Making the Right Moves

A Practical Guide to Scientific Management for Postdocs and New Faculty

Burroughs Wellcome Fund
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Chapter 5

MENTORING AND BEING MENTORED

As a principal investigator, you probably will hire technicians, assume responsibility for the direction of graduate students, and take on a few postdocs. In addition, your undergraduate students may look to you for guidance about careers in science. It's also possible that young scientists outside your lab may begin knocking on your door. Each of these individuals may look to you as a mentor. At the same time, you will continue to be in need of guidance for your own continuing professional development. This chapter describes the process of mentoring, with the focus on mentoring the people working in your lab. It also suggests desirable personal qualities and plans of action for both mentors and trainees. (Note: In this chapter, the people you mentor are referred to as "trainees," although not everyone you mentor may be receiving training in your lab.)

WHAT IS MENTORING?

Scientific mentoring is a personal, one-on-one relationship between a more experienced scientist and a junior scientist or a scientist-in-the-making. The mentor is exposed to the trainee's energy and ideas, and the trainee receives the guidance and encouragement necessary for professional development. Mentoring relationships commonly form across broad experience gaps—e.g., professor to student—but also can be established between peers or near peers. For example, a graduate student whose background is in biology may serve a laboratory mentoring role for a graduate student whose background is in mathematics, or a graduate student may mentor an undergraduate.

Mentors usually include those who are officially responsible for the work of junior scientists or students, such as the principal investigator or a formal adviser. However, it's also important to have mentors who are outside the direct line of authority. These mentors can be especially helpful in providing guidance when formal advising relationships become strained or when the personal or professional interests of the trainee differ from those of the formal mentor.

Not only does mentoring benefit the trainee, it also benefits the mentor. As a mentor, you derive personal satisfaction in helping nurture the next generation of scientists.

Your scientific achievements are carried forward by those you have mentored. As your trainees embark on new projects, you are naturally kept abreast of the latest scientific developments. In addition, your professional network expands as your trainees expand their professional horizons.

Traits of a Good Mentor

Good mentors often share some of the following personal qualities:

- *Accessibility:* An open door and an approachable attitude.
- *Empathy:* Personal insight into what the trainee is experiencing.
- *Open-mindedness:* Respect for each trainee's individuality and for working styles and career goals different from your own.
- *Consistency:* Acting on your stated principles on a regular basis.
- *Patience:* Awareness that people make mistakes and that each person matures at his or her own rate.
- *Honesty:* Ability to communicate the hard truths about the world "out there" and about the trainee's chances.
- *Savvy:* Attention to the pragmatic aspects of career development.

Confidentiality in Mentoring

As a mentor, you may be privy to a lot of information about your trainees, from their past professional accomplishments and failures to their personal relationships and financial situation. You should treat all information as confidential. Your trainees should feel that they can trust you with whatever problems they share with you.

A MENTOR'S RESPONSIBILITIES

Mentoring entails substantial commitments of time, energy, and good will. A significant portion of your time must be allocated to each trainee, and you must be prepared to obtain the resources the trainee needs. In addition, you should use your experience and contacts to help the trainee establish a professional network.

Question: How do I say no to being someone's mentor?

Answer: Be kind: Imagine yourself in your requestor's shoes. Listen to them intently and give reasons related to your own limitations. However, be clear and firm. Do not invite misunderstanding. Suggest alternative sources of help, but check first with the potential mentor.

Choosing Whom to Mentor

You will have to make case-by-case judgments about which mentoring relationships you can afford to enter into and how intensive each one should be. There are some people for whom you are clearly responsible, such as the people working in your lab. The students in your courses also have legitimate expectations of you. Others, outside your lab or courses, may come to you for advice.

Some people are more promising than others, and you want to nurture their talent. Others have interests closely related to yours, and it is natural for you to want to work closely with them. Still others show promise but are needy in some respect; for example, their skills are not fully developed or they need help focusing their efforts. With the people in your lab, the important thing is to be fair and avoid favoritism. With the people outside your lab, you need to avoid overextending yourself or setting up expectations you can't fulfill.

