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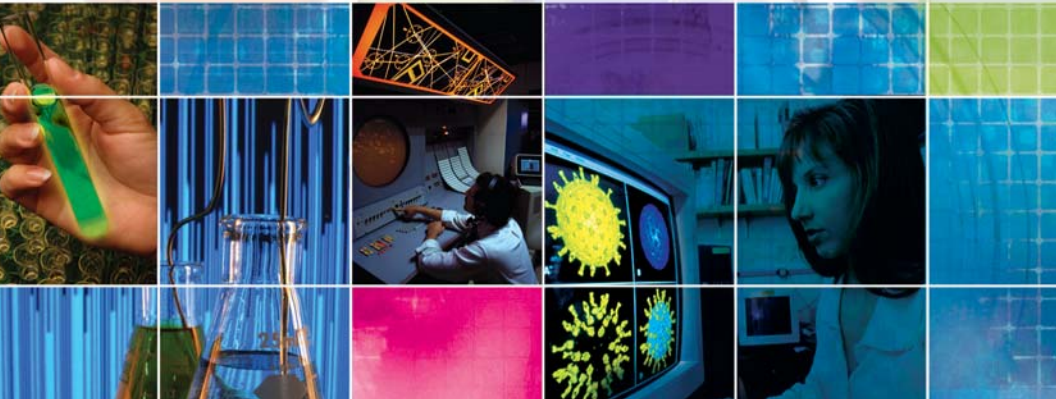
BCM
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BEYOND the BEAKERS:

SMART Advice for
Entering Graduate Programs
in the Sciences and Engineering

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Chapter Four: Making the Most of Mentor Relationships

Science is taught through an apprenticeship model

A mentor is an experienced person who takes an interest in and provides advice to someone who is establishing or progressing through a career. As a maturing scientist/engineer, you will want to seriously consider seeking mentor/mentee relationships with professionals you trust and from whom you can learn. The difference between being an advisor and a mentor is the level of personal interest a mentor takes in your life. While a mentor can be a sounding board for ideas, he or she should not dictate your actions. A good mentor should care enough to be honest about situations and help you arrive at plans of action that will promote your career and educational goals.

Understanding what type of mentorship you need:

1. As an undergraduate, you may seek a more **general mentor** relationship with someone who can provide you not only with direction and information about courses, graduate schools, careers, research opportunities and other science-related topics, but also personal advice for questions you might have related to life as a scientist/engineer. Depending on how well you work with your mentor, this person might end up writing you a letter of recommendation, or being someone with whom you do research.
2. A **professional advisor** may be someone that you will seek specifically for research and career development advice, but not for personal advice.
3. Undergraduates may have a series of **research mentors**, because some of their experiences are short term and last only a summer or semester. In some cases, you may be matched to a mentor by a program director. It helps your mentor if you provide information regarding your background in writing. Optimize the time you spend with the mentor so that he/she will feel that they know you. Sometimes heads of labs will communicate with a graduate student or post-doctoral fellow who supervises you on a daily basis. Letters of recommendation may be signed by both people.

4. As an undergraduate you can start to be observant about the qualities you would look for in a dissertation advisor, who provides research opportunities and guides you through the process of writing your Ph.D. dissertation and manuscripts describing your work. This advisor is someone with whom you will have frequent contact because you will need a lot of advice to learn to be an excellent scientist and produce a high quality dissertation. This sort of mentor should not only support your dissertation endeavors, he or she should encourage you to develop independence.

Gathering information to choose a mentor:

1. In choosing an **undergraduate mentor**, you should consider a variety of issues, including the compatibility of your research interests, the availability and approachability of the mentor, the success of that individual in the field, and the mentor's ability to help direct you into a educational/career path that will be both successful and fulfilling. In some cases, undergraduates have little choice of research mentors. My college only had one biochemist in the chemistry department at a time, so since I was interested in biochemistry, that person became my research mentor, by default. Had I thought more broadly, I might have found a research mentor in the biology department who was doing work that was close to my interests.
2. In choosing a **professional advisor**, which may or may not become a mentor, inquire about successful professionals in the field that you admire. Consider individuals like your dissertation advisor, dissertation committee members, department chairs, other scientists or engineers, as well as get recommendations of other individuals in the field.

Mentor versus Role Models

Some people provide valuable encouragement, guidance or inspiration, but do not fit the role of professional advisor because they have little knowledge about professional skills. My 8th and 9th grade science teacher was a true mentor. Genevive Cousins not only "adopted me" and treated me like her daughter, she taught me important principles of scientific writing. Every week I turned in a progress report on my science fair projects, that she returned covered in red ink. I won the Southeastern Division of the Ford Foundation Future Scientists of America Science Paper Writing Competitions in the 9th and 10th grades. As I matured, I found that the principles Mrs. Cousins taught me provided an excellent foundation for writing an NIH NRSA post-doctoral fellowship and numerous grants and scientific papers.

