



## Planning for Graduate Work in Chemistry

A Resource for Students Considering Advanced Study, Seventh Edition, 2006

### Welcome to the world of professional chemistry!

The path to selecting, applying for, and being accepted to graduate school is laid out in this comprehensive guide which was designed to help you make decisions as you consider graduate-level work in chemistry or related disciplines such as biochemistry, biological sciences, chemical engineering, pharmaceutical and medicinal chemistry.

Are you self-motivated?

Do you enjoy discovery, research, and challenges?

If this is your path...

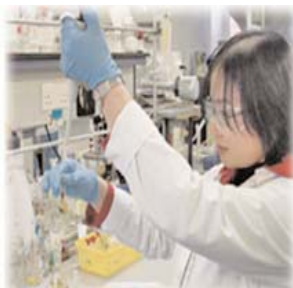


Photo by Michael Freemantle

Begin the journey!

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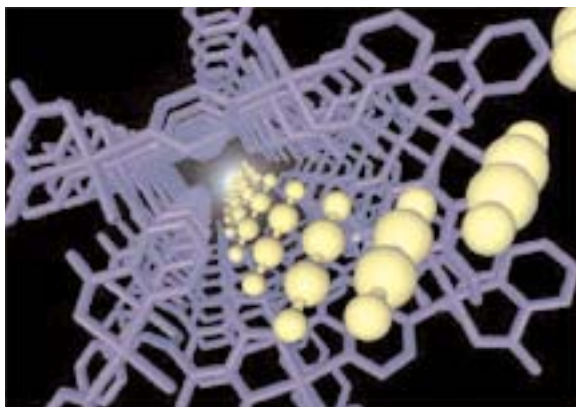
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## A Life in Chemistry

So you wonder whether graduate education in chemistry is for you? We can't provide you with an answer, but we can assure you that with solid, well-rounded graduate-level training you will have:

- A wide variety of career options, from industry to government positions to academia...but also in many other, less-obvious fields.
- Critical thinking and problem-solving skills that are so important in chemistry make a person with this kind of training capable of excelling in other areas such as medicine, law, business, or engineering.

Graduate education in chemistry is the path that may lead you to a very creative and independent career, and with this website we would like to help you to answer questions that arise in planning for an advanced degree in chemical sciences.



*A new metal-organic microporous material.  
Courtesy of Dr. Susami Kitagawa*

## Chemistry Career

A career in chemistry is almost always challenging...and almost always rewarding. Understanding chemistry is the key to any scientific career, in any sub-discipline.

As an undergraduate student in chemistry you probably already know that chemistry is the central science that:

- Provides a molecular vision of science
- Bridges to physics and materials science, the biological sciences and medicine, and the earth and planetary sciences.
- Is invaluable to the world's business and commerce.



If you are interested in getting a job in industry directly after graduation, you may wish to consult a companion web site, "Planning for a Career in Industry". It contains a bibliography of resources on possible careers, and explains the variety of career choices and opportunities available to those who hold a BS or BA in chemistry, academia, or the myriad other choices open to you as a chemistry professional. A useful listing for learning about chemistry careers can be found in the useful resources section of this website.



*Courtesy of KU University Relations*



## Personal Assessment

Graduate work in chemistry is not for everyone. It's challenging, and requires a serious commitment of an average of 5-6 years of study and a strong work ethic. If you find that research and scientific discovery are fascinating to you, then graduate work in chemistry definitely might be a right path for you. But before you decide:

- Think about what you want to accomplish and about what you enjoy.
- Consider your own particular talents in relation to what's required for success in graduate work.
- Talk with an advisor, or a faculty member, or a friend who's had experience in graduate work.
- Participate in summer internships and undergraduate research projects to find out whether research is of interest to you.



Photo by Ryan McVay

Most of your time as a graduate student in chemistry will be spent on performing research within the research group of a faculty member, who will serve as a research director. But research entails more than just performing experiments – you will study the chemical literature, plan experiments, interpret results and communicate your own research to your peers and to the scientific community. In order to succeed you must be:

- Self-motivated
- Willing to try new things
- Committed to hard work

Are you prepared to work hard to achieve your goals?



