Contemplating Collaboration

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Why am I talking about this?

• I might collaborate slightly more than average:
  • CS: systems, DB, HPC, security, networks, vision, graphics, network science, ML, NLP, AGT
  • Math: dynamical sys, spectral theory, NA
  • EE: MEMS, power grids
  • CEE: remote sensing, computational mechanics
  • ORIE: surrogate optimization
  • List gets longer if we remove the “resulted in a paper” filter.

• I have opinions that I’m willing to inflict on you.
• I needed to find someone to talk in the series!
What constitutes collaboration?

• Hallway, office, or dinner conversation?
• Joint grant?
• Joint paper(s)?
• Running something together?
Why collaborate?

- Geeking out with friends is fun!
- To improve your research and impact
- To connect theory and practice
- To expand your professional network
- To learn something new
- To teach something old
Some brass tacks

- Collaborations build your reputation
  - You need letters from experts who know your work
  - Network effects matter a lot for opportunities
- Collaborative work is judged differently
  - People ask who did what, who was a leader, etc
  - Distinct roles can help in assigning credit
  - This is a big benefit of collaboration across areas
- Collaborations are a type of professional relationship
  - Lots of failure modes available – people are messy
  - You can get out if it goes bad
  - Patience and forgiveness goes a long way
Dimensions of collaboration

- Varying relative experience of participants
  - Faculty, postdoc, PhD student, undergrad?
- Variation of disciplinary specialty
  - Same subfield of CS? Both in CS? Across fields?
- Size of the collaboration
Dimensions of collaboration

- Varying relative experience of participants
  - Faculty, postdoc, PhD student, undergrad?
  - Some collaborations persist across stages
- I’ve mostly collaborated outside my area
  - This is partly about going where needed!
  - Primary exception: my students
- I’ve mostly been in small-ish collaborations
  - Current work on stellarators is a notable exception
How it usually works for me

• The “can I ask you a question?”
  • Personal example: network tomography, opinions, ...
  • This is probably my dominant mode

• The “let’s look at this.”
  • Personal example: much of my MEMS work
  • Also a lot of my work with my students

• The “you ought to look into this.”
  • Personal example: Power grids

• The “pulling together a team.”
  • Personal example: stellarator optimization
Some common issues

- Communication and timing
- Negotiating authorship
Communication and timing: principles

• Clear communication matters to any relationship!
  • Want to avoid duplicated work (and hard feelings)
  • But communication is not necessarily all-to-all
  • “Clear” and “voluminous” are not always the same

• Respect your collaborators’ time
  • Communicate availability up front
  • Not everyone can respond immediately
  • OK to ping for liveness
Communication and timing: logistics

• A deadline focuses the mind enormously
  • This can be a calendar entry for a meeting!
• Figure out shared tooling early
  • I usually work by notes + git repos
  • Others prefer Word or Google Docs
  • Talk through shared workflows
Negotiating authorship: principles

• Authorship in CS denotes substantial contribution to the work
  • “I got the funding” is usually not enough
  • “I had the original idea” is a different matter

• I try to be generous toward co-authors and strict toward me
  • Offer to just be acknowledged on a minor contribution
  • Offer co-authorship fairly (acknowledging multiple contribution types)

• Communicate throughout!
  • It’s useful to establish principles early.
  • The actual author list depends on how the work evolves.
Negotiating authorship: logistics

- Keep all authors informed throughout
  - CC on arXiv updates, reviews back, copyright in, etc
  - Co-authors should also be cc’ed on rejections!
- It is OK to request non-authorship
  - Be clear if it’s because you think you played a minor role
  - Be diplomatic if it’s because you disapprove of the work
• I largely work with people from different backgrounds
• Challenges are different from in-area collaborations
• I’ll focus on what I know best!
Clarifying the question

When your collaborator is posing part of the research question:

- Make sure you understand the vocabulary
- Push back to the base question
- Stop for clarification often
- Be patient with your collaborator and yourself

Different areas have very different styles of questions — pay attention to what is asked and the underlying subtext!
Knowing what you do and don’t know

- You know different things from your collaborator
- You are not stupid
- The converse is also true
- Your job is to use conversation to learn
- Faculty also use students to help bridge areas!
Some anecdotes

From grad school days

- OceanStore
- SUGAR and MEMS
- CIS and sabbatical visitors
- Network tomography

From more recently

- Surrogate opt and Bayesian opt
- Opinion formation
- Power grids to radar propagation
- Stellarators