

Guide for new PhD students*

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Abstract. This guide is meant to clarify, both for you (my student) and myself, how I supervise PhD students at the Radboud University Nijmegen.

1 Introduction

So you are my new PhD student, and I just gave you this guide to read. Don't panic. There is nothing to be scared of. I just want you to know what I expect from you, and what you can expect from me.

Research is fun. Or at least it should be. That is why it is important you are working on a topic that is close to your heart. A relevant topic in which the answers to your research questions are relevant to you, the scientific community, and society at large. A topic that gives you energy. If you have found such a topic, you'll love doing research. Like I do.

Research can also be frustrating. Sometimes you will feel lost, stupid, alone, and as if you are running around in circles. This has happened (and still happens) to all of us from time to time. The trick is to learn how to deal with such situations, and to find out what it is that makes you go forward in the end. These strategies are personal. What works for you may not work for someone else.

2 Requirements

A good PhD student should satisfy the following requirements.

You should show good research, communication and writing skills. Research skills include the ability to identify promising research problems, phrase them in clear and concise problem statements, and apply the appropriate methodology to arrive at a solution. Communication skills include the ability to explain what you are doing to both experts and educated laymen verbally, as well as communicating effectively with me regarding the day-to-day supervision. Writing skills are shown by writing proper scientific papers: having proper abstracts, writing introductions that

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can be understood by a more general audience, having an appropriate structure, using proper mathematical notation, and valid and well-structured proofs. Your use of English should be fluent.

Don't worry if you don't have all these skills when you start your PhD career. The university offers several courses that help you develop them.

It's publish or perish. After the first year you should have written your first scientific paper, and have submitted it to a conference. A thesis should be based on at least four scientific papers published in respected conferences or journals.

These requirements are checked at the first formal evaluation that takes place after the first year of your PhD project, and when deciding whether you are ready to start writing your thesis. Meeting the requirements for the first year ensures your contract is extended to a total of four years. See section 4.

3 A typical PhD project

A PhD project typically consists of four phases. In the first phase you settle: find a place to live, get all the necessary paperwork done etc. If you come from abroad, this may take quite some time and effort. You also get acquainted with your working environment: the university, your colleagues, how things work and get arranged, get a computer and setup your account, etc.

In the second phase, that typically takes three months, you start the actual research project. In this phase you explore the area of research and reading up on the state of the art. Usually the PhD project is based on a research proposal. Read that proposal and explore the references cited in it. Then find other sources of information on your own, and start looking for research problems that you think are worth studying further. At the end of this phase, you should have a general understanding of the research area at large, and have identified at least one research problem that you want to study in detail. This should be laid down in a research plan.

It is in general a good idea to take detailed notes during this phase, as the things you learn in this phase typically end up in the introduction of your thesis.

The third phase is actually a repeated application of the following steps: try to solve one of the problems you identified in the research plan, write a paper on your results, adjust the research plan based on your findings, and identify new problems to study. This continues until it is time to write your thesis, after 3.5 years. Note that you can only start writing if you have sufficient results to report (see also section 2). We decide this together.

4 (Formal) procedures

The university has a set of formal requirements and procedures every PhD candidate has to comply with. They are described in detail in the 'doctorate regulations' that

<i>Phase</i>	<i>Month</i>	<i>Action</i>
Startup	1	
	2	Determine education and supervision plan
Research	4	Determine research plan
	7	
	10	
	13	1st assessment and planning meeting
	16	
	19	
	22	
	25	2nd assessment and planning meeting
	28	
31		
	37	3rd assessment and planning meeting
Thesis	43	Approve thesis outline
	46	
	48	Submit thesis

Table 1. PhD plan

can be found on the web at <http://www.ru.nl/phd/phd-related-affairs/doctorate-regulations/>. A lot of additional useful information about PhD related topics can be found at <http://www.ru.nl/phd/>. Below is an informal description of the general procedure.

A month or so after you start your PhD, we will draft an education and supervision plan. In this plan we will describe which (additional education) you need, which courses you will follow, and how supervision will be arranged.

Every year we have an evaluation and planning meeting (aka “jaargesprek”) in which we evaluate your performance based on the plans set out the year before. In the first year, this is based on the education and supervision plan drafted after the first month as well as the research plan you wrote after three months (see above). In this evaluation meeting also my performance as a supervisor is evaluated. In the planning meeting the research plan for the next year is drawn up and arrangements for supervision and education for the coming year are made.

