How to Expand Your Research Profile

This talk

- What to work on
- Defining new research projects
- Developing a research vision
- Finding collaborators

- This will be meta-advice
  - I won’t tell you **what** problems to work on, but how to **identify** good problems

What to Work On

- Choice of projects matters a lot–best problems many times more impactful than randomly chosen research problem

- Some heuristics for impactful problems:
  - Have people been going about this in the wrong way for a while?
  - Is this under-incentivized relative to its impact?
  - Will this change how people think?
  - Is this outside the convex hull of current ideas?

What to work on – Option value

- General philosophy: swing for the fences, figure out early if you'll get there
- Don't have to finish every project you start
- I finished 10-20% of projects I started in grad school (but discarded most within 2-3 weeks).
  - Key skill: identify most likely failure points and vet early
  - Relevant essay (of mine): "Research as a Stochastic Decision Process"

Some additional heuristics

- Socially important trend that is connected to conceptual obstacle
  - Feedback loops in decision systems (performativity, fairness, strategic interactions)
- Confusion around decision-relevant problem
  - Will deeper nets and more data “solve everything”?
- Concretizing an amorphous but important question
  - “Are models learning what we want them to?” -> adversarial examples

Defining New Research Projects

- Mix of top-down and bottom-up thinking
- Top-down: grand vision, what we would ideally like to solve
- Bottom-up: concrete data, what's feasible, surprising findings

- Find what works for you–I usually start top-down, and use bottom-up data to filter projects and refine my thinking

- Start early!

Developing a Research Vision

- Be ambitious but patient
- What you ponder today affects what you can work on a year from now

- Lots of value in reaching conceptual clarity for yourself (better position to make progress on future projects)
- When trying to develop a new area, just want to get any bearings at all in the area to start
- Curiosity and aesthetics–both are effective heuristics
- Marinate in, and meditate on, an important area

Finding Collaborators

- Senior collaborators: your advisor, other faculty, industry research internships
  - Junior faculty are a particularly good source of additional collaborations
- Junior collaborators: experienced PhD students/post-docs (if you're junior), newer PhD students/undergrads (if you're senior)
- Important: problem formulation best done with at most 1-2 other people
  - Avoid "problem selection by committee"