

QGG PhD Handbook

Guidelines for QGG PhD Students & Supervisors



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Contents

Introduction	3
Requirements of a PhD student at QGG	4
Requirements of a PhD supervisor at QGG	6
General expectations of QGG	7
Scheduled events during the PhD study	8
Other events	11
Building a good student-supervisor relationship	12
How to identify and deal with potential problems	13
Links and contacts	16
Appendix A: Suggested format of the PhD thesis	17
Appendix B: Aligning student-supervisor expectations	20

Introduction

The Center for Quantitative Genetics and Genomics (QGG) aims to offer PhD training of the highest standard. In order to achieve this, QGG PhD students must be given the best possible environment to achieve their potential, to establish the foundation of their future career, and to resolve problems and conflicts as soon as they arise. The time spent as a PhD student at QGG should be professionally fruitful, scientifically stimulating, and personally enjoyable.

The purpose of this PhD handbook is to provide guidance to QGG PhD students and their supervisors. Please note that QGG is part of the Faculty of Technical Sciences, and therefore the official rules for PhD Study at QGG are defined by the Graduate School of Technical Sciences (GSTS), and available on the GSTS website (<https://phd.tech.au.dk/for-phd-students/rules-regulations>). **If there is a conflict between the guidance in this handbook and the rules defined by GSTS, then the GSTS rules prevail.** Furthermore, as this handbook is not exhaustive, you should remember that you can always ask your fellow students, supervisors, and colleagues for advice and help.

This handbook describes the overall goals of both PhD students and their supervisors, as well as specific goals and responsibilities related to a number of key events during the PhD study. It also provides advice on how to establish a good student-supervisor relationship and what to do if problems arise. It is a proven fact, that the relationship between a PhD student and their supervisor is a decisive factor for a successful PhD study. It is therefore strongly recommended that the PhD student and their supervisor consider their roles in the supervision relationship very carefully.

Requirements of a PhD student at QGG

In general, a Danish PhD lasts three years. In order to complete their PhD, the student must:

- 1 – Carry out original, high-quality research on their PhD project
- 2 – Write a thesis
- 3 – Earn approximately 30 ECTS
- 4 – Spend at least 90 days in a second research environment
- 5 – Disseminate their research
- 6 – Fulfil work obligations
- 7 – Regularly update their PhD plan

1 - Carry out original, high-quality research on their PhD project. The PhD student should conduct research of an international standard within their research field. This includes:

- searching and summarizing relevant scientific literature
- identifying relevant research questions
- planning and performing analyses that address the research questions
- interpreting the results of the analyses, and relating them to the scientific literature.

The student should write up the results of their research as scientific articles, and submit these for peer-reviewed publication. **There are no strict requirements regarding the total number of articles, and how many of these must be accepted for publication.** However, in general, a QGG PhD student will write 2-4 distinct articles during the course of their PhD. The first can be a literature review (i.e., summarizes existing knowledge about the research field), but the remainder will contain original analyses and results. By the end of the PhD, usually at least one of the articles will be accepted in a reputable journal within the research field, with the remainder either submitted or very close to submission.

2 - Write a thesis. The PhD thesis should provide a detailed description of what the PhD student has worked on during their three years. There are two main types of thesis. In a “publication thesis”, the majority of the research is described within self-contained articles, formatted for publication in a journal. The alternative is a “book thesis”, where the student, in effect, writes a story describing their three years of research. In general, QGG PhD students write a publication thesis, because having already written articles, this type requires less extra work. More details are provided in **Appendix A**.

3 - Earn approximately 30 ECTS. A PhD student must earn between 28 and 31 ECTS from courses and other study activities related to their PhD project. The student can attend scientific courses run by universities or research institutions (e.g., QGG currently offers three 5-ECTS courses as part of the AU Summer University), or they can attend courses on transferable skills (e.g., GSTS offers courses on

science teaching, project management and academic writing). The student can earn up to 10 ECTS from other study activities, such as attending journal clubs, workshops or conferences (note that the head of the QGG PhD programme will decide the appropriate number of ECTS for each activity). As an approximate guide, a QGG PhD student usually earns 15-20 ECTS from scientific courses, 5-10 ECTS from transferable skills courses, and 0-5 ECTS from other study activities. More details are provided at <https://phd.tech.au.dk/for-phd-students/course>.

