

How to become a real scientist from a struggling PhD student?

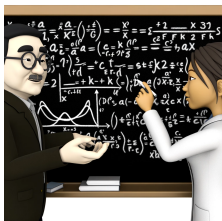
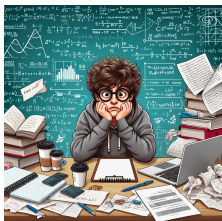
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Plan for the talk



- A little bit about myself and my journey
- Some general thoughts and observations
- Your questions and discussion

A little bit about myself . . .



Carola-Bibiane Schönlieb



- I am from Austria - worked in Austria, Germany, UK
- Now Professor of Applied Mathematics, Uni Cambridge
- I love my dog
- I love hiking, travelling, being outside in general
- I love collaboration
- Passionate about encouraging women in mathematics

Mathematical imaging

I develop mathematical methods and theory based on PDEs, variational models, optimisation and machine learning for solving image analysis, image processing, inverse problems in imaging tasks, including

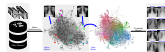
- Image reconstruction and restoration
- Image segmentation and classification
- Motion estimation and object tracking

Computer vision for the environment



Biomedical imaging

Digital art conservation



Clinical support tools

CV (official version left, unofficial right)

- 1998–2005 Salzburg: undergraduate studies, research assistant.
- 2005–2008 Vienna: PhD.
- 2008–2009 Cambridge: PhD.
- 2009–2010 Göttingen: Postdoc.
- 2010– Cambridge: Lecturer, Cambridge.
- 2011 Foundation of the Cambridge Image Analysis group.
- 2015 Promotion to Reader.
- 2016 Several leadership appointments.
- 2018 Promotion to Professor.
- Lived with my mother; got a dog; struggled with self confidence.
- Shared work environment for the first time with other women.
- Going places . . . exciting, scary, expanding horizons.
- Met my husband, also a mathematician; looking to solve the two body problem.
- Building my own research path; applying for research grants; supportive partnership.
- Learning to say no.
- Trying to get pregnant . . . four years later little Paul joined our family.

What does my work life look like?



What does my private life look like?



A few background facts

- I am the **first one** in my family to go to the **University!**
- From sheltered environment of my family and my home university to one of the best universities in the world – every step along the way took **courage!**



I did it my way . . .

- Find **your own way in mathematics** – central for me is collaboration and learning from other fields.
- If you **love it** and you have ambition then **you can do it!**



Some general thoughts . . .

. . . about doing a PhD, being a researcher and having an academic career.



Research-related advice

- If you have a research idea, before doing anything else, scan the literature for what the state-of-the-art is to avoid re-inventing the wheel.
- Check the timeliness of your research topic. Is there a lot of potential for new results and directions? And are people still publishing in this area? How large is the community working in this field?
- Accountability and feedback is essential: No matter how you are working, if in close collaboration with your PhD supervisor or more independently, do meet with your PhD supervisor on a regular and fairly frequent basis, say once every two weeks, no matter the progress.

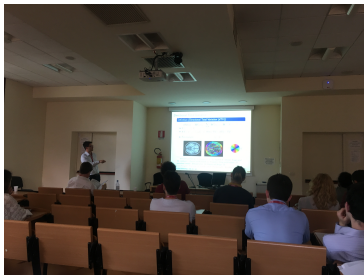
Research-related advice(cont)

- Discussion is key: Do talk to others in your research vicinity as much as possible. Bouncing ideas off others is so helpful! And it might also lift your spirit if you are stuck.
- When writing your first paper, do a structural analysis of other papers you like that have been published in your research area / in the journal you would like to publish in.
- Inform yourself on how to write mathematics ¹

¹[Nicholas Higham, Handbook of writing for the mathematical sciences, '20](#) 

Research-related advice (cont)

- Before submitting papers, try to get feedback from others as much as possible.
- Your PhD sets up your path towards an academic career. While doing great research is the foundation, it is also important to communicate it! And for this you need training!

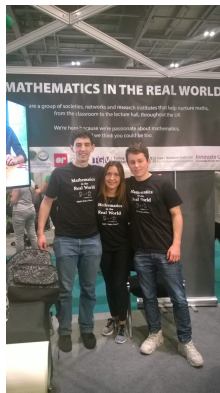


General PhD advice

- A PhD is not a 9 to 5 job, it will be part of your life for the next 3 to 4 years 24/7. This does not mean you need to turn into a workaholic and cannot have private life but it does mean that you will be going the extra mile now and then and you will not mind since you love what you do.
- A PhD is an up- and down- journey and it is important to be remembering that things will go up again when you are in a kind of longish down-phase.
- Depending on your personality, it could be a good strategy to always pursue two research projects in parallel, so you can revert to one if the other one is stuck.

General PhD advice (cont)

- Doing a PhD / doing research becomes another dimension when you travel and pursue international collaborations.
- Do go to summer schools!
- Do go and put yourself out there and present at workshops, conferences, seminars etc. as much as you can.
- In general: make the most of opportunities presented to you!



What is important for an academic career?

- Be curious, ambitious, passionate and hard working.
- Publish, publish, publish.
- Make the most of opportunities presented to you!
- Remain open and flexible, in your thinking and your expectations to life.
- Talk about your research and discuss with others.

What is important for an academic career? (cont)

- Get your own research and travel funding.
- Be present online - website, google scholar profile, social media, linkedin.
- Try to get some teaching experience.
- Outreach is a great way to energise and learn how to communicate one's own research.
- Mentoring and coaching is a great way to grow and to help the next generation in turn.
- Choose your life partner wisely.

What to do when the PhD finale is near?

- Usual academic career path: Postdoc/research fellow, lecturer/assistant professor etc.
- Pro-actively reach out to academics / research groups you would be interested in working with. Maybe they have a position . . .
- Some of these applications need one year of lead time (e.g. research fellowships)
- Difference between Postdoctoral positions and fellowships: Postdocs are mostly working with a PI and how this looks like depends on the latter
- Research fellows are independent

What to do when the PhD finale is near? (cont)

- Think about potential reference letter writers early
- Put yourself out there into your research community, so your potential future employers know you
- Get someone who knows the system in the country you are applying in to give feedback on your application material and if invited for interview, do practice with others
- Anything else?



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Your questions and discussion

