Welcome to ISE!

An Introductory Guide for PhD candidates

at the Institute for Science Education

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Welcome

We are pleased to welcome you to ISE, the Institute for Science Education, at Radboud University in Nijmegen.

In the coming years you will be working at the institute as a PhD candidate. In this document you will find information about our institute, about supervision, the training program, about various policy areas you will be involved in and about what is expected of you as a PhD candidate and/or ISE employee.

The atmosphere at ISE and on campus is open and personal. You will meet with many students, teachers, professors and researchers from different countries and backgrounds. We want you to feel at home at our institute and we support in any way we can. Our door is open!

We wish you a great time at ISE, and good luck with your research!

Erik Barendsen, Director

Floor Binkhorst, Managing Director & PhD Coordinator

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About ISE

The Institute for Science Education (ISE) is embedded in The Faculty of Science (Faculteit der Natuurwetenschappen, Wiskunde en Informatica; FNWI) of Radboud University. FNWI is responsible for research and teaching in biology, physics, astronomy, chemistry, mathematics and computer sciences. ISE is one of the eight research institutes at FNWI. Both in research and in education ISE collaborates with the other FNWI institutes as well with the Radboud Teachers Academy, which provides university degree programs in teaching in all secondary school subjects.

Research at ISE

ISE's research focuses on subject-specific thinking in science subjects and on practical knowledge and skills of science teachers. We pay special attention to research in the context of subject-specific and educational innovations. Ongoing research themes include design-based learning, scientific literacy and citizenship education, digital literacy and computational thinking, education for sustainable development and teachers' pedagogical content knowledge. Many of our research projects are practice-based and conducted together with stakeholders in practice, especially Dutch schools.

Much of the research is design research, producing both scientific knowledge and concrete educational products. This design research is conducted with partners in educational practice, in particular educational institutions and teachers.
Within this research profile, a range of activities is carried out, Most of the current (externally funded) research projects take place in the context of upper secondary schools. The research is mostly subject-specific. Currently, efforts are being made to strengthen the existing research profile. We are doing this in two ways: broadening the context of the research with university science education and expanding the content to an overarching theme requiring an interdisciplinary and STEM approach.

Education at ISE

ISE provides an elective minor program in subject-specific science (STEM) pedagogy for undergraduate students in the science faculty. This minor is a good way for students to discover whether teaching suits them. But the content of this minor can also be useful for students who are not going to study teacher training: knowledge of science education comes in handy wherever learning and communicating about subject matter plays a role. The minor is offered in Dutch.

Furthermore, the institute plays a role in the Master's degree program in Education in Science, in collaboration with the Radboud Teachers Academy. Within this Master's degree program, ISE is responsible for coordinating, developing and implementing the subject content component (30 ec for each school subject). This subject content component is designed in collaboration with the educational institutes in the faculty. These teaching activities require a strong disciplinary approach and thus specific expertise in mathematics, physics, chemistry, biology and computer science content and didactics. In addition, the program includes cross-curricular components such as research methodology, research supervision, and the institute works with the Radboud Teachers Academy on linking courses.

Currently, the institute is broadening its teaching activities. We want subject-specific pedagogical expertise in the institute to benefit the continuing of professional development in instructional and pedagogical approaches of teaching staff in the faculty.

ISE also plans to play a leading role in the pedagogical, instructional training of student assistants. To this end, we will determine and steer the content of the existing range of training courses and thus cooperate closely with the Education Centre and the various educational institutes.

Outreach at ISE

The Radboud Pre-University College (PUC) of Science acts as a bridge between secondary schools and university and organizes deepening and enriching science activities for students and teachers in secondary schools. The PUC also provides a practice environment for courses of the institute.

The program of the Radboud PUC of Science is offered in Dutch, therefore the content information is only in Dutch.

Institutional embedding of PhD candidates

Our PhD candidates are very important for ISE's research and innovation

strength. Proper embedding in the institute is therefore of great importance for both ISE and the PhDs. ISE's PhDs hold monthly PhD lunch-meetings to discuss opportunities, experiences and obstacles that pass by as well as your work-in-progress.

Floor Binkhorst acts as PhD coordinator for ISE. For general and non-scientific questions about your PhD track, please contact the PhD coordinator by e-mail at floor.binkhorst@ru.nl.

