Dennis Trautwein

Good Scientific Practice in Computer and Data Science

How to PhD

Who am I?

- Dennis Trautwein
- PhD Student @ Prof. Bela Gipp
- Background in Physics
- Software Engineer
- PhD from 2020 to 2025 (?)

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My Topic

Measuring and Optimizing Peer-to-Peer Networks:
A Case Study of the InterPlanetary File System

- InterPlanetary File System (IPFS) is a decentralized storage network
- Permissionless, decentralized networks have an inherent knowledge disadvantage
- Gap lies in understanding network dynamics which, when overcome, can drive optimizations

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Disclaimer

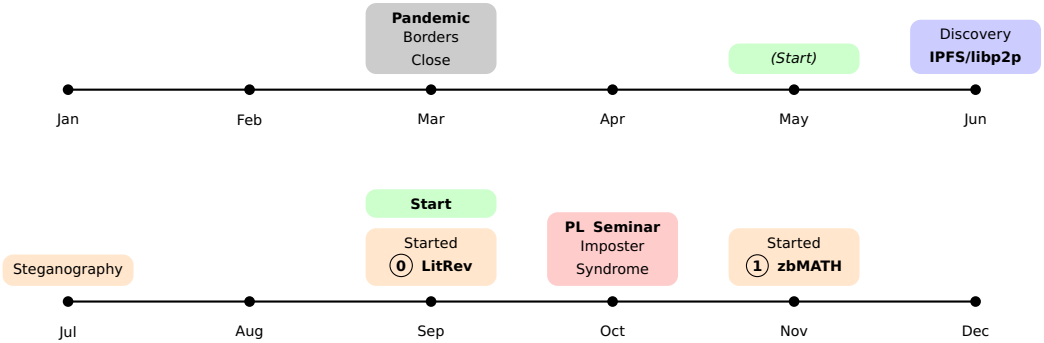
I'm describing my personal experience and
every PhD journey will be different.

Timeline Overview

What I'll cover:

- My journey through 5 years of PhD
- Timeline and milestones
- Tactical tips that worked (and what didn't)
- Strategic decisions
- Project management tools and systems

Phase 1 (2020): Year 1 - Finding Direction

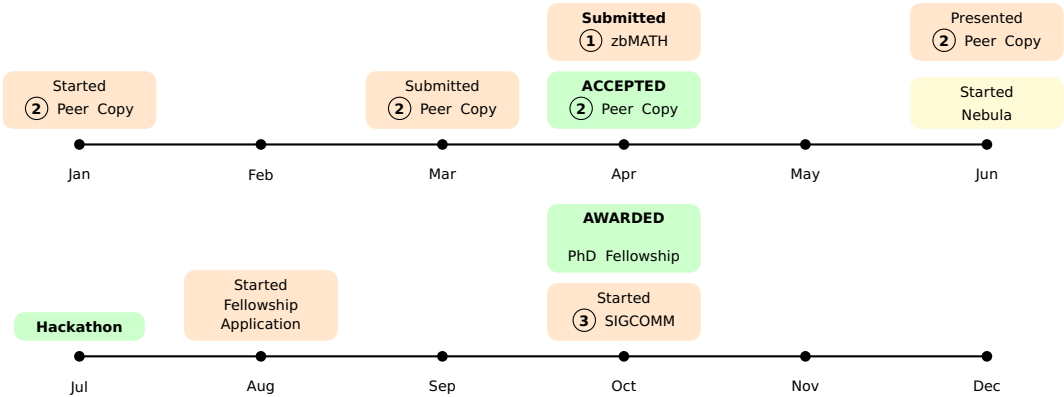


Phase 1: Key Takeaways

Tactical lessons from Year 1:

- ✓ **Get your hands dirty**
  - Co-Author a paper from a senior group member or publish your master thesis
- ✓ **It's perfectly normal to meander around**
  - I spent time on a steganography project and helped with zbMATH Open
- ✓ **Be vocal about your ideas**
  - Cornelius's casual mention changed my trajectory (Cross-pollination happens in hallways)
- ✓ **Imposter syndrome is data**
  - If you feel intimidated, you're learning from the right people
- × **Red flag: End of year 1 without clear project direction**

