How to start your research journey

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Questions

- What do I want to do?

- How do I find a research advisor?

- How do I work with my advisor?

- How do I succeed in research?

How I began my research journey: Part I

- Exchange year at UT Austin during Master's studies, undergraduate research
- *Computational neuroscience: model visual cortex with a neural network with Risto Miikkulainen, Jim Bednar*

- Internship at Georgetown University Medical Center
- *Computational neuroscience: visual system and neural networks with Max Riesenhuber*

- *Take-aways from two experiences:*

  - *I like research*

  - *I want to better understand what is actually going on*

How I began my journey: Part II

- Bachelor's thesis / master's thesis / RA at Max Planck Institute in Tübingen

- *Kernel ICA: matrix approximations, optimization on manifolds with Arthur Gretton*

- *Clustering: computational and statistical efficiency with Ulrike von Luxburg*

- *Why?* Lucky chance!!

- Great experience in overall research group, interaction with PhD students/postdocs

How I began my journey: Part III

- PhD thesis at Max Planck Institute & ETH Zurich

- *clustering -> submodularity*
  with Ulrike von Luxburg, Jeff Bilmes, Andreas Krause, Bernhard Schölkopf

- non-trivial setup: remote advisor, arrange connection with ETH

- ups and downs :-)

- many supportive people

- luck… and take initiative!

Questions

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What do I want to do? How do I know?

- Research is about fun and passion:

  - What topics have caught your attention so that you had to know/read more about them?
    What has fascinated you?

  - What kinds of questions have you enjoyed solving?

  - Talk to people to explore what research questions may look like: students, faculty, …

- There may be many — it's ok to pick one of them and explore. It's good to explore!

- Research careers are not straight journeys — there is room to explore and evolve

How do I find a research advisor?

- Talk to people who work in the area about projects: faculty, students, postdocs

- Chat with people after class / talks / …

- Undergraduate: Look out for opportunities like undergraduate research, internships etc, and announced positions

- Emails?
  Complete introduction, read people's website beforehand, no boilerplate

- You may need some background in basics in the area - talk to the potential advisor. Be honest and open to catching up / taking a class first

Your research advisor

- A research advisor is more than just a project, it is a collaboration. Personal relationship matters! (not just if the person is famous)

- Different advisors work differently, e.g. hands-on or hands-off. Different students work best with different styles. Talk to students in the lab and the advisor about style and expectations, and see what works for you.

- Advising (and collaborations in general) work best if both people share interests, and can productively work together.

- Possibly more informative than an abstract discussion on style: can you have an interesting research discussion?

How do I work with my advisor?

- You are collaborators!

- Take **initiative**: listen, discuss, brainstorm, take notes in meetings, and go and think about it yourself, explore!

- **Communication** is key: ask if something is unclear or you are stuck. Speak up if there is any problem. Keep them in the know about your projects' status (e.g., prepare a summary of updates for the meeting).

- Find out what advising style works best for both of you together.

- Everyone makes mistakes: Accept to be wrong sometimes. But also don't be shy to point out inconsistencies in your advisor's reasoning.

- **Respect people's time**: arrive to meetings prepared, communicate if you can't make it.

How to succeed in research: community

- Participate in the research group you are joining!

- Find intellectual communities that work for you. Your peers in a space can be amazing resources to intellectually challenge your ideas, and improve them

- Community is fun and helpful through little hurdles and the PhD journey

- Your peers may also be great collaborators

- This is what many of us missed during the lockdown

How to succeed in research

- Pick the "race" you can win. You're not competing with every PhD student in CS, you're picking a research area you like enough that you want to be the one person who is an expert at it.

- Don't constantly compare yourself to others.

- Dare to think big, dare to question, and dare to fail. The point is not to create as many papers as possible, but interesting, creative, new work.
  (many best paper awards were initially rejected…)

- Think beyond the past 2 years.

- Research is often not linear, even if the paper later looks like you just decided on a result and then achieved it.
  Many bumps on the road, and that's ok
  (maybe it's a bump out of a local minimum)!

How to succeed in research: collaborators

- Choose them wisely

- Matching interest is key

- Both sides should be dedicated, respect each other

- Cross-discipline collaborations are great and enriching, but need time and dedication

- Give credit where credit is due

- Can broaden your scope and you can learn a lot. But not to many! Find out what works for you

- Keep your advisor in the know

How to succeed in research

- ## Have fun!

  There's no reason to embark on tis career unless you're deriving joy from it and it's important to step back and check that, and change what you're doing if you're not having fun at least some of the time.

Other aspects of research

- Time management

- Learn / practice to communicate your results!

  - Writing is an important skill, but needs practice
  - Speaking, too

- Networking:

  - Once you have completed some research, go to workshops/conferences
  - Participate in local events
  - Possibly attend a summer school

- If you have fun and pursue your passion, you will succeed.

Credit

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- …. and now: **Q & A**