Furthermore, there are two PhD councils at Radboud. The Nijmegen PhD Council PON (Promovendi Overleg Nijmegen; https://www.ru.nl/pon/) is the consultative body for all PhD candidates at the Radboud University and the Radboud UMC. PON is managed by PhD candidates of Radboud University and Radboud UMC and is the first point of contact for all matters at the RU level. PON's three main objectives are to inform PhD candidates (about their rights, the procedures about obtaining a PhD, and all practical matters of living and working in Nijmegen), to organize social activities for PhD candidates, and to promote the interests of Nijmegen PhD candidates within the university.

PROBE (http://www.ru.nl/science/more/information/phd-students/) is the council for PhD candidates working at the Faculty of Science of Radboud University. It is established for the PhD candidates at the Faculty of Science (FNWI). PROBE guards the interests of the PhD candidates and provides relevant news.

Research ethics and integrity

Research integrity is one of the pillars underpinning good science. Within our institute we have created an open atmosphere in which research integrity issues are discussed and novel challenges to integrity are collectively addressed.

We would like to draw your attention to the Dutch Research Code of Conduct. The Dutch code of conduct for academic and scientific practice was compiled at the request of the Association of Universities in the Netherlands (VSNU). It is based on the following principles:

- Honesty: Academic practitioners are honest and forthright about their research and its applications.
- Scrupulousness: Scientific and scholarly activities are performed scrupulously and should remain unaffected by the pressure to achieve.
- Reliability: Every academic practitioner supports and strengthens the fundamental reliability of science and scholarship through their own conduct. Academic practitioners conduct and report on their research and transfer their knowledge through teaching and publishing in a reliable manner.
- Transparency: Whenever research results are published, it is made clear what the data and conclusions are based on, from where they originate and how they can be verified.
- Independence: Academic practitioners operate in a context of academic freedom and independence. Where restriction of this freedom cannot be avoided, it is clearly stated.
- Responsibility: Acknowledging the fact that a researcher does not operate in isolation and hence taking into consideration the legitimate interests of human (or animal) test subjects, as well as those of commissioning parties, funding bodies and the environment. Responsibility also means conducting research that is scientifically and/or societally relevant.

You can find the code of conduct here: https://www.ru.nl/en/about-us/policies-and-regulations/research-integrity

Research Data Management

Research data management refers to the ways in which research data are collected, stored, shared, protected, and made available, either for re-use or for verification. The Research Data Management (RDM) policy of the Radboud University states that all data corresponding with scientific publications must be stored according to the principles of findable and accessible. The consequent ISE Data Management Policy provides guidelines and advice on proper ways of managing data, in all phases and for all forms of research that takes place at ISE.

The plan has been made available through the ISE website:
https://www.ru.nl/en/institute-for-science-education/research

Your role

All researchers at ISE are responsible for the acquisition, documentation and storage of their own research data. In most cases, this means that your research plans for every study, have to be approved by the ethics committee beforehand. For research with (data of) human participants (e.g. teachers, students) it is usually necessary to obtain and record their informed consent. On the RDM Support website, information can be found concerning informed consent procedures. This website also contains recommendations about the content of informed consent forms and information brochures, including references to examples and formats.

At the start of your time at ISE, meet the ISE data steward (Marc Rodemer, marc.rodemer@ru.nl) and discuss how data are produced and can be stored in a findable and accessible way, with respect of the privacy of respondents. Make sure that whilst working on your PhD project, you adhere to the procedures of our data management plan. Please be aware that when leaving the university, your data remain property of the university. You should therefore make sure that all your data are stored in the manner described.

In addition, by the end of the first year, you write a Research Data Management plan, in which you describe how you are planning to manage your data. It can be uploaded to Hora Finita as an attachment at your 12 month evaluation.

Supervision and coaching

All our PhD researchers are supervised by a team of at least 2 staff members, usually a combination of a full professor (promotor) and an assistant/associate professor (copromotor/daily supervisor).

You meet with your supervisors on a regular basis. Together, you agree on how often it is necessary to meet. For example, you may meet weekly with your 'daily' supervisor(s) and once a month with all supervisors. During these meetings with your supervisors, you can discuss progress and address challenges.

