

## Finding a Partner for Your Ph.D.

The selection of a doctoral program: it's not quite marriage, but it's a long-term commitment that could turn into a lifetime relationship, perhaps impacting—positively or negatively—the rest of your research career. **By Emma Hitt**

**M**ost people graduating with their Ph.D. in science will say that graduate school represents a very different scenario than simply attending classes and passing exams, as during their undergraduate studies. A doctoral degree can sometimes take six or more years—and there's no guarantee that the joyous day ending with a diploma in hand will even materialize. Unlike the undergraduate experience, earning a doctoral degree is largely dependent on one's efforts to conduct research, write journal articles, and most important, complete a dissertation. Success in these areas arises at least in part from picking a graduate school and a program that represents a suitable match, selecting the right adviser, and perhaps experiencing a little luck with your research projects. On what basis, therefore, should a graduate school be selected? And how, exactly, can one sift through the myriad of potential matches to make this momentous decision?

### The Right Match

According to data from the Ph.D. Completion Project conducted by the Council of Graduate Schools (CGS)—the main organization representing graduate institution deans in the United States—fewer than 60 percent of students entering graduate school in the sciences will complete their doctoral degree within a 10-year time frame. About one in five people in the life sciences drop out entirely during the program. And by about year six, according to the project data, only about 42 percent of doctoral students in the life sciences will have completed their degree, 34 percent will still be slaving away at it, and 24 percent will have thrown in the towel. For the math and physical sciences, only about 39 percent complete their degree by year six, 27 percent are still going, and 34 percent have dropped out. These data underscore the need to pick a graduate school wisely.

“Completing a doctoral degree has much more to do with the right match of a graduate program to a given student than it does with personality characteristics or even the academic preparation of an individual student,” says **Debra W. Stewart**, president of the CGS. An excellent, motivated student may fail to succeed in a program that is not an appropriate match; whereas a less academically prepared student may blossom in the right environment.

One important aspect of the match has to do with academic climate, Stewart says. “Some students might do well in a kind of dog-eat-dog, highly competitive environment; other students would be crushed by that, and would do much better in a much more laid back, laissez faire-type environment,” she says. “You have to know yourself, and you have to really know the kind of climate you need to ensure that you grow and develop in your intellectual and professional life as a result of this program.”

### Quality Counts

“We increasingly encourage students to gain information, including about placement of graduates of the program, how long it typically takes a student to get a degree, and what percentage of the students who begin programs actually complete them,” says Stewart. “All of those are dimensions of quality,” she says.

Above all, “the most important criteria for selecting a graduate school should be the quality and commitment of the faculty,” says **G. Steven Martin**, department chair of Molecular and Cell Biology, at the University of California, Berkeley. Factors to consider when evaluating the quality of the faculty include the number, impact, and significance of scientific publications, in addition to any honors and recognition received, he says. If a PubMed search on a potential academic adviser pulls up only a few publications in recent years, or if the publications are all in specialized or archival journals, then this may indicate that the faculty member has a limited interest in research, and perhaps *continued* »



Patricia Burchat



“A new lab rotation each quarter allows students to learn more about the research pursued by the group and gives a student the opportunity to test the ‘culture’ in the group before making a decision.”

### UPCOMING FEATURES

Postdoc Survey — August 28

Faculty 2: Funding Your Future — September 11

Focus on Europe — September 25

## BS/MS: FINDING THE RIGHT GRAD PROGRAM

“Increasingly, many programs recruit students to visit the school maybe after acceptance, but before the student makes a decision, to try ensure that it is the right match.”

—Debra W. Stewart



spends more time as an administrator or in teaching activities. Likewise, if the faculty member’s institutional or lab website does not clearly describe the lab’s achievements or convey a sense of excitement about the research or future directions, then this, too, may indicate that selecting a more active lab might provide a more productive and satisfying graduate school experience.

### An Interest in Interests

A key question with respect to match, also, is whether the faculty available at an institution meshes with a student’s particular research interests, Stewart says. “You can have a fine program across the board, but it might not have a sufficient number of faculty members in a specialty area desired by the student.” Even within a specific scientific discipline, for example biology, the range of study—genetics, cell biology, botany, entomology, marine biology, zoology to name a few— can be very diverse. The same holds true for the physical sciences. Making sure a doctoral program can accommodate a student’s specific interest is an important first step in the selection process.

