How to write a good (maths) Ph.D. thesis

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University of Bath

Postgraduate Away Day
3rd February 2012
The purpose of a thesis

University regulations (the easy bit)

Content and structure (the harder bit)

Presentation and writing process

Make your life easier - some helpful \LaTeX

The defense

Summary
Outline

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Summary
University requirements

A Ph.D. shall be awarded to a candidate who shall have

1. pursued a programme of study as prescribed under Regulation 16.5(b)
2. presented a thesis on the candidate’s advanced study and research which satisfies the Board of Examiners as:
   - making an original and significant contribution to knowledge
   - giving evidence of originality of mind and critical judgement in a particular subject
   - containing material worthy of peer-reviewed publication
   - being satisfactory in its literary and/or technical presentation and structure with a full bibliography and references
   - demonstrating an understanding of the context of the research: this must include, as appropriate for the subject of the thesis, the scientific, engineering, commercial and social contexts
3. and passed a viva voce examination conducted by the examiners on the broader aspects of the field of research in addition to the subject of the thesis...
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University regulations for submitting a Ph.D. thesis

• For details see
  http://www.bath.ac.uk/student-records/pgresources/
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- Number of copies and submission procedure:
  - about two months before submission - HD1 form.
  - 3 soft bound copies to Graduate Office - HD2 form.
  - hard bound copies and electronic submission to library only after the viva.
University regulations for submitting a Ph.D. thesis

- Paper and layout - double or single sided.
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• Paper and layout - double or single sided.
• Typeface and spacing - 11pt or 12pt, easy readable font.
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- Title page and copyright declaration.
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- Title page and copyright declaration.
- Table of contents and abstract/summary.
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- Numbering of pages.
- Title page and copyright declaration.
- Table of contents and abstract/summary.
- Follow the University regulations for margin sizes/line spacing/fonts/binding etc.
Presentation and style

• Typical:
  1. **Title page** (listing author, title, department, type of degree, year and month of submission).
  2. Declaration that work has not been used in another degree.
  3. **A copyright statement**.
  4. A list of notation.
  5. A brief statement of author’s research career.
  6. Acknowledgements and dedications.
  7. **Table of contents**.
  8. List of Figures.
  9. List of Tables.
 10. **Abstract/Summary**.
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- Opening pages: indication which parts have been published.
- Optional: index.
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Content

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- No unnecessary material. Most theses are too long.
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• Organisation and structure is important.
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- Who are you writing for? (your supervisor(s), internal and external examiner)
Plagiarism - DONT!

- If you copy text put it in quotation marks and cite the source.
- Do not copy proofs of theorems unless it is really necessary for the thesis.
- Your examiners will be particularly alert to plagiarism.
Grammar, Spelling, Punctuation - DO!

- Use spell checkers!
- Ask a friend/fellow student or family member to read through parts of your thesis.
Clear communication of original ideas is most important!
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Do not waffle!
Structure

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- Demonstrate a sound knowledge of existing work, give a critical survey (Literature review).
- What is new/original in your thesis? This should be the main part of your thesis (3-4 Chapters).
- For computational projects, normally a comparison with other methods is required.
- Conclusions: What have you done? Identify future research directions/open problems.
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• **Conclusions** Short conclusion. Future research.
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Summary
Presentation and style

Make your thesis clear and enjoyable to read!
You do not want the reader to get angry or bored or both.
Writing Process - The iterative process

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- A sooner rather than later writing also helps you to become familiar with \LaTeX.
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- Fill in the gaps.

Thoroughly read and check before submission - have as many people read it as possible.
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Research

Review ← Compose
Hints and tips for writing

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• Keep what you have written for a couple of weeks and then re-read it.
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Summary
Packages

- \LaTeX and text editors
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- baththesis.sty
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- MakeIndex
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- baththesis.sty
- MakelIndex
- \texttt{BIBTEX}
Templates

• A useful template for writing a thesis which follows the University of Bath regulations:
  http://people.bath.ac.uk/mamamf/baththesis/

• Feel free to download the template and change it to use it for your own thesis. It follows all the necessary University of Bath requirements.
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- BibTeX - a wonderful LaTeX program for collecting references in .bib files which then can be used in LaTeX.
- MathSciNet, Google Scholar, CiteSeer, Mendeley and others.
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Summary
The Viva

- In the UK: normally you are asked questions.
- Possibly: short talk.
- Read your thesis.
- Opportunity to tell interested people about your research.
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Summary
Summary/Homework

- Your thesis should tell a story (try it!).
- Think about some good maths papers/books you have read, what were they doing well?
- Start as early as possible.
- Use `baththesis.sty` early on.
- Have a general structure (chapter titles/outline) in place early on.
- Make a timetable (set short term targets).
- (Re)-read your thesis as often as you can.
- Be positive.
Know your work cycle!


Questions?