Introduction

CPS 300: Introduction to Graduate Study

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August 24, 2008

Course format

- See website (http://www.cs.duke.edu/courses/fall08/cps300/) for details
- Class meetings: every other Wednesday
- Talks in the department: check dept. event calendar
  - Local TCSDLS: "must" attend; two this semester
  - Telecast TCSDLS and dept. colloquia: "should" attend
- C/NC grading: class participation + satisfactory completion of assignments
  - No exams
- Watch for email announcements!

Goal & content

- To help you get started in Duke CS, and most importantly, on research
  - Faculty are here to inform and advice
  - But nobody can "teach" you how to do research
- Essential tools for scholarly work
  - E.g., LaTeX, BibTeX, Xfig, Matlab, …
- Advice on graduate life and research
  - E.g., find/keep advisors, read/review/write papers, give talks, find internships, attend conferences, weathering highs and lows of research, …
- I am open to your suggestions on what to cover

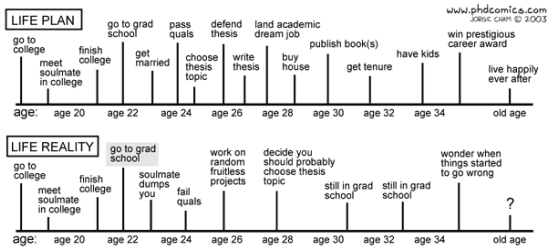
PhD program requirements

- Read the Requirement and Addendum docs
  - BTW, grad curriculum may undergo some changes soon
    - You have "grandfather clause" protection
- To reiterate some points made during orientation:
  - Rules are rules
  - Deadline ≠ suggested completion time; beware of lead times
  - Keep the DGS office informed
  - Research pretty much trumps everything else
  - Take responsibility for yourself
- Advice from senior grad students are valuable, but always consult with the DGS for the authoritative interpretation of requirements

Must vs. *should*

- For a general discussion, see IETF RFC 2119
- Must (not)/required/shall (not)
  - If you break these rules, I cannot help you
- Should (not)
  - There may exist valid reason in particular circumstances when particular behavior is acceptable
  - The DGS office will seek a detailed, official explanation from you and approve (or disapprove) the request
    - Don't wait until last minute to request
  - Requests, explanations, and decisions will be documented

Planning



http://www.phdcomics.com/comics/archive.php?comicid=360

Fictional student *X*

Year 1
- Took lots of courses and got A's, like I always did!
- Courses and TA took loads of time
  - But no time was wasted as I was taking care of requirements!
- Met with a couple of faculty members, got some papers to read, but didn't really have the time…
  - I *think* I am going to work with Prof. *A*… In the worst case I *guess* I could still work with Prof. *B*…

Summer 1
- Why won't these stingy profs fund my summer?
- So what, I got a well-paid internship in a big city!
  - Phew… Too much coding and bar hopping left me tired
  - Well… Prof. *A* was traveling and I got nobody to report to anyway

Fictional student *X* (cont'd)

Year 2
- RIP reminder from the DGS; panic…
- Prof. *A*'s hands were full and wouldn't take me
  - Curse the other student whom Prof. *A* did take…
- Thank God Prof. *B* took me! But proposal in a month? Panic…
  - Fought to schedule the proposal on the last possible day
- Proposal half-baked; committee wanted extra progress review early spring—more work!
- Scrambled to get past progress view, but Prof. *B* didn't think I'd be ready for the final review by the end of spring
  - Begged the DGS to extend deadline to summer
  - Prof. *B* told me to "prove myself" in summer or else I won't get funded in fall—help!!!

Summer 2
- How come other 2nd-years got cool internships at research labs, while I got to stay and finish my RIP review!?

What went wrong?

- After all, didn't student *X* (sort of) meet all deadlines?
- Know your priority in the beginning years
  - Research $\gg$ courses, TA, internship in summer 1
- Don't count on good results to come up in just 2 semesters
  - Spreading effort over a longer period of time is less risky $\approx$ dollar-cost averaging
- Communicate clearly with your (potential) advisor and the DGS office
  - Get him or her to commit; don't assume anything
- Plan ahead, and assume responsibility for yourself

A more reasonable schedule

Year 1
- Pass 3 (or least 2) out of 4 quals
- Concentrate on courses in your area (or related areas)
  - Do projects that will impress your potential advisors
- TA in spring
- Talk to faculty in fall; attend seminars, group meetings
- Dive into RIP (deadline for finding advisor: end of spring)
  - Best if you can decide the topic and do proposal before summer
  - At least have enough direction to go independently for a while

Summer 1
- Whatever you do, keep in touch with your RIP advisor
- If you have already started working closely with your advisor, you might be offered an RA in the summer
  - Take it—at this stage it's often better than a higher-paid coding job

