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## **Chapter 9: Applying to Graduate School**

### **9.1 Why Go to Graduate School?**

Perhaps the best reason to go to graduate school is a passion for EE or CS and the desire to conduct research. Working with a faculty member in a research lab as an undergraduate is not only a good way to get involved in cutting-edge research, but is a great way to get a feel for graduate life - which can help you to determine whether or not graduate school is for you. Possessing undergraduate research experience can be a great asset to your resume and graduate school application, and can help you to develop a stronger relationship with your sponsoring professor, which will come in handy when you begin to collect letters of recommendation. The best preparation for graduate school is to engage in research as an undergraduate. (If you are interested in graduate school, but have not yet been involved in undergraduate research, it would be in your best interest to search out research opportunities.)

In many EECS fields, an M.S. degree is effectively the entry-level requirement, simply because these areas are too complex to master in two years of upper-division course work. In general, people with master's degrees and doctorates are given more freedom, more responsibility, and more interesting work to do. A Ph.D. is a requirement for university teaching and is nearly a requirement for work in industrial research labs.

An advanced degree can make a difference in your starting salary. In 2004, Berkeley EECS graduates were offered median starting salaries of \$62,000 at the B.S. level, \$75,000 at the M.S. level, and \$105,000 at the Ph.D. level. While at first glance it may seem more financially rewarding to pursue a graduate degree, you will also want to factor in the costs associated with attending a graduate school, and the number of years you will spend in graduate school (one to three years for a Master's degree, and at least five years for a Ph.D.).

### **9.2 Where to Apply**

Before you prepare your applications you should first research which schools to apply to. Remember that you are choosing a department, not a university. Some highly ranked universities have weak EE or CS departments, or may be weak in the specific area in which you would like to specialize. Ask around, visit departmental websites, read university catalogs, or if possible, the schools which you are interested in, and talk to your Faculty Advisor for advice!

Several rankings of EE and CS programs have been published over the past several years. These are useful in giving an overall picture of the top 15-20 schools, although other factors should be weighed in making your decision. For example, several of the premier schools (Berkeley, Stanford, USC, UCLA, UC San Diego, Cal Tech, UC Davis, and UC Santa Barbara - all of which have strong programs) are all located in California. For 2008, *US News & World Reports* ranked our engineering program third nationally. However, you should also consider programs at other schools in the nation. As you might expect, the prestige of your Berkeley undergraduate degree increases with distance from the Campanile. Many schools in the rest of the country would be very happy to have more Berkeley EECS students in their graduate EE or CS programs, which may give you an edge over "local" students for fellowships or research assistantships.

You should apply to more schools than you think you need to, and not just the top-ranked schools. Admission is very competitive and you should include "safe" schools on your list. As a final word of advice, you should start early and plan carefully to ensure that you have the best chance of furthering your technical knowledge in an EE or CS graduate program.

To apply to the Graduate Program in EECS at UC Berkeley you should contact the EECS Student Affairs Office, 205 Cory Hall, [gradadm@eecs.berkeley.edu](mailto:gradadm@eecs.berkeley.edu) and refer to our website at <http://www.eecs.berkeley.edu/Gradadm/>. Applications are generally available at the end of August. We recommend that you begin the application process at the beginning of your senior year, so that you have time to obtain faculty recommendations, schedule your Graduate Record Examination, and obtain transcripts. The deadline for receipt of completed applications, test scores, recommendations, etc., is stated in the application, and is typically mid-December. New graduate students are admitted for the fall semester only.

### 9.3 Academic Preparation

Most admissions committees are primarily interested in your technical courses, and your technical GPA. (Berkeley looks for a technical GPA 3.8 and above). Enrolling in many EECS courses will not necessarily improve your chances for admission. Most admissions committees care that you have a core background that supports your plans in graduate school. A major in another scientific or engineering field, such as engineering science, mathematics, physics, or biology, will also prepare you well for admission to an EE or CS graduate program.