We encourage PhD researchers to participate, present and discuss their research in academic conferences, both nationally and internationally, to allow them to develop their profile, position themselves in the research landscape and foster visibility. Funding is available for taking part in some international conferences, provided this conference is useful for your PhD track. Especially in the later years of your PhD, you are expected to present a paper of poster at the conference. Discuss with your supervisors which conferences are useful to attend.

Confidential counselling

If you are experiencing problems during your PhD track, and do you want counselling other than from your supervisors, there are several options.

Confidential Contact Person

Every institute has a Confidential Contact Person, who acts as a low-threshold contact point for junior scientific staff. You can contact the Confidential Contact Person regarding topics such as: problems with supervision, personal circumstances that affect the PhD track, motivational issues, questions on research integrity or undesirable behaviour. The confidential contact person for ISE is Floor Binkhorst (floor.binkhorst@ru.nl). If you have an issue requiring this kind of support, do not hesitate to contact her.

The Confidential Contact Persons are meant to be a low-threshold, local person to contact. They have a broad focus, and do not offer long-term support.

Confidential Advisors

You can also approach one of the Radboud Confidential Advisors. They are appointed RU wide and focus specifically on undesirable behaviour or scientific integrity. You can contact the Confidential Advisors for longer-term support. You can also contact the confidential advisors for a consultative appointment, but the focus will always be on undesirable behaviour or scientific integrity.

The roles of Confidential Contact Persons and Confidential Advisors are meant to complement each other, in order to offer an as complete as possible array of support for junior scientific staff.

More information about these roles can be found here: https://www.ru.nl/en/staff/services/guidance-advice-and-complaints/confidential-contact-persons

Hora Finita

To monitor all running PhD trajectories and to handle all formal correspondence associated with PhD graduations, Radboud University is using the Hora Finita PhD project monitoring system. Hora Finita assists PhD-candidates, their supervisors and the support staff from start to finish of the PhD project. At the start of your PhD appointment you will receive an email with the request to register in Hora Finita. Hora Finita "finds" its users, PhD's and their supervisors, in Radboud's customer relationship management system. You can log in with SURFconext on https://horafinita.ru.nl. This step arranges the formal admittance to the PhD graduation procedure and thus it is very important.

Hora Finita is also used to monitor the PhD trajectories: each year you must upload your updated Training and Supervision Plan (TSP) and updated Graduation Plan (GP), as well as the planning and the evaluation form via this system. Close to the completion of the PhD, other formal steps, such as the selection of the manuscript committee, the approval of the manuscript, and the reservation of the defense date, are also all handled via Hora Finita. If you need assistance with Hora Finita, please contact the PhD coordinator Floor Binkhorst (floor.binkhorst@ru.nl).

More information about Hora Finita can be found here:

https://www.ru.nl/en/staff/phd-candidates/getting-your-phd/monitoring-system-hora-finita

Graduate School

All PhD candidates at Radboud University are required to be part of a graduate research school. All PhD candidates who do research at ISE are automatically enrolled in the ISE Graduate School. The aim of the Graduate School is to offer all ISE PhD candidates a complete program and support for academic development in this phase of their career.

PhD candidates can also choose to join another national graduate research school. For example, the Dudoc-Bèta training program or the ICO research school. Discuss with your supervisors which graduate school is most relevant for you.

Training & Supervision Plan (TSP) and Graduation Plan (GP)

The aim of the ISE Graduate School is that you finish your PhD in a smooth way. To help you with this, you will write a Training & Supervision Plan (TSP) and Graduation Plan (GP) at the start of your project, and hand it in at the start of your PhD track.

The TSP is the 'contract' you make with your supervisors. The TSP comprises issues like research strategy, frequency of contacts with the supervisors, courses to be followed, and teaching tasks to be performed. You can evaluate and update your TSP every year. The initial version of the TSP should be uploaded to Hora Finita 3 months after the start of your PhD project.

The Graduation Plan describes the planned research. You describe the background an motivation for the research, the main research question(s) and your approach that you plan to use to answer these questions. Furthermore, the GP contains a description of the planning and deliverables for each year of your PhD track. You complete the GP after 9 months, and then you discuss it with your supervisors. At the 12 month annual evaluation, you can upload the (updated) form to Hora Finita.