4 - Spend at least 90 days in a second research environment. GSTS strongly encourages PhD students to spend substantial time in a foreign research institute or company. In general, PhD students will have a single 3-month stay in a foreign university, which is used to work on a collaborative project with members of the second research organization (often resulting in a joint publication). For students who find a long stay difficult (e.g., due to family commitments), alternatives are possible (e.g., they can arrange multiple shorter stays, or spend time at a Danish research institute or company). More details are provided at <https://phd.tech.au.dk/for-phd-students/going-abroad>.

5 - Disseminate their research. The PhD student should gain experience presenting their research in various settings. Most commonly, they will give scientific presentations (e.g., during conferences or visits to other research institutes). However, dissemination can also include teaching-related activities, assisting other PhD students, co-supervision of MSC students, public lectures, writing articles for newspapers, etc.

6 - Fulfil work obligations. A PhD student is required to work up to 280 hours per year (unless the PhD student has agreed to an exemption, with a corresponding reduction in salary). Usually, the student works as a teaching assistant (e.g., helps with exercise classes and grades assignments), but QGG can instead require the student to perform other academic tasks (e.g., updating a website or creating documentation for a software package). Note that because QGG runs relatively few courses, most QGG PhD students will work substantially less than 280 hours per year. **It is therefore important that the student and their supervisor agree on the work obligations early in the PhD study.**

7 - Regularly update their PhD plan. The PhD plan is an online document that details the progress of the PhD student throughout the course of their PhD. The PhD plan should describe how the PhD student will achieve Points 1-7 above, and record if the PhD student experiences or anticipates any obstacles. The student should create their PhD plan within three months of starting their PhD, then update this at least every six months until completing their PhD. More details are provided at <https://phd.au.dk/for-current-phd-students/myphd-login>.

Requirements of a PhD supervisor at QGG

The supervisor of a PhD student should:

- 1 – Ensure the PhD student receives high quality supervision
- 2 – Assist the PhD student with the steps required to complete their PhD
- 3 – Provide the PhD student with a motivating, supportive and collegiate learning environment
- 4 – Create a supervision group

1 - Ensure the PhD student receives high quality supervision. The supervisor should be an expert in the research field of the PhD project, able to provide high quality advice and feedback to the PhD student. For example, this involves helping the student find relevant scientific literature and methods, and commenting on analysis plans. Ideally, the supervisor should vary the intensity and nature of their supervision, so that the PhD student increases their independence over the course of the PhD.

2 – Assist the PhD student with the steps required to complete their PhD. While the PhD student is ultimately responsible for completing their PhD, their supervisor should be continuously checking the student is on track to achieve the formal requirements (i.e., fulfil Points 1-7 in the previous section).

3 - Provide the PhD student with a motivating, supportive and collegiate learning environment. The supervisor should ensure the PhD student is integrated within QGG, aware of the different groups they can participate in (e.g., journal clubs and focus groups), and is introduced to QGG members who may be able to assist with the PhD project.

4 - Create a supervision group. All PhD students at Aarhus University (AU) have a main supervisor. **However, at QGG, it is strongly encouraged that PhD students also have one or more co-supervisors, because this increases the expertise and help available to the PhD student.** The co-supervisors should interact regularly with the PhD student (e.g., at least every two months, and prior to key events in the PhD study, such as initiating the PhD plan and taking the qualifying exam). Note that the main supervisor is ultimately responsible for the quality of supervision of the PhD student, and for ensuring the co-supervisors adhere to Points 1-3 above.

General expectations of QGG

Expectations of the PhD student:

The student must recognise that a PhD study is a demanding task and that a high level of commitment and independence is expected.

The student must be committed to completing the PhD study on time. This requires being proactive and recognising when to seek assistance.

The student must honour mutual agreements with their supervisor.

The student must keep their supervisor informed of activities, progress, problems, and plans related to the PhD study.

The student is a part of QGG and should contribute to the activities in the centre in the same manner as other employees, such as attending centre meetings, seminars, workshops and relevant activities.

