

PhD Handbook

Quality in PhD Education



 NTNU

Norwegian University of
Science and Technology

Front page photo:

Sethulakshmy Jayakumari is affiliated with the Center for Research-Driven Innovation (SFI) Metal production. She has done research on the production of silicon, which for example is used in solar cell production.

PHOTO: GEIR MOGEN/NTNU

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Quality in PhD Education

NTNU's vision is "Knowledge for a better world", and our objective is to be internationally outstanding. To achieve the goal, we must offer a PhD education that is of high quality and relevance.

The primary target groups for the PhD handbook are PhD candidates and their supervisors, department and faculty. The handbook will be a tool for achieving the best possible doctoral degree, from admission to disputation. The first version of the handbook was published in 2011. It was then revised in 2015. New revised PhD regulations were published on 1 January 2019, and a new revision of the PhD handbook became necessary. The handbook interacts with information on NTNU's new PhD pages in Norwegian and English, www.ntnu.no/phd and www.ntnu.edu/phd, as well as <https://innsida.ntnu.no/doktorgrad>.

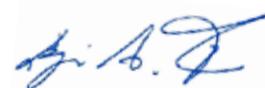
We have regulations and rules that take care of all steps in a doctoral degree, both for a scientific PhD and PhD in artistic development. The handbook shall clarify what is compulsory in all PhD education at NTNU, and what is NTNU's standard for the PhD education. In addition, the handbook provides guidance and good advice for completing the doctoral programs.

Doctoral education is one of the university's most important tasks, and we have high ambitions for the PhD education at NTNU.

NTNU November 2020



Anne Borg
Rector



Bjarne Foss
Pro-rector for research



Håkon Magnar Skogstad – winner of Forsker Grand Prix 2020 (regional final) – is a pianist and researcher on historical classical recordings and the knowledge hidden in these.

PHOTO: JULIE GLOPPE SOLEM/NTNU

Handbook for PhD education at NTNU

Introduction

The focus of the handbook for PhD education is on the PhD candidate. The aim is to complete the PhD process in the best way possible. The handbook consists of two parts:

- **The Common Standard, which is compulsory for all PhD education at NTNU**
- **A guide to the PhD process**

The Common Standard specifies requirements for PhD candidates, academic supervisors, departments and faculties. It also describes which level of the organization is responsible for various aspects of PhD education. The guide presents a standard; it describes measures to promote quality and clarify the functions and responsibilities assigned to the individual PhD candidate, supervisor, department and faculty. The handbook is made for the PhD education. Matters concerning the employer relationship with PhD candidate are not considered in the handbook. The faculties are responsible for their PhD programmes, and each programme has a responsible PhD programme coordinator. The handbook specifies the responsible level in the organization, which may not be the same as the level that performs the function.

The handbook follows the stages of the pathway to a PhD from admission to completion and the public defence. All the stages require attention to ensure the best possible education. Doctoral candidates must be followed up throughout their PhD studies through measures including the use of annual progress reports and a more thorough evaluation during the PhD period. It is important that all candidates are well integrated academically and socially in a research group. This also applies to externally employed candidates. The responsibility to provide and receive expressions of concern is made clear, which is a prerequisite for implementing any additional measures. The aim is to harmonize the practices at NTNU, but this must be balanced against the traditions in different disciplines.

The main responsibility of the PhD candidate is to conduct research or artistic research of high quality. This requires active participation in the academic environment. The most important component of a PhD degree is the research

project and the PhD thesis, and the academic environment and supervision must ensure the quality of these.

