Finishing Your PhD: Thesis, Viva, Training—in the School of Electrical Engineering, Electronics & Computer Science

Clare Dixon, Ivona Mitrovic, Roberto Ferrero, Alison Goodyear
School of Electrical Engineering, Electronics & Computer Science
University of Liverpool, UK
{cldixon,ivona,ferreror,eeecspgr}@liverpool.ac.uk
In this session we aim to:-

- remind students in year three or four of the University, School and Department training to be completed;
- provide details of the requirements and standards of a PhD;
- describe how PhDs at the University of Liverpool are examined;
- provide advice on writing a PhD thesis;
- explain the organisation of a PhD viva and its outcomes;
- provide advice on preparing for a PhD viva;
- mention the forms to be completed.
Key People

- Your supervisors;
- Clare Dixon - Department of Computer Science Director of Postgraduate Research;
- Ivona Mitrovic, Roberto Ferrero- Department of Electrical Engineering, Electronics Director and Deputy Director of Postgraduate Research;
- Alison Goodyear - PGR administrator.
Timing for Full-Time PhDs at Liverpool

- Research on some topic for 3-4 years leading to a thesis.
- The first 3 years is for the bulk of the research with an additional year allowed for writing up.
- You must submit your thesis within 4 years from your start date.
- Please check your final PhD submission date (from your Liverpool Life record).
- Extensions are extremely rare.
PhD Requirements in Year Three/Four

- Complete any outstanding training (see Departmental guidelines), End of Year Progress monitoring, Annual Progression Requirements etc.
- Write and submit a thesis.
- This is examined (usually) by two examiners: an internal and an external.
- The thesis is discussed/defended in a viva (an oral exam).
Year 3 Training

University
- Completion of Annual Progression Requirements including record of supervisory meetings - 12 per year, one a month
- Careers Development Options
- Complete Annual Progress Report (APR) via Liverpool Life in June.

School
- Finishing Your PhD: Thesis, Viva, Training (seminar)
- Third Year Progress Report (usually May)
- Progress Interview (usually June)

Department
- Computer Science Technical Presentation (CS only)
- Attend Computer Science Research Seminars (CS only)
- Attend Computer Science Postgraduate Workshop (CS only)
Year 4 Training

The most important thing for you to do during the fourth year is to finish writing your thesis.

Please make sure you have completed any outstanding training from previous years. Additionally the following is required.

- **Completion of Annual Progression Requirements including record of supervisory meetings - one a month until your research degree is awarded.**

- **Complete Annual Progress Report (APR) via Liverpool Life in June. You should complete this if you may need to re-register in September eg to complete any modifications to the thesis.**
Record of Supervisory Meetings (reminder)

This is a University wide requirement.

- The University view this as a professional requirement and part of good practice.
- It is used to show engagement with your PhD.
- It is used to provide a formal record of meetings (showing they have happened and may be used in appeals).
- It is part of the formal University regulations— a bit like exams on the taught programmes.
- It is used to satisfy UK Visas and Immigration requirements in relation to visas.
- Other Universities do something similar.
- Alison will try and remind you if you fall behind.
Research Seminars (reminder)

- You are strongly encouraged to attend Departmental Research Seminars to further your knowledge of EEE or CS research.
- This is a great opportunity to learn about current research methods, results and open problems from experts in the area as well as a chance to practice listening and understanding skills and observe presentation techniques.
- The Computer Science Department runs a seminar series on Tuesday afternoons 13-14.
- Details about the talks are available on the CS Departmental web site.
- Some research groups also run group seminars. Talk to your supervisor to find out about these. Offer to present your work there.
Liverpool Doctoral College

From 2015 the University has established the Liverpool Doctoral College (LDC) www.liverpool.ac.uk/doctoral-college/ aiming

- to enhance the overall PGR experience;
- to provide innovative doctoral training;
- to support a thriving doctoral community; and
- to deliver tailored employability and entrepreneurial provision.

There are many development opportunities available. You are encouraged to complete the Development Needs Analysis (DNA) document (see the LDC intranet) to identify additional development training you need.
The Requirements of a Research Degree (QAA)

Doctorates are awarded to students who have demonstrated:

- the creation and interpretation of new knowledge, through original research or other advanced scholarship, of a quality to satisfy peer review, extend the forefront of the discipline, and merit publication;
- a systematic acquisition and understanding of a substantial body of knowledge which is at the forefront of an academic discipline or area of professional practice;
- the general ability to conceptualise, design and implement a project for the generation of new knowledge, applications or understanding at the forefront of the discipline, and to adjust the project design in the light of unforeseen problems;
- a detailed understanding of applicable techniques for research and advanced academic enquiry.
The Requirements of a Research Degree (QAA)

Typically, holders of the qualification will be able to:

- make informed judgements on complex issues in specialist fields, often in the absence of complete data, and be able to communicate their ideas and conclusions clearly and effectively to specialist and non-specialist audiences;

- continue to undertake pure and/or applied research and development at an advanced level, contributing substantially to the development of new techniques, ideas, or approaches; and will have:

- the qualities & transferable skills necessary for employment requiring the exercise of personal responsibility and largely autonomous initiative in complex and unpredictable situations, in professional or equivalent environments.

