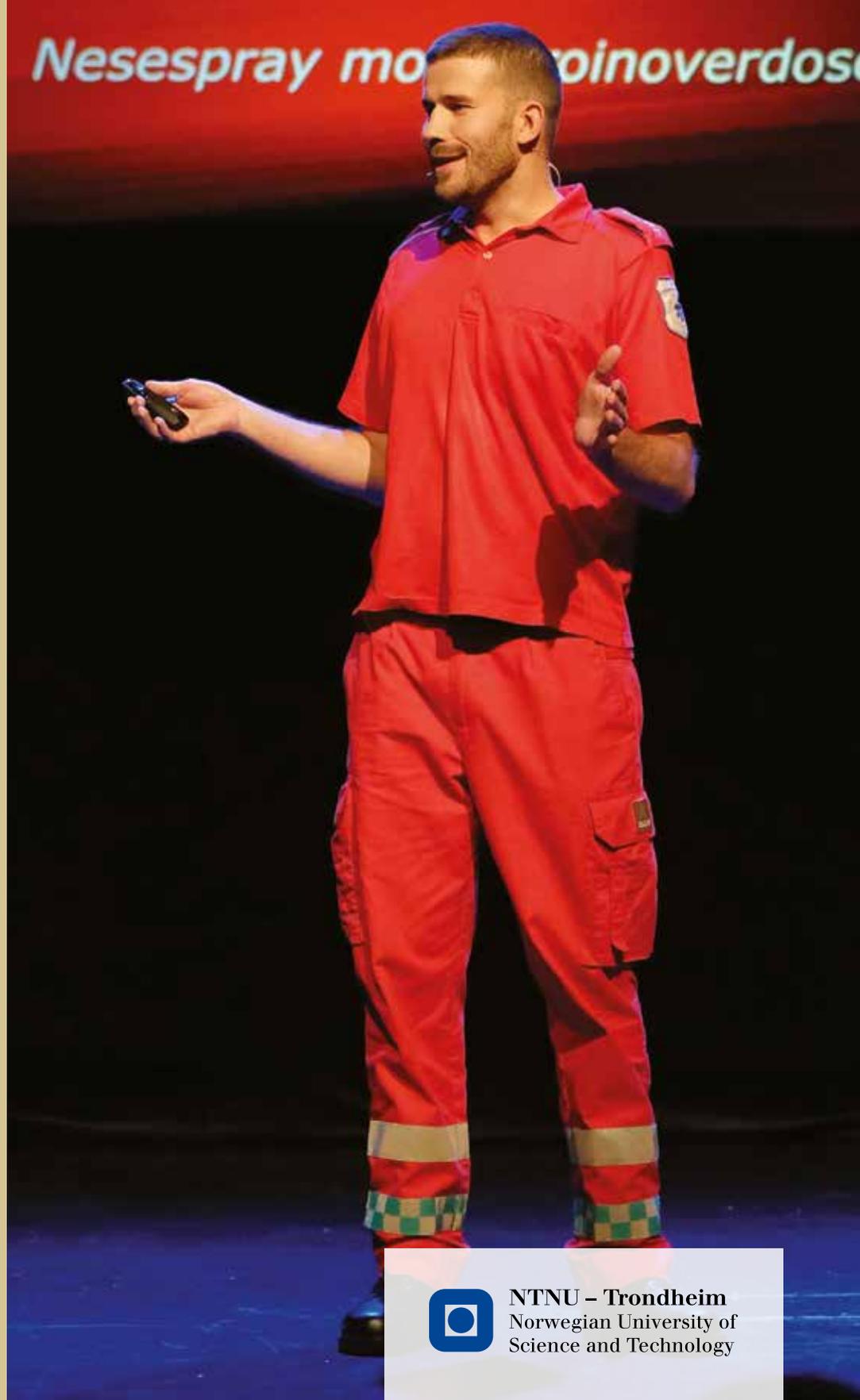


PhD Handbook

Quality in PhD Education



NTNU – Trondheim
Norwegian University of
Science and Technology

Front page photo:

PhD candidate Arne Kristian Skulberg is researching a nasal spray with an antidote to treat heroin overdoses. In emergencies, using the nasal spray can save lives.

In 2014, Skulberg won the national finals of Norway's Grand Prix for Researchers (Forsker Grand Prix, a competition where PhD candidates get a few minutes each to present their research to the public).