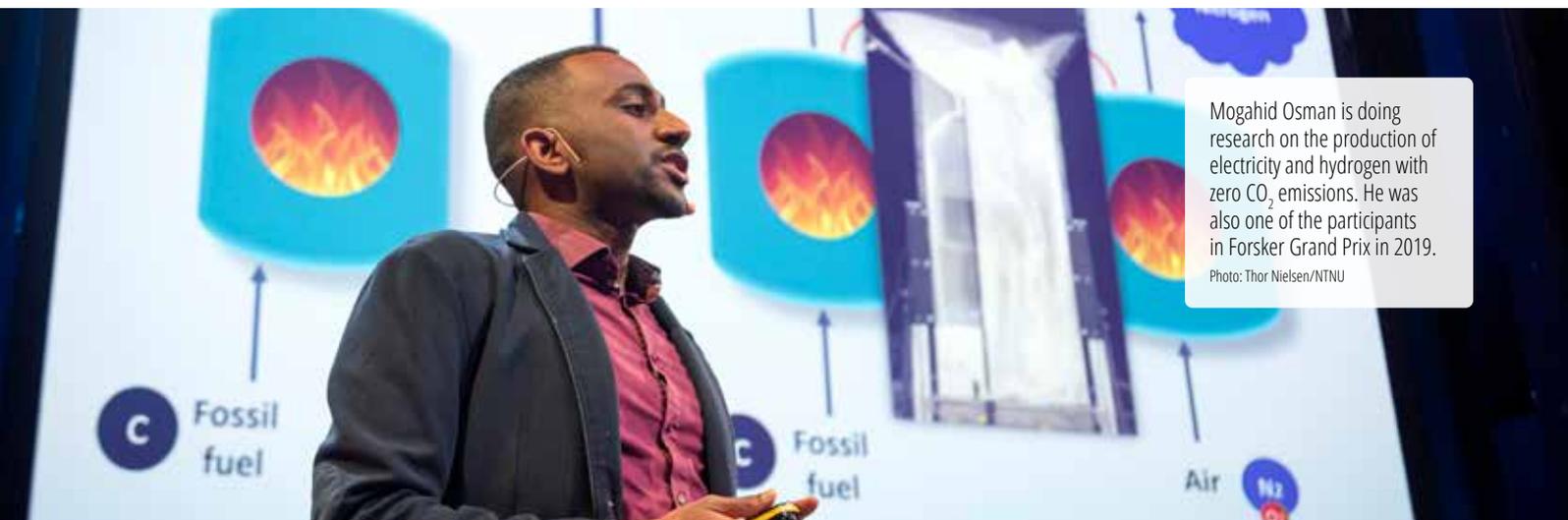
The handbook complies with legislation and regulations at national and local level which can be found at the web page PhD 123:

- Regulations for the degree of PhD at NTNU (“the Regulations”)
- Agreement concerning admission to organized PhD education at NTNU (“the Agreement”)
- The Qualification Framework
- Supplementary Provisions at some faculties

If you are employed as a PhD fellow in addition to being a PhD candidate you must also relate to:

- the Regulations on Required Duties (in Norwegian)
- NTNU’s human resources policy (in Norwegian) governing the appointment process for employed PhD candidates, the trial period and performance review
- The government personnel handbook

NTNU’s web pages also link to NTNU’s personnel politics that regulates the recruitment process for PhD fellows, probation and employee interviews, and a link to the international action plan that provides guidelines for the PhD education. NTNU International Researcher Support office provides support to all foreign PhD candidates. DION is the professional interest organization for PhD candidates employed by NTNU.



Mogahid Osman is doing research on the production of electricity and hydrogen with zero CO₂ emissions. He was also one of the participants in Forsker Grand Prix in 2019.

Photo: Thor Nielsen/NTNU

1. The Common Standard for all PhD education at NTNU



The Common Standard of Quality for PhD education is to apply to all PhD education at NTNU. The Common Standard specifies a common minimum standard that the faculties must follow. It describes best practice for the whole PhD path forward to the end and indicates which level of the organization is responsible for initiating action.

PhD education is governed by the Regulations with Supplementary Provisions if applicable, and the Agreement as well as the Qualification Framework, which also provides principles for learning outcomes for PhD education.