Defining Your Role as a Mentor

Generally speaking, a mentor provides whatever is needed to further a trainee's professional development but is not necessarily a friend. You should offer to teach technical skills, give advice about the political aspects of science, and suggest networking opportunities, but you should probably not offer advice on personal matters. Often, emotional issues are relevant to one's work, and you can offer moral support, but a good mentor treads carefully.

> *One of the lessons is that my job is not to be their best friend. My job is to be their mentor, and my job is to be their boss or supervisor.... I had this sort of egalitarian thing where I was trying to run a professional laboratory, but I was also wanting to be buddies with everybody.... I have come to realize the alternative—to have a little distance. Things work better if it's clear that I am the head of the lab.*
>
> —Charles Murry, University of Washington School of Medicine

Mentor Versus Adviser

In theory, mentors have multiple responsibilities—being an adviser is one of these. According to the Council of Graduate Schools (*http://www.cgsnet.org*) mentors are

- *Advisers:* People with career experience willing to share their knowledge.
- *Supporters:* People who give emotional and moral encouragement.
- *Tutors:* People who give specific feedback on one's performance.
- *Masters:* Employers to whom one is apprenticed.
- *Sponsors:* Sources of information about opportunities and aid in obtaining them.
- *Models of identity:* The kind of person one should be to be an academic or a professional scientist.

In reality, it is unlikely that any one individual can fulfill all possible mentoring roles. For this reason, many argue that the term mentor should be used broadly to mean an individual who helps another with one or more aspects of his or her personal or professional development or both. In this sense, trainees are encouraged to seek out various faculty who can provide some of these components.

STRATEGIES FOR EFFECTIVE MENTORING IN YOUR LAB

Make Everything a Learning Opportunity

It helps to think of mentoring as a highly individualized mode of teaching. You want to establish a "culture of teaching" in your lab, so that each individual feels empowered to seek whatever he or she needs to do good science.

Set Specific Goals and Measures of Accomplishment

Work with each individual—at performance evaluation time, in the course of lab meetings, and on other occasions when his or her work is under review—to set specific goals and measures of accomplishment. The following are some examples:

- For a postdoc or student, you might want to establish a publishing goal. It should include deadlines.
- For postdocs, job-hunting goals might be important. You might say, "By next month, give me your list of places you want to apply to. Then we can talk about developing your job talk."
- Have technicians identify new skills they need (e.g., using new equipment or software). Give them time to learn and the opportunity to take courses or seek help from others. Then ask them to demonstrate what they have learned at a staff meeting.

In some cases, you may have to push people a bit to set their goals. In other cases, people's goals may be well-defined but may not exactly fit your lab's overall goals. If you can, give them room to explore options, and offer whatever educational and networking opportunities you can afford. They will be much happier and more productive while they are with you if they feel you are looking out for them and their future well-being.

Encourage Strategic Thinking and Creativity

Trainees in your lab, especially newcomers, may not have the experience to judge how long to struggle with an experiment or a project that is not working. As the principal investigator, you must decide what work is most important, how long a given project can be pursued, and what resources can be allocated to any particular effort. As a mentor, you should explain the basis and significance of your decisions to your trainees. In this way, you give concrete examples of strategic thinking and prepare your trainees for similar decisions they must make when they are in charge of their own research programs.

It is also important to give people enough space to be creative. Don't rush in too quickly with interpretations of data or solutions to problems. Let your staff take the first stab. Be thoughtful and ask probing and guiding questions. By doing this, you prepare your trainees to work through projects independently and you benefit from their insights and creativity.

