How to do Research

Eyal de Lara

Computer Science

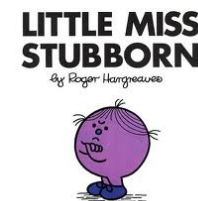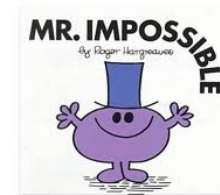University of Toronto

Finding the Right Topic

- Read a lot

- Find a problem that fascinates you
  - 5 years is a lot of time to spend on something you are not gaga about
  - If you are not excited, how do you expect to sale it to others

- Characteristics of a good topic/problem
  - Real
  - Relevant (others care about it, or can be made to care)
  - Good shelf life (still relevant in 5 to 10 years)
    - Will not go away on its own in a reasonable time frame
  - Can measure/quantify benefits, improvements, savings

  - Also nice
    - Can be broken into 2-4 paper size components
    - Not over subscribed

Research Methodology

- Don't stress too much about creating a complete picture of Dissertation on day 1
- Identify the first step
  - Come up with 1 key new idea
  - First major problem that you want to attack
  - Ideally, double in 12 to 18 months
- Don't just stand there, do something!
- Other steps will become obvious as you start to work
- Own your project!
- For each major research thrust
  - Determine the point you are tying to make
  - Design an experiment that validates your point
  - Build the minimum software embodiment that supports your experiment
  - Measure
  - Report results
  - Optional : Productize

Persistence

- Everything will take longer than anticipated

- Your papers will get rejected

- Some ideas will not pan out

- Don't give up!

- Learn from your mistakes!

- Get on the horse again!

- Don't confuse perseverance with:
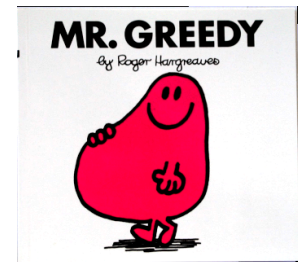 - Stubbornness
  - Ego

Collaboration

- Owning your project does not mean that you cannot work with others

- Students
  - Comrades in arms to share laughs and tears
  - Mentoring opportunity

- Faculty
  - Role models
  - Letters of reference

- External
  - Impact beyond narrow institutional walls

- Collaboration demands awareness of others' needs

Communicating and Publishing Results

- **"If a tree falls in a forest and no one is around to hear it, does it make a sound?"**

- If you don't communicate your work, it might as well not exist

- Get feedback, soon and often

- Poster, WIP

- Workshop

- Conference

- Journal

- Talk to people

- Ask questions at talks

- Meet with visiting speakers

Questions?