

## Graduate School Workshop Chemical & Biomolecular Engineering

### Graduate Study – General Information

- Good Reasons to consider graduate education...
  - Interest in Research
  - Possibility of a Career as a Faculty Member
  - Desire to Learn More About Chemical Engineering
  - Expand Career Opportunities
  
- Bad Reasons to consider graduate education...
  - Not Finding the Right Job
  - Desire to Extend One's Collegiate Experience
  
- What Can You Expect?
  - Living Expenses and Tuition Paid
  - Less Structure and More Freedom Academically
  - Greater Competition in Courses
  - Expectation that You Will Be Self Motivated
  - Frustration and Joy of Being Active in Research

### Choosing Schools to apply to...

1. Think about your interests in Chemical Engineering. What areas would you like to learn more about?
2. Talk to faculty members in the department in your interest area – talk to them about research possibilities, which schools have good programs and good faculty, which schools would match your personality?

Talking with our faculty is probably the single most helpful thing in the search process. Faculty across the country make up a small group – people know people and other programs. They are also experts in their fields and can let you in on possibilities in the field research.

If you aren't sure which areas of Chemical Engineering you want to pursue further, but you know that graduate education is for you than talk with faculty in a variety of different fields and find out what they are doing and what their colleagues are doing.

These talks provide valuable insight and a huge first step. From here you can look to rankings and other guides as well as check with the schools for more information. After you have applied to a number of schools you will have visits in February/March after the deadlines. This gives you the opportunity to see the campuses, meet with faculty and meet with graduate students who can give you invaluable opinions on the school, department and faculty.

Note from a current senior who has completed the process: “While it seems economical to apply to fewer schools in December, each school you get accepted to provides a very nice all-expenses-paid weekend vacation winter quarter.”

### When to apply?

- Apply during Autumn Quarter (October-December). **Apply no later than the middle of January if you want to be considered for funding.** (Funding is typically reserved for PhD candidates, however, at some smaller

schools MS candidates could receive funding) Check with each school's website for deadlines and application requirements.

- If you are thinking of completing a BS/MS combined degree you need to have a 3.5 at the beginning of your senior year. If you are planning to complete this option you should meet with Mary or Angela to devise a schedule plan.

### **Application requirements**

- Letters of recommendation: you want ask professors you know you well and can comment on coursework or undergraduate research; find professors who will write you a **GOOD** recommendation – if you do well in a course with a particular instructor attempt to take courses with that instructor again and solidify your relationship.
- Statement of purpose: Outline your motivation for attending graduate school and your goals after receiving your degree. This essay allows you to express your interest in chemical engineering. Describe what area(s) interest you the most, and goals that you have for apply the training received. Since most of the materials supplied with the application is little more than numbers, data, and grades, this statement allows you to “speak” to the faculty reviewing your file and gives them a glimpse into your motivations. The statement should be 1-2 pages, but check with each school for specific requirements. Be sure to include your name and SSN on this document.
  - Note from current senior: “Each school required at least one essay in their application. Unfortunately, the prompts for these essays were different enough that I ended up writing a new essay for each school. Find out the essay prompts early and allow enough time to write many essays.”
- Curriculum Vitae/Resume
- Transcripts
- GRE scores reported by ETS
  - Given year round at the computer based test centers. A test center is located at 1800 Cannon Drive, 820 Lincoln Tower, 614-292-2241
  - Register online at [www.ets.org](http://www.ets.org) or by phone 1-800-473-2255. Appointments fill up fast, so register early.
  - Arrive 30 minutes early to fill out registration paperwork. The test appointment lasts approximately 4 hours.
  - Plan on taking the GRE at the BEGINNING of autumn quarter. If you do terribly, you can re-take it in December.
  - Visit the website for free general test preparation materials and other useful tips and resources for test takers. Check for “GRE POWERPREP Software” (Includes two computer-based GRE General Tests, sample analytical writing topics, scored sample essays and reader commentary, test-taking strategies, a math review, and test tutorials) in the “Downloads” section of the website.
  - Note from current senior: “It's best to know where you want to apply before taking the GRE. That day you can tell which schools you want to receive your scores for free. If you wait, there's a fee and an extra step in the application process later.”
- Optional: Any material that would enhance your application