PhD students have a temporary contract of 1.5 year. After the first year, based on the first evaluation meeting, a go/no-go decision is made. After a positive decision, this temporary contract is extended with 2.5 years (see also section 2). The final evaluation and planning meeting takes place after the third year of your PhD. In this meeting also your plans for your career after you have completed your PhD are discussed.

When you have finished your thesis manuscript, both the promotor and I will judge it. If we agree with the contents, a reading committee will be established. This

committee will officially judge your manuscript. Officially they can either approve or reject the proposal. Typically, they will informally suggest some improvements while formally approving the manuscript. If they approve, you are supposed to make the suggested improvements and print the thesis. You can then also select a date for your defence.

5 Responsibilities

In the end, you are responsible for writing a good thesis and finishing your PhD. When I foresee serious problems, I will tell you. Likewise, I expect you to inform me when problems occur or may occur. Otherwise, I expect you to work independently. I am always available for questions, by mail, phone or face-to-face. Feel free to walk into my office for a chat, or a discussion. I do realise that I am quite busy and occupied at times, so this may not always be possible. If I'm really busy with something, I will tell you and we'll try to schedule a meeting some other day.

I have responsibilities as well, of course. Over all, my responsibility is to ensure that the work you do will deliver a thesis of sufficient scientific quality, that will be accepted by the reading committee. In practice this means I will provide you with pointers to other research, bring you in contact with other researchers that are involved in research similar or relevant to your own. I will also monitor progress, push you when needed, and steer you when I think you are moving away too far from your core research topic. I will carefully read the drafts of papers that you write, and give comments for improvements wherever necessary.

Apart from doing research, there are certain chores associated with being a PhD, like maintaining websites, writing progress reports, etc. Also, we expect our PhD students to help teaching. This may be in a topic totally unrelated to your research. All these tasks should not take you more than one day a week at most, on average.

6 Day to day supervision

I expect you to work independently. I am always available for questions, by mail, phone or face-to-face. Feel free to walk into my office for a chat, or a discussion. Typically we will have weekly or bi-weekly meetings to discuss progress and ask questions. You are responsible to schedule these meetings, make an agenda and take notes. If there is anything in particular you want to discuss, let me know beforehand, so I can prepare. If this requires some reading or reviewing, email me the documents at least a two full working days before the meeting.

Note: I'm not the expert: soon you'll know more than me about your own research topic.

Regardless of when we meet, I want you to email me a status report at the end of each week. The status report should contain your long term goals, current assignments, activities in the past week, plans for the coming week, and any issues you'd

like to raise. See <http://www.cs.ru.nl/~jhh/guides.html> for a template of such a weekly report.

Twice a year we will have a meeting with the promotor to discuss the progress you are making. You are also responsible to schedule these meetings, make an agenda, and take notes.

Let me know when you take a break, or go on holiday or something.

7 Additional training, summer schools and conferences

There are several options for additional education. For foreign PhD students, the university offers Dutch language courses. These are recommended. Also, courses for writing scientific papers and presenting scientific results are offered. These are mandatory. The writing class should preferably coincide with the time that you write your first paper. This typically happens 6 months after you start your PhD. The presentation class should follow soon after that. Make sure you take this into account when signing up for these courses.

International summer- or winterschools are often offered on a subject that is at the core of your research. We will discuss them and decide which one is appropriate for you to participate in when drafting the education plan at the start of the first year. Depending on the travel budget available, a second summer- or winterschool can be joined in the second year of your PhD.

You only get to go to a conference if you get a paper accepted. This should be an incentive to write many good papers. The exception to this rule is the first year, where I would like you to go to one conference that is at the core of your research area. We decide this when drafting the education plan at the start of the first year. Any such trips require my explicit approval.

National meetings also take place on a regular basis. You are encouraged to go, and take the initiative to find out about them, to join mailinglists for announcements etc. This is the first step towards building your own network.

8 Writing a paper

Writing papers is an important part of your work. As mentioned above there are courses for that, that you should follow. Some additional information is available at <http://www.cs.ru.nl/~jhh/guides.html>.

Below I describe the process.

As a supervisor, I help you so you can write a good paper. This first of all means guiding you towards a good scientific result. This does not mean I do the research for you: you should do this yourself. If you hit a problem, you should try to solve it. If you can't, you can try asking me for suggestions, but usually I will have no clue

either. But we can sit together behind a whiteboard and throw ideas at each other — I actually enjoy that a lot.

