and the student will work together to pursue the scope of the research.

# 3 Supervision: Administrative and scientific supervision

Since the European XFEL does not have its own right to award Ph.D. degrees, the Ph.D. thesis is carried out in cooperation with a university. When our staff lacks the credentials to officially supervise a Ph.D. student, an external supervisor (typically a university professor) will assume the role of “official” supervisor with administrative responsibilities. In this case, our staff member assumes the role of a co-supervisor with scientific supervision responsibilities. European XFEL scientists/engineers wishing to achieve the status of “official” supervisor are encouraged to search for opportunities and engage in stronger interaction with academia. Application for supervisor status—and the associated activities at university to achieve this status—must be discussed with management. An agreement must be found on how to smoothly insert these activities into multi-annual planning so they do not interfere with duties related to the smooth operation of the facility. In the following, the term “supervisor” always refers to a European XFEL staff member.

# 4 Who this programme concerns

All Ph.D. students who have a European XFEL supervisor (or co-supervisor) will be part of this programme, independent of where the funding for their positions comes from[1] and independent of where the Ph.D. work is carried out. This includes Ph.D. students hosted at European XFEL for more than 12 months and either enrolled in external programmes (such as AIM, IMPRS, PIER) or affiliated with universities in Germany or abroad.

Excluded from this programme are Ph.D. students who do not have a European XFEL supervisor, including

- Students who access European XFEL as part of a team through peer-reviewed proposals
- Students from DESY or HiBEF (or another external organization) partners permanently located at European XFEL. These students are, however, automatically associated with all activities of the social and didactic programme (student self-organization and Ph.D. seminar meetings, Student Day, etc.).

[1] Ph.D. students hired at institutions other than European XFEL are considered as “guests”.

# 5 Commitment of supervisor and group leader

Supervisor and student shall agree on actively engaging in the Ph.D. project for a maximum duration of three years, and both sign the Ph.D. project agreement form (Appendix E), which defines the rights and duties of both parties.

Approval of a Ph.D. student project is a commitment on behalf of the supervisor to share his/her time for supervision tasks throughout the full duration of the thesis or for the full duration of the stay of the student at our premises. In addition, approval of a Ph.D. student project is a commitment of the group leader (GL) or leading scientist (LS) that sufficient in-house research beamtime, funding, and lab and office space will be allocated to the project. In particular, the necessary beamtime for the fulfilment of the Ph.D. project must be included into a multi-annual plan of in-house research beamtime requirements of the group.

Students who are shared by two groups in the same division, or in two different divisions, shall have a primary unique supervisor.

# 6 Ph.D. student spokesperson and Ph.D. self-organized activities

The Ph.D. students will appoint a spokesperson and a deputy spokesperson each year[2]. The spokesperson (and, in his/her absence, the deputy) will be in charge of communicating with the Ph.D. committee. The spokesperson will transfer his/her duties to the deputy upon termination of his/her contract. A new deputy spokesperson will then be appointed.

Self-organized activities of the student community at European XFEL include the Student Seminar and the bi-weekly Student Lunch. The Seminar takes place on a monthly basis and is intended to give an environment for the students to practice the presentation of posters and talks. In addition, it provides room for exchange and discussion. The responsibility for scheduling the Seminar lies with the students. In the scope of the Student Seminar, visits to all Instruments as well as XBI and optical labs are organized to enable a comprehensive overview of the facility.

In 2019, two one-day workshops took place with external professional trainers focused on programming in Python (May) and a scientific writing (December).

Further hard- and soft-skill courses are envisioned to take place on a regular basis (2–4 times per year). In addition, social events are organized that take place off campus.

The students are required to provide input on which additional skills they would like to obtain, which should be presented by the spokesperson in a short list of workshops to the Ph.D. committee.

[2] If someone wants to stay in “office”, he/she can be re-elected.

# 7 Ph.D. committee

The scope of the Ph.D. committee is to assist the European XFEL Management Board (MB) in all matters concerning supervision, protection, and well-being of the Ph.D. students at European XFEL. In particular, this committee assists the scientific directors in taking decisions by providing all necessary background information.

