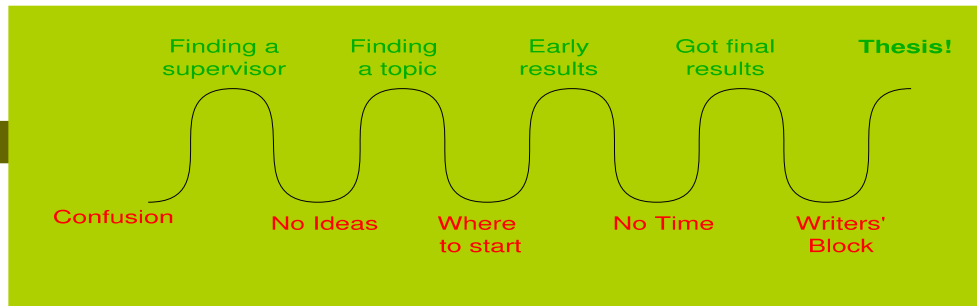


The MIT Research Project HOWTO

Surviving the Research Rollercoaster



Hussein Suleman
hussein@cs.uct.ac.za

University of Cape Town
Department of Computer Science
Digital Libraries Laboratory / Centre for ICT4D



November 2017

Somewhat of an outline ...

- ▣ The Thesis
 - ▣ The Supervisor
 - ▣ 9 step research degree process
 - ▣ Common Pitfalls
-
- ▣ Further reading: Various books on how to successfully complete a Research Degree



The Thesis

- ❑ Must demonstrate ability to do research at a Masters level:
 - Understanding of literature, understanding of scientific methods, ability to carry out research, ability to analyse results and draw conclusions, scientific presentation, innovation, publishability
- ❑ Should be linked to learning in MIT coursework.
- ❑ Need not involve programming.
- ❑ Often somewhat original, but not absolutely necessary for Masters!
- ❑ ~50 pages for C+D degrees



The Supervisor

- ❑ Assistance with choosing a topic.
- ❑ Advice on planning/proposal development.
- ❑ Feedback on research as it progresses.
- ❑ Comments on written work.
 - Presentation/language/style.
 - Quality of content.
- ❑ Decide up-front what supervision will be provided!



1. Thinking About Research Areas

(usually Year 1 – Semester 2)

- ❑ Consider interesting problems at work.
- ❑ Consider interesting applications of computing in your undergraduate specialisation.
- ❑ Attend CS department seminars.
- ❑ Join and read discussions on mailing lists.
- ❑ Read papers and theses of previous students on:
 - <http://pubs.cs.uct.ac.za/>
 - <http://open.uct.ac.za/>
- ❑ Read widely!

Welcome to UCT CS Research Document Archive



Welcome to the [UCT Computer Science](#) Research Document Archive, which archives and makes accessible documents that are products and by-products of research in the department.

Search the Titles, Authors, Abstracts and Keywords :

[Browse](#)

Browse the archive by [Subject](#), [Year](#), [1st](#) or [Topic](#).



2. Find a Supervisor

(usually end of Year 1)

- ❑ Staff have specific interests:
 - <http://www.cs.uct.ac.za/>
- ❑ Speak to multiple staff:
 - This is more about matching area/personality than topic.
 - You WILL be turned down – do not take it personally!
- ❑ Once you find a supervisor, agree on what supervision will be provided.
- ❑ Inform course convenor.



The screenshot shows the 'STAFF' page of the University of Cape Town Department of Computer Science. It features a navigation bar with tabs for 'Academic Staff', 'Technical and Support Staff', 'Administrative Staff', 'Post-doctoral Researchers', and 'Teaching Assistants, Tutors and'. The 'Academic Staff' tab is selected. Below the navigation bar, there are two staff profiles. The first profile is for Sonia Berman, an Associate Professor on sabbatical in 2016, with her office, telephone, email, research interests (Databases), and teaching areas (Databases, algorithms) listed. The second profile is for Edwin Blake, a Professor on sabbatical from July-December 2016, with his office, telephone, email, website, and research/teaching interests listed.

STAFF

Academic Staff | Technical and Support Staff | Administrative Staff | Post-doctoral Researchers | Teaching Assistants, Tutors and

Academic Staff

Sonia Berman
BSc Rhodes, MSc PhD UCT
Associate Professor, on sabbatical in 2016

Office: Room 317.3, Computer Science Building
Telephone: +27 21 650 2668
Email: sonia at cs dot uct dot ac dot za

Research: Databases ([more details...](#)).
Teaching: Databases, algorithms.