The student must be familiar with the official rules for PhD study, as defined by GSTS, and available on the GSTS website (<https://phd.tech.au.dk/for-phd-students/rules-regulations>).

Expectations of the PhD supervisor:

The supervisor must complete an approved supervisor training course.

The supervisor must be aware of the seven requirements of a PhD (see above), and should aim to provide guidance on all parts of the PhD (and not only those related to the PhD project).

The supervisor should provide regular and timely feedback on the student's research. It is important that this feedback is given in a constructive, supportive and sensitive manner.

The supervisor must ensure that they allocate enough time for supervision.

The supervisor must honour mutual agreements with their student.

The supervisor should keep the student informed of relevant scientific activities and ensure that the student is included and encouraged to participate in QGG activities.

The supervisor must be familiar with the official rules for PhD study, as defined by GSTS, and available on the GSTS website (<https://phd.tech.au.dk/for-phd-students/rules-regulations>).

Scheduled events during the PhD study

Key events are described in the timeline below. Red and yellow dots indicate events that are common to all AU PhD study programs, while green dots indicate events that are specific to QGG. The yellow dots are events administered through MyPhD (<https://phd.au.dk/for-current-phd-students/myphd-login>).



Kick-off meeting

When: As soon as possible after the PhD student has started (e.g., within two weeks)

Aims: Introduce the PhD student to co-supervisors

Start aligning expectations between the PhD student and their supervisor(s)

Agree on a plan for the first months of the study

Note: The main supervisor should arrange this meeting

Introduction to QGG mentor

When: Within two months of enrolment

Aims: Meet the QGG mentor

Allow the PhD student to ask questions about PhD studies and life in QGG

Discuss student-supervisor expectations

Note: The mentor will arrange this meeting, and will also invite the supervisor(s)

Start-up presentation at a QGG seminar

When: Within three months of enrolment, prior to submission of the PhD plan

Aims: Present the PhD project to colleagues

Get feedback on the overall project planning

Ensure potential co-supervisors are aware of the project

Note: This presentation is not an evaluation of the student (instead it introduces them to colleagues)

Submit PhD plan

When: Three months after enrolment

Aim: Plan the PhD study
Stimulate project management

Note: The plan should include a supervision agreement, made jointly by the student and supervisor(s)

Meet with QGG mentor

When: Six months after enrolment

Aims: Informally discuss progress on the PhD project

Note: The PhD student is welcome to arrange further meetings with the QGG mentor, if desired

Half-year evaluation

When: Every half year – starting six months after approval of initial PhD plan

Aims: Evaluate the progress of the study
Stimulate project management
Regular updates and adjustments of PhD plan

Note: The PhD student and supervisor(s) are jointly responsible for submitting the evaluation on time

Register for qualifying exam

When: 6 weeks prior to the exam

Aims: Find an external examiner (an expert in field, generally not from AU)
Decide a date (and room) for the exam
Send details to the Graduate School of Technical Sciences

Note: The PhD student and supervisor(s) are jointly responsible for registration

Submit mid-term report

When: 3 weeks prior to the qualifying exam

Aims: The mid-term report serves as a progress report on which to base the qualifying exam

For students enrolled on the 4+4 program, the mid-term report serves as a master thesis

Note: The PhD student is responsible for submitting the report on time

Qualifying exam

When: Usually 18 months after enrolment (two years for students enrolled on the 4+4 program)

Aims: Present and discuss results, and outline plans for the remainder of the PhD study

Get feedback from external experts

Evaluate the progress of the PhD study

Notes: The result of the qualifying examination is either pass or fail

Submit PhD thesis

When: On or before the last day of enrolment (typically three years)

Note: The PhD student is responsible for submitting the thesis on time

Rehearse PhD defence

When: After submission of thesis and before the defence

Aims: To be prepared for the defence

Get feedback from colleagues

PhD defence

When: Typically 10-12 weeks after submission of thesis

Note: The main supervisor organizes the defence

Other events

The following events are arranged on an ad-hoc basis between the PhD student and their supervisor(s):

Regular meetings with supervisor(s)

When: Typically at least once every two weeks

Aims: Discuss plans and results

Follow up on the progress of the PhD study

Section meetings

When: Typically held every two or four weeks

Aims: Get brief updates on research progress from section members

Inform section members of important news

Local research presentations (e.g., to project group or section)