It is composed of

- 1 scientific director
- 1 secretary (ex-officio)
- 1 administrative assistant (ex-officio)
- 2 GLs and 4 staff members (from the Science & Experiments and Development & Operation Divisions)
- 1 HR
- 1 Ph.D. student spokesperson

The members of the Ph.D. committee for 2020 are listed in Appendix C. They are appointed for a period of 2 years, renewable once.

Tasks and responsibilities of Ph.D. committee are:

**1** Issue (and update when necessary) the Ph.D. Agreement Form.

**2** Assist in the selection of Ph.D. candidates and participate in the “Ph.D. Candidate Interview Day”.

**3** Receive and scrutinize:

**a** Ph.D. Agreement Form signed by both supervisor and student

**b** From supervisor: First- and second-year progress reports

**c** From student: Ph.D. project plan, first- and second-year reports

**d** Active feedback from the students, through their spokesperson

**4** *R&D funded Ph.D. projects:* Two weeks before the deadline of R&D projects, receive a draft of Ph.D. proposal templates.

*All other Ph.D. projects:* Before submission of an MB proposal, receive all applications for supervision of Ph.D. students that are not part of our R&D programme. After approval by the MB, these students will be integrated into the European XFEL student programme.

**5** Students enrolled in graduate schools or at university may already have obligations to report regularly on the progress of their Ph.D. thesis. It is the role of the Ph.D. committee to scrutinize these cases and to organize regular in-house reporting, if necessary with invitation of the university supervisor to avoid double reporting.

**6** Track student progress and solicit reports that have not been submitted.

**7** Discuss and propose measures to help students complete their manuscript on time.

**8** Discuss and advise the MB on contract extensions beyond three years.

**9** Discuss and advise the MB on options for hiring for few months students who have completed Ph.D. degrees to write up publications.

The Ph.D. committee meets whenever necessary and at least twice a year.

# 8 Tutors

Ph.D. students participating to this programme (see Section 4) must be able to approach a neutral mediator at European XFEL if in need of advice or in case of problems. At the start of a Ph.D. thesis contract, a European XFEL scientist/engineer must be associated with the programme as a tutor, in addition to the thesis supervisor. The tutor could be a GL, LS, or younger scientist/engineer from a different group, or a member of the Ph.D. committee. The Ph.D. committee selects a tutor for each new Ph.D. student. The name of the tutor is communicated to the student at the start of the contract. The tutor alerts the Ph.D. committee in case of noted or foreseeable problems in the progress of the Ph.D. thesis; hence, regular contact between the student and his/her tutor are encouraged.

# 9 Experimental work on instruments (if relevant)

To increase opportunities for experimental work with X-rays, Ph.D. students will work on the instrument(s) in collaboration with the in-house team and/or with external users. Active participation in user shifts can also be planned to provide additional opportunities for gaining experience in the use of the instrument (optics, detectors, data acquisition, etc.). Students will use in-house beamtime or proposal review panel (PRP) allocated beamtime in the framework of their own proposal, or act as collaborators in an in-house or external user proposal. It is the responsibility of the supervisor to verify that the Ph.D. student takes part in experimental work on the instrument(s), if relevant in the framework of his/her Ph.D. project. Upon their request, Ph.D. students may be involved in user support, but this must not be a “distraction” from their Ph.D. projects.

# 10 Ph.D. projects funded through the European XFEL R&D programme

## 10.1 Number and duration of projects

Every year, up to four new Ph.D. contracts with a maximum duration of three years shall be funded by European XFEL. The scientific director in charge may impose a limit to the number of Ph.D. students per instrument/support group, taking into consideration our limited resources (budget, office space, supervisors, beamtime).

Milestones should be set and regularly updated to enable submission of the final manuscript before the end of the third year. Extensions of the contract of up to one year may be accorded on a case-to-case basis but should be exceptional. The request shall be scrutinized and commented by the Ph.D. committee, which will give a recommendation to the MB. The financial implications of an extension need to be set out before approval of a Ph.D. project. Extensions will be financed by the corresponding group budget or external collaborator groups.