The Common Standard is a supplement to the regulations and supplementary provisions, and complies with the absolute principles stipulated in the Regulations. The aim of the Common Standard is to reduce withdrawal from PhD programmes as well as to contribute to high quality and completion within the nominal period of study. For each programme there is a PhD Programme Coordinator who is responsible for quality assurance of the programme.

The PhD candidate's most important responsibility is to conduct research of high quality and to be a contributor to the academic environment through active participation. Each PhD candidate is to have at least two supervisors (Section 8 of the Regulations), and resource allocation of responsibility between the supervisors should be agreed explicitly and as early as possible. The supervisors' most important role is to pave the way for good individual PhD progression for their candidate, as well as to introduce a candidate to relevant academic groups internally and at national and international level. The scope of the Common Standard does not include initiatives related to academic quality in the respective disciplines.

ADMISSION AND START-UP

Goal: Our PhD candidates will receive the best possible start and thus lay the foundation for a successful PhD programme.

The PhD candidate

- is responsible for applying for admission to a PhD programme within three months of his or her appointment, in consultation with the supervisor
- must prepare a complete project description in cooperation with the supervisor

- must prepare a plan for the required coursework or other academic training in consultation with the supervisor
- is responsible for becoming familiar with and making an active contribution to the department and the academic community
- must apply for necessary permission for the use of research data and planned compliance with guidelines for research ethics

Supervisors

- are to contribute to a good start-up for the PhD candidate
- the main supervisor shall initiate a start-up conversation about supervision with the candidate and co-supervisors
- are to help the PhD candidate to formulate research questions and prepare an application and project description
- are to inform the PhD candidate about the International Action Plan and, together with the candidate, prepare a plan for internationalization
- are responsible for possessing skills in supervision and for further development of these skills, through activities including international publishing or artistic work, and participation in international forums
- are responsible for their own didactic skills in supervision and for further development of these skills, through activities including participation in seminars and courses for further development of their skills in supervision
- are to introduce the candidate to relevant academic environments: within the university as well as at national and international level
- are to provide quality assurance for the PhD candidate's application for necessary permission for the use of research data and ensure compliance with guidelines for research ethics

The department

- must offer all new candidates a "Welcome" talk with necessary information to be able to work at NTNU
- must offer a mentor/sponsor to the PhD candidate
- must ensure that the infrastructure and necessary working capital are in place
- must ensure an attractive and inclusive environment for PhD candidates, in both academic and social terms
- must ensure that all candidates, both internal and external employees, are included in a research group at NTNU
- in cooperation with the candidates involved, must develop a plan for carrying out required duties in accordance with the regulations
- must ensure compliance with obligations related to the use of research data by seeing to it that the PhD candidate, supervisor, and head of department, as well as any external parties, submit a signed list of necessary authorizations for the use of research data
- shall ensure that qualified professionals have the opportunity to build up supervisor competence by being co-supervisor together with experienced main supervisors and participating in courses for supervision at doctoral level



PHOTO: SØRVIW. NORMANSEN

Karoline Osnes is working on a thesis about how glass behaves under extreme stress such as a collision or an explosion. Her research can save lives because it contributes to safer window solutions in buildings and cars.

The faculty

- must provide quality assurance for admission to PhD programmes
- must ensure that appointed supervisors fulfil the requirements in the regulations
- must ensure that the required coursework or other academic training is of high quality
- must hold an introductory seminar for all new candidates
- must ensure the doctoral agreement is signed by all parties

IMPLEMENTATION

Goal: PhD candidates employed by NTNU and externally appointed PhD candidates in our programmes must be offered good academic and social working conditions enabling them to enjoy their work and complete their PhD within the nominal period of study.