From QAA Framework for higher education qualifications in England, Wales and Northern Ireland
Requirements of a PhD at the University of Liverpool

The full rules and regulations regarding PhD’s are contained in Ordinance 57(B) (for students who started their studies between April 2011 and end of 2013-2014).

www.liverpool.ac.uk/corporate-governance-and-support-office/calendar/programmeordinances/

The Degree of Doctor in Philosophy may be conferred upon...a candidate...who has submitted...a thesis embodying the results of his/her individual research. . . .

- which is adjudged to make an original contribution to learning;
- which is coherently structured and clearly presented; and
- which shows evidence of systematic study; and
- of ability to relate the results of such study to the general body of knowledge in the subject.
Example Research Degrees

- Whilst the content of research degrees differ within the Department/School think how the above guidelines are applicable to your work.

- In Computer Science, for example, simply doing some implementation would not be sufficient.

- However a proposing a new theory to solve some key problem, exploring any theoretical aspects (correctness, complexity), implementing this, experimenting with the implementation and comparing this the solutions of others would be reasonable (given sufficient content).

- Some PhDs involve purely theoretical work, others may have a greater emphasis on experimentation.
Papers

- PhD students are strongly encouraged to write and submit papers relating to their research.
- These may be workshop, conference or journal papers.
- This provides good practice in writing, presenting your work and responding to questions.
- It also provides external feedback on the work.
- Any published papers should be mentioned in your thesis.
- It gives your examiner confidence in your research.
Timing of Forms in Year Three/Four

- When you have completed your primary research, normally at the end of 3 years full time study, you can transfer to submission pending status. This reduces your fees. Please check that this will not affect your funding (e.g., research council funded students with funding for 3.5 years).

- You must submit an Intent to Submit form at least two months before submission of your thesis.

- On this form your supervisor nominates your internal and external examiners which are agreed by the DDPR.

- These forms are available at www.liverpool.ac.uk/student-administration/research-students/
Writing a PhD Thesis

- Your thesis should well presented, sensibly structured, and contain a clear and systematic account of your work, making clear its contribution to learning, and how it relates to research in the area.

- It should be written and formatted in line with university requirements. These can be found at www.liverpool.ac.uk/student-administration/research-students/thesis-preparation/

- It should be written in English and all sources should be clearly and appropriately referenced.

- Usually PhD theses (including footnotes and appendices) should not exceed 100,000 words and MPhil theses should not exceed 60,000 words.
# Questions to Consider When Writing a Thesis

- What is the research question being addressed?
- What is the contribution your work has made?
- Why is this of interest?
- Which work does this build upon?
- What have others done in this area and how does your work relate to this?
- Is it better, faster, more accurate, ... and provide evidence to justify these claims (theorems, experiments, data etc)?
- You should provide enough details to allow someone else to repeat your experiments.
Practical Help When Writing a Thesis

- Ask your supervisor for their tips on writing.
- Prepare a thesis structure and make a timetabled plan for thesis writing to be agreed with your supervisors.
- Start writing early. After you have finished a particular portion of research it is a good idea to write this up. This helps at the end.
- It is better to write something (even if it doesn’t read well) rather than nothing at all. You can refine it later. It is easier the edit existing text than look at a blank page.
- Spell check your document before you give it to your supervisors to read.
- Don’t expect your draft back in a day or two. Your supervisors will need time to be able to read and comment on your thesis.
The library, University repository and Liverpool Elements contains electronic copies of recent PhDs.

It might be useful to have a look at some from your Department or research group.

For students who write in latex there is a link to a latex style file on the CS PhD web pages. Please make sure it conforms to the University rules.

Make sure you have provided references correctly to relevant work. Are the references uniform in style and complete? Have you made references to relevant work of your examiners?
Practical Help When Writing a Thesis III

- Define any terminology before you use it. Make sure your terminology is consistent.
- Think about your thesis structure. It doesn’t have to be structured in the order you did the work.
- Try make you writing interesting. Think of your reader. Help guide them through your thesis.
- Give examples to help the reader through difficult sections.