> *If you just regiment the students' and postdocs' lives, you may have a very productive laboratory, but you may miss out on an opportunity to stumble on a major discovery or new scientific direction.*
>
> —Thomas Cech, HHMI

Uphold Professional Standards

Those new to research are still forming their professional standards and habits. They will be working with you for months or years and will learn your lab's way of doing things. Set high standards for yourself and your workers, and make sure your lab offers an encouraging and disciplined environment. Experienced lab leaders list the following essentials:

- Encourage good time-management techniques. At the same time, respect individual patterns of work. (See chapter 6, "Time Management.")
- Clearly state your expectations. Let people know when they are not meeting them. (See chapter 3, "Laboratory Leadership in Science.")
- Offer criticism in a way that doesn't shame and discourage people.
- Keep abreast of laboratory record keeping. This is a key management responsibility and an aspect of mentoring. As the principal investigator, you are responsible for seeing that your people keep meticulous records documenting their work and meeting regulatory requirements. This habit will serve them well later on. By reviewing lab notebooks frequently, you also guard against falsification of data. (For more on record keeping in the laboratory, see chapter 8, "Data Management and Laboratory Notebooks.")

Impart Skills

Do the following to encourage your lab workers to learn new skills:

- Involve everyone in the scientific publishing and grant-writing process. Part of your job is to teach your trainees how to write publishable scientific papers and successful grant proposals. For papers, have the first author write the first draft, and then send the paper around the lab for review. For proposals, have each person write a piece of the proposal, and then have everyone review successive drafts of the whole package. By doing this,

everyone will gain invaluable experience and get a chance to see the big picture of the lab's activities.

- Impart technical skills. As a manager, you need to know the skill sets of each member of your lab and make sure that each important skill is passed on to several people in the laboratory, for their benefit and yours.
- Teach lab management explicitly. Give the people in your lab managerial responsibilities; for example, have them coordinate the sharing of equipment in the lab or draw up a list of routine lab jobs that can be rotated among lab members.

> *I have a graduated system for providing opportunities. For example, [graduate students and postdocs] must write their own meeting abstracts and papers. They must present at lab meetings and seminars in the department when works are published. If they go to meetings, they must provide meeting summary presentations when they get back. If they do well at these tasks, I let them review manuscripts with me, providing comments that I may choose to incorporate into the final review. The ultimate compliment is when I ask them to attend meetings on my behalf.*
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> —Milton Datta, Emory University School of Medicine

Provide Networking Opportunities

One of the most important benefits you confer on the people you train is admission to the network of scientists in your field. Your reputation opens doors for those associated with you, and the connections are not likely to be made without your involvement. So take steps to facilitate the introductions, including

- Allowing trainees to meet with seminar speakers invited to your institution.
- Taking trainees with you to meetings and introducing them to your colleagues.
- Encouraging trainees to approach your colleagues about scientific matters, using your name.
- Encouraging trainees to make presentations at meetings when they are ready.

Give Moral Support

You can help the people you mentor estimate their own potential and chart their life course. To do so, you must be supportive and honest. Try to convey to each of your trainees that you have a commitment to him or her and that when a problem surfaces, you have an interest in helping to solve it and will do everything you can to do so.

DIFFERENT MENTORING NEEDS

Each type of lab worker—for example, undergraduate, graduate student, postdoc, and technician—is on a different professional trajectory. As you work with them, you need to keep in mind their path and their location on that path.

Mentoring Undergraduates

The seeds of a scientific career are planted in the undergraduate years or even earlier. Promising undergraduates can be invited to take part in research through academic independent-study options or can be given paid work. Take their work seriously, and set high standards for them. You might place them under the day-to-day guidance of a graduate student or postdoc, but you should maintain a strong role in overseeing their training and the overall flow of their work within the lab. Keep in mind that these beginning researchers may need extra encouragement when their research isn't going smoothly.

Mentoring Graduate Students

In science as in other fields, graduate school is vastly different from the undergraduate scene. Perhaps the most important difference is that undergraduates are expected to be primarily engaged in absorbing knowledge, whereas graduate students are expected to begin making their own contributions. A mentor helps new graduate students make this transition. A graduate student may have several mentors, but the most important is the principal investigator in whose lab the student is working.