The PhD candidate

- must work to find solutions to his or her research questions or questions related to artistic research
- is responsible for conducting research or artistic work in accordance with the legislation in force and guidelines for research ethics
- must participate actively in supervisor meetings and follow up on arrangements made with supervisors
- must participate actively in the academic community and become familiar with the latest developments in the field relevant to his or her PhD work
- must keep supervisors continuously informed about issues important for progress, including results of the required coursework or other academic training
- must publish in accordance with the traditions of the research field, preferably in recognized international channels, when the thesis is based on published work
- must participate actively in international conferences and in international research communities
- must submit annual progress reports and conduct mid-term evaluation
- must contact the department and/or faculty if problems occur in the supervisor relationship
- keep the department and/or the faculty informed of major changes in the project and about circumstances that may lead to delays
- must follow NTNUs policy about open research

Supervisors

- The main supervisor has an academic responsibility and must ensure progress and conduct regular supervisory dialogues
- Supervisors must help to ensure that the candidate is integrated in the academic environment and is kept informed about the latest development within the field
- The main supervisor must coordinate the supervision with co-supervisors.
- Supervisors must help the candidate to establish contacts with relevant academic environments and encourage internationalization of PhD education

PHOTO: PER HENNING/NTNU



Aluminum alloys make cars and planes lighter – and thus contribute to environmental savings. Corrosion, on the other hand, is a challenge with many types of aluminum alloys. Adrian Lervik has used a transmission electron microscope (TEM) to find out how the materials can be developed to prevent corrosion.

- Supervisors must help to ensure that the candidate publishes his/her work in channels of high quality and must ensure compliance with guidelines for research ethics
- The main supervisor must submit annual progress reports and participate in the mid-term evaluation
- The main supervisor must report non-conformances and concerns to the department and/or faculty
- The main supervisor must evaluate the composition of the supervision resources and initiate changes if necessary
- must ensure that the PhD candidate follow NTNUs policy about open research

The department/research group

- must keep informed of the PhD candidate's progress and ensure that it is according to plan
- must offer PhD candidates good working conditions in an attractive and inclusive environment, both academically and socially
- must offer all employed PhD candidates an annual employee appraisal interview
- must ensure that the mid-term evaluation is done
- must ensure that any required duties comply with the regulations in force and that they are organized in such a way that they do not impede completion within the nominal period of study
- must facilitate internationalization of doctoral education

The faculty

- must ensure annual reporting at least once and an evaluation in greater depth during the PhD process
- must have procedures for receiving and recording non-conformances and concerns in connection with academic progress in the PhD and deal with these quickly in order to initiate necessary measures in cooperation with the department/supervisor
- shall identify reasons for dropout by conducting interviews with candidates who voluntarily interrupt their education
- must provide measures for further development of supervisory skills

COMPLETION AND SUBMISSION OF THE DOCTORAL WORK

Goal: PhD work must be of a high international standard. It must be possible to publish results of the work in recognized academic channels.

The PhD candidate

- is responsible for all the content of the doctoral work and for ensuring that it is of a high international standard
- is responsible for completing the doctoral work and the required coursework or other academic training within the prescribed period

- must account for his or her contribution to joint work in articles and obtain declarations/statements from all the co-authors
- is responsible for familiarizing him or herself with the faculty's requirements and procedures for completion, submission and public defence

Supervisors

- must ensure that the doctoral work meets the quality requirements before it is submitted
- must contribute to making it possible for the doctoral work to be completed within the prescribed period
- must prepare the PhD candidate for a future career

The Department/research group

- must propose the assessment committee, invite the members, collect declarations of impartiality and help to ensure that the assessment and public defence can take place within the applicable time limits

The faculty

- is responsible for appointment of the assessment committee, usually based on a proposal from the department
- must ensure that the assessment and public defence take place in compliance with the applicable deadlines and regulations
- is responsible for awarding the degree and providing information about the doctoral degree awards ceremony