Edwin Blake
BSc (Hons) Wits, PhD London
Professor, on sabbatical from July-December 2016

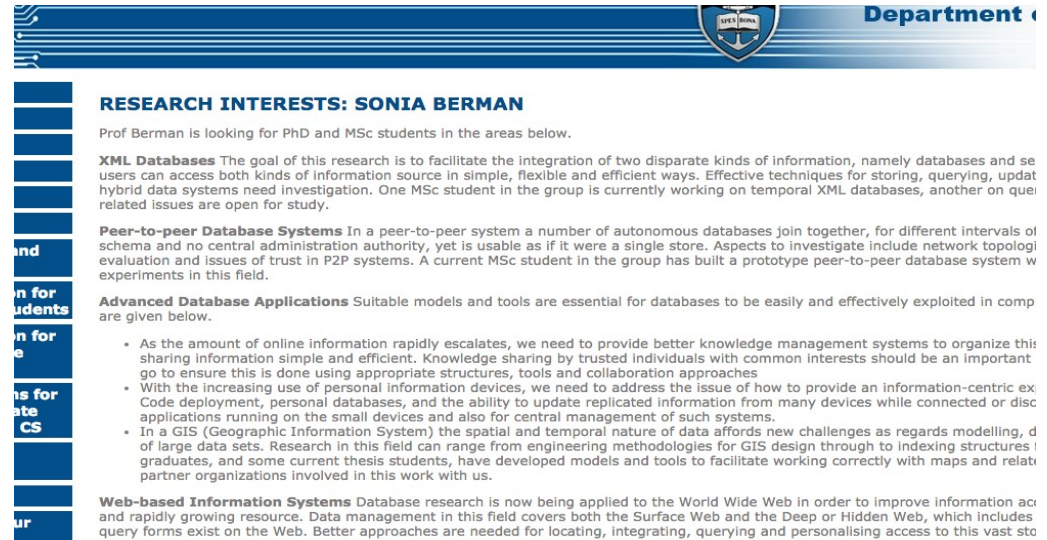
Office: Room 312, Computer Science Building
Telephone: +27 21 650 3661
Email: edwin at cs dot uct dot ac dot za
Website: <http://www.cs.uct.ac.za/~edwin/>

Research: information technology for development, user experience in games and virtual n
Teaching: Functional programming, advanced software design, user experience in games a



3. Find a Topic

(usually beginning of Year 2, but earlier is better)



The screenshot shows a webpage header for the Department of Computer Science. Below the header, there is a section titled "RESEARCH INTERESTS: SONIA BERMAN". The text indicates that Prof Berman is looking for PhD and MSc students in the areas below. The research interests are categorized into three main areas: XML Databases, Peer-to-peer Database Systems, and Advanced Database Applications. Each area has a brief description of the research goals and current projects. The XML Databases section mentions the integration of two disparate kinds of information. The Peer-to-peer Database Systems section describes a system where autonomous databases join together. The Advanced Database Applications section discusses suitable models and tools for databases. A list of bullet points follows, detailing specific research challenges and goals. The Web-based Information Systems section mentions the application of database research to the World Wide Web.

RESEARCH INTERESTS: SONIA BERMAN

Prof Berman is looking for PhD and MSc students in the areas below.

XML Databases The goal of this research is to facilitate the integration of two disparate kinds of information, namely databases and search engines. Users can access both kinds of information source in simple, flexible and efficient ways. Effective techniques for storing, querying, updating and hybrid data systems need investigation. One MSc student in the group is currently working on temporal XML databases, another on query-related issues are open for study.

Peer-to-peer Database Systems In a peer-to-peer system a number of autonomous databases join together, for different intervals of schema and no central administration authority, yet is usable as if it were a single store. Aspects to investigate include network topology, evaluation and issues of trust in P2P systems. A current MSc student in the group has built a prototype peer-to-peer database system with experiments in this field.

Advanced Database Applications Suitable models and tools are essential for databases to be easily and effectively exploited in complex applications. The following are given below.

