

How to do research (?)

Ian F. Blake

University of Toronto

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The joys of research

- ▶ Research, a process of discovering new facts, methods etc
 - ▷ finding new ideas or new ways of doing old ideas
- ▶ Immensely satisfying to make new discoveries
- ▶ Very frustrating when stuck
- ▶ A privilege to travel to conferences and talk to/work with some of the best minds around the world
- ▶ What do you expect to be doing ten years from now?
 - ▷ choose the problem (area) appropriately
- ▶ The 'one time in your life to work on something really interesting' vs 'I'm going to need a job when I'm finished'

Finding a research problem

Finding a good problem **IS** the problem

- ▶ Choose something between trivial and impossible
- ▶ High risk/high reward vs low risk/low reward
- ▶ Work on important problems?
- ▶ Incremental vs disruptive problems
- ▶ The best researchers seem to have insight
- ▶ Supervisor chosen vs student chosen
- ▶ The problem and your personality

You're stuck - when bad things happen to good people:

- ▶ Knowing when to 'cut and run' or 'stay the course'
- ▶ Keep reading good authors in your area
 - ▷ there's a reason they have been successful
 - ▷ they often start new directions, leave things open
- ▶ As appropriate, work out small examples, get experimental data
 - ▷ write a computer program to test your understanding
 - ▷ often suggests the way forward - theorems etc
- ▶ Have some related problems at hand to work on

Characteristics of good researchers:

- ▶ Courage, confidence and imagination
 - ▷ don't expect every idea to work out - 1 out of 10?
- ▶ Intelligence vs creativity vs effort
- ▶ Persistence vs inspiration
- ▶ You have to enjoy what you're doing!
 - ▷ without this, you cannot do good work
- ▶ Learn how to give a great talk and write well
 - ▷ **they can be learned!**
 - ▷ papers on websites

Good luck