## Your Education

### The PhD Degree

The Ph.D is awarded for demonstrated proficiency in original research. It usually takes about five years to attain this degree. A Ph.D program is designed to help you develop critical thinking skills. It will also provide a template for you to develop creative approaches to problem solving. This kind of training will lay the foundation for professional work in research, whether it's in industry, teaching, or some other area. Your undergraduate degree was the beginning of this process, and provides a framework on which you can build. Graduate training is usually necessary for you to develop a proficiency in the discipline of chemistry. Once you've laid the groundwork, you can eventually lead the way in research projects of your own...and more important...in developing new knowledge. Once you've developed these skills, your opportunities are almost unlimited.

**TIP!** There is considerable variation from academic program to academic program in the requirements for these kinds of degrees. Be sure to thoroughly check the requirements at the school you choose for your work before you commit to a degree program.

### The Master's Degree

Though this website is geared towards questions you may have as you work toward the doctoral degree, there are other options in graduate-level work. You may decide that a Master of Science or Master of Arts (MS or MA) is right for you. There is considerable variation in Master's degree programs, some require research, some require a library thesis, and still others require only that the candidate do satisfactory work in a number of graduate courses. The MS degree is generally not a prerequisite for the PhD degree.

The Master's degree can usually be earned in about two years and can be of significant value to those who need a chemistry background for other types of careers. However, those who enter the work force with only a MS degree in chemistry will find themselves "topping out" in the pay scale and opportunities fairly early into their career. The Commission on Professionals in Science (CPST) and technology provides information about master's education in science, mathematics, and engineering at their website Science Master's Education. The CPST also maintains a database of master's programs which lists 322 chemistry master's programs in chemical sciences from 209 colleges and universities.

### Undergraduate Preparation

You actually began preparing for graduate school on the day you entered your undergraduate program! So, you see – you're already well on your way. Completing the certification requirements in an ACS-approved chemistry program provides an excellent background. You should take a range of courses, spread over all of the subdivisions in chemistry. Not only will this give you at least a passing familiarity with all of the aspects of chemical research, it will allow you to decide which areas you like best. You should definitely take a course in biochemistry and as many advanced-level chemistry courses as your timetable for graduation permits.



## A Well Rounded Scientist

### Personal Development

As we said before, you are already well on your path to graduate school while still in your undergraduate years. Below you will find some tips to help you with personal development during your undergraduate education:

➤ Depending on the work you like the most, and that you most want to do, you will probably find it helpful to take additional advanced courses in mathematics, physics or biology. You're going to need to acquire good problem-solving skills, effective teamwork skills, and good communication skills as well.

➤ Mastery of a foreign language can be important...plus, it's a good mental discipline. Attaining basic fluency in a language other than your own by its very nature can open new and interesting opportunities that otherwise would pass you by. Knowledge of lab safety is necessary in order to take lab courses. Finally, whether it's in industry or the academy, an unshakeable knowledge of ethical and professional standards will be vital to your success. It's also important to acquire skills such as:

- word processing
- database use
- spreadsheets
- molecular modeling and related calculations

➤ Take advantage of every opportunity to do undergraduate research. The experience will help you decide if this is the kind of career that is right for you. Graduate school admissions committees also look very favorably on undergraduate research experience.

**TIP!** Don't forget – one way or the other, you're going to need to communicate your research findings at some point. Nothing can derail a career faster than poor communication skills, or an inability to work with others. The more practice you get, the more skilled you will become.



Top: Optimized structure of Star Wars Tie Fighter Ship Shaped Supramolecular Zinc Naphthalocyanine-Fullerene Triads  
Bottom: X-ray Structure of Magnesium Porphyrin-Fullerene Dyad  
courtesy of Dr. Francis D'Souza

**TIP!** Though language facility is no longer required in many graduate degree programs in chemistry, it can be invaluable in today's era of multinational corporations and global academic research collaborations.

**TIP!** Lots of institutions have summer research programs for undergraduates. There are also internship opportunities in government research, and the chemical industry. You can find out about these opportunities online at the NSF website or at your departmental office. Another source is the Directory of Experience Opportunities, a searchable database of internships, co-ops, summer work, and fellowship opportunities for undergraduates in the chemical sciences.



## How to Proceed

A distinguished undergraduate record from a good institution with high academic standards generally guarantees admission to graduate school. However, if you have graduated with a less impressive grade record, don't forget that motivation and creativity will also go a long way toward making a successful application. Required letters of recommendation from people acquainted with your work are often a particular help in these cases. It's especially helpful if they identify an aptitude for research.