Gladys Mallory was a powerful influence and role model, but not a mentor. My mother was sick a lot with unexplained illnesses. I always hoped that Gladys would be working at the hospital as we raced my mother to medical care. I was 15 or 16 years old the night that Gladys leaned across the bed while she was checking my mother's vital signs and said, "There's something I always wanted to do." I yawned, "What's that Gladys?" "I want to be a real nurse." That caught my attention. She was so competent that it hadn't occurred to me she wasn't a "real" nurse. Gladys was the first African American nurses' aid at our parish hospital, in an era when some white patients would not let her touch them. I naively asked, "Why don't you go to college." "I can't pass chemistry," she responded. "Oh, don't worry. If I'm in town I'll be glad to help you." Several years later I had become a chemistry major at our local college and Gladys contacted me. She had started a two year associate degree in nursing and was failing chemistry. We started working together after the second test. She stayed in the class until the last day to drop - there was no way to pass that semester. But, she passed the chemistry course the next semester and the semester after that and she finished the associate degree. Then she finished a R.N. degree, then a Master's Degree in Nursing while she continued to work full time and be the mother to three children. At times she got up at 4 am to wash and iron her children's clothes, drove 70 miles each way for clinical studies in a larger town, worked a shift at the hospital and then got up and did it all over again. Gladys became the supervisor of the intensive care unit at our hospital and according to one physician, "...was the best nurse in a 60 mile radius." My mantra in grad school was, "If Gladys can do it, so can I." Gladys Mallory didn't have to know more chemistry than I did to teach me valuable lessons about persevering toward your goals.

3. In choosing a **dissertation advisor**, you should review the science literature and look for someone in your area of research interest that is producing quality research and publications and has a clear future in that area of science. Good graduate schools provide a period of time during which you “rotate” in a lab to get a sense of whether you’d like to join. You should consider how well you might interact with the advisor, the faculty, other students and post-docs in the lab as well as the overall atmosphere of the lab. Ask about the track history of the potential mentor in graduating Ph.D. level scientists/engineers. Some faculty are good scientists but terrible mentors. Also look into the careers of past students or post docs to see, in general, how well prepared they were to continue a career in the field. Finally, you should try to match your goals with the interests and demands of the advisor to ensure that the experience is most helpful in establishing your career.

Approaching Individuals about Mentorship:

1. When you, as an undergraduate, approach someone about being a general mentor, you will want to take a similar approach to someone seeking a dissertation advisor. Although a general mentorship generally requires a less significant commitment than a dissertation advisor, this relationship will likely span a considerable period of time and be important to your future in the field, so take this meeting seriously. Explain why you want the person to provide you with advice.
2. Approaching an individual about becoming a professional advisor is much less formal than approaching someone about being a research or dissertation advisor not only because you are asking them for a much less significant commitment, but because you will require much less time from them. Make an appointment with them, asking when they would have time to discuss a specific issue/question. Depending on how successful the first encounter was, you may want to follow up with more extensive questions.
3. In approaching an individual about becoming your research advisor you should make an appointment and outline the reasons you would like to join their lab, communicating your interest and experience in their

research. Don't panic if your first choice doesn't choose you. Consider approaching other mentors. And if you end up turning down faculty that offered you a position in their lab, try to let them know of your decision in person, and without burning bridges or destroying relationships. You may want to ask them to be on your dissertation committee, become a collaborator, or become an informal advisor.

General Pointers for Working with Mentors

1. You must accept responsibility for your own career. Others can help you, but don't count on somebody else to take care of you.
2. You will have different mentors at different points in your life. Different mentors will provide different types of help and support.
3. Don't look for mentors who just remind you of yourself. Most of my mentors have not been women. When we started an Initiative to Maximize Student Diversity in the Graduate School of Biomedical Sciences at BCM, we had few faculty who were from under-represented minority populations, but a number of people wanted to help Ph.D. students develop their careers. Some of them have been excellent mentors for students from different ethnic/racial backgrounds. Between 1998 and 2005 we increased the number of Ph.D. students from 20 to 100, with as many as 63 enrolled at the same time and 18 granted Ph.D.s.

Who do women undergraduates see as mentors?