## 10.2 Call for Ph.D. proposal submission and project selection

Calls for R&D programme–funded Ph.D. proposals are issued once a year and are integrated into the call for R&D projects. The call is open to the Experiments & Science Division and to the Development & Operation Division.

The LS of an instrument or the GL must approve the Ph.D. proposal prior to submission, with the aim to have a coherent view and harmonization of the in-house research activities in the group. The Ph.D. proposal must be submitted in the format defined in Appendix A.

The Ph.D. student proposal will also be evaluated by the Ph.D. committee. At least two weeks prior to the deadline for submission of the R&D proposal, a draft of the Ph.D. proposal template must be sent to the secretary of the Ph.D. committee. If necessary, the proposer will be contacted for further clarifications/questions.

The final decision to award a Ph.D. project is made by the MB[3]. This decision is communicated individually to each supervisor and to the corresponding GL or LS.

## 10.3 Ph.D. student advertisement and recruitment

A call for European XFEL Ph.D. student candidates will be launched immediately following the approval of the Ph.D. projects. A single advertisement describing the financed Ph.D. projects will be posted on the European XFEL website and distributed through standard advertisement channels. Particular efforts should be made to advertise these positions within member countries to reach a more diverse student community.

[3] Once approved, the Ph.D. proposal becomes a Ph.D. project.

A “Ph.D. Candidate Interview Day” will be organized, where Ph.D. candidates will be invited to give short presentations on site to an evaluation panel which includes

- Members of the Ph.D. committee
- All the Principal Investigators of the advertised Ph.D. projects (the future supervisors)

Students will also have the opportunity to discuss with the Ph.D. project Principal Investigators (PIs).

The funding will start in January of the following year, giving the possibility to attract Ph.D. students after the summer semester at universities. The supervisor is responsible for the recruitment of a suitable candidate. If a candidate has not been identified within nine months from the Ph.D. project award, funding will be returned to the pool of Ph.D. vacancies. A deferral of funds can be granted in exceptional circumstances by the MB.

Group budgets may be used to cover “early start” of contracts (i.e. start in September instead of January of the following year).

# 11 Ph.D. projects not funded through the European XFEL R&D programme

All Ph.D. projects that are not part of our R&D programme must be approved by the MB.

Staff wishing to supervise a student, with or without financial support from European XFEL, must do the following:

**1** Submit a draft of the Ph.D. Student Request Template (Appendix A) to the secretary of the Ph.D. committee at least two weeks prior to submission to the MB. If necessary, the proposer will be contacted for further clarifications/questions.

**2** Submit an MB proposal.

**Special Note:** If you wish to apply for competitive funding programmes (i.e. BMBF), the procedure described above must be carried out at least two weeks prior to the submission deadline.

# 12 During the Ph.D. contract

The following guidelines apply to all students who comply with the definition given in Chapter 4. Once the candidate has been recruited, the following procedure is to be applied (see also Appendix B).

## Year 1

**1** An appointment should be made by the supervisor with the scientific director in charge to formally welcome the student at the start of the contract. General guidelines will be given to the student during this short meeting, including information on the student's informal association.

**2** Progress should be monitored in order to identify any problems at an early stage and assist the student by setting up well-defined goals. For this, a number of actions are taken (see points 3–11 below)

**3** Within the first six months, in collaboration with the supervisor, the student has the obligation to compile a Ph.D. project plan with milestones and main goals. This plan should include a refined and updated version of the milestones and main goals described in the approved Ph.D. project (see Appendix A). An important goal of this exercise is to bring to the surface and discuss any eventual misunderstandings. It allows clarification between the supervisor and the student concerning the topic of research and the proposed experimental approach. The plan will be submitted to the Ph.D. committee.