**TIP!** Recommendations can come from people you might have worked with in undergraduate research programs, or a summer job in a chemistry or chemistry-related field. Teachers who have been particularly impressed with your critical thinking skills or your writing ability are also good choices.

If the graduate program of your choice requires the submission of an essay, don't neglect it! To write a really good essay you must:

- Take time with your writing. Even though an essay is not an English assignment, spelling and grammar count!
- Think creatively.
- Ask friends or teachers to review it before you submit your application.



When you think you are ready to drop your application into the mailbox (or press SUBMIT button) don't forget to check (and double-check!) that you have enclosed all the materials required for application!  
And make sure to submit it by the deadline listed!

## Domestic Student's Checklist

Print this page to keep track of your progress.  
 International Students Checklist - Located on page 22.

### Fall of your Junior year -

- Gain research experience in the lab.
- Study for the GRE.

### Spring of your Junior year -

- Contemplate. Talk with an advisor or a friend about graduate school opportunities and make a personal assessment about whether graduate school is the right path for you.
- Take the GRE - 1st try.

### Fall of your Senior year -

- Find prospective programs. Use online resources, email, and advisors to apply the "rule of 3" to several program choices, that is find schools of interest with at least three professors each with whom you'd like to work.
- Make visits to schools.
- Apply Make sure to follow guidelines so that your applications are complete.
- Take the GRE again if necessary.


### Early Spring of your Senior year -


- Follow up. Go through your correspondences and make sure your applications are complete.
- Make visits to schools. If you have not had time yet, go ahead and visit schools that you are considering.


### Decisions are made by April 15 -


- Investigate financial support.
- Choose a program. Be timely with respect to choosing a program. Be sure to inform the institutions that you have declined about your decision.

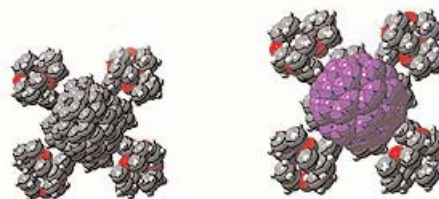
## Testing


 The Graduate Record Exam, or GRE, is required for admission to most graduate programs in chemistry. Usually, the verbal and quantitative GRE examinations are required. Some institutions also require the chemistry subject area examination.



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 For international students, a TOEFL test score is required by almost all institutions. The GRE and TOEFL tests should be taken before the end of the fall semester of the senior year so that the results will be available by the following February.


**TIP!** Many students find it to their advantage to take their GREs in the summer prior to their senior year of study, so that they have time to retake the exam if their scores aren't quite as good as they were hoping.



*Porphyrin-Fullerene developed for Switching applications courtesy of Dr. Francis D'Souza*


**TIP!** Most departments will make their decision concerning graduate admissions by the February prior to your proposed starting date. As with most things in the world, there's no real hard-and-fast rule about this. Your best bet is to check with the school you hope to attend to find out what's the best time to take the GRE/TOEFL in order to meet all of their deadlines.

## Choosing a Program

So you have decided that graduate school is for you, but now you wonder which program you should choose. You are absolutely right! No two schools are exactly alike.

Some questions to ask about the university or program you are considering:

- ↪ Does the faculty exhibit special strengths and research qualities through their graduate advisees, published work, and funded research?
- ↪ Are the libraries, laboratories, computers, and other research facilities adequate for your educational needs?
- ↪ Are the graduates of the school or program sought by employers?
- ↪ Does the department of interest offer a sufficiently large and varied curriculum to allow you a broad offering of courses and options?
- ↪ Are potential advisors likely to have a place in their research group should I wish to join it?
- ↪ What are the degree requirements?
- ↪ Is financial support available?
- ↪ Are support services adequate to make campus life conducive to the needs of minority students?
- ↪ How long will it take for me to complete my program?
- ↪ How are the advisors assigned and selected? Will I have a choice of who my major advisor will be?

How can I find out the answers to these questions?

- ↪ Talk with other graduate students. Find out what they like about their schools, departments, and research group.
- ↪ Consult the American Chemical Society Directory of Graduate Research, which is an important source of information on graduate programs in chemistry and related areas. You can use this directory to find out about the individual professors whose work

appeals to you.

**TIP!** Don't forget to approach this selection process with an open mind. You should realize that your plans to study with a specific professor might not materialize. For example, the faculty member may find it impossible to accept new students at the time you're ready to begin your research. You may also change your mind about your initial choice after visiting the department, or as your training advances.