Phase 2 (2021): Year 1.5 - Getting Traction

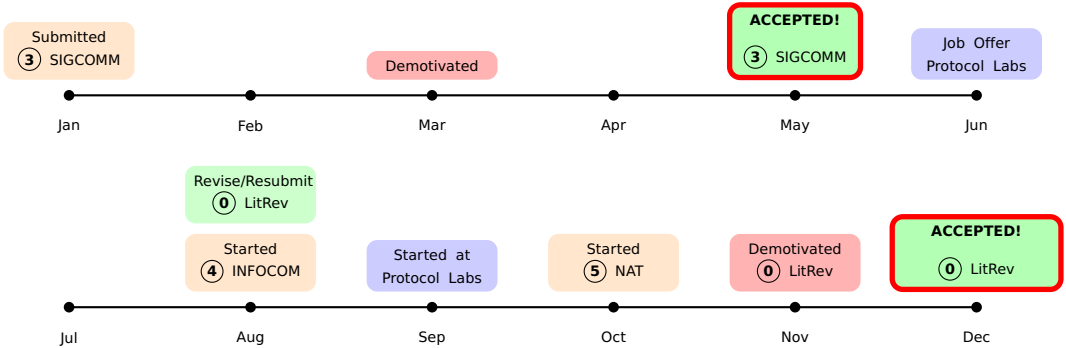


Phase 2: Key Takeaways

Tactical lessons from Year 1.5:

- ✓ **Build things publicly (GitHub)**
  - Peer Copy tool trending on Hacker News got Protocol Labs' attention
  - Visibility matters as much as quality
- ✓ **Submit anything by month 12-15**
  - Demo papers count. Workshop papers count. Co-authorships count.
  - Learn the submission process early
- ✓ **Apply for funding (DFG/Fellowships)**
  - That fellowship changed a lot
  - Worst case: practice writing proposals
- ✓ **Reviewing teaches you the game**
  - Became reviewer at JCDL, found plagiarism
  - Seeing the other side give perspective

Phase 3 (2022): Year 2 - The Inflection Point



Suddenly: 2 years, 2 A* papers. Mood shifted completely.

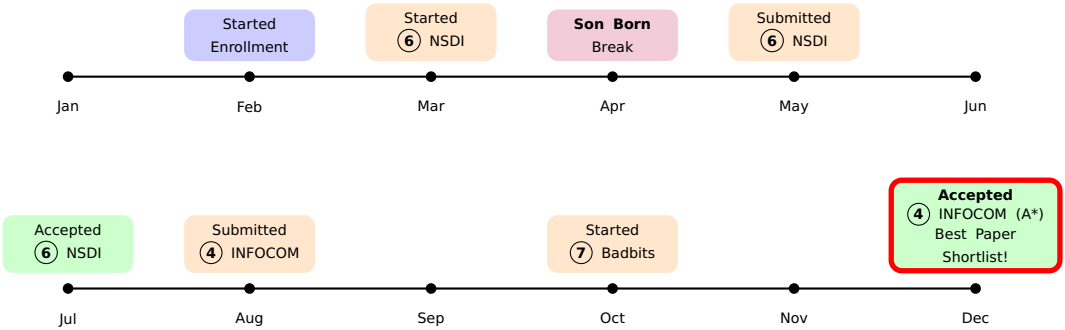
Phase 3: Key Takeaways - The Inflection Point

Critical Moment: First major paper accepted. Exactly 24 months after starting.
If this had been rejected, I would have quit.

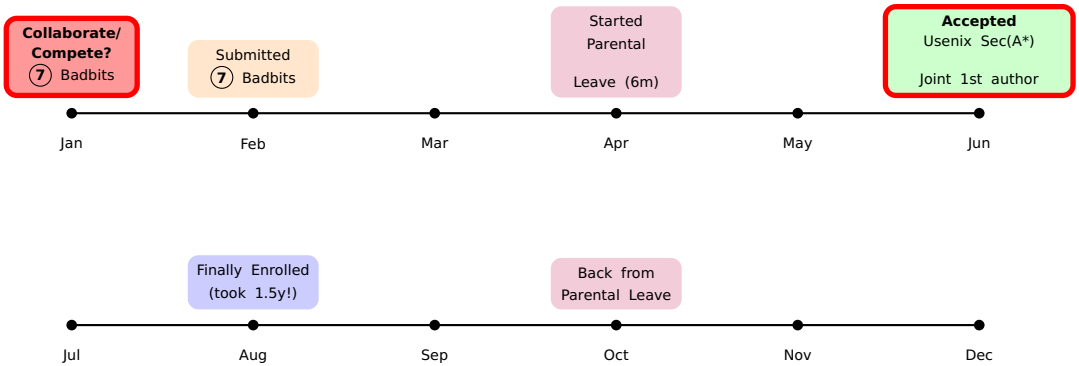
What I learned:

- ✓ **First major paper timing: >18 months is not unheard of in CS**
  - This paper is make-or-break psychologically
- ✓ **Collaboration multiplies impact**
  - Protocol Labs co-authors provided privileged data access
- ✓ **Long cycles are normal**
  - Have backup projects in the pipeline
- × **Red flag: Month 18 without first-author submissions**

Phase 4 (2023): Year 3 - Momentum



Phase 4 (2024): Year 4 - Collaboration



Phase 4: Collaborate or Compete?