A typical graduate student follows this trajectory:

First years. The principal investigator's task is to provide a focus—a coherent plan of study. The student faces a steep learning curve. Basic techniques must be learned, comprehensive exams taken, and a thesis topic chosen. The principal investigator keeps tabs on the student's progress. The student's success depends on effective mentoring by the principal investigator.

Middle years. At some time during these years, the student may be struggling with his or her thesis. The principal investigator helps the student out of a slump by offering moral support and suggesting ways to tackle a scientific problem. By now, the student has learned a lot and should be sharing information and techniques with colleagues, younger students, and postdocs. Teaching others is a good way to learn.

Final years. The student is preparing to move on. The thesis should be near completion, and the search for a postdoctoral position should be under way. The principal investigator will be asked for letters of reference and perhaps more active job-hunting assistance. Other mentors, such as members of the thesis advisory committee, may be called upon for help in the job search as well.

Mentoring Postdoctoral Fellows

Postdocs are in transition. On the one hand, they are highly trained professional scientists who are working in your lab for a limited time to conduct research within the general parameters of your and their shared interests. On the other hand, they are not really complete professionally, because a stint as a postdoc is usually a prerequisite for an academic position. Your task as a mentor of postdocs is therefore complex.

Keep in mind that the amount of time you can spend helping your postdocs will be limited, so use that time efficiently. In addition, find ways to have them help one another or obtain assistance from other sources.

You must strike a delicate balance in directing postdoctoral work. Although the postdocs may be working on your projects, you must treat them as collaborators, not employees who require close supervision. Encourage them and give them the help they need in setting research and career goals, but give them sufficient independence so that they "own" their projects.

You do have a protective function when it comes to the politics of the larger academic world. Your postdocs are young, politically inexperienced, and vulnerable. You need to be aware of outside competition. Be prepared to steer your postdocs away from projects that might result in conflict with researchers who are already working on similar projects and who might publish results before your postdocs are able to.

If a postdoc is not working out as you had hoped, encourage him or her to make a change. You may be able to help the postdoc find a more suitable position. But even if you can't, an unhappy postdoc should move on sooner rather than later. (See "Asking Staff to Leave," page 91 in chapter 4, "Staffing Your Laboratory.")

As with all trainees, it is important to discuss career goals with your postdocs. Not all will be interested in or competitive for academic positions. For those who are, help them develop a project that they can take with them after they leave your lab and begin to establish their own labs. Alternatively, you can let your postdocs take a project from your lab with them and work on it for a specified time period (e.g., for several years) without competition from you, with the understanding that when that period has passed, your lab may pursue research in the same area.

You have a huge role to play in facilitating your postdocs' job hunts. Keep alert to job openings, counsel them about the process, coach them in their interview presentations, and give them the best letter of recommendation you can. Sometimes, when the search doesn't go smoothly, you may need to keep them in your lab a little longer than you expected. Keep up the words of encouragement during this difficult period. After they have gone, keep in touch with them. They will be an increasingly important part of your professional network.

Mentoring Technicians

A technician is your employee, hired to get work done. That being said, many technicians are a distinct type of professional scientist. You should understand and encourage their aspirations. Make it clear to them that they are valued contributors to your projects. If they are interested, you may want to give them research projects of their own. If their aspirations are purely technical, encourage them to gain new skills.

Special Issues for Physician-Scientists

How to Mentor Physician-Scientists

Physician-scientists have an especially complicated balancing act: caring for patients, carrying out experiments at the bench, and meeting regulatory requirements for human-subjects research. As a result, they may not be able to spend as much uninterrupted time in the lab as their Ph.D. colleagues. However, the strength of physician-scientists is that they have a clinical base. As a mentor, you should understand the unique challenges physician-scientists face, as well as value their strengths. Help physician-scientists in your lab with establishing priorities and developing effective time management skills. If you are not a physician-scientist, put them in touch with someone who can help them with these competencies. In addition, encourage physician-scientists in your lab to use their clinical base. For example, they might enroll patients from their clinic or practice following a simple protocol. They might collect answers to a questionnaire with demographics, or obtain data on clinical presentation, progression and response to therapy, as well as collect relevant serum or tissue samples. Even if you do not have use for these specimens, if they are well-collected and from well-defined sources, then they will have value to someone, perhaps a colleague in your department, who is testing a particular hypothesis. Making use of the physician-scientist's clinical base can compensate for the split in time. In addition, clinical work allows physician-scientists to sometimes see connections that someone with narrower training may not see. As a mentor you should take advantage of this perspective. Make sure that questions about clinical translation or relevance are brought up in the lab and directed to the physician-scientists.