When: Regularly (e.g., at least twice a year)

Aims: Provide more detailed updates on research progress to colleagues

Get qualified and detailed feedback on results and research plans

Practice presentations and scientific discussions in a small forum

Note: It is often appropriate to invite external collaborators

Employee development talks (Danish: MUS)

When: Once a year

Aims: Discuss the PhD student's future career plans and possibilities with section leader

Provide feedback on the section and / or department

Note: Organized by the section leader

Building a good student-supervisor relationship

A good student-supervisor relationship is a decisive factor for a successful PhD study. It is therefore strongly recommended that both the PhD student and their supervisor consider their roles in the relationship very carefully. Below are some recommendations on how to establish and maintain a good student-supervisor relationship.

When recruiting a new PhD student, the main supervisor should ensure that the prospective student is well informed on matters that are important for deciding to pursue a PhD within QGG (e.g. the content of the project, members of the supervisor group, location of QGG etc.)

At the start of the PhD, the PhD student and their supervisor(s) should make time to discuss and align mutual expectations, with regard to the PhD project and the supervision process (suggestions of points to discuss are in **Appendix B**. This discussion should form the basis of the supervision agreement, that is included within the PhD plan.

Good communication is important. Communication should be timely, clear, and constructive.

Make clear agreements on supervision meetings (e.g., their frequency, duration form, whether material should be sent in advance, and if the PhD student should take minutes).

Use the PhD plan and the half-year evaluations as project management tools. If the project is behind schedule or in other way deviates from the plan, it should be reported. The earlier this is done, the sooner the plan can be re-evaluated. It should be kept in mind that the PhD plan is dynamic and it is possible (and common) to change it during the PhD study.

Discuss co-authorship as early as possible when preparing a manuscript (e.g., who expects to be co-authors, what are their contributions, and what order will they appear).

A safe and supportive learning environment facilitates the learning process. This should be achieved by building mutual respect and trust.

Be proactive when encountering problems and do not wait too long to do so. Most problems are easier to solve if addressed earlier.

Praise and recognition are sources of motivation! Feedback should be given both on what can be improved and what is good. The more concrete and constructive the feedback, the better.

How to identify and deal with potential problems

Completing a PhD study is not a trivial task and you will often face many challenges on your way to the goal. An important thing to keep in mind is that it is completely normal to be frustrated and feel “inadequate” sometimes. However, the fact that you were selected to be a PhD student at QGG, means that we strongly believe that you have what it takes to complete a PhD study and end up with a PhD degree. You are not alone and you are encouraged to seek help, regardless of the magnitude and type of challenge or problem.

This section provides an overview of who can help with different challenges related to your PhD study. It also introduces some tools for dealing with problems related to the progress of your PhD study, and for improving collaborations with your supervisor(s) and other colleagues.

The Graduate School of Technical Sciences (GSTS) is responsible for the enrolment and employment of all QGG PhD students. Therefore, all administrative issues related to enrolment or employment (e.g. visa, salary, parental leave and extension of study) are handled by GSTS. The GSTS contact is Nanna Maria Elgaard Pedersen (nmep@au.dk). Please contact her regarding administrative issues. If you suffer from work related stress or psychological problems, GSTS will assist and prescribe consultation at a psychologist or coach. As such problems often affect the progress of your PhD study, your supervisor, and in some cases the head of department, will be involved to ensure that a realistic solution is found.

For more practical issues (e.g. housing, bank, insurance, municipality contact etc., the QGG secretary, Louise Fischer Koue (lfkoue@qgg.au.dk) will often be able to help you.

QGG has a mentor, with whom you can discuss challenges or problems that cannot be solved by your supervisor(s) or the above-mentioned persons (or that you do not wish to discuss with them). The intention is not that the mentor shall solve the problem, but instead point you in the right direction and / or act as a mediator. The discussions with the mentor are informal and confidential. The QGG mentor is Kristian Meier (kristian.meier@qgg.au.dk).

Lastly, QGG has a union representative, who represents all scientific staff employed by the department, and in particular handles issues related to working conditions and salary. The union representative for QGG is Albert Johannes Buitenhuis (bart.buitenhuis@qgg.au.dk).