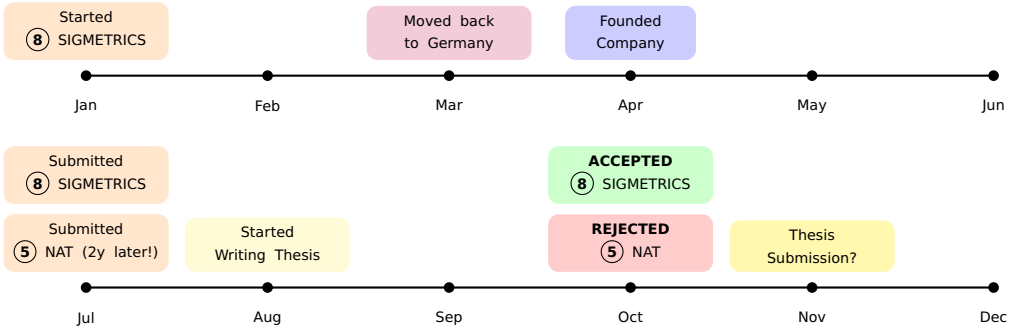
I learned another group is also working on the Badbits topic.

Collaborate or Compete?

Phase 4: Key Takeaways

- ✓ **Life events happen during PhDs**
  - Son born April 2023, took break
- ✓ **Collaboration > Competition**
  - Badbits: Competing team discovered
  - Chose to join forces → joint first-authorship
  - Stronger paper, new collaborators, no burnt bridges
- ✓ **Momentum compounds**
  - For citations, time works in your favor
- × **Red flag: Not being formally enrolled three years in**

Phase 5 (2025): Year 5 - The Finish Line



Phase 5: Key Takeaways

What I learned:

- ✓ **Rejections happen of course also at the end**
  - You develop a thick skin after the first major papers published
- ✓ **Conference deadlines create forcing functions**
  - Hole punching: 2 years from data to submission is TOO long
  - Should have targeted intermediate deadline
  - Use conference cycles to force completion

Next slide: That rejection review in full...

The Reality of Peer Review

Review (A* Conference)

Complete Review

Paper summary
The authors do a thorough study of decentralized NAT traversal via a well thought out extensive measurement campaign.

Reasons to accept
The papers is well written and informative about the area and the important questions that they try to address. It is a solid empirical study of the decentralized NAT traversal protocol.

Reasons not to accept
I cannot comment on the novelty of the work as I am not up to date with the state of the art in the area.

That's the entire review. Nothing more.

What This Review Teaches You

Key Lessons:

- Peer review is **noisy**
- One shallow review can sink a paper
- Even "solid," "well written," "thorough" work gets rejected
- This happens to **everyone**, at **every stage**

How to handle this:

- Don’t take it personally (though it stings)
- Resubmit to another venue
- Develop thick skin early
- Remember: Your worth != one reviewer’s opinion

If I had gotten this review in Year 2, I might have quit.
In Year 5, I shrug and resubmit.

General Remarks

CS-Specific Expectations

Publications ARE your thesis:

- In CS, thesis = extended intro + 3-4 papers + conclusion

Target numbers (systems/networking):

- 3-4 first-author papers at graduation
- Mix of A*/A conferences + maybe 1 journal
- Co-authorships are good, but not sufficient alone

Strategic Outreach & Networking

What worked for me:

Action	Outcome	Lesson
Cold email Protocol Labs	Collaboration, fellowship, job	Cold emails work
Public GitHub	PCP trending $\rightarrow$ PL noticed	Build in public

Concrete actions for you:

- Find the “Protocol Labs” of your area
- Build something small but public (GitHub, blog)
- Submit to hackathons, workshops, apply for fellowships

Project Management System

Don’t procrastinate optimizing your workflow!

Tool	Use Case	Why
Zotero	Paper management	Free, open, exports BibTeX
Notion	Project planning, notes	Rich Media + Sharing
Obsidian	Daily notes, ideas	Plain text + Git
GitHub	Code, experiments	Version control everything
Overleaf	Paper writing	Collaboration + LaTeX

Plain text files are king. Put as little as possible into walled gardens. In 10 years, your plain text files will still open.

Final Thought

The PhD is years of making strategic bets:

Which topic? Which collaborators? Which conferences?

You won't get them all right.

Make lots of bets.
Learn from misses.
Double down on hits.

Trial Disputation

Trial Disputation