The templates of these documents are available on the ISE website.

Personal training and development

Within the Graduate School, you have the opportunity to receive training, develop your personal and professional skills, and prepare for your future career. This section describes the framework of the ISE Graduate School training program. The study load of the training should be approximately 420 hours in total, which is 15 EC.

When completed, PhD candidates receive a Graduate School certificate. You can obtain the certificate by entering your activities in your Hora Finita portfolio and submitting the portfolio when complete.

You will largely compose the training program yourself (in consultation with your supervisors). Some courses are mandatory for ISE PhD candidates.

You can participate in the courses offered by the Faculty of Science (more information and registration via this page) and/or follow courses of the standard training program for PhDs at Radboud University (via the gROW learning environment). It is also possible to complete (some) courses on the same topics at another graduate or research school. Please signal this in your TSP.

At ISE we recommend the following courses:

Course / activity	# of hours
Introduction for new employees of the Faculty of Science** (Sign up here)	4 hours
Scientific ethics and integrity * (more information and registration via this page)	12 hours
Didactic skills ** Choose between: • Practical Didactic Skills (Faculty of Science course, see this page) • Teaching Practice (Radboud course, see this page)	12-28 hours
Managing your PhD* Choose between (or a similar course): • Essential skills to manage your PhD project (via Faculty of Science or gROW) • Project Management for PhD Candidates (via gROW)	24-52 hours
Other recommended courses and trainings are: - Writing course - Presenting course - Career orientation - The art of presenting science - Finding, managing and publishing scientific literature during your PhD *If you need advice on which courses to choose and when to schedule them, please contact the graduate school coordinator*	
Total	**ca. 224 hours (8 EC)**

* These courses are mandatory for all ISE PhD candidates (including external PhDs)
** These courses are mandatory for internal ISE PhD candidates only

Other activities are also a vital part of the PhD candidate's training program, but are more tailor-made depending on the PhD's preferences, interests, and pursued career after the PhD. You can choose from the list below and are expected to complete at least 240 hours in this part of the program.

Course / activity	# of hours
ISE activities:	
ISE Research Meetings*	48 hours
Outreach: get involved in our outreach program at the pre-university college (PUC) of science	Depends
Additional courses:	
Master's / bachelor's courses or other research school courses	
Academic development and networking:	
Networking activities (e.g. conferences, Faculty/Radboud meetings, etc)	
Becoming a board / committee member of PON (PhD Organisation Nijmegen) or of PNN (PhD Network Netherlands), or PROBE	
Science communication: e.g. public lectures, writing blogs, etc)	
Total	**Ca 196 hours (7 EC)**

* These activities are mandatory for all ISE PhD candidates (including external PhDs)

Educational tasks

Furthermore, every PhD candidate is expected to spend time with supporting educational tasks. Teaching includes supervision of students and providing (guest) lectures. In this manner, you become well embedded in the daily work of the institute, and it allows you to develop educational experience and skills.

To prepare you for the supporting educational tasks, each PhD candidate at the science faculty is required to complete a short course on didactic skills. Make sure to discuss this with your supervisor, and include participation in this course in your TSP.

Make sure you discuss the teaching load over the four years with your supervisors and include it in your TSP.

Progress monitoring

As an indication of good progress, we give you the following milestones:

When	What
Start	Register in Hora Finita
After 3 months	Have completed your Training and Supervision Plan (TSP). Discuss it with your supervisors and upload it to Hora Finita
After 9 months	Have completed your Graduation Plan, and Research Data Management plan. Discuss it with your supervisors and upload it to Hora Finita at the first annual evaluation.
After 1 year	Have a formal assessment, the go/no go-interview. Upload the first year evaluation form to Hora Finita. Include the Graduation Plan, Research Data Management plan and updated TSP as an attachment.
18 months	Official go/no go decision
After 2 years	Evaluation of the past year and planning for next year. Upload it to Hora Finita.
After 3 years/beginning of the last year	Evaluation of the past year and planning for next year. Agree with your supervisor(s) on a date for finishing the manuscript, and make a realistic plan to finish it. Upload it to Hora Finita.
The last 6 months of your contract	To be spend on writing the synthesis and the introduction of your thesis and preparing for submission

Annual evaluation

At least every 12 months you and your supervisors evaluate the progress and planning of the project, in the so-called planning and evaluation interview. This is also a good moment to discuss your needs for supervision with your supervisor(s). Make sure that you update your Training and Supervision Plan as well as your Graduation Plan during or after this meeting and that you complete the planning and evaluation forms. The second assessor can be invited to these evaluations if you or your supervisors prefer this.