## Choosing a Program cont.

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- ↪ Check out on the Internet graduate school department websites and individual faculty home pages.
- ↪ Visit the institution to find out whether it has adequate facilities and resources to allow for meaningful research projects.
- ↪ Find out whether the schools of interest have at least three professors each with whom you'd like to work. This is so called "Rule of Three".
- ↪ Consult other sources of information including graduate school department websites and individual faculty home pages on the Internet.

But:

↪ Don't automatically commit to a graduate school simply because it has offered you a large stipend or other inducements. While graduate stipends are a great privilege, allowing you to be paid for doing something interesting, challenging and enriching, don't forget that the most important thing about a graduate program is its suitability in meeting your educational and professional goals.

## Choosing a Mentor

As you become a graduate student, you will need to choose the person who will direct your Ph.D. thesis research. Hopefully, you will be able to build the mentoring relationship with your research advisor, which can be one of the most important you will ever experience. The chemistry professional you choose as a mentor will have an enormous effect on your attitudes, skills and insights. So how should you choose the research advisor that will not only direct your research but will also help you grow professionally in various directions?

**TIP!** Don't panic if things fail to work out as you had initially anticipated, or if those kinds of relationships don't automatically seem to be falling into place. It's better to lose a little time in selecting an advisor...or changing an advisor entirely...than it is to persevere through a mismatch.

Here are some tips:

- Don't rush into this kind of relationship.
- Take a look around a graduate department to see whose personality and research goals seem to be most complementary with your own.
- Talk first with other students working with the considered research advisor. Talking with students will give you a sense of what your life will be if you choose to join their research group.
- Be flexible and talk with several professors whose work interests you. Having some choice in advisors is important because you might need to choose someone else other than your first choice.
- And, finally look at the condition of laboratories. While people count more than infrastructure, facilities also matter a lot as the majority of current research requires state-of-art instrumentation.



Courtesy of Dr. John C. Sherman

Some schools utilize rotations to help students determine their course of graduate study and choice of research mentors. Upon entering graduate school a student will spend several months working with various professors and research teams to get a sense of the various options available before stepping into their own program of study.

While your research mentor is of crucial importance for your graduate career, you'll also need to examine your potential with other members of the department. They will also play an important role in providing for your intellectual growth and development. An advisory committee is often established once a match has been made between a graduate student and a research director. The faculty on this committee provide the student with lots of advice on issues ranging from research to academic courses to professional opportunities. Consider the extent to which your general field of interest is represented in the chemistry department that you choose, and the intellectual climate, vitality, and spirit of cooperation that the department projects as a whole.

## School Visits



You are strongly encouraged to visit individual graduate school departments where you are considering study. Such visits are a routine part of the process. Visits can help you assess the educational and social environment in different departments.

**TIP!** In many cases, the institutions you're considering are prepared to assist you in financing the visits. Sometimes you can even coordinate visits to several institutions in a single trip.

Some departments prefer to host prospective students individually, while others set aside a day or more on which they invite a selected number of students who have expressed interest in attending. Many schools do it both ways, and are willing to accommodate any special requirements that you may have. Be sure to take time to talk candidly with graduate students. They are a good indicator of what life is like in any particular department and research group.

**TIP!** It is important for you to inform schools in advance about your plans to visit, so that they can arrange for you to meet with faculty and graduate students in your areas of interest.

## Financial Support



Financial assistance for an entering graduate student generally comes in the form of a teaching assistantship. Less frequently, it comes in the form of a research assistantship. After the first or second year, many graduate students are supported by assistantships or special fellowships.

Teaching assistantships, research assistantships, and fellowships generally include tuition waivers or allowances, in addition to a stipend that is usually sufficient to support reasonably comfortable living. Some departments provide financial assistance for only nine months out of the year (which is to say, during the academic year), while others provide support for a full calendar year. You should be especially attentive to the financial details of the offers extended to you.

Some departments offer first-year research appointments as a way of attracting especially well-qualified graduate students. These appointments are often prestigious, and very enticing. But keep in mind: accepting such an appointment means that you won't be teaching. Teaching assistantships provide an opportunity for you to work with undergraduate students, to exercise your knowledge and understanding of chemistry, and to associate with experienced teachers and other graduate students who are also in the process of learning to teach. In fact, this experience has proven to be so valuable that it's often recommended that all graduate students have a period of service as a teaching assistant – even those who hold fellowships.