### 9.4 The Graduate Record Exam

The [GRE](#) is a more advanced version of the SAT. If you are a good student, and if you did well on the SAT, the GRE shouldn't worry you. This means that it is worthwhile to review the format of the test and take some practice exams. Most admissions committees will be primarily interested in your quantitative score, but your verbal score is also important. (For Berkeley, your quantitative percentile should be in the 90's.) If you elect to take any of the GRE Subject Tests, high scores on these can also help your application in some cases.

You may take the exams several times, but ETS reports all scores to the universities you list. Most students do better if they retake the exam, and most admissions committees look at your best scores. It is recommended that you take the exams during the summer and again in the middle of the first semester of your senior year. Be sure to take the exam early. If you wait until November or December of your senior year to take the GRE, your scores may not be reported to admissions committees in time for the January-February admission decision deadlines.

For information about registration or for sample questions, visit the [GRE website](#)<sup>1</sup> or call (800) 473-2255. A number of preparation books for the general exam are also available from commercial publishers; check at any college textbook store. In addition, HKN provides review sessions for the [CS Subject Test](#).

## 9.5 Letters of Recommendation

Most graduate departments ask for three letters of recommendation. Ideally, at least one of these letters is from a faculty member with whom you have done research. Most undergraduate research projects are supervised by graduate students, and typically these graduate student 'mentors' work closely with the faculty research sponsor in drafting letters of recommendation. The faculty advisor, not the graduate student, should sign these letters. One strong letter of support by a respected member of the Berkeley faculty can do you a tremendous amount of good, possibly helping you to gain a fellowship at a premier department. With such a letter, you increase your chances of getting into a good graduate program, even if you do not have a perfect GPA.

Letters of recommendation may also be from professors who have had you in class, for whom you have done project work, or from your Faculty Advisor. University professors travel a lot and are tied into an international network of experts in their field. They know many of the faculty at other institutions, at least by reputation.

If you have participated in an internship or co-op with an industrial research lab, a letter from your supervisor can also be worthwhile. In this case, it would be helpful if your supervisor could describe his/her academic background in the letter. Admissions committees want to hear from people who have known you in an academic setting, and whose academic standards are well calibrated. Letters from other internships or employers are generally less prestigious.

Unfortunately, undergraduate classes at Berkeley tend to be large, and professors may not get to know all of their students. So what should you do? First of all, plan ahead. Start thinking about getting letters as soon as you begin taking upper-division courses. If you know you are doing particularly well in a course, be sure the professor knows you. Go to his/her office hours, even if you do not need help. (Show your enthusiasm by inquiring about research opportunities.) You can tell the professor that you are considering graduate school and ask them if they would be willing to write you a letter in the future. That way, if for some reason they are not able to write a good letter for you, at least you have given them an "out" and you will still have plenty of time to seek another recommendation. Most faculty will be willing to write a letter for you as long as you give them ample time to prepare.

Once you have identified your recommenders, be sure to let them know several months ahead of time that you will be needing a letter, so they won't be surprised when you show up at their door with a recommendation form. Start preparing a packet of information about yourself for each of your recommenders. This packet should contain: a rough draft of your statement of purpose, a list of the courses you took with that professor, the grades you received in their class, and your academic resume. Your resume should list the schools you have attended, courses you have taken, any research work or related employment you have held, a list of honors you have received, plus anything else that can help the professor to get to know you as a person. A rough draft of your statement of purpose is especially helpful to your recommender. Providing this serves a two-fold purpose: in addition to serving as another reviewer for your essay, after reading it your recommender will be more familiar with your particular interests, which will be helpful to them in writing you a more specific and stronger letter of recommendation.

Letters of recommendation are now submitted online at UC Berkeley, and many other campuses. Otherwise, as soon as you receive your recommendation form, you should hand-deliver it to each recommender along with the

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<sup>1</sup> <http://www.gre.org>

packet you have compiled. Make sure you have clearly communicated to your recommender the deadline for the submission of your letter. In order to ensure that your letter arrives on time, you may want to arrange to pick up your letters directly from your recommenders. Most schools will accept a letter of recommendation from you as long as the letter is placed in a sealed envelope that is signed by the recommender across the seal. You can then mail the letters along with your other application materials. Some students choose to keep their letters of recommendation on file with the [Berkeley Career Center's Letter Service](#)<sup>2</sup> (2111 Bancroft Way, Room 249, 510-643-6293). The Letter Service will keep your letters of recommendation on file and will mail copies of these letters out to each school you specify. The Letter Service charges a fee for maintaining your files and for mailing each letter.

