Finding a Research Topic & Interdisciplinary Research

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A winding, branching path

- My story of identifying a research topic is full of twists turns, false starts, new beginnings and crossing paths
- An interdisciplinary journey through computation, ecology, scaling theory and robotics
- A long, inefficient, & ultimately rewarding way to navigate through a research career

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Other kinds of research journeys

- Some PhD students have a long standing goal, and they methodically pursue that goal

- Most students will face uncertainty, setbacks, & confusion as they navigate toward a research topic or topics

- Often your research will lead to multiple interesting ways forward, and you have to choose where to focus your time

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Ways to explore

- Think big, but focus
- Always connect to what you think is important
- Take advantage of serendipitous opportunities –
  - Speakers you heard or meet with
  - Synergy or a spark from a few of papers you read
  - Discussions with your lab mates, advisor, course projects
  - you make your own luck – the more you explore, the more opportunities for that great insight
- Take time and space (but not too much)
  - Research is a marathon, not a sprint

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Identifying an Interdisciplinary Research Topic

- Many (perhaps most) interesting, challenging and high-impact research programs at the boundaries between disciplines
    - Other researchers have been untrained in skills to take on these research problems, unprepared to identify the problems or unsure of whether the problem is worth pursuing
- Look for opportunities for cross pollination
- Read, attend conferences, talk to speakers in different research areas that you are excited about

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Identifying an Interdisciplinary Research Topic

- Many hot areas in CS research began with interdisciplinary innovations in, e.g. human robot interaction, computer security, social network analysis

- Almost all natural and social sciences need new computational approaches

- Opportunities abound for YOU to be THE EXPERT in
  - Computational linguistics
  - Computational immunology
  - Computational X

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Opportunities and Challenges for Interdisciplinary Research

- Have you found a problem that matters?
  - Are you passionate about the problem? Is anyone else, or can you convince them to be?
- Is there funding?
- Do you have the needed Skills, Tools & Training?
  - Have you leveraged your unique skills, training, interests and perspective in identifying a problem and approach?
- Is there a community of researchers ready to accept the research?
  - Are you building from established successes or too far out on a limb?

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Case Study in identifying and engaging in an Interdisciplinary Research Project

- TBD

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Finding advisors for interdisciplinary research

One, two or more advisors and mentors?

Do they appropriately balance breadth vs depth of research?

Do they have a core identity that supports or overlaps with yours?

Are they open-minded and enthusiastic about learning from other fields?

Can they provide financial support for interdisciplinary research?

Will you find a community of researchers that support your work?

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Take home messages