**4** At the end of the first year of the Ph.D. contract, the student must make an informal presentation to her/his thesis supervisor, tutor, and the Ph.D. committee. This presentation should give the status of the thesis work: work accomplished, plans for the following years, and any foreseeable problem. A short, written report of 1–2 pp. max. must be supplied by the student. A discussion should follow and a programme for the following two years should be laid out. In case of any unsolved

problems, the thesis supervisor must inform the Ph.D. committee. Any other person invited by the student or supervisor may participate in this meeting. Following the meeting, a short progress report should be submitted to the Ph.D. committee by the supervisor.

**5** A student in the first year of his/her contract must give a poster presentation at the Student Day (see point 11 below).

# Year 2

**6** A more formal presentation must be given by the student to the supervisor, tutor, and Ph.D. committee before the end of the second year. Staff interested in the thesis subject are welcome to attend. A short written report of 1–2 pp. max. must be supplied by the student. At this stage, the thesis work should be well advanced and any problems must be clearly identified and actions discussed. Following the meeting, a short progress report, which includes the timeline for the completion of manuscript, should be submitted to the Ph.D. committee by the supervisor. All precautions must be put in place by supervisor and student to avoid prolongation of the contract beyond the nominal three year period.

**7** A student in the second year of his/her contract must give a poster presentation at the Student Day.

# Year 3

**8** If the thesis cannot be completed in the foreseen three-year period, any exceptional prolongation must be proposed by the thesis supervisor, with the agreement of the direct hierarchical responsible, at least six months before the end of the contract. The supervisor must send a recommendation to the Ph.D. committee on whether the student's employment contract should be prolonged for a fourth year. The Ph.D. committee will advise the MB on whether all precautions have actively

been put in place by the supervisor and student to avoid prolongation. Decisions on prolongations will be taken by the MB.

**9** A student in the final year of his/her contract must give a talk at the Student Day.

**10** Supervisors are to encourage students to give presentations at conferences or other external events.

**11** The student should have at least one paper as first author published or submitted before the end of the contract.

# 13 Student Day

The Student Day is an annual one-day internal event aimed at giving visibility to the Ph.D. students' research activities within the facility. It is an open event, and it should be largely advertised internally as well as externally to the administrative supervisors of the students and to the graduate school coordinators (if relevant). Students in their first or second year shall present their research topics and preliminary results through posters, whereas students in their last year shall make an oral presentation. Other activities may also be organized by the students (poster clips, invitation of an outstanding external speaker or expert, etc.). Conference funding may be awarded as a prize for best presentation and best poster during the Student Day.

# 14 Funding for events/conferences and other benefits

A small budget is made available to the Ph.D. students, as a community, for self-organized events (workshops and tutorials on X-ray FEL–related scientific culture, soft-skills, etc.), including the invitation of external lecturers. Ph.D. students must apply for authorization and funding for participation in scientific workshops or conferences (fee and travel/accommodation expenses) using the existing administrative tools available to all staff.

European XFEL will assure that all Ph.D. students with “guest” status receive the same benefits as European XFEL affiliated Ph.D. students (i.e. subvention for meals at the BeamStop restaurant).

# 15 Survey, alumni database, and performance indicators

At the end of their contract, students will be given access to an “Alumni Survey” webpage on the European XFEL website. (Appendix D). They will be prompted to provide and update information, which will be stored in a European XFEL Alumni Database.

Information in this database can benefit alumni in their future scientific careers—building a professional network is often one of the first steps. Moreover, it will provide former students a “sense of belonging” to the European XFEL alumni community. Overall, it will contribute to establishing long-term identification with European XFEL.

