

Graduate Schools:

Who, what, why, where, when, and how

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Overview

- ◆ Who is this talk for?
- ◆ What is grad school?
- ◆ Why go to grad school?
- ◆ Where to go to grad school?
- ◆ When to start thinking about grad school?
- ◆ How to get into grad school?
- ◆ Any more questions?

"Who"

- ◆ Who is this talk for?

- EE/CE/CS students who want to go to grad school
- EE/CE/CS students who don't want to go to grad school
- EE/CE/CS students who aren't sure what they want to do

This talk does not apply to other majors!!

- ◆ Who can benefit the most from this talk?

Answer: Juniors

Disclaimer: This talk only reflects my personal experience and opinions. This talk is not comprehensive. You are strongly encouraged to get a 2nd opinion from someone else.

"What" are the different kinds of Grad Schools

- ◆ Course-only Master's degree program

- for example, ECE's IMB
- 1 to 1.5 years of course work
- optional thesis or project You have to ask for it!
- intended to increase depth and breadth of your education
We keep on inventing new stuff, but the fundamentals still remain. How do you learn everything we used to teach in the 80's and then make up for the last 20 years?
- a very good deal financially (even considering the tuition)
- "relatively" easy to get into
- course-only MS program are terminal—you must re-apply for PhD
- caveat: if you intend to continue into a PhD program, some schools require a MS thesis/project.

"What" are the different kinds of Grad Schools

◆ Master/PhD Degree Program

- 1 to 2 years for MS + 3 to 4 years for PhD
Note: some have finished in as little as 3 years total; some have taken as long as 13 years and not finish
- PhD program trains you for "original and independent research"
 - not everyone can, should or need to do this (we will talk more about this later)
- MS program is a warm-up for PhD
 - figure out if you really want to go all the way
- some schools now have so-called direct-PhD program (skipping the M.S. step)
 - this is really not different from the traditional MS/PhD flow

"What" exactly do you do?

- ◆ You assist the faculty in research
 - early on, you are told what to do, usually technical
 - as you gain experience, you are "trusted" to do more
 - it is very much an apprenticeship
- ◆ You assist the faculty in preparing and teaching a course
In return, you are paid tuition plus a stipend (~\$22K/yr).
- ◆ What do you learn?
 - how to think about a problem
 - how to solve a problem
 - how to test your solution
 - how to express your thoughts
 - how to deal with setbacks
 - *** your other interests and inclinations ***

It is actually a very fun and rewarding experience

"Why" go to Grad School

- ◆ In MY opinion, "everyone" should get a MS
 - you learn more
 - more importantly, (industry) people "believe" you are more capable than a BS
 - (Hey, anyone who only has a BS must be because he/she is not good enough get a MS, right?)
 - you make more money for the rest of your life
 - 15K ~ 20K difference on initial job offers
 - more important, you get to the better jobs sooner

"Why" go to Grad School

- ◆ You should think long and hard before trying for a PhD
 - it is challenging, even painful at times
 - unless you have a very "good" reason to help you persevere through the hard times, you will not finish
 - (Note: this does not apply to the "truly gifted", but then most grad students are not.)
- ◆ Some good reasons
 - you are not satisfied with developing someone else's idea; you want the ammunitions to work on your own ideas
 - you enjoy the academic life-style
- ◆ Some bad reasons
 - someone you know has one; you are not ready to start working yet; it seems to impress a lot of people; I am just smart; you like to increase your income; etc.

"Why" go to Grad School

- ◆ How to decide if you should go
 - try undergraduate research
 - talk to graduate students, professors, people with PhD's, grad school drop-outs,
 - go visit some schools
- ◆ Bottom line,
 - you can always try a Master's and then decide later (there is very little to lose)
 - you should only attempt for a PhD if you find it to be fun and challenging; it is too painful to do it for any other reason

"Where" to go?

- ◆ Apply to several schools
 - a few dream schools with all of the right stuff (prof/projects)
 - a few schools that are sure shots
 - don't forget to apply here too
- ◆ Two schools of thoughts
 - you should go to a different school to gain a more diverse exposure
 - if you are working on a project at CMU already, you can have smoother/faster sailing if you continued here
- ◆ Bottom line
 - It is not so important where you go but who you work with and what you work on
 - Go to recruiting events, open houses, campus visit, etc
 - Do your homework using grad school guide books and web sites

"When" to go to Grad School

- ◆ Most people go right after undergrad
- ◆ A lot of people go into industry "thinking" they will come back in a few years
 - rule of thumb: almost none of them ever do
 - exception to the rule: the few that return usually do extremely well in grad school and afterwards
- ◆ You have to decide
 - don't go right away if you are burnt out
 - don't disrupt your momentum if you are not disciplined
 - most schools will allow a one-year deferral on admission

In any case, take your GRE's now while you can still remember how to add

"When" to start preparing

- ◆ It is always too late!!
- ◆ You should start preparing even before you decide
- ◆ Suppose you are applying for next Fall
 - school/fellowship applications are in full swing right NOW, but it takes a full semester to be well prepared
 - GREs should have been taken this past summer and repeated in the Fall if necessary
 - undergraduate research experience should have started this past summer, at the latest
 - you should have taken all of the important courses by this term
 - you should have gone to office hours and spoken up in class so the professors know who you are

"How" to apply?