6 Steps to Completing Your Dissertation

- Drudgery
- Procrastination
- Panic
- Despair
- Drudgery
- Printing
Writing Skills

- The Development Team offers one or half day writing skills workshops (see www.liverpool.ac.uk/pgr-development/offering)
- The Development Team also offers online resources (see www.liverpool.ac.uk/pgr-development/offering/online-resources/)
- International students can attend thesis writing workshops run by the English Language Centre (see www.liv.ac.uk/english-language-centre/in-sessional-support/)
- The PGR Team website has a web page with details about thesis writing, vivas etc. (see www.liv.ac.uk/student-administration/research/thesis-preparation/)

These book up early.
Don’t panic

• Writing a thesis is daunting.
• Don’t hide away or put it off.
• Break what you have to write into small manageable pieces.
• Start writing early—write up pieces of research once they are complete.
• Talk to your supervisors.
• Take breaks.
Submission of Thesis

- Two hard copies of the thesis must be submitted (one for each examiner) to the Student Reception in the Foundation Building.
- This can be presented in a temporal binding which can be bound in the CS or EEE office. The use of ring binders is not permitted.
- Additionally an electronic copy of your thesis should be sent by email to pgrs@liverpool.ac.uk.
- Along with the copies of the thesis you must hand in a Thesis Submission form.
- After the thesis has been examined and any corrections carried out an electronic version should be submitted through the University open access research portal called Liverpool Elements (elements.liverpool.ac.uk)
What is a Viva?

- A viva is an oral examination attended by the candidate (you), your internal and external examiners.
- Your supervisor is not allowed to attend the viva.
- The object of the viva examination is to allow you the opportunity to explore, clarify and defend their research in the presence of academic leaders in their chosen discipline.
- It is intended to test both the work and the candidate’s knowledge of its context and significance.
- It allows your examiners to ask questions about your thesis and work related to this.
What is a Viva (cont)?

- There is no fixed format, but often examiners begin with relatively open-ended questions (to help put the candidate at ease), followed by detailed questions working systematically through the thesis, and such general areas as the examiners think appropriate.

- After your PhD is submitted your internal examiner will organise the date and time for your viva with you and your external which is normally within three months of your submission.

- There is no fixed time length for a viva - they could be as short as 1-2 hours or take several hours.
How to prepare for your viva I

- Talk to your supervisors. Ask whether they can suggest questions that they might ask. Think of your own questions. Present your work at research group meetings.
- Read your thesis carefully. Make sure you are clear about the contributions you have made and how this fits into the research landscape.
- Are you able to summarise the technical contributions? Write a summary of each chapter. Identify areas that may be challenged.
- Often vivas start asking for you to outline the contributions of your work and how it relates to work in the area. Check with the internal examiner whether they would like a short presentation.
- You could ask your supervisors for a short mock viva to give you an taste of what this might be like.
How to prepare for your viva II

- Make sure you are aware of related work in the field. Make sure you know the contents of the work you have cited.
- Examiners can ask *anything* even very indirectly related to the work, as long as it is mentioned in some way. For instance, if you have used a method for a small part of the work and then the external might ask for details about this and you should be prepared to answer.
- Have you become aware of new work that relates to your work (since you submitted)? Have you done any further work since submission, or submitted any conference or journal papers?
- What work have the examiners done that relates to your area? Be prepared to discuss this.
- Take in an annotated copy of your thesis.
The Viva Process

- In advance of your viva, your examiners will prepare independent written reports on your thesis.
- After the examination, a formal joint report with an agreed recommendation will be produced.
- The internal examiner should provide you with informal feedback, and if necessary, a copy of the revisions that have been requested.
Outcomes of the Viva

The Examiners may recommend:

- pass;
- pass subject to minor modifications (the modifications should usually be carried out within three months of the viva);
- resubmission (revisions to be made usually within one year of the date of the viva);
- to award MPhil subject to, if required, amendments to the thesis;
- resubmission for the award of MPhil (revisions to be made usually within one year of the date of the viva);
- fail.
Outcomes of the Viva (Cont.)

- For the full wording please see Ordinance 57(B).
- For any modifications (minor or a full re-submission) your examiners will provide a list of what should be done. They will also decide whether just one of the examiners or both needs to approve these.
- You should discuss how to tackle these modifications with your supervisors.
- Once you have addressed the modifications they need to be approved by the examiner(s).
- Once the thesis has been approved you must submit an electronic version through the University open access research portal called Liverpool Elements (elements.liverpool.ac.uk)
If you have a DTG/University/School/Departmental Studentship please check how long this is for so there are no surprises.

If you have any queries in relation to this please contact School Finance officer Angela Winker (eeecsfir@liverpool.ac.uk). Elaine Smith is the Computer Science Departmental finance administrator (ground floor Ashton Building).

This is a reminder that bookings for any any travel that is being funded via the Department, School or via Research Support Fees should be booked through the finance team (eeecsfir@liverpool.ac.uk).
Leaving the University

- Please clear your workspace and return your office key to Alison/Rebecca.
- Graduation occurs in July and December when your degree will be conferred on you.
- Please note that there are cutoff dates for the University to have received all the documents and final version of the thesis so you may not be able to graduate at the next ceremony.
- Once you have submitted your final thesis you will receive information from the Student Administration and Support Division regarding graduation.
- Remember that the University has a Careers Department that can help you explore your career options and achieve your potential.
- Please keep in touch.