Identifying and dealing with problems related to the progress of your PhD project:

If you experience scientific problems that affect progress on your PhD project (e.g., delays obtaining data or difficulties completing particular analyses), you should inform your supervisor(s) as soon as possible. Additionally, you should record these problems on your next half-year evaluation. This is especially important if these problems might be subsequently be used as reasons for requesting an extension (see next paragraph). You should also inform your supervisor(s) if your progress is affected by problems of a personal nature. Similarly, your supervisor(s) should tell you if they experience problems that prevent them fulfilling their supervision responsibilities.

PhD students are automatically granted an extension of their PhD studies if they take leave due to childbirth, adoption or prolonged illness. It is possible to obtain an extension for scientific reasons (i.e., if you are unable to complete your PhD thesis within three years). In this case, the PhD student and their supervisor(s) should write a request, explaining why an extension is justified (i.e., what factors caused the delay in completion). This request should be sent to the head of the QGG PhD programme, who will then forward it to GSTS for consideration. Be aware that GSTS will generally only grant short-term extensions (e.g., 3 months), and only if there are compelling arguments why an acceptable thesis can not be completed within the original deadline. Further, if a PhD student is granted an extension for scientific reasons, they will not usually receive a salary for the extra period.

If you are ill (either short-term or long-term), make sure you inform your supervisor(s) as soon as possible and register your absence in MitHR. The QGG secretary, Louise Fischer Koue (lfkoue@qgg.au.dk), can help you sort out the required paperwork.

Identifying and dealing with problems related to supervision and collaboration:

Both PhD students and PhD supervisors are human beings, and problems with interaction and collaboration may occur. The most important thing to do is to react promptly in order to avoid escalation of potential problems, which will minimize the impact of these problems on your PhD.

If the PhD student encounters problems related to the level, frequency or manner of supervision, they should first try to solve the problems together with their supervisor(s). If this is not possible, the PhD student should contact the QGG mentor, Kristian Meier (kristian.meier@qgg.au.dk), or the head of the QGG PhD programme, Doug Speed (doug@qgg.au.dk).

If the PhD supervisor encounters problems with the commitment or effort of the PhD student, the supervisor should first try to solve the problems together with their PhD student. If the problems affect the progress of the PhD study, this should be indicated in the half-year evaluation. For serious violation of the employment contract, the supervisor must contact the GSTS contact, Nanna Maria Elgaard Pedersen (nmep@au.dk).

If facing grave problems (e.g. suspicions of scientific fraud, sexual harassment, discrimination based on race, religion etc.) you should contact either the QGG mentor, Kristian Meier (kristian.meier@qgg.au.dk), or the GSTS contact, Nanna Maria Elgaard Pedersen (nmep@au.dk).

Links and contacts

QGG PhD programme webpage: <https://qgg.au.dk/en/education/qgg-phd-programme>. This includes guides for the qualifying exam and thesis defence, and useful information regarding PhD travels, ECTS and the QGG mentor system.

GSTS webpage: <https://phd.tech.au.dk>. Explains the formal requirements of the PhD, including the official rules and regulations.

QGG secretary: Louise Fischer Koue (lfk@qgg.au.dk). Contact regarding practical issues, such as housing, bank, insurance, contact with the municipality etc.

Head of QGG PhD programme: Doug Speed (doug@qgg.au.dk). Contact regarding PhD issues, such as ECTS requirements, questions about exams, or to request an extension.

QGG mentor: Kristian Meier (kristian.meier@qgg.au.dk). Contact regarding problems with your project or supervision that can not first be solved by talking to your supervisor(s).

QGG union representative: Albert Johannes Buitenhuis (bart.buitenhuis@qgg.au.dk). Contact regarding issues related to working conditions and salary.

GSTS contact: Nanna Maria Elgaard Pedersen (nmep@au.dk). Contact regarding administrative issues related to enrolment or employment, such as visas, salary or parental leave.

Appendix A: Suggested format of the PhD thesis

These guidelines assume the PhD student writes a publication thesis (the most common type at QGG).

The dissertation must be written in English (with a Danish summary) and must not exceed 200 pages, including appendices. A typical thesis comprises about 100 pages. There is no requirement to mention the evaluation committee in the thesis.