Writing the paper is your work, not mine. I may contribute bits and pieces here and there, but you should not count on that. What I *do* do is review what you have written, and give suggestions for improvement.

When the research results are clear and substantial, the actual paper writing starts. We may at that time already decide on which conference to submit it to. This sets the deadline for when the paper has to be ready. Otherwise we (together) decide on a conference when the paper is ready in draft. If you already have ideas about where to submit a result while still doing the actual research, plan your research to ensure that you are ready to start writing the paper well before the submission deadline.

Writing papers takes longer than you think. And you are dependent on me for the reviewing, so ensure that you take account of my schedule when planning the writing phase. Allow me sufficient time (at least two full working days) to review what you wrote. When you send me something to review, first carefully re-read it yourself. Pretend you are reviewing your own paper as if it was written by someone else and submitted to a conference you are a reviewer for. When sending me the paper, tell me which parts you want me to review.

You can only submit a paper with my explicit approval, even if I am not the co-author. I am a co-author of a paper, unless you really did almost everything on your own (or together with a few other people) and all I did was reviewing. It is standard procedure in our field to list authors in alphabetical order. I have made exceptions to this rule in the past, but will not do so any longer.

9 Writing your thesis

In the last phase you write your thesis. Typically this phase takes six months. A year or so before the end of the PhD project, you should already start thinking about what to include or not to include in your thesis, and adjust the research plan to ensure that any missing pieces will be collected in time. We will discuss this thesis plan together.

A thesis is normally based on the set of papers you produced during the PhD project. These need to be carefully rewritten to match the flow of the full thesis. Notation and terminology need to be consistent, for example. Additionally, a solid introduction and a separate conclusions chapter must be written. The introduction should contain an overview of the research field, connect the different topics covered by the thesis, and express the main research questions addressed in the thesis. The introduction should be readable by an educated layman.

10 Preparing a presentation

Giving a good presentation is skill in itself. For some people it comes natural. Others only get reasonably good at it even after considerable training and practice. The university offers such courses, and there is additional information available at <http://www.cs.ru.nl/~jhh/guides.html>.

When giving a presentation, it is important to know your audience. What is their background, what do they know, what do they expect, what do they want to learn from you? Prepare your presentation based on the answers to these questions. A good presentation has a clear focus, a central message that you want to get across. In the beginning of the presentation you 'promise' the audience this central message. You then build up the argument and deliver the message at the end.

You can use Powerpoint, Adobe acrobat (PDF), or the white board as a visual aid. Don't put too many words on one slide, and remember: pictures speak louder than words. Tell more than what's on the slide. Give examples when explaining abstract concepts. Be prepared for questions. Take each question seriously and answer it properly. Don't rush it. Look the audience in the eye.

When presenting a research paper, put your co-authors on the title slide (in the same order as on the paper itself). Clearly mark your own name, so the audience can tell who is talking.

11 Reviewing scientific papers

Reviewing papers other people write is an important aspect of the research practice. It gives you a rare insight in what other researchers are working on before their results are published to the general public.

When reviewing a paper, be fair but critical. This is not easy, but there are several guides [3,1,2]. My personal advice is to write a review as if you write it to yourself: write it in a way that you yourself would like to receive it and would be happy to read. This doesn't mean you can't be critical. Even very critical reviews can be written in a constructive manner, that will actually help the authors to improve the paper.

Sometimes you get to see the review reports by others on the paper you are reviewing too. If this is the case, compare those reviews to your own and learn from them.

12 Project proposal

If you are writing your own PhD project proposal, make sure it is

relevant it solves a genuine theoretical or practical problem, that you are motivated and well equipped to answer, and that has not been answered before.

well founded it has a clear scope, is based on clearly expressed assumptions and progresses beyond the current state-of-the-art.

precise it clearly states the main research question.

methodological it clearly states the approach needed to answer the research question, the scientific method to be used, and the sub-questions to be answered.

functional it contains a detailed project plan that makes explicit which resources are needed, what external resources (information, support, etc.) it depends on, the steps to be taken and the amount of time they will take.

consistent the proposal as a whole is consistent and complete.

A good research proposal provides convincing arguments for each of these aspects.

13 Final remarks

This guide has become quite a bit longer than I initially intended. I hope it is useful to you. If anything is unclear, please ask. If you have suggestions for improvements, let me know, and I'll incorporate them in the next version.

References

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