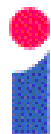# How to Get a PhD in Informatics

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Starting on a Research Project

A Daunting Prospect?

- **Significant and Original Research.**
- **Creativity is learnable.**
- **Researchers Bible.**
- **Anyone can do it:**
  - **sufficiently bright;**
  - **work hard;**
  - **take this advice.**

Choosing a Project

- **Criteria project must meet:**
  - inspiring;
  - significant and original;
  - do-able;
  - supervisable.
- **Sources of ideas:**
  - supervisor & other colleagues;
  - read literature of chosen area;
  - further work suggestions of others;
  - previously, badly done work.

Types of Research

- Development of new techniques.
- Exploration of existing techniques:
  - theoretical analysis;
  - 'rational' reconstruction;
  - experimental exploration and hypothesis testing;
  - comparison of several techniques;
  - comparison to natural systems.
- Extension and improvement of existing techniques.
- Application of known techniques to new domains.

Hypothesis and Evidence

- **What hypotheses will you investigate?**

- **Along what dimensions will you explore properties or relations of techniques or systems?**

- **What kind of evidence will you present to support your hypotheses?**

When Things Go Wrong

I'm starting to get the impression that you're not happy here, Jones.

"I'm starting to get the impression you're not happy here, Jones."

Postgraduate Diseases

- **Manna from Heaven.**
- **Ivory Tower.**
- **Solving the World.**
- **Ambitious Paralysis.**
- **Computer Bum.**
- **Stamp Collecting.**
- **Misunderstood Genius.**

Psychological Hurdles

- **Loneliness of the long distance researcher.**
- **Self doubt.**
- **Early morning --- Cold start.**
- **Theorem envy.**
- **Fear of exposure.**
- **Dealing with criticism.**

Good Working Habits: Keeping Regular

- **Regular hours:**
  - get a routine.
- **Regular reading:**
  - outer, middle and inner circles.
- **Regular writing:**
  - notes, technical reports and journal articles.
- **Regular talking:**
  - informal chats, seminars and conference talks.
- **Regular check-ups:**
  - where am I going?
  - what will it be like when I get there?
  - what step should I take next?

Relations with your Supervisor

- **Meet regularly.**
- **Provide written and oral reports,**
  - **before meeting**
  - **and summary of main actions afterwards.**
- **Talk over problems.**
- **You can swap them.**

Sorting Out Your Ideas

Structure of Thesis

- **Introduction**: motivation, extended contents.
- **Literature Survey:** broad and shallow.
- **Background:** technical introduction.
- **Specification:** what you required.
- **Implementation:** what you did.
- **Results:** how well it worked.
- **Related Work:** deep and narrow.
- **Further Work:** what is left to do.
- **Conclusion:** significance of achievement.
- **Appendices:** glossary, full results, example traces, selected code, etc.

Thesis Message

- Abstract of thesis.

- Each sentence corresponds roughly to thesis chapter.

- Whole reads as central argument of thesis.

- Helps ensure thesis hangs together ...

... and nothing is missing.

The Computational Modelling of Religious Concepts
by Fr. Aloysius Hacker

- We apply ideas from Computer Science to the understanding of religious concepts.
- Problems with previous attempts to explain religious concepts,
  - e.g. the holy trinity and miracles.
- These problems arose because the appropriate terminology was not available.
  - Computational terminology often provides an appropriate analogy.
- Although some problems still remain,
  - e.g. free will,
- We are seeing the beginning of a new, computational theology.

Conclusion

- **You too can get a PhD ...**
  - **... just by following this simple advice.**
- **Keep doing meta-research.**
- **Keep regular --- stay healthy.**
- **Communicate!**

  Recommended Reading: Researchers Bible.

  http://homepages.inf.ed.ac.uk/bundy/how-tos/resbible.html