Structure of the Dissertation:

The PhD dissertation usually consists of the following sections:

1. Front page

This should contain the title of the dissertation, the name of the student, the year of submission, and the affiliations of the student (i.e., QGG, GSTS and AU). Apart from this information, the front page can be designed freely (e.g., include a relevant illustration)

2. Acknowledgments

This should acknowledge persons, organizations, funding sources, etc. that have supported the PhD studies financially or with other assistance.

3. Table of contents

4. Summary in Danish and English

The summary should be available in both Danish and English and provide a brief outline of the results obtained during the PhD and their significance in a more general context. The summary should not contain too many specific details and must be written in a language understandable for a person with general academic training.

5. List of abbreviations and symbols

This list should contain all non-trivial, scientific abbreviations as well as mathematical symbols used in the dissertation. Note that abbreviations should also always be defined in full at their first occurrence in the main text of the thesis.

6. General introduction

This chapter describes provides a detailed overview of the existing knowledge of the academic field studied during the PhD. It should be specific enough to allow the reader to understand and assess the results presented in the following sections, but at the same time give a more general overview in order to put the results into a larger context. The introduction must be written in the style of a scientific review with references to the original literature.

7. Aims

The aims section should briefly and clearly describe the biological questions addressed in the project. It should not exceed one page.

8. Results chapters

These chapters present the main results of the PhD project, laid out in the form of scientific papers. The chapters can include supplementary material (however, if very long, it may be preferable to include only abbreviated versions, or instead place the supplements in a separate chapter at the end of the thesis). Each chapter should start by explaining the status of the work (i.e., whether the paper has been published, and if so, in which journal). If the candidate has worked on several unrelated projects, it may be beneficial to provide a brief introduction to the project (in which case the general introduction will be shorter and only deal with subjects common to all projects).

Each results chapter should include a section that explains the contributions of the candidate. This will typically be 5-10 lines long, detailing how the candidate contributed to the inception, planning, carrying-out and reporting of the research. When possible, this section should refer to specific parts of the paper (e.g., a section, figure or table). Note that GSTS additionally requires the candidate to submit co-author statements (see <https://phd.tech.au.dk/for-phd-students/thesis-defence> for details).

10. General discussion

The PhD dissertation should be concluded by a thorough summary and discussion of the results obtained, in which these are put into perspective and related to the remaining scientific literature.

11. References

Full references, including titles, must be included for all cited literature. References should be listed in a format that complies with standards for scientific publications in the discipline. As a courtesy to the opponents, it is recommended to use names and years in the text and include full titles in the reference list. The use of hyperlinks to online versions of the cited literature is encouraged.

12. Plagiarism

Copy and paste are not acceptable (except for text written for the qualification exam report). In case of direct citations, the source has to be cited even if it is one of your own publications (self-citation) or if it is from a public source like Wikipedia.

Appendix B: Aligning student-supervisor expectations

These questions can be used as inspiration when aligning expectations between the PhD student and supervisor(s). Some of the answers can be part of the supervision agreement, included in the PhD plan.

1. What is the PhD students motivation and ambition for their PhD?
2. How frequent will there be supervision meetings and who will attend these meetings?
3. What is the preferred mode of interaction? What kind of issues can be dealt with via emails, and what should be saved for a regular meeting?
4. Are the PhD student and supervisor(s) allowed to email each other outside of regular working hours?
5. Will supervision meetings be scheduled regularly, or planned when required need?
6. Should the PhD student submit material before a supervision meeting?
7. Should there be an agenda for supervision meetings?
8. Should the PhD student take minutes of supervision meetings?
9. Who controls the project funds?
10. How will the supervisor(s) contribute literature relevant to the research project?
11. How much time does your supervisor(s) need to give feedback on manuscripts?
12. How many times will the supervisor(s) give feedback on the same manuscript?
13. Will the supervisor correct the writing of the PhD student (e.g., the spelling and grammar)?
14. How are co-authorships decided?
17. How will the PhD student and supervisor(s) monitor progress?
18. What personal issues should the PhD student share with their supervisor(s)?
19. Can the PhD student share confidential things, and trust that they remain confidential?