Overview

• Why?

• Difference between a MS and a PhD
  • Why a MS degree
  • Why a PhD

• What happens
  • What is a qualifying exam/candidacy/screening exam
  • What is a dissertation/thesis

• Application Process
MS:
- Extension of undergraduate coursework
- Some masters degrees include a thesis project
- Typically 1-2 yrs

PhD:
- Includes a masters degree
- Majority of time is spent doing research
- Typically 5yrs (in engineering)
- Ends with the thesis (written)
Example: Chem Eng at USC

MS:
- CHE 501
- CHE 530
- CHE 540
- CHE 541
- CHE 542
- CHE 544
- CHE 550a/b
- Electives (3)

PhD:
- CHE 501
- CHE 530
- CHE 540
- CHE 541
- CHE 542
- CHE 544
- CHE 550a/b
- Electives (1-2)
- CHE 590 (1-2)
- CHE 790 (~6)
- CHE 794a/b/* (~8-12)

PhD research leading to thesis

http://chems.usc.edu/academics/graduate-programs/phd-in-chem.htm
Logistics (PhD)

(Typical process and what each step is)

- First year: coursework

  - End of first year – screening exam/qualifying exam

- Second/third year – research

  - End of second/third year – candidacy exam

- Fourth/fifth year – research

  - End of fifth year – thesis defense
Example Electrical Eng PhD

Device invented

Application: Makes laser

Makes new device

Application: Raman

Application: Modulator

Yr 1  Yr 2  Yr 3  Yr 4  Yr 5  Yr 6
Key things to consider

Bachelors:
• School rank
• School environment (e.g. small vs. large, clubs, diversity of activities)

MS:
• School rank
• School environment (e.g. small vs. large, clubs)
• Career opportunities (job placement)

PhD:
• Advisor
• Research interest overlap
• Research group “fit”
• School rank
• School environment (e.g. PhD network)
• Career opportunities (job placement)
Choosing an Advisor

Determine what area(s) of engineering interest/excite you

Determine which professors are strong in this area

Determine which schools are strong in this area

Talk to people you know about the schools/professors

Choose 8-12 schools
Looking for professors/ schools

Finding a professor who is doing that research:
- Do literature searches – Who publishes? Who is writing review articles?
- Talk with your professors
- Look at department websites: look at websites both in field and out of field

Look at the top 15-30 schools
- Look at top schools in engineering and in individual fields
- The top schools rotate frequently, as the ranking is very dependent on funding which fluctuates
- Look at the degree requirements
Choose a professor/school

Choosing a professor:
- Talk with people about the professor
- Consider if you want to be in a large or a small research group
- Consider if you want a lot of attention or if you want to work more independently
- Look at the make-up of the professor’s current research group

Choosing a school:
- Apply to the PhD degree program which best suits your academic background
- Apply to a school where there are at least 3 profs that you would want to work for
Choosing a project

Large group effort to a single goal
Examples:
• Genome
• HIV Vaccine

Main Goal (started 10 yrs ago)
  ↓
Sub project 1
  ↓
Sub project 2
  ↓
Sub project 3
  ↓
Your project

Single efforts around a “theme”

Sub project 1
  ↓
Sub project 2
  ↓
Theme/focus of group
  ↓
Sub project 3
  ↓
Your project
Factors determining acceptance:

**Undergrad**
1. GPA
1. SAT
3. Extracurriculars
4. Awards/honors/etc
   .
   .
   .
N. Rec letters

**MS**
1. GPA
1. GRE
3. Work/ Research
4. Rec Letters (3-5)
5. Awards/honors/etc
   .
   .
Extracurriculars

**PhD**
1. Research
1. Rec Letters (3-5)
1. GPA
4. GRE
5. Awards/honors/etc
   .
   .
Extracurriculars
Fellowships (PhD)

Fellowship: Grad School as Scholarship: Undergrad

Pro: get higher stipend when you have a fellowship.
Con: you have to apply for it. Many require permanent resident or citizenship status

Standard ones, but there are many others:
• NSF (http://www.nsfgrfp.org/)
• NDSEG (http://ndseg.asee.org/)
• Hertz (http://www.hertzfoundation.org/)

More advice (and videos coming soon):
http://armani.usc.edu/advice/