How to Research: Research, Reading & Synthesis

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What's new?

- Your MSc dissertation project is **not** another (large) piece of coursework
  - your advisor doesn't know the answer
  - you will need to teach yourself new things in order to be able to do the project
  - your advisor wants to learn from you
  - the project needs to be driven by you

Why research?

- To find out what has been done before: prevent reinventing the wheel
- To find out why something is hard
- To find out possible ways to solve the problem
- To get inspiration

Getting started with research

- Use a wide variety of tools
  - search the web: Google, CiteSeer, Amazon, …
  - UoB on-line catalogue of books and journals
  - go to the library & browse journals, books
- Try to identify
  - major papers in the subject area
  - current state of the art and open problems
- Always research with a purpose!
  - it's easy to get lost

Background research: method

- Initially random walk: charting the terrain quickly and approximately by identifying landmarks
  - main papers, main researchers, main journals, main conferences, ...
- starting point can be anything
  - latest volume of conference proceedings, paper provided by advisor, web repository, ...

Background research: method (2)

- Later drilling down: reading papers that are highly relevant to your project in detail
  - but not more detail than necessary
- These are the papers that will end up in your bibliography

Reading papers

- Papers can be read at many levels:
  - abstract only
  - abstract, introduction + conclusions
  - + opening / closing paragraphs of sections
  - complete read-through, skipping details
  - studying the paper in depth
- Appropriate level depends on your goal, and where you are in your research

Selecting papers

- Useful papers to include in your literature review:
  - survey papers
  - landmark work often cited
  - recent work closely related to your own
- Be sure to
  - obtain the most recent published version
  - take note of relevant bibliographic details

Writing a literature review

- Start writing early
  - keep notes while reading papers
- Present a coherent framework
  - what are the major approaches?
  - what are the main open problems?
- Choose the right level of detail
  - keep your audience and goals in mind

Synthesis

- Don't just copy, give your own opinion!
  - is it a good way to approach things?
  - does it always work, or are there fundamental limitations?
  - how would it help you to solve your problem?
  - contrast and compare different alternatives; which one do you prefer and why?