

The Nitty Gritty of PhD Dirty Work. if you can get it

Jon Crowcroft

<http://www.cl.cam.ac.uk/~jac22>

2024 attendance question: "What happens
at the end of the PhD viva in TU Delft?"

Process - wrong!

- Pick Institute
- Find Advisor
- Find Topic
- {work, writeup, publish}*
• s/paper/chapter/
- Submit thesis
- Defend thesis
- Get Faculty Position

Process - better

- Pick Topic
- Find Advisor
- Change topic - not rare
- Change advisor - not necessarily bad
- Change institute - difficult but not un-heard-of
- Do Research (no prescription for this)
- Write thesis (*thesisometer* no particular help)
- Defend thesis
- Get Faculty Position or industry or retire (*)

If in doubt...

- Do a Masters (MSc/Mphil)
- If still in doubt...
 - Do not do a PhD
- If merely torn between several interesting alternate topics....
 - See which advisors/inst. you like best
 - And follow the money

Funds

- PhD funding comes from several places
 - You
 - EPSRC or equiv. via DTAs (or DTCs)
 - EU projects
 - Industry (you may lose IP, but gain a job later)
 - Univ (CISS, Gates) & College scholarships
 - Your country's benefactors
- Most places require 3 years funds up front
 - They don't want you to have to leave for reasons of poverty
 - Speak to possible institute/advisor *with your idea*
 - As this may make them think of the alternatives

Picking Topic Part b

To do, is To Be

- First off, Don't be Hamlet
 - “to be or not to be, and all that jazz”
- Be Jean Paul Sartre
 - “to do is to be”
- And for landsakes, don't be Frank Sinatra
 - “do be do be doo”
- But not Scooby Doo (or Fred Flintstone)

It is really essential to do some actual work

- Work precedes thought in many cases.
- Simon Peyton-Jones' maxim
 - writing a paper being about writing down your ideas to clarify
- Leslie Lamport's:
 - Writing down your ideas in code is an even better way to bring precision to your ideas

Software works for you

- But working code also does work for you.
- You can use it to get results.
 - Results are really useful since they tell you about things:
 - *reproduce*,
 - *contradict*, or
 - *improve* on other peoples results,
- All fodder for chapters of thesis

Zero Day Knowledge

- Most people start a CS PhD with some idea how to write code, and a vaguer idea how to write a dissertation.
 - Some may have written a paper once or twice.
 - The writing bit is a lot easier when you have a system to describe and results to report.
- This means that from Day Zero, you can actually get on with things...
 - ...even when *you don't even know what you are doing!*

Some navel gazing errors

- Decisions not to make
 - Big v. small
 - Bottom up v. top down
 - Gap analysis v. synthesis
- or
 - Just do it...

Socialize your ideas

- Meet people, talk to them as often as possible
- Write papers and give talks at every available opportunity
 - Get feedback, listen to it
 - Meet people again.
- If you feel a bit “shy” about your ideas,
 - Try them on local friends/colleagues first
 - Some phd student dedicated workshops too!

Finding that elusive problem...

- If you are only moderately lucky, the devil will be in the details, and...
- hey presto, you have
 - hypothesis (H0) and
 - a plan (P0), and eventually
 - a dissertation (D0) and...
- ...a diploma in thinkology (ThD) (TM Ozco)

- So what about those details...

Impact & luck

&

the essence of all true comedy

- If you're very lucky with timing
 - You might have a lot of impact....
 - Even if you made mistakes (loop freedom, not)
 - Actually, making mistakes gets you more citations:)
- You might do really cool work
 - But vanish without trace
- This is not something you can plan for
 - It won't affect the validity of your PhD
 - So don't worry about it
 - I'll say that again: do **not** pursue impact

You might get gazumped

- Imitation is the sincerest form of flattery
 - Doesn't matter provided its during, not before your work
 - Proves you are right:)
 - Risk of being a fashion victim
- On the other hand, you might be so far ahead of other people...
 - They don't even notice you gazumped them
 - Unless they are patent lawyers looking for prior art:-)

Obscurity ain't necessarily bad, but prepare to be disappointed

- ...that you won't get gazumped
 - You might work on something very outre...
- And you will get a cool thesis
 - But you'll never hear of it again with high probability
- On the other hand, a .0001% performance hike which the annual speed up in PCs does anyway and noone uses is a Bad Idea

Misguided heroes

- You might write your own OS
 - This is probably fun but very very risky
 - If you really know where you want to go next and only if your advisor agrees
 - And you don't believe in sleep
- Brave, or Foolish?
- Better to be a cog in a big machine
 - (see below)

“A PhD in a year” - the anti-hero

- Several students claim they did it in 1 year...
 - Actually, it is fairly common that the work in the dissertation represents 1 year But the previous 2 years were necessary to get in to the state of mind and skills base to do this.
- Note Bene:- you can talk about all those other things
 - etc in your viva -
 - just leave them out of the dissertation!!!