Reasonable schedule cont'd

Year 2
- Pass the remaining quals
- Concentrate on courses useful to your research
  - Follow your advisor's advice
  - No need to meet all course requirement yet
- TA in fall or spring (perhaps for your own advisor)
  - May even be deferred or waived
- Full speed ahead with your RIP
  - Proposal in early fall (if not done in Year 1) and review in spring
  - You should now have a publishable piece of work
- Confirm future advising/funding arrangement with your advisor

Summer 2
- Continue working with your advisor, to get a head start on prelim
- Or, find an internship relevant to your research
  - Use your advisor's connection

Reasonable schedule cont'd

Year 3
- In fall, decide on your dissertation direction
  - Wrap up your course requirements
    - Again, consult with your advisor for classes to take
- Obtain initial results, and publish more papers on the way
- In spring, get your committee together, and write/defend your prelim report/thesis proposal
  - When appropriate, you can combine prelim and thesis proposal—at the discretion of your advisor and committee
  - Can defer for up to an year, but you must already be doing very well on research

Reasonable schedule cont'd

Years 4 to $n - 1$

- Research, research, research…
- No need to shun courses; take/audit them to expand your horizon and stay up-to-date

Year n

- Your last spring will be packed by interviews, writing, and defense
  - Job hunting starts earlier and takes more time than you think
    - For academic jobs, applications start in late fall
- Get bulk of your work done by last fall!

Annual progress report

(cf. Addendum document)
Provide by the end of every January:

- CV
- Research summary (1-2 pages)
  - Big picture + progress + future directions
- Progress statement (1 page)
  - Self assessment of progress
  - Specific goals for the coming year
  - Plan for meeting milestones
- BibTeX bibliography of your pubs and works-in-progress

Feedback from faculty around mid-February:

- Written feedback from your mentor/advisor
- Discussion at a faculty meeting
- Request for additional progress steps, or in the worst case, withdrawal (let's hope this won't happen!)

On picking profs/topics

- Most important: work on something that you love
  - Or else grad life will be miserable
  - But then, tastes are sometimes acquired…
- Flexibility vs. concrete projects
- Large vs. small groups
- Hands-off vs. hand-on
- Practical impact vs. intellectual challenge
- Junior vs. senior
- Funding prospects
- Having non-CS advisor is fine, but requires more effort
  - Good idea to find a champion in CS

On approaching profs

- Start early; they want to see you "in action" before committing
- Show you have background/skills, or can acquire them quickly
  - Past projects, current course project
  - Communicating, writing, coding…
- Show you have the right attitude/habits
  - Initiative, punctuality, genuineness, independence, meticulousness, tenacity, flexibility, …
- Short, productive meetings > long, one-way monolog

☞What if you got completely lost in the meeting?
☞What if you were just given a paper to read?
☞What if nothing concrete came out of the meeting?

Tools of the trade

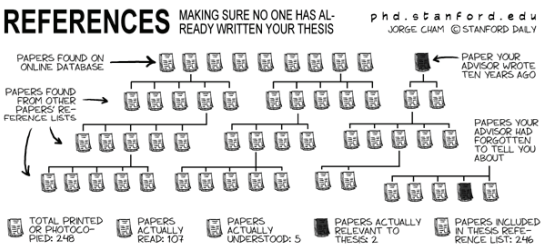
	My current choices
Document editing	LaTeX + Emacs + make Occasionally Word 2007
Reference management	BibTeX + Emacs + make
Literature search	Google, ACM DL, DBLP
Presentation software	PowerPoint with TeXPoint
Web authoring	Emacs + XML + scripts Wiki + XML + scripts
Graphing	Gnuplot, Matlab
Drawing	Xfig with LaTeX PowerPoint + PDF/EPS export

Assignment

Due at next CPS 300 meeting

- Talk to your potential advisor or a senior student
  - Get recommendation of a recent and/or important paper in an area/project that interests you
  - Get a sense of the important publication venues in this field
  - Get recommendation on document editing, reference management, and literature search tools
- Read the suggested paper
- Find a few (between 2 and 5) related papers; skim them
- Prepare a BibTeX file of all above papers
- Prepare a short document ($\leq$ 2 pages)
  - Summarize (in your own words) the paper you read
  - Write a few sentences about each related paper

On finding related work



http://www.phdcomics.com/comics/archive.php?comicid=286

On finding related work

- Ask your advisor, who can offer good starting points and see not-so-obvious connections
- Follow citations (forward & backward)
- Google (Scholar) + online databases (e.g., ACM DL, DBLP)
  - Need to build up a list of useful keywords
- Rank using citations/venue prestige
- Routinely check top venues
- Share with fellow students (reading groups, journal clubs)
- Talk to people at seminars, conferences, …
- Talk to those outside your field
  - Start with your fellow grad students!

Next meeting

- Share our experience on document editing, reference management, and literature search
- Talk abut how to read/write papers
- Briefly discuss other tools of trade: presentation, web authoring, graphing, drawing