Go/No Go interview

At the end of the first year, the planning and evaluation interview has a more formal status: an assessment of the PhD candidate, will take place in order to decide upon the continuation or, in rare cases, termination of the project. This is called the go/no go-assessment. The complete supervision team, including the second assessor, takes part in this assessment. One week before the assessment, you send relevant information such as the Training and Supervision Plan, the Graduation plan, evaluation form for the first year and planning form of the second year to the supervision team. In the unfortunate case that the outcome is a 'no go', your contract will be terminated after 18 months of the start of the project thus leaving about 6 months for finding an appointment elsewhere.

External or part-time PhD candidates

ISE supervises a number of external PhD candidates. External PhD candidates often work in an organization outside the university (for instance a secondary school) and are therefore instrumental for maintaining contacts with societal stakeholders. Our ambition to educate interdisciplinary, critical and engaged scholars also holds for external PhD researchers, although as a rule they do not contribute to teaching as often as internal PhD candidates, and progress meetings are less frequent. Yet, we expect them to present lectures during colloquia and meet other employees of ISE. A tailor-made training and supervision plan (TSP) is also required for external PhD researchers.

Finalizing your PhD project

The requirements for a PhD graduation at ISE are in line with the RU Regulations for PhD graduations. These regulations can be downloaded from the RU website.

What does a PhD thesis entail?

A typical PhD thesis consists of:

- *A general introduction*. Here you can describe for example the current state-of-the-art in your research topic, the gaps in scientific knowledge, your research aim/questions and contribution, and an overview of your thesis.

- *Research chapters*. Each research chapter contains work that demonstrates that you followed the scientific research cycle (identifying a gap in scientific knowledge, outlining an approach/method, reflecting on the findings in the context of your topic).
  There is no strict requirement for the number of research chapters in a thesis: quality, coherence and your specific contribution are more important than quantity. It is common to include 4 publishable or published chapters (i.e. equivalent to journal or conference papers in your field), but fewer can be justified (e.g. due to extensiveness of the work). If you are not the first author of one or more of these research chapters, you should explicitly indicate how you have contributed to this work. If you wish to add more research chapters, it should by no means be at the expense of submitting the manuscript on time.

- *General discussion*. In the final chapter, you reflect with a birds-eye perspective on your research chapters and notable findings in the light of the issues raised in the general introduction. You identify future opportunities for research, and discuss the impact on the research field and society. There is no minimum length for the discussion. Quality is the only criterion.

Submitting and printing

After 48 months (on the basis of full time employment) the PhD project must be completed, which means that the thesis manuscript must be submitted to the manuscript committee.

Printing costs of the PhD thesis may be reimbursed up to a certain maximum. On the website of the personnel department (P&O) an application form can be

downloaded. This form should be submitted within 6 months after the printing of the thesis.

Delay

If there are sufficient data, no additional chapters should be added if this leads to a delayed thesis submission (that additional data still can be published at a later stage).

If after 48 months your thesis manuscript does not meet the guidelines mentioned above, you and your supervisors should draft a pragmatic planning for finishing the manuscript as soon as possible.

Extensions of PhD-contracts are sometimes possible, for example due to illness or other unforeseen circumstances.

Other extensions of PhD contracts are very rare. A prerequisite for considering an extension application is that the PhD supervisor(s) provide(s) the required budget for the extension. A request for prolongation should be handed in to the ISE Board several months before the contract termination date.

In the unfortunate case that your PhD project is delayed severely, try and work out a new schedule with your supervisor. You may submit a concrete plan aiming at completing the manuscript within 6-12 months.

Feedback to ISE

ISE also wants to learn. We want to know what we do well and what we can improve for PhD candidates, specifically for issues related to the PhD training. By the end of your PhD, you are invited by the PhD coordinator for a feedback interview. In this meeting you can share your view and give feedback on your experiences within the institute. The interview is confidential.