## **Beating the odds**

- **Research and Work:** Ideally, your undergraduate research should be in the engineering area that you would like to pursue. Graduate schools know that the success rate of students who have done undergraduate research is very high. Relevant work experience adds a similar boost to your application.
  - Just about every faculty member in the department takes undergraduates to work in their labs as research assistants. You can do anywhere from 1 credit hour of research up to nine hours of honors research. To explore your options and learn how to get started, go to the department webpage and click on “Undergraduate Research.” The webpage will tell you about getting started, which faculty are working on which projects, what their typical requirements are and also provides links to summer research experiences outside of Ohio State.
- **GPA and GRE requirements?** Check with each school’s website for minimums or averages. In our department, we look for a GPA of 3.6 and GRE Verbal: 560 (75%), Quantitative = 730 (75%), and Analytical Writing score of 4.0.

## **Additional Tips on Getting In (from U.S. News & World Report 2007 Edition)**

**Score Well:** Undergraduate Grades and GRE scores are the only objective ways that applicants from different schools can be compared, so scoring well is key. The bar for graduate admissions, though, is higher than undergrad, and showing steady improvement won’t always cut it. If your grades are not at the top of the class, getting an outstaying letter of recommendation from a professor who knows you and your work well may be a saving grace.

**Research Helps:** Most undergraduates have had some research experience, which is a good thing. Graduate programs value such experience highly. Independent research as an undergraduate in a professor’s lab or lengthy research papers can demonstrate that you’re well prepared for graduate student life and work. If you somehow managed to get your B.S. without spending time in a lab, doing some engineering-related work between undergraduate study and grad school can help. If you take time off after receiving your bachelor’s degree, make sure to stay in contact with professors for whom you’ve worked, or use your break to pursue your research interests.

**Snare Top Recommendations:** Just as a dissertation adviser’s helping hand can lead to a job after graduate school, a detailed, laudatory recommendation from a college mentor can help you get to graduate school. If grad school is your desire, seek out mentors early and often, and express your interest in pursuing a higher degree.

**Show Leadership:** The best schools look for students who’ve demonstrated leadership and character “and who’ve stretched themselves,” says Delores Brown, admissions dean at Northwestern University’s Feinberg School of Medicine. This could be holding elected school office or organizing community action, for example. Master of something, whether it’s a sport, music, or research, is a plus. Interpersonal skills are important, too, with schools parsing letters of recommendation for clues to applicant’s communication skills.

**Do a Little Homework:** Do some research about the people with whom you’d like to do research. Graduate students spend a good deal of time with individual faculty members. Check out what other students are researching and which professors they are working with. Visit the campus, and take a stroll around the laboratories. A few hours on campus can tell you more about the place than days spent reading glossy admissions brochures.

**Rankings Aren’t Everything:** If you already have a particular field in mind, look at schools that have a strong track record of placing graduates in jobs in that area. Don’t let a school’s overall ranking discourage you from applying if one of its individual programs is particularly strong. *NOTE: IF YOU ARE PLANNING ON GOING INTO ACADEMIA AT A LARGE INSTITUTION OR CONSIDER IT A POSSIBILITY IT IS IMPORTANT TO GO TO A TOP TIER SCHOOL.*

## **The Grad School Decision: Basic Considerations From Petersons.com**

To go or not to go, that is the question. Grad school sounds like a great option for...what exactly? A chance to learn more, get a better job, and earn a bigger salary...or are you looking to gain bragging rights, or perhaps borrow a little more time before you have to hit the real world? Whatever your reason, there's a lot to think about if you're going to commit to another few years of school.