MENTORING INDIVIDUALS OUTSIDE YOUR LAB

When you get a request for mentoring from a young scientist in another lab, or even in another university, think carefully before you agree. Do not enter into such a relationship secretly. Insist that the individual inform his or her principal investigator that you two are speaking. On the one hand, the request says something positive about your standing in the research community. In addition, by taking on a new relationship, you might open up the possibility of future collaborations. On the other hand, there may be problems you are not aware of. Ask yourself the following questions:

- Why is this person asking me for help? There may be a negative reason. In the case of a postdoc, perhaps he or she is dissatisfied with relationships in the home lab. If this is the case, make sure you are not offending the indi-

vidual's principal investigator. You may find that the other principal investigator welcomes your help as an extra resource.

- What are the person's expectations? You need to be clear about whether you are being asked for occasional advice or long-term assistance. If it's the latter, determine whether your mentoring role will be formal or informal.
- Do I really have the time and energy to commit to this relationship?
- Is this someone I want to mentor?

The people in your lab deserve priority. But if the person fits, and you can extend yourself, do so.

HOW TO GET THE MENTORING *YOU* NEED

Being mentored is as much an art as mentoring. It's a matter of getting plugged in to a complex network, knowing whom to ask for what, knowing how to accept the professional advice you receive, and maintaining long-term personal and professional relationships. The following suggestions may help:

- Don't let go of your old mentors. Stay in close touch with your graduate and postdoc advisers. Although they may not be familiar with your new environment, their distance from it, combined with their general understanding of the world of science, can help you put your current environment in perspective. Also, you never know when you will need to ask them for a reference or other professional help. Even a quick e-mail to let them know that you published a paper or received a research grant or an award will help them support your career.
- Establish a relationship with a set of official mentors. Your new department probably will assign you a mentor or even a mentoring committee. These individuals may ultimately constitute your promotion and tenure committee, so cultivate them carefully and treat them with respect. You do not want to vent your frustrations or confide your uncertainties and weaknesses to this group.
- Seek out informal mentors. These usually are experienced scientists within your department or elsewhere who can give you a broader perspective on science and scientific politics. It is especially important to do this if your department has not assigned you an official mentor.
- Establish a set of confidants. These are people with whom you can openly share information about politically sensitive issues. Choose them carefully. You may be more comfortable limiting your confidants to one-on-one relationships. Or you may find a group that puts you in close touch with colleagues whose situations are similar to yours.

- Meet regularly with your formal mentors. Keep them apprised of your progress. Do not avoid them if things are going badly. Enlist their help.
- Keep meetings professional. Respect your mentors' time constraints. Be prepared and specific about what you ask for.

How to Be Mentored Well

Here are some qualities to cultivate in yourself as you seek to be mentored:

- *Foresight:* Start early to think about your future.
- *Proactivity:* Don't expect to be taken care of. You could easily be overlooked in the competitive world of science.
- *Probing:* Ask tough questions. Find out about the experiences of others with this potential mentor.
- *Respect:* Be polite. Make and keep appointments. Stay focused. Don't overstay your welcome.
- *Gratitude:* Everyone likes to be thanked.
- *Reciprocation:* Repay your mentor indirectly by helping others.
- *Humility:* Be willing to accept critical feedback so that you are open to learning new ways of thinking about and doing science.