The gateway character

- Like the geni in the lamp
 - In story writing, a gateway is a person who gives you your task:
 - “now Frodo, will you take this ring...”
 - “Your mission, should you choose to accept...”
 - ...”to boldly go...”
- Your supervisor/advisor *may not be the gateway*
 - Often its another student or person at a conference, or author of a paper you dismantle
 - The more you socialize, the more likely you find your elusive gateway

Really useful may or may not be research

- Really useful stuff might not be research in itself
 - but the actual research...
 - ...turned up in doing them, of itself
 - i.e. (again), the devil is in the details
 - Research is almost fractal...

Being a cog

in a big machine

- Being part...of a really **big** organisation is good, *not* bad
 - Your name may be lost in a cast of 1000s
 - But you are at least on the credits
 - And that's what your next job is likely to be like too
 - Key in big projects:
 - is to partition work cleanly
 - and define shared components cleanly

Writing it down -

papers may be chapters

- If you are at a loss(pun:-),
 - write it down or
 - say it to someone
- Levels of abstraction are good
 - math v. code v. design tools
 - “lab” books
- Papers may become chapters
 - But not always -
 - only if you are lucky:
 - that progression of work matches thesis *story*
- A thesis is more like a novel than a paper
 - But a chapter like a short story version of a paper
 - Narrative is good.

What next?

- Framing your PhD:-
 - Do you wannabe an academic
 - Or an industry lab researcher
 - Or an industry builder
 - Or do a startup
 - Or a consultant
- roughly even mix in my 60.3 PhDs so far
- Timing of papers is slightly affected by this

Dissertations

- Shorter is better
 - Proofread by normal humans is better
 - Spellchecked by programmes is better
 - Error bars, bibliographies, captions, glossaries, legends are all better
 - Giving advisors and friends more than 24 hours warning is better
- In defense of examiners....
 - They work quite hard for very little “pay”
 - So make their lives easier
 - Prepare for viva properly

On writing dissertations...

- There's no formula
- Two patterns common
 - Glom papers together and see what you have
 - Edit edit edit
 - Read through all your notes/papers,
 - throw them away and sit down and
 - write from start to finish
- Hybrids abound...
- If in doubt, leave it out.

Examiners/Defenses (UK)

- Examiners are usually 2
 - 1 local (generalist), 1 (expert) external
 - Defense is private and 1-5 hours
 - Some inst. Let advisor be present, but silent
- There's no formula for a UK defense
 - But having 15-20 min summary of your contributions ready does no harm
 - And offering any errata you've found between submission & defense doesn't hurt either.

How examiners are chosen

- Typically, a degree cttee ask advisor for suggestion for external
 - But BOGS filter out for inappropriate (conflict, overworked, inexperienced)
 - Internal is usually from different group
 - Or possibly different but related department
- Some places let you have 2 externals
- Some let you have 3 examiners!
- Europe (mostly) has a huge committee
 - (and public defense as well as sometimes private)

Viva outcomes

- Range from accept, through to
 - minor corrections (very common),
 - major corrections (quite common),
 - re-submit (with or without viva) occasional, or
 - (rarely) MPhil “only” and
 - a big no (very very rare)
- If your friends and advisors all say ok,
 - then you ought to be in one of first 3.
 - There’s always some uncertainty
- make sure corrections requested are
 - very well specified (including time frames)
 - (although this is really the local examiner’s job)
 - & understood (your job)

Q&A&B

- Questions....?
- No, Answers...?
- No, ok, so – the attendance question's answer

The praelector walks into the middle of the hall and strikes a mace on the ground and announces, loudly, in fluent latin:

Hora Est!

Acknowledgements pt 1

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 - <https://www.cl.cam.ac.uk/~jac22/paststudents.html>
 - CL netos list members
 - <https://www.cl.cam.ac.uk/~jac22/students-examined.htm>

Acknowledgements pt 2

- Some ideas were probably broken in this work:
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