Grad school isn't for casual learners — it entails hard work; long hours; lots of reading, research and writing; and most likely, financial debt. As much as the idea of extra letters in your title might sound endearing, if you really want to go for an advanced degree, there are a few things you need to consider.

### Why you want to go

First and foremost, grad school isn't a cakewalk. Even if you were cream of the crop as an undergrad, this is a whole other ball game. Students entering grad school should be serious about their studies, so maturity and dedication are necessary. Your decision to attend should be made with a goal in mind — entering a certain profession or enhancing your career, for example. Don't go after an advanced degree if it's just a way to kill time or stave off a midlife crisis. If that's what you're looking for, take up golf!

### What to study, where to go

When you apply, know what you want to study, because unlike college, this isn't the time to be feeling out what you want to do with your life. This is serious stuff, so give serious thought to what you want to study and why you think it will benefit you.

If you're sure of your aspirations, then it's time to consider where you want to study. Most programs are competitive and many schools have fewer grad programs to choose from than they do undergraduate programs. Many schools build reputations as excellent places for certain fields of study, and that's where they may put all their energy, finances, and academic resources. Depending on what you want to study and how concerned you are with the name of your alma mater, this may limit your options in terms of location, size, student body, etc.

Depending on your life circumstances, choosing a school may be complicated by the fact that perhaps you have a good job (or your spouse has a good job) — and maybe a mortgage and kids, too. It's possible that there are no options for graduate study within driving distance, let alone within the field you want to pursue. Ask yourself if you're willing to tear up roots to get that degree.

### The peer factor

In grad school, classes are smaller and more interactive. Professors tend to treat you more like, well, adults...adults with skills, knowledge, and a keen interest in their chosen studies. Your fellow students may be a bit more diverse, including people from various stages of life. Many classes consist almost entirely of students in their thirties or forties who have returned to school to enhance their education and their careers. These are not folks who will be impressed with discussions of the keg parties last weekend. Come to class prepared. Do your homework and expect to involve yourself in discussions, make presentations, and speak to the subject as an expert (or at least as someone who wants to become one).

### The benefits

The benefits of a graduate degree are an essential consideration. While it may be a nice added feature to your resume, spending the time and money may not be necessary. There are a few degrees that are obviously necessary to get into certain fields, such as law or medicine, but many fields don't demand that you have a master's to get started. Take a look at available jobs — even the higher end job postings in your chosen field are likely to state something like, "Master's degree preferred, but will substitute for experience and other qualifications." If you're already working and have built a sturdy career, another degree may not be required to climb higher up that ladder.

### How far to take it

Given that you need to weigh the necessity and benefits of pursuing an advanced degree, you should also consider how much of a degree you need. A doctorate in just about anything is great if you plan to become a professor or researcher, but in most fields, it's not necessary. While it may sound nice to refer to yourself as Dr. So-and-So, it's not necessarily going to impress potential employers or change their salary offers.

### Competitiveness

We've already mentioned that grad students tend to be serious about their studies, and subsequently, there is a certain level of competitiveness, at least at the admission end of things. Grad schools have far smaller programs than most colleges, so you may be competing against some very smart people for a limited number of openings. Admission officers want students who will be able to contribute to their research programs and reputation, so ask yourself if you're up to the challenge.

### Workload and lifestyle

If you start grad school, expect whatever social life you have to diminish substantially. (If you didn't already have one, don't expect to gain one!) After-hours get togethers will probably consist of library outings and study groups, and that's as good as it's likely to get. You may have some fun here or there (as you should), but the bottom line is there's a lot of work to be done and it's not the kind of work that you can cram in the night before. Say goodbye to squeaking by on the next day's test. It just doesn't work that way. Also make sure the prescription on your eyeglasses is current; you're likely to be doing a lot of reading...late at night...when everyone else is asleep.

### Costs

Last but not least, look at how much that degree is going to cost you and whether you'll be able to get any free aid to obtain it. Free financial aid for grad school is harder to come by, so unless you're independently wealthy, it's likely you'll have to take on at least some debt. When all is said and done, will it be worth it?