When the Relationship Is Not Working Out

What you view as a problem may simply be a matter of personal style or a different understanding of the mentor's role. Have a conversation with your mentor about getting what you need. If that does not help solve the problem, you may need to think about finding other mentors. Consider finding another mentor if yours is clearly and consistently uninterested in you, undervalues your abilities, or displays any other signs of undermining the relationship. Consider finding another mentor if yours behaves inappropriately by violating workplace rules or fails to fulfill essential responsibilities to you—for example, by not sending letters of reference or by not reviewing your work. You may need to appeal to whatever conflict-resolution mechanism exists at your university. Start with the human resources office for guidance on how to proceed.

Adding new mentors may be helpful. However, be very careful about severing a mentoring relationship. Even if the relationship is not going well, you do not want to offend someone unnecessarily. If the relationship is official, ending it will require explicit action and most probably generate bad feelings. If the relationship is informal, and you can just allow it to peter out, do so. If your mentor wants to terminate the relationship, accept the decision with good grace. It will be better for both of you.

GENDER AND CULTURE ISSUES

Scientific labs are close quarters that ideally will create equally tight and fruitful working relationships. However, these working environments can also create friction and conflict. In addition, many labs include people from many different cultures and backgrounds, which can contribute to difficulties in communicating and to misunderstanding. For this reason, everyone in the lab has to work especially hard to show respect to other lab members. As the principal investigator you need to set the example by facilitating positive and cooperative relationships.

Teach your students and postdocs appropriate social behavior by

- Respecting other people and not offending them with jokes, pictures, or music that show disrespect for who they are or where they come from.
- Treating everyone fairly, and keeping the main focus on science.
- Respecting different sensitivities by tailoring your way of criticizing students to their personal style (e.g., some will be devastated by words that others take as simply a push in the right direction).
- Demonstrating your willingness to communicate with and to understand each student, regardless of their background and culture.
- Ensuring that all lab members feel physically safe while working in the lab.

As a principal investigator, you will also need to be aware of issues that are particularly relevant to certain segments of the population, such as women and minority and disabled students. Some of these issues are mentioned below.

Gender and Minority Issues

Role models and networking. African Americans, Hispanics, and American Indians are underrepresented in the science and engineering labor force. And in some fields of research, females are underrepresented either as students or at the faculty level. Be aware of minority support groups on your campus and of potentially helpful role models for minority students and postdocs. Similarly, women students and postdocs may not have access to the same networking opportunities as their male counterparts and may need your help in seeking these out. If you are a woman or a minority scientist, and you are making good progress on a career in science, younger women or minority students may want to know how you do it. If you have had failures, or are making compromises, they may want to know that too. You may want to share your experiences, positive or negative, with the next generation.

Discrimination and harassment. Be sure you are familiar with your institution's policies pertaining to discrimination and harassment. This knowledge will help you deal with the situation if you are approached by someone who believes to have been discriminated against, if you are accused of harassment or discrimination, or

if you become romantically involved with a colleague or someone you supervise. Understanding the nature of discrimination will help you avoid making unlawful mistakes and help you spot mistakes made by others. Be sure you know what offices in your university deal with harassment and discrimination complaints and offer training about university policies and procedures.

Sharing the load. If you are a successful woman or minority scientist, you may be called upon too often to serve on committees as the representative of your gender or group. Do what you can, but be selective and don't let committee work get in the way of your research. Have an answer ready so that when you are called to serve in some way that you feel taxes your time too much you can politely explain you have a lot on your plate at the moment. Alternatively, you can make it a policy to always ask for a day to think about a request for your time.

Family responsibilities. In many cases, women have the primary responsibility for the care of young children and aging parents. As a principal investigator, you should try to accommodate family obligations of all those in your lab who have such responsibilities (e.g., avoid scheduling mandatory meetings before or after the hours when child care is typically available). You may also consider what you can do more generally to be an advocate for family-friendly policies at your institution. If you are shouldering pressures of family responsibilities, find out whether your institution has policies or programs you can take advantage of to help alleviate those pressures (such as tenure clock extensions, part-time appointments, parental leave, and flexible work hours).