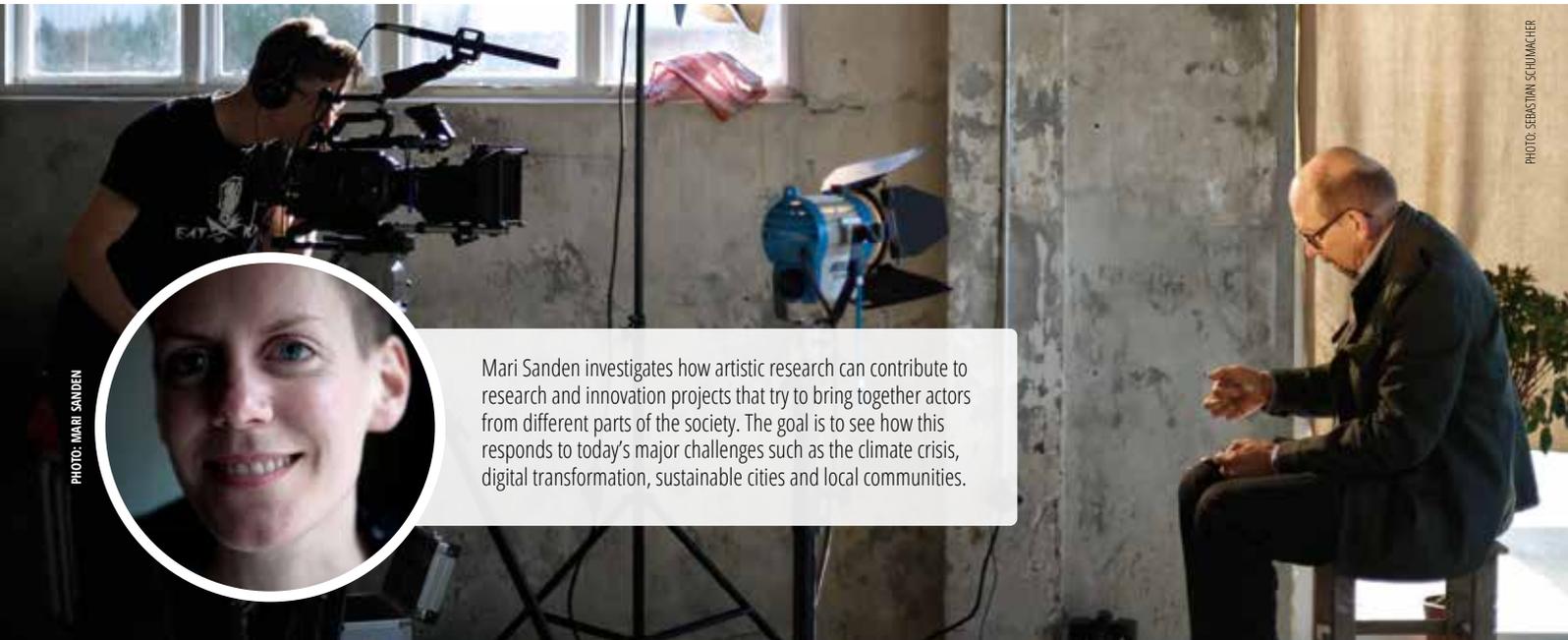


PHOTO: MARI SANDEN

PHOTO: SEBASTIAN SCHUMACHER

Mari Sanden investigates how artistic research can contribute to research and innovation projects that try to bring together actors from different parts of the society. The goal is to see how this responds to today's major challenges such as the climate crisis, digital transformation, sustainable cities and local communities.

2. Guide to the PhD process

This part of the handbook presents a guide and a standard, but these are not compulsory. The guide describes measures to promote quality and clarify the functions and responsibilities assigned to the individual PhD candidate, the supervisor, the department and the faculty.

1. ADMISSION AND START-UP

NTNU's PhD candidates have diverse backgrounds. Some are recruited directly from our own master's programme; others come from other universities and university colleges in Norway and abroad, or from working life. Many are employed in PhD positions at NTNU. Others are PhD candidates in our programmes, but employed outside NTNU. We must pave the way for a good start to PhD research for everyone.