<http://www.petersons.com/common/article.asp?id=506&path=gr.gs.advice&sponsor=1>

## **Preparing for Graduate School Suggested Timeline**

### **First Years**

#### Academics

- Keep your GPA high
- Consider the Graduation with Honors Program and start planning on how to complete the program (3 parts: honors coursework, research experience, volunteerism/leadership)
- Consider any other areas of interest you would like to pursue in terms of studying abroad or pursuing a minor or second major and work with Mary to design an appropriate schedule
- Get Involved!! Find a club, activity, honors group, etc... Tutor, be a mentor, volunteer, etc...
- As a sophomore – get signed up with AIChE

#### Research Experiences

- Attend Denman Undergraduate Research Forum in the Spring to view projects
- Read over faculty profiles and CHBE Research webpage information - Begin to evaluate the areas of engineering you are interested in for potential research projects and summer research internships
- Search and apply for REU's for summer (most apps due by March!)
- Register with ECIP and apply for research based internships (earliest you can sign up is winter or spring of your first year!!)

### **Year Prior to Graduation**

#### Academics

- Keep your GPA high (minimum 3.0)
- Revisit the Graduation with Honors Program and evaluate your completion status
- Assume leadership roles in the groups that you have been active in

#### Research Experience

- Start working with a professor/GTA part time on a research project
- Participate in the Denman Undergraduate Research Forum
- If planning a senior thesis; plan research with a faculty member and submit thesis abstract to College of Engineering to compete for funding

#### Applications

- Get to know some faculty members (think: Recommendations)

### **Summer Before Last Year**

#### Applications

- Talk with more faculty members about graduate schools you should think about
- Do searches online to view potential school choices
- Gather all application materials and start working on essays (drafts) and think about who you are going to ask for recommendations
- Study for (A LOT) and take the GRE by early August
- Begin to collect information about national and school-based fellowship programs, and their required application materials.
- Develop your personal timeline for applying, based on the requirements of specific programs. **KNOW THE DEADLINES.**

#### Research Experience

- Continue working on a research project and develop a thesis proposal or **START** working on undergraduate research by starting with professors

## **Graduation Year**

### Sept/Oct

- Request your recommendations as soon as possible.
  - Remember to provide any required information or documents to those writing your recommendations. Make sure your recommenders know when the letters need to be sent to each school.
- You will also be required to send a number of official transcripts from each college or university you have attended; (this includes any summer school classes that may have been taken at a community college in your area). (You can order from Buckeyelink)
- Complete your Graduation with Honors in Engineering application or Graduation with Distinction Forms

### December/January:

- Mail applications even if deadlines are later. Get applications in as early as possible.
- Complete applications for fellowships and send in to schools and national organizations

### February

- Arrange to visit each department you have been admitted to. Most major departments invite admitted students to visit their school in March and early April (sometimes for specific dates or weekends), and most provide considerable travel support.

### April-May

- Inform those programs you have been accepted to whether you will attend or not.
- If doing a thesis, be sure to schedule your defense in time to make changes and submit paperwork to the College Office
- If completing the GHIE program, collect final completion signatures

## Scheduling a GRE Exam Appointment

Students needing to take the GRE may schedule by calling 614-292-2241 during regular business hours or online at [www.gre.org](http://www.gre.org). The GRE will be available at a minimum of twice daily Monday – Friday during Autumn Quarter. Please send an email to [testing@exchange.ureg.ohio-state.edu](mailto:testing@exchange.ureg.ohio-state.edu) for more information.

### Scheduling for the GRE and current fees

All fees are due at the time of registration. The fee for the GRE is \$130. Once you have scheduled an appointment, there is never an opportunity for a full refund (See Cancellation and Rescheduling Policies below).

If you are paying by credit card, you may schedule by calling the Office of Testing at 614-292-2241 during regular business hours or at the GRE Website. Candidates needing to pay by check or money order must register in person at the Office of Testing at 820 Lincoln Tower.

