Carnegie Mellon SCS PhD Programs

Robert Frederking

Assoc. Dean for Grad Programs, SCS

(Chair of Graduate Programs, LTI)

(Principal Systems Scientist, LTI)

Carnegie Mellon University

October 2014

U.S. University structure

- In US, "university" implies several "colleges"
- Universities are generally either public or private
  - Public typically run by state government
  - Private typically organized as non-profit charity
- Technical Degrees:

    BS, MS (at least two kinds), PhD

- Research funding largely from Federal govt.

Carnegie Mellon University

- CMU is a medium-sized private university
  - Started by Andrew Carnegie and Andrew Mellon
  - Has always had a real-world focus
  - Growing international orientation
  - Not on either coast (but now SV/NYC campuses)
- Tied at #25 for U.S. National Universities
  - With tiny endowment
- Tied for #1 in Computer Science
  - School of Computer Science (SCS)
    - One of seven colleges in CMU

U.S. Science PhD programs

- Classes, other requirements (e.g. TAing)
- Qualifying Exams *(but none now in SCS)*
- Directed Research with advisor
  – A kind of apprenticeship
  – Fully-funded by research fellowship
- Thesis Proposal
  – After topic found
  – Thesis committee with external member
- Thesis Defense *(no hard time limit)*
  – After dissertation written

History of CS at CMU

- 1965 CSD established (Perlis, Simon, Newell)
  - No undergrads, PhD only
    - So CMU CSD could be first-class
- 1980 Robotics Institute established
- 1989 SCS established
  - CSD was half of Mellon College of Science
  - CSD was becoming too big to govern
  - Hired instructors to teach undergraduates
- Other units grew out of CSD, inherited culture
  - E.g., "Reasonable Person Principal"

CMU School of Computer Science

- 7 departments
  - CSD, RI, LTI, HCII, MLD, ISR, Lane (CompBio)
  - Grad programs completely run by departments
- More than 7 PhD programs
  - E.g., ISR has two. Plus things like CS&Art.
- Many MS programs (almost 30)
  - Plus some housed elsewhere (e.g., ETC)
- One "SCS" undergrad major, several undergrad minors

CMU SCS Principals

- Quality first; Research from day one
- Reasonable Person Principal
    - HCII "Meta-rule": no rule should get in the way of doing the right thing
- Balance between coherence and flexibility in course requirements.
- Full funding for PhDs guaranteed
    - While making good progress

Differences between top U.S. CS PhD programs

- When students get assigned advisors
  - Upon admission
  - Upon arrival *(the CMU choice)*
  - After qualifying exams
- CMU SCS specific
  - "Immigration (orientation) course"
  - "Handshake" (matching) process
  - "Black Friday" (evaluation) process

PhD Admissions

- Forecast how many funded positions, by areas
- Receive applications
  - GRE, TOEFL, transcripts, letters, statement
- Admissions Committee ranks applicants
- Admissions meeting goes through top of list plus outliers, makes decisions
  - May or may not involve whole faculty
  - Forecast probable yield, continue until full
- Send out letters, hold Open House

"Immigration Course"

- Orientation to CMU SCS
  - After Intl. Student Orientation, before/during classes
- Full-time talks for several days/weeks
  - Overview of main technical areas in department
  - Administrative information
  - Some fun activities
- Individual faculty research presentations
  - Mostly faculty recruiting new students

"Handshake Process"

- The Process:
  - Student goes to **all** research talks, meets one-on-one with possible advisors of interest as soon as possible
    - If student considers an advisor outside of SCS, tell chair **immediately**!!
  - Student indicates 1st, 2nd, and maybe 3rd choice for advisor
  - Advisor indicates number of new students desired and preferences
  - "Handshake Committee" meets to find optimum match

Effects of Immigration/ Handshake Process

- Students see current range of local work
- Potential advisors/students get to know each other
- Optimum match between advisors and students
  - Deal with mismatches as a group

Semi-Annual Student Evaluation

- ("Black Friday")
- Whole department faculty meets, discusses each student's progress
- A letter is sent to each student; short is good. Worst case: "N-1" letter.
- Advice to students:
  - Your advisor is your advocate
  - It's vital that your advisor think you are doing well!

Effects of Black Friday meeting

- Sets norms for expectations of students
- Letter comes from whole faculty
- Advisor gets help from peers with difficult students
- Faculty see current range of local work
  - Helps in finding PhD committee members
- Different advisor's expectations calibrated
  - Helps junior faculty get up to speed

Discussion