Photo: Gunnar K. Hansen, NTNU Communication Division

Published by Rector's Office – Research, NTNU, June 2015

Translation: Margaret Forbes

Design: NTNU Communication Division

Print: Skipnes Communication

Contents

Quality in PhD Education	4
Introduction	6
The Common Standard for all PhD education at NTNU	8
Admission and start-up; writing, completing and submitting the thesis	
Guide to the PhD process	14
Admission and start-up, implementation, termination before the agreed time, completion and submission of the thesis, the doctoral examination (public defence)	

Quality in PhD education

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

This handbook is a revised version of the previous handbook from 2011. Surveys of PhD candidates and academic supervisors in 2009 and 2013 have been used to develop and strengthen doctoral education at NTNU. The handbook is now integrated 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>. The handbook is mainly intended for PhD candidates and their supervisors, departments and faculties. The handbook is intended as a tool to help candidates achieve the best possible PhD process, from admission to the public defence.

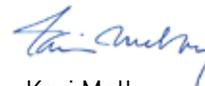
We have statutory regulations and rules that cover every step in PhD education. This handbook explicitly describes what is compulsory in all PhD education at NTNU – that is, NTNU's own standard for PhD education. The handbook also provides a guide and good advice for the PhD process, explaining which level in the organization is responsible for each aspect.

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

NTNU June 2015



Gunnar Bovim
Rector



Kari Melby
Pro-Rector for Research



Seth B. Agyei has written his PhD thesis on how the brain develops in infants born prematurely.

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 faculties are responsible for their PhD programmes, and each programme often has a PhD programme coordinator who is responsible for it. 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. To strengthen supervision, inclusion of two supervisors has been established as a standard arrangement, but further development of supervisors' skills is also important. 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 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. All of these are available at NTNU's website www.ntnu.no/phd and www.ntnu.edu/phd, as well as at <https://innsida.ntnu.no/doktorgrad>. The most important regulations and provisions are the *Regulations for the degree of PhD at NTNU* ("the Regulations"), the *Agreement concerning admission to organized PhD education at NTNU* ("the Agreement") and *Supplementary Provisions* at some faculties, the *Regulations on Required Duties* and the *Qualification Framework*. NTNU's PhD website also has links to NTNU's human resources policy governing the appointment process for employed PhD candidates, the trial period and performance review, and a link to an international plan of action with principles for PhD education. For all international PhD contacts at NTNU, the link to the NTNU International Researcher Support office is worth noting. DION (the professional interest organization for PhD candidates employed by NTNU) also has an important function for PhD candidates at NTNU. The handbook is available at the website, as well as a number of examples of best practice throughout the PhD process. Because of the extensive upgrades to the PhD website in 2015, the printed handbook has been streamlined to cover the specifics of PhD education at NTNU.

Photo: thinkstock.com



Ane Møller Gabrielsen explores two topics in her thesis "Når vilddyret våkner" ("When the wild animal awakes"): Training dogs and the debate on different ways of training dogs – and what the concept of "dangerous dogs" means.

Photo: Kristin Møller Gabrielsen

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 public defence 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 these, 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. Faculties often have several PhD programmes; 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 7 of the Regulations), and 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 of study (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 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 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 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
- must offer all new candidates a "Welcome" talk with information about academic and administrative contacts responsible for PhD education
- 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

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 one of the supervisors has previously supervised PhD candidates
- 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 that an agreement is entered into and signed by the head of department, supervisors, the faculty, the PhD candidate and any external 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.



Photo: thinistock.com

PhD candidate Halvdan Haugsbakken has shown that using YouTube in English teaching helped to motivate students in construction subjects to learn English.

The PhD candidate

- must work to find solutions to his or her research questions
- is responsible for conducting research 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 research 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
- must contact the department and/or faculty if problems occur in the supervisor relationship

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 research
- 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
- 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
- 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

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 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
- Based on annual reporting as well as evaluation in greater depth if necessary, the PhD programme coordinator must follow up the progression of the individual PhD

Photo: Jussi Evertsen/NTNU AUR-Lab



Fredrik Dukan has written his PhD thesis in engineering cybernetics on the use of intelligent remotely operated vehicles and hyperspectral underwater cameras on the seabed.

with the aim of helping the candidate to complete the programme with quality work and within the prescribed period

- must identify the causes of dropout by conducting interviews with candidates who voluntarily abandon their course of study, and report these to the faculty

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
- must provide measures for further development of supervisory skills
- must ensure that reasons for dropout are identified

COMPLETION AND SUBMISSION OF THE THESIS

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 thesis and for ensuring that it is of a high international standard
- is responsible for completing the thesis 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 thesis meets the quality requirements before it is submitted
- must contribute to making it possible for the thesis 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: Private



Espen Lie Dahl has written his PhD thesis in biology on the relationship between white-tailed eagle mortality and wind turbines on the island of Smøla. White-tailed eagles that live within a radius of 5 kilometres from a wind turbine are at risk, but the general population of these birds remains stable on Smøla.





