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

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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
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.
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 into 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 50.3 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 ctte 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 Beer?
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