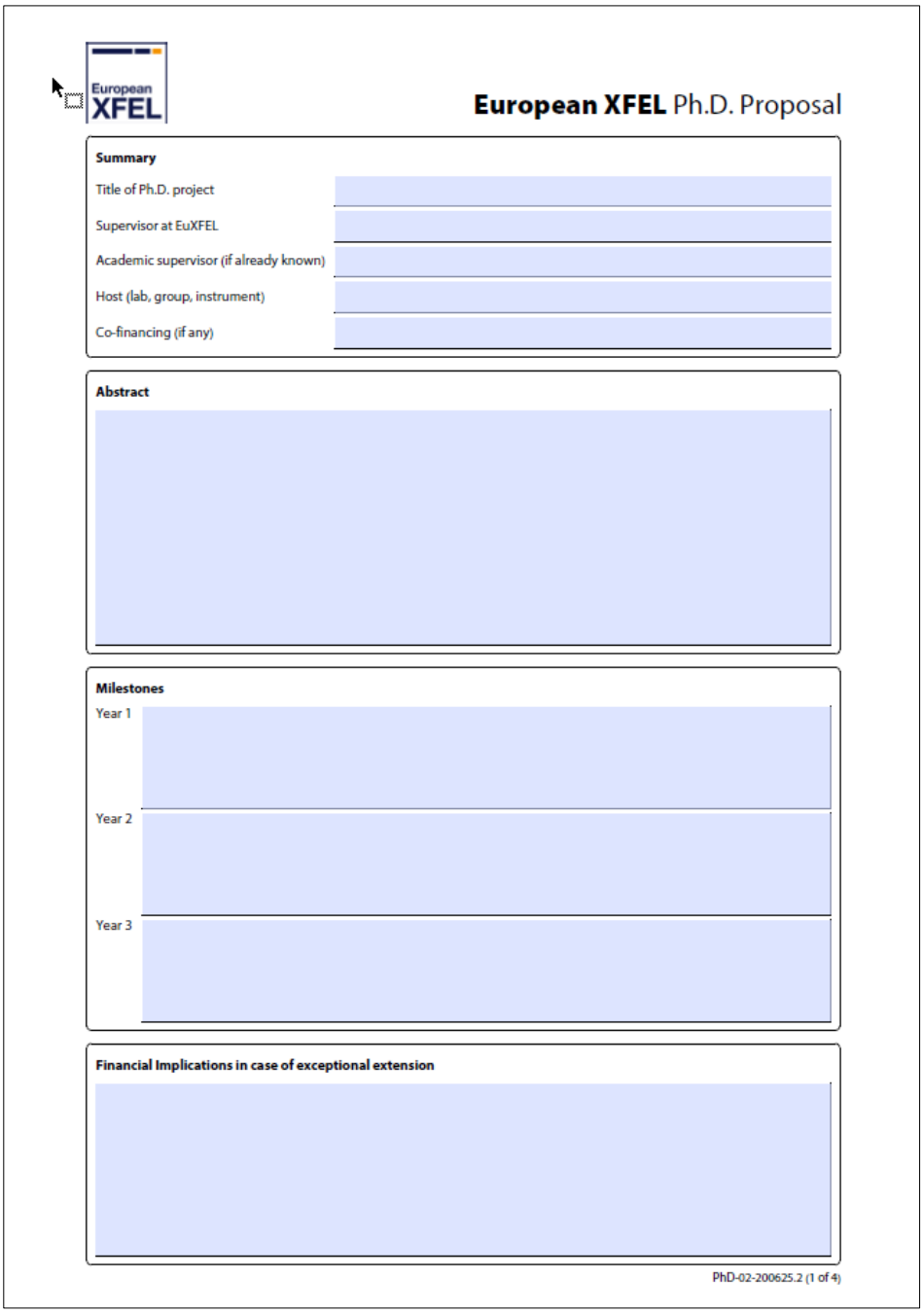
Performance indicators will be put in place to evaluate the success and the efficiency of the programme, in terms of scientific impact, visibility, and relevance.

Some of the indicators could be

- Number of new Ph.D. position applications per year
- Job/positions after Ph.D.
- Scientific output after one year, five years, etc.

# A Ph.D. proposal

Ph.D. proposal templates are integrated into the R&D project templates. For proposals that are not funded through the R&D programme, please use the European XFEL Ph.D. Proposal form (shown below).