For PhD candidates who are employed at NTNU, the start-up should be prepared already when the candidate has accepted the position. It is important with coordination between the faculty, department and the supervisor to ensure that the PhD candidate is comfortable and has access to relevant information.

The start-up phase should provide a solid foundation for the PhD candidate's work, well-being, and sense of belonging to NTNU. PhD programme coordinators are responsible for quality assurance of the PhD programme content and implementation. It is important that all PhD candidates, both internal and external employees, are introduced to the academic community, and that a good working relationship is established between the supervisors and the candidate. This relationship is a key to a rewarding PhD experience; it should be characterized by mutual respect and active participation by all parties. The supervisors and the candidate must draw up a plan for implementation and allocate responsibilities.

The PhD candidate

The PhD candidate prepares a project proposal and an individual education plan in consultation with supervisors, participates in introductory seminars, prepares the application for admission within three months after being appointed and participates in filling in the agreement on admission in accordance with the Regulations (Section 7).

Supervisors

The main supervisor should follow up the candidate particularly closely in the initial phase to help ensure a good start for the PhD work. It is especially important to define the content of the project in detail, to define the required scope, and to

agree on milestones. The supervisors assist in preparing the revised project plan, composing the training component, drawing up a plan for internationalization and preparing an application for admission.

Supervisors are responsible for assessing their own supervisory competence and supervision capacity, and for further development of their skills. Allocation of responsibility between the supervisors should be agreed explicitly and as early as possible. It is recommended that the main supervisor organizes a joint meeting with the candidate and the other supervisors as early as possible after start-up.

The department/research group

The department plays an important role. This is the environment to which PhD candidates should feel they belong during their work with their doctoral degree. For candidates employed by NTNU, the department has employer responsibility. Externally funded PhD candidates usually reside near the university for a period, often totalling one year (residency requirement). The residency requirement is intended to ensure supervision of the candidate and to include him/her in a relevant group of researchers. At the department, PhD candidates must have office space, receive feedback on their work, and learn good research practice.

The guide (“fadder”) is responsible for introducing the candidate to the social environment and contributing to inclusion of the candidate at an early stage of the PhD period. The guide’s role can be filled by a variety of people who know the academic community well: a fellow PhD candidate who is an experienced colleague, a supervisor, a PhD coordinator, or other permanent employee. The most important contacts in the initial phase are the head of department (formal employer responsibility), the PhD programme coordinator the (main) supervisor (academic skills and networks) and the guide, if applicable (who knows important people and established procedures in the department).

The faculty

The faculties are responsible for quality assurance of admission to the PhD programme and for appointing supervisors. It is especially important to evaluate the project’s feasibility, the PhD candidate’s qualifications and the supervisors’ skills in accordance with the Regulations.

The faculties should hold introductory seminars for new candidates 1-2 times a year, either for the faculty as a whole or for each programme. The faculty is responsible for the required coursework or other academic training and for ensuring that PhD candidates are offered courses of high quality and relevance. The faculty must enable the candidate to take parts of the training at other institutions if there are academic grounds for this. The faculty approves the required coursework or other academic training based on the supervisor’s recommendation. The faculty is responsible for offering training in research ethics, the philosophy of science and scientific methods (Section 9 of the Regulations).

PHOTO: HELESE ANDRE OG ROMSDAL



The research project of PhD candidate Øystein Bjelland will contribute to the realization of a patient-specific orthopedic surgical simulator for keyhole surgery, with haptic feedback. This is useful for the surgeon that can practice on your knee before the actual operation is performed.



PhD candidate Katriina E. M. Vuorinen is writing her thesis on how climate and herbivores, such as reindeer, affect northern plants. The results help us to understand vegetation dynamics under current environmental changes.

PHOTO: KATARIINA E. M. VUORINEN



2. IMPLEMENTATION

When candidates have been welcomed and their doctoral projects are under way, it is important to maintain motivation. They must be offered academically and socially inviting environments that help to make it possible to complete the PhD journey in a good way. To reduce dropout from the programme and to avoid delays, it is essential to ensure effective follow-up throughout the PhD process.