- As the amount of online information rapidly escalates, we need to provide better knowledge management systems to organize this sharing information simple and efficient. Knowledge sharing by trusted individuals with common interests should be an important goal to ensure this is done using appropriate structures, tools and collaboration approaches
- With the increasing use of personal information devices, we need to address the issue of how to provide an information-centric environment. Code deployment, personal databases, and the ability to update replicated information from many devices while connected or disconnected applications running on the small devices and also for central management of such systems.
- In a GIS (Geographic Information System) the spatial and temporal nature of data affords new challenges as regards modelling, distribution of large data sets. Research in this field can range from engineering methodologies for GIS design through to indexing structures for graduates, and some current thesis students, have developed models and tools to facilitate working correctly with maps and related partner organizations involved in this work with us.

Web-based Information Systems Database research is now being applied to the World Wide Web in order to improve information access and rapidly growing resource. Data management in this field covers both the Surface Web and the Deep or Hidden Web, which includes query forms exist on the Web. Better approaches are needed for locating, integrating, querying and personalising access to this vast store.

- ❑ Suggest your ideas to supervisor.
- ❑ Ask supervisor for suggestions.
- ❑ Consider topics listed on supervisor's research pages.



4. Write a Research Proposal

(usually January/February/March of Year 2)

- ❑ Follow format on department website.
 - http://www.cs.uct.ac.za/teaching/forms/researchProposalGuide_2007.pdf/view
 - description of problem, research questions, proposed solution, methodology to answer questions, workplan
- ❑ Aim is to ensure:
 - Your project is enough work and at right level.
 - Your project is not too big or too difficult.
- ❑ Submit proposal to course convenor.
- ❑ Revise proposal if necessary.



5. Conduct Research

(usually January-October of Year 2)

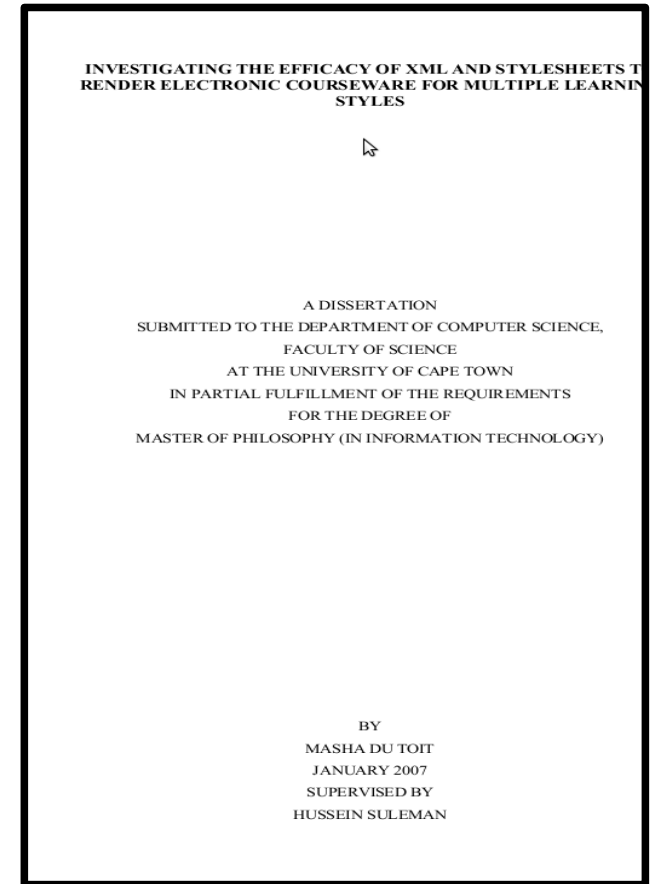
- Read (more) background literature.
- Do actual work!
 - Get ethical clearance if necessary (apply early).
 - Develop/deploy/analyse/evaluate systems.
 - Perform experiments.
 - Conduct surveys of users.
 - Perform analysis of results.
 - etc.



6. Write up Thesis

(usually last 6+ weeks of Year 2)

- ❑ Use a format similar to previous students.
 - see pubs.cs.uct.ac.za
- ❑ Writing **MUST** be in scientific style, with citations wherever necessary and a reference list at the end.
 - Think Wikipedia!



7. Submit Thesis

(usually end of Year 2, but up to Feb of Year 3)

- ❑ See Faculty Handbook for deadline.
 - or ask at Faculty Office (0216502713).
 - If you miss the deadline, you will have to re-register for a third year!
- ❑ Inform faculty of intention to submit.
- ❑ Submit copies of the thesis directly to Faculty Office in format they require.