European XFEL

**European XFEL** Ph.D. Proposal

**Summary**

| | |
|---|---|
| Title of Ph.D. project | |
| Supervisor at EuXFEL | |
| Academic supervisor (if already known) | |
| Host (lab, group, instrument) | |
| Co-financing (if any) | |

**Abstract**

**Milestones**

| | |
|---|---|
| Year 1 | |
| Year 2 | |
| Year 3 | |

**Financial Implications in case of exceptional extension**

PhD-02-200625.2 (1 of 4)

**European XFEL** Ph.D. Proposal *(continued)*

**Scientific background/motivation**

**Scientific goals and technical approach**

PhD-02-200625.2 (2 of 4)

**European XFEL** Ph.D. Proposal *(continued)*

**Scientific goals and technical approach** (continued)

PhD-02-200625.2 (3 of 4)

## **European XFEL** Ph.D. Proposal *(continued)*

**Time schedule with milestones**

Year 1

Year 2

Year 3

**Additional Information (resources, collaborations, available candidates)**
Feel free to add/attach any information you believe may aid panel members in making their decision

PhD-02-200625.2 (4 of 4)

# B Summary of stages in a Ph.D. contract

| | | | |
|---|---|---|---|
| Student's name: XXX | Supervisor: YYY | Tutor: ZZZ | |
| Start date | Month M0 | End date | Month M36 |

| **Timeline** | | **Actions** |
|---|---|---|
| Start of contract | M00 | Formal introduction to director in charge and tutor |
| Six months | M06 | Revised and updated version of Ph.D. project plan; Ph.D. Agreement Form (Appendix E) signed by both supervisor and student |
| < First year | M12 | Poster at Student Day |
| First year | M12 | Informal presentation; short written report; short progress report (supervisor) |
| < Second year | M24 | Poster at Student Day |
| Second year | M24 | Formal presentation; short written report; short progress report (supervisor) |
| 2.5 years | M30 | Recommendation on fourth year prolongation (supervisor) |
| During final year | M24–M36 | Oral presentation at Student Day<br>Finished manuscript and submission |