Teaching How to Mentor

Jo Handelsman, Christine Pfund, Sarah Miller Lauffer, and Christine Maidl Pribbenow of the Wisconsin Program for Scientific Teaching have developed a mentoring seminar to teach scientists how to be better mentors. Guided by a "facilitator" the seminar takes a group of mentors through different scenarios and situations that serve as teaching tools. It consists of eight sessions that provide an intellectual framework for mentoring, present various mentoring methods to experiment with, and describe dilemmas that participants solve through discussions with their peers. The manual for the seminar, entitled *Entering Mentoring: A Seminar to Train a New Generation of Scientists,* may be obtained from *http://www.hhmi.org/grants/pdf/labmgmt/entering_mentoring.pdf*.

For more information about the Wisconsin Program for Scientific Teaching, visit *http://scientificteaching.wisc.edu*.

Cultural Differences

As a scientist, you are very likely to find yourself the mentor of students from other countries, or from minority groups within the United States. Language and cultural differences may make the mentoring relationship more challenging. For example, people from some cultures may convey information only in indirect ways, or they may be reluctant to argue with an authority figure. As a mentor, it is important to be aware of cultural differences when dealing with issues in the lab, and you should make an effort to learn about these differences. In addition, most campuses have resources to help foreign students become acculturated; encourage the people in your lab to get whatever aid they may need.

RESOURCES

American Association for the Advancement of Science. ScienceCareers.org has many articles on mentoring, http://sciencecareers.sciencemag.org.

Association for Women in Science. *Mentoring Means Future Scientists: A Guide to Developing Mentoring Programs Based on the AWIS Mentoring Program.* Washington, DC: Association for Women in Science, 1993.

Barker, Kathy. *At the Helm: A Laboratory Navigator.* Cold Spring Harbor, NY: Cold Spring Harbor Laboratory Press, 2002.

Council of Graduate Schools. *A Conversation About Mentoring: Trends and Models.* Washington, DC: Council of Graduate Schools, 1995.

Council of Graduate Schools. *On the Right Track: A Manual for Research Mentors.* Washington, DC: Council of Graduate Schools, 2003.

Federation of American Societies for Experimental Biology. "Individual Development Plan for Postdoctoral Fellows," http://opa.faseb.org/pdf/idp.pdf.

Fort, Catherine C., Stephanie J. Bird, and Catherine J. Didion, eds. *A Hand Up: Women Mentoring Women in Science.* 2nd ed. Washington, DC: Association for Women in Science, 2005.

National Academy of Sciences, National Academy of Engineering, and Institute of Medicine. Committee on Science, Engineering, and Public Policy. *Adviser, Teacher, Role Model, Friend: On Being a Mentor to Students in Science and Engineering.* Washington DC: National Academy Press, 1997, http://search.nap.edu/readingroom/books/mentor.

National Academy of Sciences, National Research Council. Reports from the Committee on Science, Engineering, and Public Policy, http://www7.nationalacademies.org/cosepup.

National Institutes of Health, Office of the Director. *A Guide to Training and Mentoring in the Intramural Research Program at NIH.* Bethesda, MD: National Institutes of Health, 2002, http://www1.od.nih.gov/oir/sourcebook/ethic-conduct/TrainingMentoringGuide_7.3.02.pdf.

Nettles, M. T., and C. M. Millet. *Three Magic Letters: Getting to Ph.D.* Baltimore, MD: Johns Hopkins University Press, 2006.

Nyquist, Jody D., and Donald H. Wulff. *Working Effectively with Graduate Assistants.* Thousand Oaks, CA: Sage Publications, 1996.

Reis, Richard M. *Tomorrow's Professor: Preparing for Academic Careers in Science and Engineering.* New York, NY: IEEE Press, 1997.

University of Michigan, Horace H. Rackham School of Graduate Studies. *How to Mentor Graduate Students: A Guide for Faculty at a Diverse University.* Ann Arbor, MI: University of Michigan, http://www.rackham.umich.edu/StudentInfo/Publications/FacultyMentoring/contents.html.