

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



UNIVERSITY OF  
**BATH**

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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  $\text{\LaTeX}$

The defense

Summary



# Outline

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# University requirements

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## 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

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- For details see

<http://www.bath.ac.uk/student-records/pgresources/>



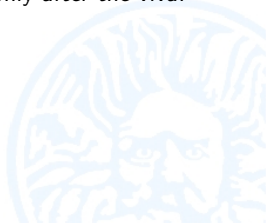
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- Number of copies and submission procedure:
  - about two months before submission - HD1 form.
  - 3 soft bound copies to Graduate Office - HD2 form.
  - hard bound copies and electronic submission to library only after the viva.



# University regulations for submitting a Ph.D. thesis

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- Table of contents and abstract/summary.



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- Typeface and spacing - 11pt or 12pt, easy readable font.
- 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

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- 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.**



# Presentation and style

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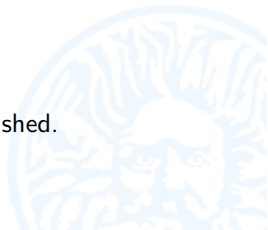
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- Opening pages: indication which parts have been published.
- Optional: index.





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- May include more than one topic.



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- **Organisation and structure is important.**
- **Who are you writing for?** (your supervisor(s), internal and external examiner)



# Plagiarism - DONT!

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- 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!

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- Use spell checkers!
- Ask a friend/fellow student or family member to read through parts of your thesis.



# Structure

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**Clear communication of original ideas is most important!**



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Do not waffle!



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- 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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# Presentation and style

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**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  $\text{\LaTeX}$ .

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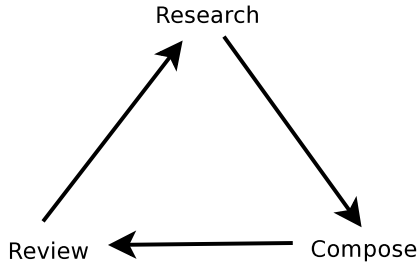
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- **Make a timetable.**
- What have you done? What do you still need to do?
- Fill in the gaps.
- Thoroughly read and check before submission - have as many people read it as possible.



# Writing Process

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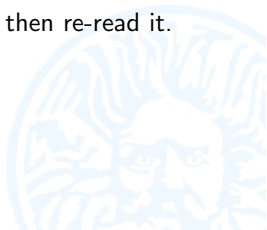
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- Keep what you have written for a couple of weeks and then re-read it.



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# Packages

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- $\text{\LaTeX}$  and text editors



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- $\text{\LaTeX}$  and text editors
- `baththesis.sty`





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- $\text{\LaTeX}$  and text editors
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- $\text{\BIBTeX}$



# Templates

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- 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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- MathSciNet, Google Scholar, CiteSeer, Mendeley and others.



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# The Viva

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- 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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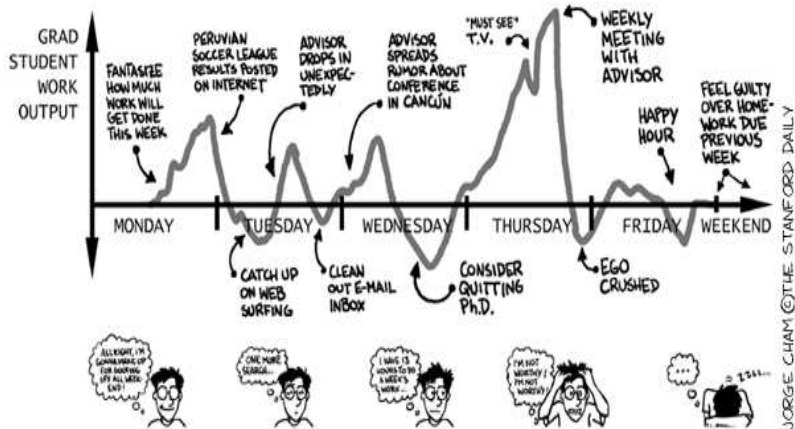
# Summary/Homework




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- 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!



-  N. J. HIGHAM, *Handbook of writing for the mathematical sciences*, Society for Industrial Mathematics, 1998.
-  D. KNUTH, T. LARRABEE, AND P. ROBERTS, *Mathematical writing*, no. 1193, Mathematical Assn of Amer, 1989.
-  S. KRANTZ, *A primer of mathematical writing: Being a disquisition on having your ideas recorded, typeset, published, read and appreciated*, Amer Mathematical Society, 1997.

**Questions?**