The PhD candidate

The PhD candidate must complete the required coursework or other academic training in accordance with the plan. The PhD candidate must inform the supervisors of any circumstances that make progress difficult. Where relevant, PhD candidate must document experiments, fieldwork, etc. When required, a written basis for supervision meetings and brief reports after formal supervision meetings must be prepared. The PhD candidate must contribute to planning of required duties in addition to the doctoral work work, and carry out any such work in accordance with the agreement. The PhD candidate must contact the department and/or faculty if problems occur in the supervisory relationship.

Supervisors

The main supervisor is the candidate's most important academic contact and has the primary academic responsibility. Co-supervisors share the academic responsibility with the main supervisor. The main supervisor must initiate regular supervision and provide the necessary follow-up for the candidate throughout the PhD period. The frequency of contact between the candidate and supervisor must be accounted for in the annual progress reporting.

The main supervisor is to coordinate the cooperation with co-supervisors. Co-supervisors must ensure that their contributions to the supervision are in accordance with the project's overall goals, and keep the main supervisor informed about their contact with the candidate.

Supervisors must remain informed of the progress of the candidate's work, and must follow up academic issues that might result in delays. Supervisors are responsible for reporting any non-conformances and concerns.

The main supervisor is responsible for ensuring that the PhD candidate is integrated into the academic community. The supervisors are to act as door openers to other relevant experts, and actively provide information about new research results that are relevant to the PhD project. The supervisors must contribute actively to internationalization during the PhD period and pave the way for the candidate to publish in relevant channels of high quality. The supervisors must contribute to good career development for the candidate.

PHOTO: SØVIVV, NORMANSEN



John Fredrick Berntsen is doing research on super strong adhesives that can make cars more crash-proof. They replace screws and bolts, and Berntsen's computer simulations show what they can withstand and how they behave under extreme load.

The department/research group

The department is responsible for offering the PhD candidate a good academic and social environment. The head of department has a special responsibility to identify or receive expressions of concern, and must initiate the action needed in cooperation with the PhD programme coordinator and faculty. The department must ensure that the attendance of the PhD candidate at the workplace is adequate to enable effective implementation of the doctoral programme, and realization of the opportunities for mutual academic benefits between the candidate and the academic community. The department is responsible for arranging research visits abroad.

If the PhD candidate has a contract that includes work in addition to work on the doctoral work, the department is responsible for ensuring that the work is performed in accordance with the regulations in effect for required duties. The work must be organized so that it does not impede completion of the doctorate within the nominal period of study.

Responsibility for the PhD programme

Each PhD programme is headed by a responsible PhD Programme Coordinator designated by the faculty. In addition, there is often a PhD committee or a PhD programme council. The PhD programme council may vary, but usually the programme has responsibility for proposing academic content, structure and implementation of the PhD programme according to approved policies and systems, delegated from the dean. The PhD programme coordinator has overall responsibility for the quality of the PhD programme and leads the work related to the programme's quality assurance report. He/she must initiate measures to promote quality and provide support and mentorship to supervisors. In consultation with relevant departments, the PhD programme is to propose changes in the curriculum and local policies.

The faculty

The faculty is responsible for the framework conditions for completion of the doctoral programme, in accordance with regulations and supplementary provisions. The faculty must ensure that progress is in accordance with the plans. Annual reporting must be implemented, separately for the candidate and the supervisor. Reporting in greater depth during the PhD period should be carried out for all candidates. The candidate, supervisors, head of department and PhD programme coordinator must all participate in the reporting. The faculty (or department) is responsible for arranging a change of supervisor where necessary. In some academic environments, the faculty must take responsibility for offering language courses to candidates to enable them to communicate with the rest of the research group. The faculty has overall responsibility for internationalization of PhD education.