It is also possible that a graduate program will support you for beginning your research in the summer prior to your official start in graduate school. It's a great opportunity for you to try out a research group, and to settle into your new department before you officially start your program of study.

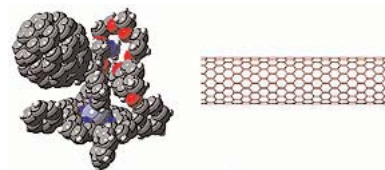
**TIP!** Check on the requirements of the specific department that you choose. Some graduate schools require teaching experience as part of their programs.

**TIP!** Summer research is usually done by placing you in the laboratory of a faculty member whose research interests you. There's usually no obligation for you to select that person as your research mentor...still, be sure to check with your graduate school for all of the requirements and financial details of your aid package.

**TIP!** It is the bottom line that counts. Included in this bottom line is the stipend minus fees that will be counted against the stipend- either directly or indirectly such as health care, state and local tax if any, tuition, different cost of livings, housing, etc..

## The Application Process

The majority of graduate school departments have extensive Internet websites as well as mailed out advertisements of their graduate programs. You can also write to the Graduate Admissions Officer of the department that interests you. Ask questions about such things as course requirements, types of qualifying examinations, or specific research opportunities.



*Supramolecular 'two-point' bound porphyrin-fullerene dyads constructed for light energy harvesting courtesy of Dr. Francis D'Souza*

Many departments start to consider graduate school applications during the fall semester. Most try to be finished with their decisions by late winter or early spring. You should begin making your inquiries early in the fall semester, and if at all possible, submit your applications before the end of the calendar year. It's smart to wait until you have heard from all of the institutions you've petitioned for acceptance before you make your final decision. Institutions would generally rather wait for your firm decision than have you renege on a decision made in haste. Normally, mid-April is taken as the de facto deadline for a decision on your part. The earlier you can make a decision, the more it will be appreciated by departments that have the difficult task of efficiently managing their recruitment programs.

It is generally advisable to enter graduate school in the fall semester, rather than at mid-year. But if your circumstances require it, some departments are receptive to mid-year applications. If this is the sort of situation that applies to you, you should write to the chairpersons of the departments in which you are interested for more information.

**TIP!** Don't be bashful. A letter or e-mail to the Director of Graduate Admissions should get you a useful response. Departments are more than willing to provide whatever information you may need, but they cannot telepathically intuit that you want it! Let them know you are interested in their work, and you will certainly get the answers you need.

**TIP!** It is bad form to accept an offer and then reject it if you feel later that you have gotten a better offer.

**TIP!** Departmental policies, requirements and application processes for mid-year admissions may substantially differ from those required for fall applications. The schools are usually happy to offer you guidance on the mid-year application process. Just don't assume that the application processes or deadlines are going to be the same as those for fall applications.



## After Being Accepted

### You're in! Congratulations

Once you have been accepted into a graduate program, there are a number of practical matters that will require your attention – such as:

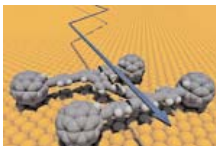
- The institution's academic calendar.
- Housing arrangements that you will need to make.
- The department's required examinations.

**TIP!** The department that you have chosen may have some form of entrance or placement examination. Put your focus on doing well and tending to the immediate actions required upon accepting a program. It is a good practice to contact other graduate students who are already in the department to aid in preparing for entrance exams and other tasks.

Examinations, if required, are usually in the four traditional areas of chemistry: Analytical, Inorganic, Organic, and Physical Chemistry. Many graduate departments are willing to refer you to standard textbooks in these areas to serve as a review as you prepare.

In some institutions, the selection of a research advisor is directly linked to the admissions process. In others, you'll be expected to choose a research advisor after you have joined the department, usually by the end of the first semester. Remember:

- You should choose a research area that you regard as interesting and challenging.
- Your potential advisor should be readily accessible and provide constructive feedback.
- You will want to find an advisor who understands the balance between providing close direction of your research, and providing ample opportunity for you to demonstrate independent thinking.
- It's important to choose someone who is genuinely interested in you, your intellectual development as a scientist, and your emotional development as a person.