*Note: the Career Center's Letter Service does not maintain electronic letters of recommendation, which are now required by some graduate programs, such as UC Berkeley's EECS program.*

## 9.6 Statement of Purpose

The Statement of Purpose is your opportunity to explain who you are and what your career goals are. If you already know the area you wish to specialize in (e.g., wireless communication, theory, graphics, MEMS, databases), indicate that in your statement. If you don't know, it's okay to say that you aren't sure, and to discuss two or three areas of interest to you.

If there is a reasonable chance that you may wish to pursue the Ph.D., you should state that as your ultimate goal. The Ph.D. is more prestigious, and faculty generally are more interested in selecting students who make a commitment to a Ph.D. than to students who will leave after two years with a Master's. At Berkeley, we treat MS and Ph.D. students the same once they are here, but do not favor Master's applicants during the admission process.

If you worked on a research project or entered a competition, describe this. If you have co-op or industrial experience, explain your role and the knowledge that you gained from the experience. If you believe your grades don't reflect your true ability, you may discuss this in your statement, using your best judgment.

Your statement should give the impression that you are mature and highly motivated, and that your academic goals are reasonable. Your statement does not have to be a literary masterpiece: a simple, unpretentious expository style is best. It should go without saying that your statement should be neat, grammatical, and concise, without misspellings. The statement should be approximately one page single-spaced. Remember that the admissions committee members are reading many applications: an excessively long statement may work against you. Be concise and to the point. Avoid frivolity, boasting and self-deprecation. Finally, have at least one peer proof your statement. The more people who review your essay and provide feedback, the more polished your application will be.

## 9.7 Funding for Graduate School

Most Berkeley undergraduates (or their families) pay the university a substantial sum of money for the privilege of attending college. By contrast, nearly all EECS graduate students are fully funded to go to school. Sources of support for graduate students include:

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<sup>2</sup> <http://career.berkeley.edu/Letter/Letter.stm>

- External fellowships, awarded to individual students by foundations or government agencies external to the university, e.g., the National Science Foundation, NDSEG, etc. These fellowships typically cover fees, tuition, and provide a living stipend. They may be good for multiple years and often may be used at any university you choose to attend. Some of these fellowship deadlines fall a month or two prior to the graduate admissions applications, so you will want to start preparing your application materials early.
- University fellowships, funded by the university itself. Students are usually notified of these awards at the time of admission.
- Departmental fellowships, funded by grants or donations made to the university, awarded by the department. Students are usually notified of these awards at the time of admission.
- Research Assistantships (RAs), funded by research grants made to the university, usually by federal agencies such as the National Science Foundation, Advanced Research Projects Agency (ARPA), or Department of Energy. Most of the time, RAs are hired by, and work for, an individual professor.
- Graduate Student Instructor (GSI) positions, funded by the university. The department hires GSIs to lead discussion and laboratory sections.

Not all graduate schools are able to support their students as well as Berkeley. Fellowships are usually awarded to only the top students. But the fact remains that there is more money available to support graduate students than undergraduates. Do not dismiss the possibility of going to graduate school solely for financial reasons, as your graduate school may be able to help you find the funding you need to attend graduate school. Other good sources to keep in mind are

- The Grad Division Fellowship Website:  
[http://www.grad.berkeley.edu/financial/fellowships\\_resources.shtml](http://www.grad.berkeley.edu/financial/fellowships_resources.shtml)
- The Scholarship Connection: <http://scholarships.berkeley.edu/>
- The EECS Scholarship/Fellowship/Award Information Page:  
<http://www.eecs.berkeley.edu/Programs/scholarship/index.html>

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