For students with a clearly defined idea of what they want to study, perhaps the best resource will be a professor at an undergraduate institution who currently serves as an adviser or mentor. A student who has worked with a professor in a lab during undergraduate studies and wants more of the same may ask for a recommended professor or program of related research at another institution.

However, not all students have a clearly defined path when they go to graduate school, so one strategy for a successful match is to pick a larger school, with many different types of programs and qualified faculty. “The interests of students often develop and change between undergraduate and graduate studies because the student is exposed to many more research options as a first-year graduate student than they likely were even aware of as an undergraduate,” says **Patricia Burchat**, department chair, Physics, Stanford University. “Therefore, I think students should look for schools with a variety of programs of interest, rather than focusing on one particular research area, laboratory, or adviser,” she says. The more opportunities that are available, the better the chance will be of selecting a lab that will match your interests and for completing the venerable degree program.

Some graduate science programs offer the opportunity to perform research rotations in various laboratories and with different professors. Rotations are a way to make sure that a lab is a good match, both personally and professionally, before settling in. This is especially important since it is often difficult to switch labs later on, and doing so may add months or years to a degree program. The Ph.D. programs in physics and applied physics at Stanford give first-year graduate students the opportunity to rotate through different research groups during their first year. “A new lab rotation each quarter allows students to learn more about the research pursued by the group and gives a student the opportunity to test the ‘culture’

in the group before making a decision,” Burchat says. “The rotation system also allows the adviser to interact with the student before making the very significant commitment to mentor and support the student for her/his graduate career, and helps promote better matches between student advisees and faculty advisers and research areas,” she adds.

### Financially and Geographically Speaking

Other aspects to consider include more practical issues, such as financial support, that may or may not be available to the student. One question to ask is, what is the average number of years it takes students to complete the program? since each year spent in graduate school represents tens of thousands of dollars of foregone income. In the sciences, many Ph.D. programs offer a tuition waiver and a stipend in return for committing to an intensive schedule working in a laboratory and passing up other employment. Graduate programs will typically state this information on their website. Some package deals are better than others. The cost of living of a specific area must also be considered, as should personal preferences: a student attending a college that is nestled in the countryside is likely to miss the big city after five or six years, even though it’s “just college” and they haven’t “settled down” yet.

Other questions about the design of the program include the coursework required—does it closely match a student’s interests? Does the school draw important seminar speakers within a field of research, and how often do these events take place? Does a student have the ability to participate in the academic life of the department and campus, such as by serving on faculty search committees, inviting seminar speakers, organizing student-led courses and seminars, participating in graduate student organizations? “These are all important aspects of graduate school life,” says Martin.

“One trend we have written about is that an increasing number of research universities are building large, open ‘megalabs,’ where investigators share space and supplies,” says **Jennifer Ruark**, a deputy managing editor at the *Chronicle of Higher Education*. “The goal is to get scientists interacting with each other and to foster interdisciplinary research—particularly in the life sciences, such as among developmental biologists, structural **continued** »

### Featured Participants

**Chronicle of Higher Education**  
www.chronicle.com

**Council of Graduate Schools**  
www.cgsnet.org

**Google**  
www.google.com

**PhDs.org**  
www.phds.org

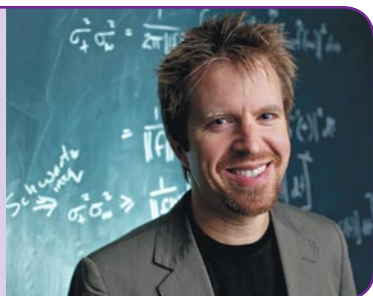
**Quintessential Careers**  
www.quintcareers.com

**Stanford University**  
www.stanford.edu

**University of California, Berkeley**  
berkeley.edu

## BS/MS: FINDING THE RIGHT GRAD PROGRAM

“The problem with most rankings is that someone else is determining what is important.”  
—Geoff Davis



### 10 Questions To Ask ...

#### ... A Current Student

1. What do you see as the strengths of the program?
2. What do you see as the weaknesses of the program?
3. How accessible are the program faculty?
4. What are the research facilities like—does there seem to be adequate funding, supplies, and equipment?
5. If you had it to do over, would you select this graduate school again? Why/why not?
6. What is the surrounding location of the school campus like? Are there leisure activities, good housing, and other amenities?
7. What is campus life like—do you have an opportunity to become involved and/or take on leadership roles?
8. Do you feel that there is an adequate level of financial and academic support to complete your studies?
9. How competitive and difficult are the academic standards here?
10. Is there anyone else I might talk to who could help provide an accurate picture of the program?