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.

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 5.2). The complete project description must be available within 6 months after admission.

Supervisors

The main supervisor must 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. Each PhD candidate

is to have at least two supervisors, where the main supervisor represents a minimum of 50 per cent of the supervisory resources. Allocation of responsibility between the supervisors should be agreed explicitly and as early as possible. The main supervisor organizes a joint meeting with the candidate and the other supervisors as early as possible after start-up. The supervisors are responsible for introducing the PhD candidate to relevant academic communities both inside and outside the university as well as internationally.

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 department should consider offering a guide (“fadder”) to all new PhD candidates employed by NTNU (and externally funded PhD candidates in residency periods). The guide 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 department must offer the PhD candidate a “Welcome” talk, provide information about available resources and practical matters related to the workplace, and introduce key people (for example the head of department and PhD programme coordinator, the guide, the person responsible for health, safety and the environment (HSE), the safety representative, the laboratory manager and others). The department is also responsible for providing information and making agreements concerning safety courses, fire protection, and required duties where applicable (see NTNU’s Regulations for required duties).

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.



Photo: thinkstock.com

Siri Weider has written her thesis on how eating disorders can weaken the brain. The findings could help to improve treatment methods.

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 8 of the Regulations).

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 inform the supervisors of any circumstances that make progress difficult. The PhD candidate must complete the required coursework or other academic training in accordance with the plan. 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 thesis 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 documented 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.



Birgitte Hjelmeland McDonagh is conducting research on nanoparticles with superparamagnetic and fluorescent properties for imaging and drug delivery in the body, including cancer drugs that the nanoparticles can carry to the exact place where they are needed.

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.

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. The department is also responsible for offering an annual employee appraisal interview to all employed PhD candidates attached to the department.

If the PhD candidate has a contract that includes work in addition to work on the thesis, 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 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 coordinator 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 5.7 of the Regulations.

4. COMPLETION AND SUBMISSION OF THE THESIS

To be eligible for a PhD degree, the candidate must have passed the required coursework or other academic training and must submit a thesis for assessment. NTNU is responsible for ensuring that a thesis submitted for assessment is of high quality. NTNU must therefore arrange for an assessment of the thesis that ensures it is an independent academic work of international standard and that the thesis 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 thesis 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 (approved academic training, copies of certificates, the completed thesis, and the list of publications with a form specifying co-authorship).

Supervisors

The supervisors are responsible for assessing whether the work meets the quality requirements for a PhD thesis. The supervisors must comment on the candidate's academic contribution to any work carried out in cooperation with others that is included in the thesis.



Photo: thinkstock.com

PhD candidate Brandy Solheim is conducting research on sleep. Solheim's goal is to help to improve treatment for young people with delayed sleep phase disorder.

The department/research group

The department invites and proposes the committee for assessment of the thesis in consultation with the supervisor. Declarations of impartiality from the relevant committee members must be obtained before proposals for the assessment committee are submitted to the faculty.

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 thesis. 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 thesis is worthy of defence. On the basis of the submitted thesis, the assessment committee may recommend that the faculty permits the candidate to make minor revisions to the thesis within three months before the committee submits its final report (Section 15.2 of the Regulations). The assessment committee can also recommend that the faculty rejects the thesis, and the PhD candidate may not then submit a new thesis 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 thesis 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 thesis 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 thesis as well as assessment of the trial lecture and of the defence of the thesis from the assessment committee. The external members of the assessment committee should be requested to comment on the level of the thesis in relation to corresponding theses at their own university.

Relevant links for PhD education at NTNU are available at NTNU's website www.ntnu.no/phd and www.ntnu.edu/phd as well as at <https://innsida.ntnu.no/doktorgrad>



Photo: thinkstock.com

Sara Anastasio is conducting research on how to make tarmac last as long as possible and which asphalt mixes work best in different climatic conditions.