A single-molecule car.  
Courtesy of  
Dr. James M. Tour



## Six Steps for International Students

U.S. colleges and universities have long recognized the important contributions of international students to the scientific and cultural life of this country and to their own institutions. For reasons of national security, the U.S. government has made the immigration process for students more rigorous, and therefore more complicated and time-consuming. We will discuss some of these requirements in detail later in this website; the most important thing to remember is that **you are still most welcome in the United States and in our graduate programs!** We have developed a series of suggestions designed to help you select a college or university for study. Many of these are the same suggestions that we make for domestic students. An excellent source of information is an online booklet called [If You Want to Study in the United States](#), which is available in six languages.



Photo by Mike Ciesielski

You should pay special attention to the sections regarding admissions and applications. For most institutions, the graduate curriculum and admissions are oriented around a sequence that starts in the fall semester.

**TIP!** You should plan to enter graduate school in August or September, as that is traditionally the beginning of the university year in the United States. The admissions process can take a year or more, and missing deadlines may mean that you will not be admitted to the institution of your choice.

### Step One (more than a year in advance)

Your choice of institution will depend on a number of factors, including matching your interests with those of the faculty; possibilities for future employment; location of the institution; financial aid; and admission requirements. The research interests of particular faculty members can be found in the free online ACS Directory of Graduate Research. Additional information concerning a department and its admission policies and deadlines can be found on its respective web site. YOU will need to establish which examinations (the Graduate Record Examination verbal and quantitative tests, and possible subject-area tests) are required for applications. You may also find useful information concerning living expenses, living arrangements, and other such details, on web sites devoted to international student programs.

At many U.S. institutions, initial financial support is provided in the form of a Graduate Teaching Assistantship, or GTA. In order to be eligible for this kind of support, it may be necessary for you to pass the Test of Spoken English, or TSE, exam. After June 2006, this examination will not be offered separately, but will be included as part of the TOEFL Internet-based Test in most countries. Some U.S. institutions now require locally-administered exams known by various names such as SPEAK (Speaking Proficiency English Assessment Kit) and TAST (TOEFL Academic Speaking Test). Successful passing of these exams often determine eligibility for a GTA appointment. You should inquire about these requirements. **Admission to graduate programs will not be granted until results of these examinations are received, and that is a process that can take several months.** Applications to sit for these exams should be timed so that the results are in the hands of the institution by February, which is when most admission decisions are made.

## Six Steps for International Students cont.

### GOALS:

- Identify 5 or 6 possible institutions that meet your needs.
- Make applications for the GRE exam and the TOEFL iBT exam
- Check on institutional requirements for tests of spoken English

### Step Two (September-December)

In choosing a graduate program, most of the criteria already mentioned in the previous portions of this website apply to you as well. Since visiting the institution is not normally an option, you might wish to communicate via e-mail with the graduate admissions officer. You may also wish to contact specific faculty about research and academic programs. It is important to note, however, that **individual faculty do not normally have the authority to admit you to departmental programs**. That is a decision that is typically assigned to a committee, which works in conjunction with the institutional admissions office.

### GOALS:

- Obtain and submit application forms to the institutions of your choice.  
IMPORTANT NOTE: The name that appears on your application should be **IDENTICAL** to that which appears on your passport.
- Identify three persons familiar with your academic performance, who can provide recommendations for you. The institution to which you are applying will generally provide forms for these recommendations.
- An OFFICIAL copy of your transcript should be sent to the institutions you have chosen.
- The Educational Testing Service (ETS) should be instructed to send the results of the GRE and TOEFL iBT exams to the relevant institutions.
- Make applications for financial aid. This process may be separate, yet related, to graduate school admission.

### Step Three (January-March)

During this time period, the institution will be making decisions concerning both domestic and international admissions. These decisions can be delayed because of incomplete information. Things that are very necessary, but often missing, include requisite letters of recommendation, transcripts, or the results of required GRE or TOEFL exams.

### GOALS:

- Check with the institutions to which you are applying to make sure that all of your required information is complete.

## Six Steps for International Students cont.

### Step Four (April-May)

Most institutions make their admission decisions and expect a response from successful applicants by mid-April. Usually around April 15th, but don't panic if you haven't heard by that date. You are likely to hear one way or the other by mid-May. You should make your choice as soon as you can, and inform all institutions to which you have applied about your decision. It is NOT considered acceptable to accept one institution's offer, then turn it down later if "something better" comes along. **This is considered evidence of unreliability and untrustworthiness.** Such practices may jeopardize opportunities for admission, since positions for international students in a particular institution are often limited.