# C Ph.D. committee members for 2021

As of February 2021, the Ph.D. committee members are

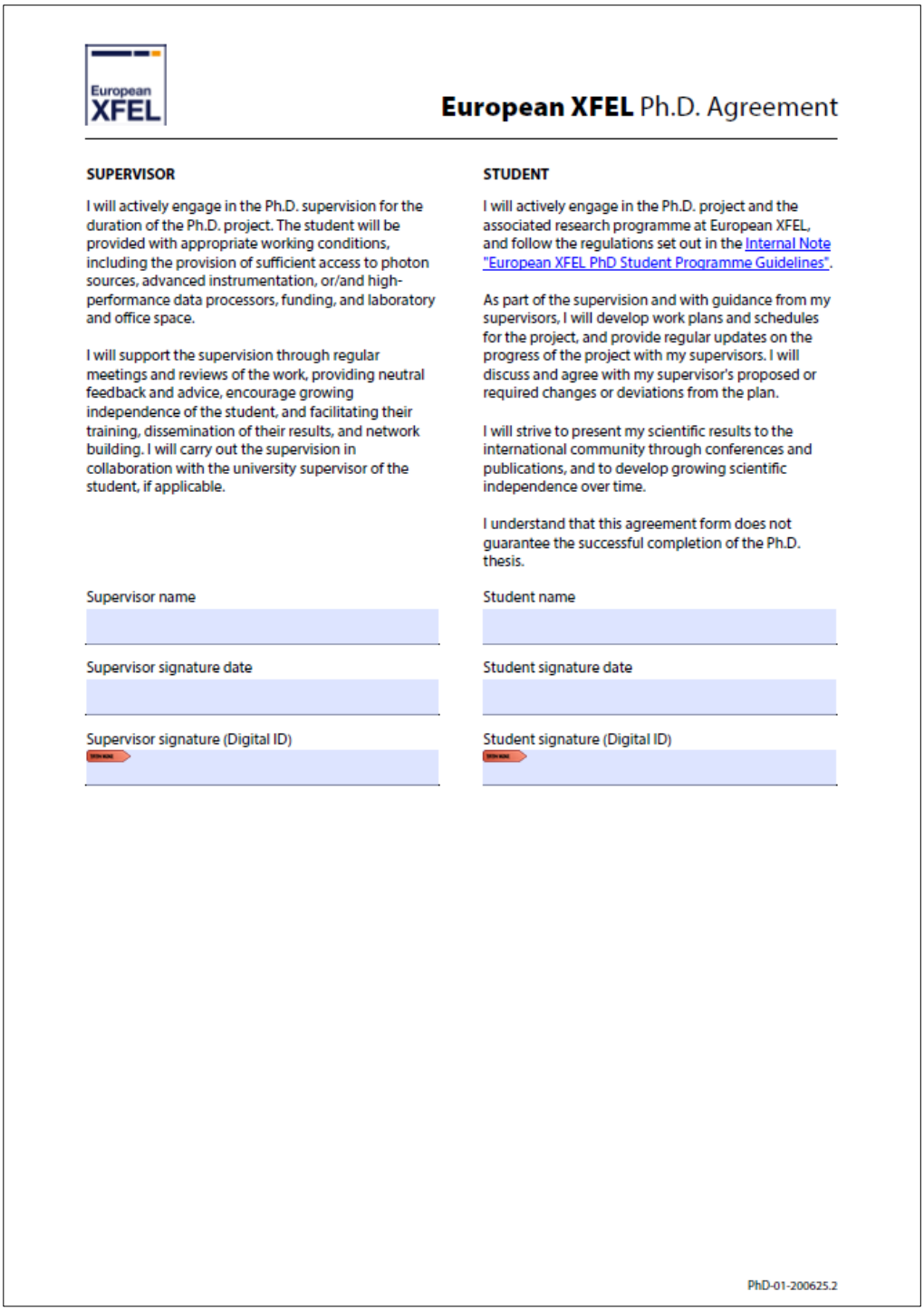
- Sakura Pascarelli
- Brunhilde van Hees
- Friederike Itzen
- Michael Meyer
- Steve Aplin
- Karen Appel
- Liubov Samoylova
- Richard Bean
- Ulrike Bösenberg
- HR (NN)
- Florian Otte

# D Survey of the European XFEL Ph.D. student programme

| | |
|---|---|
| Name | |
| Ph.D. topic | |
| Contract dates | |
| Supervisor(s) and affiliation | |
| Thesis defense date | |
| Contract duration? Extension (Y/N)? | |
| Publications related to the Ph.D. work / patent / programme | |
| Subsequent post held by the student | |
| Attended beamtimes | |
| Collaborations | |

# E Ph.D. agreement

The online European XFEL Ph.D. Agreement form is shown below.



European XFEL

**European XFEL** Ph.D. Agreement

**SUPERVISOR**

I will actively engage in the Ph.D. supervision for the duration of the Ph.D. project. The student will be provided with appropriate working conditions, including the provision of sufficient access to photon sources, advanced instrumentation, or/and high-performance data processors, funding, and laboratory and office space.

I will support the supervision through regular meetings and reviews of the work, providing neutral feedback and advice, encourage growing independence of the student, and facilitating their training, dissemination of their results, and network building. I will carry out the supervision in collaboration with the university supervisor of the student, if applicable.

Supervisor name

Supervisor signature date

Supervisor signature (Digital ID)

**STUDENT**

I will actively engage in the Ph.D. project and the associated research programme at European XFEL, and follow the regulations set out in the Internal Note "European XFEL PhD Student Programme Guidelines".

As part of the supervision and with guidance from my supervisors, I will develop work plans and schedules for the project, and provide regular updates on the progress of the project with my supervisors. I will discuss and agree with my supervisor's proposed or required changes or deviations from the plan.

I will strive to present my scientific results to the international community through conferences and publications, and to develop growing scientific independence over time.

I understand that this agreement form does not guarantee the successful completion of the Ph.D. thesis.

Student name

Student signature date

Student signature (Digital ID)

PhD-01-200625.2