A survey of mentor issues with 123 women alumni of the SMART Program revealed interesting information. Mentor relationships were considered as very important by 62% of the respondents and as unimportant by only 6% of the students. The undergraduates listed a variety of people who had been mentors, but there was a correlation between the education level of people and the frequency with which they were identified as mentors. Faculty were the most frequent mentors and cited by 77% of the respondents. The most valuable characteristics of mentors were being approachable, knowledgeable and that they challenged the mentee. The characteristic that ranked the lowest (8th) was kindness. Students didn't appreciate those who were too afraid of hurting their feelings to be honest. The most valuable aspects of mentor relationships involved practical issues with

writing letters of recommendation as the most important function. Discussing career opportunities and discussing science were the other functions ranked as important. Many women felt the gender of the mentor wasn't relevant. Only 12% of those who listed males as mentors thought gender was relevant, while 68% of those who had female mentors thought the gender of their mentor was relevant. (The survey was funded as a part of the NSF Model Project for Women and Girls (HRD-9631519) through which the first SMART GRE prep workshops were developed.)

4. A mentor can help you understand the system, provide encouragement and relate personal experiences.
5. You must help your mentor understand your background, strengths and weaknesses. A mentor can't help you with a problem you won't discuss.
6. Criticism is often a necessary part of growth. Don't discount a mentor because of a lack of tact. Even people with your best interest at heart may "stick their feet in their mouths" or find it difficult to discuss some situations.
7. Mentors are usually busy people; don't give-up on scheduling discussion time.
8. Mentoring can occur in short spans of time.
9. Learn to recognize when the mentor relationship is beneficial and when it is not.



Working Effectively with Your Research Mentor

1. Understand the demands of working with each mentor. How many hours per week are you expected to work? Will you need to do some work at night or on the weekends? Be sure the hours and safety conditions are reasonable relative to your other responsibilities. Failing classes because you spend too many hours in the research lab will not be viewed as a wise choice.
2. Read information on the project and ask for help in understanding it.
3. Take notes and pay attention when people take time to teach you things. Don't pretend you understand or know something when you don't. This can lead to major mistakes.
4. Be sure you keep good records in the form that is used by the lab (see section on Data Management). Keep your reagents, equipment, materials organized and labeled.
5. Admit mistakes when you make them, but don't keep reminding people of them.
6. Communicate with your mentor, whether in person, by note or by email.
7. Keep appointments with your mentor. If it is impossible to get to a meeting, let your mentor know why you missed the meeting as quickly as possible.
8. Maximize the impact of time with your mentor by:
 - reading or reviewing relevant information
 - organizing your information
 - preparing what you want to say
 - bringing clearly labeled data and information to the meeting
 - presenting a plan, even if it isn't perfect
 - taking some notes so you are sure you know what was decided
 - following up with a written note, maybe only a short note, reiterating what was discussed and decided (Your mentor will let you know if this is not needed.)
9. Work hard, but work smart. There may be a faster, easier way to get to the goal.
10. Express an interest in the work.
11. Treat your co-workers with respect and be a good lab citizen in terms of keeping things tidy.
12. Allow enough time for your mentor to critique abstracts you write or posters you prepare.

13. Pay attention to advice. If you don't agree, express your opinion in a professional way.
14. Let your mentor know you appreciate the time she/he/co-workers spend to train you.

Making Your Way Out of Mentoring that Becomes Messy:

1. Look for signs that the relationship isn't working. This can be anything from lack of communication or derogatory language to inappropriate criticism or behavior that approaches harassment. Not every student will, or should, be treated the same. Because of differing personalities, some students require more encouragement to reach their potential, while others need blunt criticism. Recognize the difference between individualized treatment and unfair or abusive treatment.
2. Seek advice and try to reconcile the differences. Talk with other trusted faculty, in a professional manner, about the situation. Generally, you should avoid discussing the situation with other students because they may not have the experience or knowledge to objectively assess the situation. Depending on the severity and time-frame of your problem, you will either want to continue the relationship, despite the differences, or you will want to make a change. If you are in your last year of graduate school or have limited opportunities as an undergraduate to change mentors, you will probably want to make it work. Often many problems can be solved simply by having more frequent and organized communication with your mentor. However, in more serious situations, you may need to involve your program director or meet with an external mediator to resolve the problem.
3. Finally, if it still isn't working after you've made an effort to resolve the differences, know that it is okay to change mentors. Finding a different mentor may be worthwhile for your career and your psychological health. Sometimes, no one is really at fault, it's just that two good people don't fit each other's styles, habits or philosophies. Good graduate schools will help students make transitions between dissertation mentors.

4. Depression in either the student or mentor can torpedo a relationship. A high percentage of people will experience depression at some time in their life. Luckily, today there is help for coping with the lack of energy, interest in life and work and hopeless feeling that accompany depression. If you think you are depressed, please talk with someone who can help or find help for you. Many very successful scientists have coped with this medical problem. An engineer, who charted his moods very carefully, played an important role in identifying one of the most manageable manic/depressive diseases. Seasonal affective disorder or SAD, is linked to extreme responses to low levels of sunlight in winter. Millions of people have found their brain function stabilized through understanding the cause of their symptoms and using light therapy to regulate sensory input, thanks to an engineer who keep meticulous records, even when he felt terrible.





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