- ◆ Get the application forms and fill it out (mostly online)
 - Neatness counts, try typing (if paper application)
 - There is a fee per application (may be waivable for hardship)
 - Read the instructions very carefully: every school wants a different set of materials
 - Don't forget to apply to fellowships as well
(Hertz, NSF, DoDs, industry, minority, women)
- ◆ 3 ingredients of a strong application
 - 1/3 objective indicators (GPA, GRE, courses taken)
 - 1/3 "Statement of Purpose"
 - 1/3 recommendation letters (3 to 5)

Note: You should apply to the full-PhD program even if you are just considering it. The thesis-track MS program is not any easier to get into than PhD. Terminal course-only MS program is easier.

Objective Indicators

- ◆ We don't pay attention to these except as a first-round filter
- ◆ But, you won't get a 2nd look if you are not up to par
- ◆ Very competitive, especially at top-tier schools
 - check out graduate school guides to find out school averages (pay attention to your major and not the whole school)
 - you must do well (nearly perfect) on Quantitative and Analytical (This isn't that hard for engineering students)
 - yes, it's true you don't have to do quite as well on Verbal, but it can still hurt you
 - some departments require additional items (Subjects, writing, etc) —read your pamphlets early and carefully
- ◆ Remember, this is only 1/3. Don't despair if your freshmen GPA is coming back to haunt you

Statement of Purpose

- ◆ This is the first impression you make
 - Who are you? What have you done? Why do you want to go to grad school? What do you plan to do? (Typically 200~400 words)
- ◆ You must spend time on it (weeks not days)
 - saying everything in a few hundred words is really hard
 - you absolutely should write it yourself
 - get someone to help you polish your writing
 - see if some grad students will show you theirs
- ◆ Say something interesting
 - don't use cliché and don't try to snow us—we know all of the tricks and what a hastily-prepared statement looks like
 - show some vision/ambition/foresight
 - have some solid technical content (work/course/research)
 - mention specific professors/projects that interest you

Recommendation Letters

- ◆ You need 3 to 5 blind letters (you won't see them)
 - preferably from academics/researchers in the same field, even better if a few are from outside of CMU
 - one letter from an ex-boss of a summer job is okay
- ◆ Find someone you have a good relationship with
 - undergraduate research advisor
 - a professor who you interacted with extensively in a course
 - someone who knows your work and can vouch for you strongly
 - Good relationships take time to develop!!
 - beware of form letters, "Jon Doe was 5th in my class..."
 - A lukewarm letter is worse than worthless
- ◆ Solicit letters early
 - bring your resume, course project, statement of purpose
 - sit and talk with the guy, make sure he remembers you and hint about what you like him to say

To put things in perspective

- ◆ At a highly ranked ECE department (us for example)
 - we get close to 1500 applications
 - we admit may be 50; we may admit a handful of students in the best of years in the computer architecture area
 - each student will cost over \$500,000 if he/she runs the full course (not to mention time cost and other resources)

You bet it is competitive, and luck and chance are involved
- ◆ The bottom line
 - Most of the grad students and PhDs are just very hard working "real" people who enjoys what the do
 - If you really want it and you work for it, your chances are good (Caveat.....don't confuse motion with progress)
 - **Don't count yourself out without trying; similarly, don't count yourself out by not trying.**

Resources

- ◆ ECE graduate offices at places you want to go
e.g., <http://www.ece.cmu.edu/users/prospective/graduate/>
- ◆ Our own faculty
- ◆ Office of Scholarships and Fellowships
<http://www.cmu.edu/frac/>
- ◆ Graduate School Rankings
http://www.usnews.com/usnews/edu/grad/rankings/rankindex_brief.php
- ◆ Wikipedia
http://en.wikipedia.org/wiki/Graduate_school#United_States
- ◆ PhD Comics
<http://www.phdcomics.com/comics/archive.php?comid=1>
- ◆ The Web (google for it)

Invest time and elbow grease. You have to want it for yourself.