### GOALS:

- Decide on your choice of graduate school. Notify the school you choose of your acceptance as soon as possible.

### Step Five (May-June)

After you have been accepted and indicated your intention to enroll, the institution you have chosen will submit the information necessary to grant you a visa to the Student and Exchange Visitor Information System (SEVIS). SEVIS is simply an on-line government database for recording information related to your program of study and U.S. immigration status. The institution will then provide you with a Form I-20 (F-1 visa) or Form DS-2019 (J-1 visa). If dependents such as a spouse or children are accompanying you, you will be required to provide the institution with the necessary information for the SEVIS database so that they will also be eligible for visas. The advantages, disadvantages, and eligibility for these two different types of visas are complicated. You are strongly advised to consult with an Advising Center if you have questions. Locations of these centers may be found on the educationUSA website. Procedures and regulations for entry to the United States may change at any time. It is essential that you be fully prepared for your interview at a U.S. Consulate or Embassy. The consular or embassy officer responsible for immigration will make a decision based on your specific case.

In approaching the interview, keep the following points in mind:

- You will need to pay a \$100 SEVIS fee prior to your visa interview (and after getting your I-20 or DS-2019). Students who are unable to show a receipt of payment, are immediately turned away by the consular official. F-1 and J-1 student visas are temporary visas designed to enable study (not long-term employment) in the United States. Due to the temporary nature of these classifications, the immigration officer will be looking for evidence that you intend to return to your home country upon completion of your degree. They are required to do this, therefore it is important to be prepared to articulate

## Six Steps for International Students cont.

### Step Five (May-June) cont.

Plan your interview as far in advance as possible. It may take longer to get the visa depending on the country. Plan ahead and see what the usual waiting time is and then back plan accordingly. **Ideally, you could do this at least two months before your scheduled departure to the United States.** There may be inconsistencies or incomplete information issues that must be addressed before a visa will be granted.

Be prepared. Bring your I-20 or DS-2019 form (also referred to as the Certificate of Eligibility) with you. You should also bring personal information, such as your test scores, letters from faculty members at the institution you will be attending, official letter of graduate admission, and other information relating to your graduate program. Check with the embassy or consulate about which other documents (such as a valid passport), forms, photographs and such will be required.

Have in mind, very clearly, how a degree from your U. S. college or university will aid in your professional advancement.

Provide evidence supporting the availability of sufficient financial resources for yourself (and your family, if your family is accompanying you). Bank account statements, GTA offer letters, signed letters of financial support from sponsors, grant notification letters, affidavits of support from family with accompanying bank statements - are all acceptable. Check with your school's international office to determine how much you will be allocating for living expenses each month for yourself and your family members. This will vary from region to region and city to city.

The immigration officer will be looking for evidence that you intend to return to your home country upon completion of your degree.

The U.S. Department of State has up-to-date information on the availability of visa interview dates and times in the nearest city to you with a U.S. Consulate. This information is available online.. While academic visas are given the highest priority at U.S. Consulates, you should be aware that the summer is also the busiest time for these offices. Applying as early as possible is always a good idea

#### GOALS:

Obtain visa.

### Step Six (June-August)

The educationUSA website also features a volume in its series, *If You Want to Study in the United States, entitled "Getting Ready to Go: Practical Information for Living and Studying in the United States."* This contains useful information about the visa interview, as well as preparing for travel and entry into the U.S. Let your new department know of your travel plans. There may be people in the department who can help you once you arrive...or, they may know of or be able to find someone who can assist

## Six Steps for International Students cont.

### Step Six (June-August) cont.

Getting settled into a dormitory or apartment will require a number of unfamiliar steps. It's possible that someone else originally from your country will be able to help you handle the basic tasks of the first few days or weeks. As you make your plans for arriving in the U.S., keep in mind that there may be graduate school orientation sessions that are scheduled to occur prior to the start of classes. Participation in the school's international student orientation program is mandatory and a critical step to ensuring the maintenance of valid visa status while in the U.S. All schools are federally mandated to provide such orientation programs for their international student if they issue I-20s or DS-2019s. You should also be aware that you will have to report to the institution's Office of International Programs so that your arrival can be noted by SEVIS.

#### GOALS:

Arriving in the United States, and getting started at school. You made it! Congratulations!