The faculty is responsible for further development of supervisors' skills. Seminars/ courses for supervisors should be arranged.

The faculty may create a forum consisting of all PhD programme coordinators at the faculty.

3. TERMINATION BEFORE THE AGREED TIME

The candidate and the institution may agree on termination of the PhD programme before the agreed time. In the event of voluntary termination, the faculty is responsible for ensuring that the reasons for the candidate's wish to end the course of study are identified, and that an interview is conducted with the candidate to explore possibilities for preventing termination.

The institution can approve enforced termination of the PhD education prior to expiry of the agreement period under the provisions of Section 7-6 of the Regulations.

After the end of the agreement period, the parties' rights and obligations in accordance with the PhD agreement cease, so that the PhD candidate may lose his right to supervision, course participation and access to the institution's infrastructure (PhD regulations section 7-2).

Maximum study time is six (6) years from the start time to the submission of the doctoral work for assessment. Duty work and statutory interruptions are not included in the 6 years. The candidate loses the right to defend a dissertation if the maximum study time is exceeded (PhD regulations §7-2).

4. COMPLETION AND SUBMISSION OF THE DOCTORAL WORK

To be eligible for a PhD degree, the candidate must have passed the required coursework or other academic training and must submit the doctoral work for assessment. NTNU is responsible for ensuring that a doctoral work submitted for assessment is of high quality. NTNU must therefore arrange for an assessment of the doctoral work that ensures it is an independent academic work of international standard and that the doctoral work is on a level enabling it to be published as part of the academic literature in the discipline.

The PhD candidate

The PhD candidate is responsible for preparing the doctoral work within the applicable time limits. The PhD candidate must submit documentation that the required coursework or other academic training has been passed, and submit an application for admission to the doctoral examination with required attachments.

Supervisors

The supervisors are responsible for assessing whether the work meets the quality requirements for a PhD doctoral work. The supervisors must comment on the

candidate's academic contribution to any work carried out in cooperation with others that is included in the doctoral work.

The department/research group

The department invites and proposes the committee for assessment of the doctoral work in consultation with the supervisor.

The faculty

The faculty is responsible for appointing an assessment committee, usually based on the department's proposal. The faculty must ensure that the assessment committee issues its report within three months of receiving the doctoral work. The faculty must arrange to hold the disputation within two months of receipt of the report. Based on the assessment committee's report, the faculty decides whether the PhD doctoral work is worthy of defence. On the basis of the submitted doctoral work, the assessment committee may recommend that the faculty permits the candidate to make minor revisions to the doctoral work within three months before the committee submits its final report (Section 15.1,2 of the Regulations). The assessment committee can also recommend that the faculty rejects the doctoral work, and the PhD candidate may not then submit a new doctoral work before six months after the faculty's decision (Section 17 of the Regulations).

5. THE DOCTORAL EXAMINATION (PUBLIC DEFENCE)

After the assessment committee has determined that the doctoral work is worthy of public defence, the public defence (disputation) must be planned and implemented. In a disputation, the work must be publicly defended and must be a contribution to the development of new scientific knowledge (see detailed descriptions of the doctoral examination in the Regulations).

The faculty

The faculty must ensure that the doctoral work is available at least three weeks before the public defence. The faculty is to obtain the topic for the trial lecture from the assessment committee at least three weeks before the disputation and ensure that the topic is related to the work, but not a central part of it. The candidate is to be informed of the topic for the trial lecture ten working days before the disputation.

The faculty is to obtain a written assessment of the PhD doctoral work as well as assessment of the trial lecture and of the defence of the doctoral work from the assessment committee. The external members of the assessment committee should be requested to comment on the level of the doctoral work in relation to corresponding theses at their own university.



PHOTO: PER HENNING/NTNU

The fish fillets we eat for dinner can make up as little as a third of the fish. Veronica Hammer Hjellnes uses enzymes from pineapple to make new products from what could otherwise have become waste.