8. The Waiting Game

(usually February-May of Year 3)

- ❑ Thesis will be sent for examination (1-2 months).
- ❑ 5 reports are written by: supervisor, 2 examiners, HoD and Dean!
- ❑ Dean informs supervisor of outcome.
 - Supervisor will inform you.
 - But to check on status, ask Faculty Office.
- ❑ Note: You are not registered in Year 3!



8b. Resubmissions (hopefully not)

- ❑ If examiners require substantial changes, you may be required to revise and resubmit.
- ❑ You will then have to register for Year 3!
- ❑ Consult supervisor and make improvements to thesis.
- ❑ Submit as before.



9. Corrections and Final Copy

(usually May/June of Year 3)

- ❑ Talk to supervisor about corrections.
- ❑ Perform corrections and write report on corrections.
- ❑ When supervisor is happy, submit final thesis and correction report to supervisor, and then to faculty.
- ❑ Submit PDF to pubs.cs.uct.ac.za.
- ❑ Ask faculty about graduation procedure.
- ❑ Celebrate!



Common Pitfalls 1/5

- ❑ Leaving research project to after coursework is done.
 - What happens: You need a break after coursework, then cannot get back into work mode.
 - Remedy: Don't!

- ❑ Not knowing where to start.
 - Remedy: Start with CS dept Web pages, then speak to some of the staff.



Common Pitfalls 2/5

❑ Cannot find a topic.

- What happens: Everything you think of is not a good enough topic, you do not know what is a suitable topic and where to find one.
- Remedy: Ask your supervisor. It is easier to find an acceptable area and then find a topic.
- Remember:
 - ❑ Your supervisor has done this many times.
 - ❑ The research process is more important than the topic!

❑ Procrastination.

- Remember: You want to do this. We will not force you.



Common Pitfalls 3/5

❑ Writer's Block.

- What happens: (blank)
- Remedy: Speak to supervisor about approaches to writing, such as using outlines. Get a professional editor if necessary.

❑ Unrealistic expectations.

- What happens: You set tight deadlines to do difficult tasks and cannot get them done.
- Remedy:
 - ❑ Understand how you work best. If you need tight deadlines, set them and tell your supervisor.
 - ❑ Do not agree to write complex programs in Perl when you barely know Java. :)



Common Pitfalls 4/5

❑ Exhaustion.

- Remedy: Planning. Plan your research around your other commitments. Take time off from the research for work/family, but make sure to take time off from work/family for research!

❑ Research never ends.

- What happens: Supervisor wants more work.
- Remedy: Know when to say NO.
- Remember: A Masters degree trains you to do research – it does not expect you to solve all the problems of the world!



Common Pitfalls 5/5

❑ The absent supervisor.

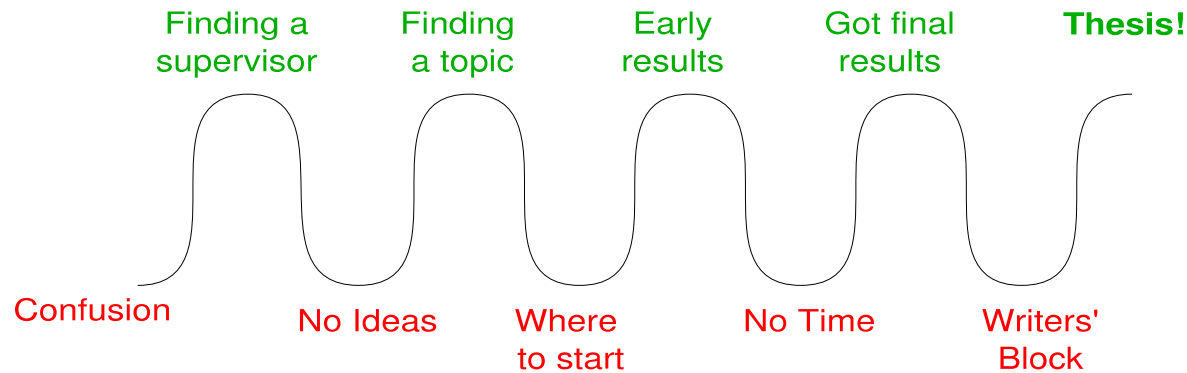
- What happens: S/he may not be providing adequate guidance.
- Remedy:
 - ❑ Speak to supervisor and/or course convenor.

❑ Boredom.

- What happens: You dislike what you are working on so do not work.
- Remedy: Discuss the possibility of a change in topic/supervisor asap!



Discussion...



to find me, search on Google or Facebook for "Hussein Suleman"