### INTERNATIONAL STUDENT CHECKLIST

#### At least 1 year in advance:

- Find schools. Select 5 or 6 schools that you would like to apply to.
- Do testing. Apply for GRE and TOEFL exams. Investigate requirements for spoken English testing.

#### September through December:

- Gather documents for applications.
- Email departments of interest.
- Send in applications. Make sure the entire application is complete with test scores and letters of recommendation.
- Investigate financial aid options.

#### January through March:

- Follow up. Make sure that all your applications are complete.

#### April through May:

- Decisions are made. Accept offers in a timely way. Inform the institutions that you have declined about your decision.

#### May through June:

- Obtain visa. Get your I-20 or DS-2019 from the school you have chosen and pay the SEVIS fee. Gather important paperwork and be prepared to answer interview questions about your intention to study in the U.S.

#### June through August

- Prepare for arrival. Learn about living in the U.S.. Communicate with your department about arrival dates and identify people who can help you get started.

## Useful Resources

### Bibliography: Chemistry careers and teaching

D. Parry, "Choosing and Preparing for an Industrial Career in Chemistry," *Applied Spectroscopy*, 55(8), 268A (2001). A good general overview of what PhD chemists (emphasizing analytical chemists) do in industry and how to obtain an industrial job.

R. Friary, *Jobs in the Drug Industry: A Career Guide for Chemists*, Academic Press, San Diego, CA, 2000. A detailed description of drug discovery and development from a chemistry point of view, and what chemists do in jobs related to these areas. Targeted especially to undergraduates and to PhD chemists, particularly those in organic or medicinal chemistry.

F. Owens, R. Uhler, and C. Marasco, *Careers for Chemists: A World Outside the Lab*, American Chemical Society Career Services, Washington, DC [Don't know year]. Description of opportunities for chemists at all degree levels outside of laboratory research.

#### Ordering Information:

ISBN: 0-8412-3479-5

211 pp

Price: \$15.00 + sales tax (\$25 + sales tax with purchase of Career Transitions for Chemists)

Contact: ACS Career Services at 1-800-227-5558; or e-mail: Office of Society Services

J. H. Reed, *A Guide to Classroom Instruction for Adjunct Faculty, 2nd Edition*, American Chemical Society, Washington, DC (2005). An excellent resource for anyone teaching at the college level. Covers a wide range of the educational principles, from the fundamentals of learning, to methods of delivering instruction, to evaluation and feedback.

#### Ordering Information:

Call 1-800-227-5558 x6050 and ask for product #39940 or Order Online.

The Guide is \$13.50/copy for ACS members and \$15.00/copy for non-members. Orders of 25 or more are \$12.00/copy.

A. T. Schwartz, R. D. Archer, A. K. El-Ashmawy, D. K. Lavalley, S. McGuire, G. Richmond, and R. Eikey, *And Gladly Teach*, 2nd Edition, American Chemical Society, Washington, DC (2006). A broadly based primer covering deciding on and preparing for an academic career, as well as searching for and keeping an academic job.

#### Ordering Information:

For a complimentary copy of *And Gladly Teach*, contact the ACS Office of Graduate Education, or the ACS Office of Society Services by phone at 800-227-5558 or 202-872-4600, or by e-mail. To purchase multiple copies of the book, go to the ACS Online Store, product number 61617.

R. M. Reis, *Tomorrow's Professor: Preparing for Academic Careers in Science and Engineering*, Wiley-IEEE Press, Piscataway, NJ (1997). A roadmap for all scientists and engineers spanning your research as a graduate student and postdoc to insights on teaching, directing research, and obtaining tenure. The academic job search is amply covered.

## About This Guide

### Planning for Graduate Work in Chemistry A Resource for Students Considering Advanced Study Seventh Edition, 2006

This guide was prepared by the American Chemical Society (ACS) Committee on Professional Training (CPT). The website contains the revised information previously available in the printed brochure, *Planning for Graduate Work in Chemistry: Suggestions for Students Considering Advanced Study*. In keeping with the printed tradition, this website is available in electronic form as a .pdf file that may be downloaded and printed.

The site was developed by First Insight Media, LLC.

Prof. George Wilson, University of Kansas, who directs this project, wishes to thank the ACS Offices of Graduate Education and International Activities as well as Joe D. Potts and Charles A.S. Bankart from the University of Kansas Office of International Student and Scholar Services for their helpful comments and advice.

Please send your comments related to this resource to [cpt@acs.org](mailto:cpt@acs.org)

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