The GRE General test will be offered during Spring Quarter on Mondays, Wednesdays, and Fridays at 8AM or 12PM.

### Cancellation and Rescheduling Policies

Registered candidates who need to cancel or reschedule must do so 3-full business days prior to your scheduled test day. The GRE registration system does not allow us the ability to reschedule or cancel appointments after this deadline.

For example, if you are registered for a GRE exam on a Tuesday at 12:00PM, 3 full business days prior to your appointment are the preceding Monday, Friday, and Thursday. Thus, to be eligible to cancel or reschedule, you must do so prior to close of business on Wednesday. There must be 3-full business days between the day you cancel or reschedule and the day of your appointment. You must call our office at 614-292-2241 or the GRE program office at 1-800-GRE-CALL (1-800-473-2255) to cancel or reschedule.

The maximum refund for cancelled appointments is \$60. An additional \$40 fee will be assessed for rescheduling.

### Identification Requirements

GRE candidates must submit a valid identification for the GRE. Examinees must review the IDENTIFICATION REQUIREMENTS prior to their exam day.

If you are a US CITIZEN, you may present:

- Valid Driver's License or state-issued Identification Card.
- Valid Passport
- Military Identification Card

NON-US Citizens must present:

- A valid passport

To be considered valid, your acceptable identification must:

- Have your name exactly as it appears on your registration
- Contain a current photograph
- Be unexpired
- Contain your signature
- Be issued by a state or federal agency

\*\*A Buck-ID is never an acceptable form of identification for the GRE\*\*

NOTE: If you are unable to present a valid identification, you will not be eligible to test and your test fees will be forfeited. Candidates denied admission should contact Education Testing Service Candidate Care Department at 1-800-853-6769.

**Where is OSU's Testing Center?**

We are located in Lincoln Tower, Suite 820. The street address is 1800 Cannon Drive, Columbus, OH 43210. Lincoln Tower is the southern-most of the two identical towers immediately south of Ohio Stadium.

Please note that the surface lots adjacent to Lincoln Tower only contain metered parking for visitors. These meters will expire during your exam and GRE rules prohibit leaving the building during the exam. Thus, you will not be allowed to exit the building to feed the meter and you will likely receive a parking ticket if you use these meters.

All candidates should plan enough time for traffic and parking on exam days. Due to construction on campus, candidates should research parking and traffic patterns before your scheduled exam day. Candidates who are late may not be seated and you could lose your registration fee.

**What To Bring On Test Day**

Your valid identification is the only thing you may bring with you and take into the testing room.

We will provide scratch paper and pencils for your use during your exam. All scratch paper and pencils must be provided by the Testing Center and may not, for any reason, be taken from our office.

We will provide a locker (free of charge) for you to secure your personal items in. Nothing brought to the test center, besides your identification, may be taken into the exam room with you. Lockers are small and only designed to hold a small amount of items. Items that do not fit into your locker may be placed on our coat rack. We are not responsible for an item damaged, lost, or stolen.

Because temperatures may vary widely, you should dress in layers. Note that any jacket, sweater, etc. that you remove during your exam must be brought out of the test room and secured in your locker.

**Scores**

At the conclusion of your GRE, you will be asked if you want to REPORT or CANCEL your scores. If you chose to cancel your scores, neither you nor anyone else will ever see them. Once reported, scores will be part of your GRE record for 5 years (these scores will also be reported with any future GRE taken). If you chose to report your scores, you will be able to view your "unofficial" scores (less the analytical writing section). You may write these scores down to take with you. Reported scores are mailed to the candidate and each selected institution in approximately 15 business days.

During score reporting, you may select up to 4 institutions to send scores to. Most institutions are listed on a drop-down menu and school codes are not required. If your recipient institution is not listed, we can provide a list of school codes and a paper form for you to submit. Candidates wishing to submit scores to more than 4 institutions may do so online for an additional fee.

**More information on the GRE, including free prep software and test booklets, is available at <http://www.ets.org>**