#### ... The Faculty

1. What are the major strengths of this program?
2. What are potential weaknesses of the program?
3. How would you describe the faculty?
4. Are the classes team taught or taught by one individual?
5. How would you describe the academic environment here compared with other schools?
6. What attributes does a graduate student need to be successful at this school/in this program?
7. Do you see any common characteristics in students who have quit their doctoral degree programs here—if so, what were they?
8. What research facilities are available and how adequate is intramural and extramural funding for the labs?
9. What have recent graduates of the same program done with their degrees?
10. What unique features are offered by this school compared to other similar schools?

student makes a decision, trying to ensure that it is the right match,” Stewart says.

According to **Randall Hansen**, education and career coach and founder of Quintessential Careers, four steps can be taken to evaluate a graduate program. The first step is to find a list of schools that offer the degree (and specialization) sought. “There are any number of books, websites, and even some professional organizations that offer this information.” The second step is to spend time researching each graduate program, starting with each program’s website. “Review what they say about themselves, their faculty, their students, and their graduates. Look at costs, location, accreditation, culture, financial assistance, and anything else the program says about itself.” The third step is to review any rankings or outside reviews and solicit the opinions of professors regarding the programs. The fourth step is to visit the top two or three programs and talk with current students about their likes and dislikes about the program to get a sense of the university and its surroundings.

One tempting approach is to look at the online rankings and apply to the top schools in your intended area of study. Online rankings, such as those from *Newsweek* and *US News and World Report*, “can be useful but not totally reliable,” Berkeley’s Martin says. “Rankings are a popular way to evaluate graduate programs,” says **Geoff Davis**, a mathematician who developed the PhDs.org Graduate School Guide, and now is a researcher with Google. “The problem with most rankings is that someone else is determining what is important,” he says. “One-size-fits-all definitely does not apply for graduate schools—there is no ‘best’ program—what’s great for one person might be terrible for another,” he says.

With so many options to choose from, making the right decision about graduate school can be bewildering. As was inscribed by the ancient Greeks at the entrance to the Temple of Apollo at Delphi, perhaps the most important piece of advice is to “know thyself.” Doing so will go a long way toward choosing the right path. Another piece of advice, perhaps not from the ancient Greeks, although you never know, is to “do your homework.” Thoroughly researching all the options is the best way to ensure selecting wisely. Finally, if all else fails, one can take solace from the fact that “nothing is irreversible,” even a decision about graduate school, although let’s hope it doesn’t come to that.

### Resources

**Council of Graduate Schools.** Resources for students.

[www.cgsnet.org/Default.aspx?tabid=160](http://www.cgsnet.org/Default.aspx?tabid=160)

**Gradschools.com.** A comprehensive online graduate school guide to finding the best graduate schools and graduate degree programs. [www.gradschools.com](http://www.gradschools.com)

**Petersons.** A searchable database of graduate programs based on subject area, location, and other parameters. [www.petersons.com](http://www.petersons.com)

**PhDs.org.** A website with extensive information on graduate school selection that lets students generate their own rankings. <http://graduate-school.phds.org>

**Science/AAAS Graduate Program Finder.** [http://sciencecareers.sciencemag.org/career\\_development/tools\\_resources/graduate\\_programs](http://sciencecareers.sciencemag.org/career_development/tools_resources/graduate_programs)

*Emma Hitt is a freelance medical and science writer residing in Marietta, Georgia.*

DOI: 10.1126/science.opms.r0900075

biologists, and chemists,” she says. “Such a learning environment may represent an attractive feature for some students.”

### Strategies for Sleuthing a School

One obvious step for evaluating a potential graduate program is to visit the school. This is often part of the graduate school admissions process, during which prospective applicants have a chance to meet with students and faculty. “Increasingly, many programs recruit students to visit the school maybe after acceptance, but before the