PRISM
Lecture 1 - An Overview of CS Research

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University of Toronto, Winter 2021
This Workshop

Topics

- **Week 1 (today):** CS Research overview
- **Week 2:** Learning about prior work
- **Week 3:** Scientific problem solving
- **Week 4:** Writing a research paper
- **Week 5:** Giving talks and presenting posters
- **Week 6:** Embarking on your research career

This plan is flexible, so if there’s another topics you’d like to hear about, just let us know!
This Workshop

- **Typical class meeting**
  - 40 minute talk by a CS researcher
  - 40 minutes of lecture
  - 30 minute interactive activity (e.g. critique a paper or talk)

- **Today:** research talks by faculty members

- **Final week:** Poster session, presentation of lit reviews
This Workshop

- Not a course, so no formal enrollment or certificate of completion
- Won’t help your CV — participate because you want to learn, not because it will give you a leg up
- What’s required?
  - Participate in in-class activities
  - Present a lit review in the poster session on the final day (4/9), on a research topic of your choosing
How is research different from courses?

- Rather than absorbing existing knowledge, trying to produce new knowledge
- Learn one topic very deeply
- No single right answer, no clear-cut boundary between success and failure
- Learn things as you need them, rather than proceeding linearly through subjects
- Many different things can go wrong and ruin an experiment
- Exciting to be at the frontier of knowledge
The Research Experience

Some challenges

- Dealing with repeated failure
  - Most attempts don’t succeed — which is why the problem hasn’t been solved yet!
  - Important not to take it personally
- Uncertainty: you don’t know how the results will turn out, which is why we need to do science
- Isolation: very few people understand the details of the work that you’re doing
The Research Experience

The ups-and-downs of research

- “This problem is impossible.”
- “Wait — I got it!”
- “Oh, doesn’t work. I forgot about X.”
- “Hey, I fixed it! Now it works waaaay better than the baseline.”
- “Darn, I found a bug in my baseline implementation. Now the baseline’s just as good.”
- “Oooh, there it is. I set $\alpha = 0.1$, but setting $\alpha = 0.5$ works waaay better.”
- “Oh no! Here’s a paper in last year’s conference that did the same thing!”
- “Actually, now that I read it again, it’s totally not the same thing. My way is better because of X, Y, and Z.”
- And so on...
The Diversity of CS Research
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Meet Ludwig: a boyish robot that can analyse dementia patients by talking with them

TORONTO - Dr. Frank Radtke built a robot five years ago. It was five feet tall, and it had a belted white coat, like an early iRobot. It followed Alzheimer’s disease and dementia patients around their homes, and instructed them to do basic tasks. But it couldn’t listen to them.

Fixing that limitation was the idea behind Radtke’s latest project: a two-foot robot named Ludwig, billed as an innovative means of caring for the cognitively impaired.

Ludwig looks like a boy. His voice is high-pitched. He has brown, mohawk hair. And he can speak and interact with dementia patients, asking them questions, offering fields answers and reporting back to caregivers on their condition.
The Diversity of CS Research