



Mentoring Student and Postdoctoral Researchers



Office for the Protection of Research Subjects (OPRS)

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This series of booklets is adapted from the Collaborative Institutional Training Initiative (CITI) Responsible Conduct of Research online course available at www.citiprogram.org

Also available in the RCR Series:



Using Animal Subjects in Research



Collaborative Research



Peer Review



Data Management and Acquisition



Human Subjects Research



Conflicts of Interest and Commitment



Research Misconduct



Responsible Authorship and Publication

About the Source Material

The Collaborative Institutional Training Initiative (CITI) web based education program, developed by the University of Miami and the Fred Hutchinson Cancer Research Center, offers training in Human Subjects Research, the Responsible Conduct of Research, and Good Clinical Practice. CITI is currently used by over 1130 participating institutions and facilities from around the world and offers online course material in more than seven different languages. CITI RCR was developed with public funds and thus allowed access to material used to create these booklets.

Introduction to Mentoring Student and Postdoctoral Researchers

This booklet is a resource for faculty, students, postdoctoral researchers and staff involved in Mentoring relationships. Mentor/Mentee expectations and responsibilities are discussed in the following pages. Mentors have the opportunity to enhance the student and postdoctoral researcher's experience while at a university and in their career beyond graduation. Case studies and reference lists are provided.

What is Mentoring?



Mentoring is the social foundation of research. It is the mentor who has the potential to draw the best from the student or postdoctoral by acting as an adviser, teacher, role model, motivational friend and supportive advocate. It is an ideal way to pass ethical and professional values to the next generation of researchers, and yet most research organizations do not directly address it as a core responsibility. At USC the goal is the commitment to long term development, progress, and the cultivation of an encouraging, jointly supportive mentoring environment.

Why is Mentoring Important?

Students and postdoctorals pursuing research with inadequate mentoring can put the research structure of the entire university at risk. Mentoring serves to alert students and postdoctorals to the institutions legal, ethical and moral expectations.

How Do Mentors Impact Research for the Next Generation?

Mentoring is one of the primary means for one generation of researchers to impart their knowledge to succeeding generations. More than textbooks and formal classes, the relatively informal dimensions of research, including the relationship between mentor and trainee, prepare the next generation of research professionals.

Who Can Mentor?

A mentor might be a faculty adviser, a laboratory director, a fellow student or postdoc, another faculty member, a wise friend, or simply another person with experience. For our purposes, a trainee or protégé in the research setting includes anyone in a junior or apprentice position, such as an undergraduate or graduate student, a postdoctoral fellow, or a junior research or faculty member

The Role of the Mentor

According to William Silen, M.D., Dean for Faculty Development and Diversity at Harvard Medical School, "the truly complete mentor is a single individual who is able to serve as an advisor/guide, developer of talent/coach, opener of doors/advocate, role model, interpreter of organizational or professional rules, protector, rule setter/boss - and carries on all of these functions on a long term basis."

What Attributes Should a Mentor Have?

- Experience with the research and challenges that students and postdoctorals face
- The ability to communicate that experience
- The willingness to communicate his/her experiences and to guide the trainee through his/her own research
- A special interest in helping another person develop into a successful professional

What Needs Should a Mentor Fulfill?

The wide range of needs a mentor can fulfill include:

- Contributing to the development of a capable trainee in many aspects of research, including methods, technology, directions, creative thinking, completing academic or professional requirements, and communication skills.
- Furthering career development and preparation for the job market. This includes an understanding of the current job market, opportunities to make contacts with leaders in the trainee's field, introduction to networking, and an awareness of the range of career options. A mentor may help with career advancement in terms of applying for grants, and how to write a strong proposal.
- Socialization of trainees including guiding ethical development and fostering an understanding of the political, economic, and social elements of interacting within the academic community and instilling a sense of collegiality. This training includes promotion of skills for teaching, communication, working in teams, leadership, management of people, interacting with others, listening, expressing ideas, administration and planning, and budget management.
- Advocating for the trainee. There are times when the mentor has to step forward and defend or advocate for the trainee.



Responsibilities of Mentors

Just as trainees have a responsibility to seek mentors, researchers have a complementary responsibility to become mentors. Taking a direct role in training the next generation of researchers should not be optional - it should be part of the definition of a researcher. For this reason, the enterprise of research depends on effective communication not just about the research but about the practice of research, standards of conduct, and ethical and social responsibility. This obligation extends to all members of the community, not just senior researchers. For example, it

is likely that a newly arrived undergraduate student could benefit from the mentoring of a graduate student or postdoctoral, technician, or even a more senior undergraduate.

1. Be Available

At the core of mentoring responsibilities is the simple admonition to make oneself available. In the span of a few minutes, a mentor can effectively assist trainees by being attentive to a few key elements, such as careful listening and keeping in touch.

2. Listen Carefully

Through attentive responses and thoughtful questions, the way is open for clear communication and a feeling of support and encouragement.

3. Keep in Touch

Regular communication with trainees is essential. Try to give at least a few minutes to trainees every other day or so. Short exchanges can help one stay aware of what is going on and anticipate problems.

4. Allow for Differences in Style/Personality

Successful mentoring, as with any personal relationship, depends on those involved. Some trainees learn readily with a minimum of nurturing or guidance. In such cases, frequent and probing discussion initiated by a mentor may be perceived as invasive and micro-managerial. Other trainees require the reassurance of being closely monitored and given frequent feedback -positive and negative. Conversely, some mentors will be uncomfortable with offering advice or initiating discussions unless first asked by a trainee, and information and advice without any clear indication that help would be welcomed.



5. Let Trainees Make Decisions

The role of the mentor is to provide advice, help, and encouragement. However, the trainee should not be bound to follow suggestions made by the mentor. Ultimately, the trainee must act responsibly in the context of his or her own values, goals, and experience.

6. Teach by Words and Example

Mentors behavior must match their own advice. It is crucially important that mentors make explicit the rationale for their behavior, because the policy and philosophy that underlie even the most exemplary behavior may be esoteric to the uninformed observer. This is especially true for observers who have a different cultural background.

7. Keep Learning about Effective Mentoring

Responsible mentors should strive to continue learning about effective mentoring, through experience and through the available resources on mentoring. Mentoring

techniques and departmental expectations should be added to regular faculty meetings, or other faculty events.

Responsibilities of Mentees

Mentors have an obligation to help train the next generation of researchers. The advancement of research also depends on students picking the best Mentor available and acting upon the guidance provided by that Mentor. The responsibilities of Mentees are complementary to the responsibilities of the Mentors.

1. **Be Available**

Be cognizant of the Mentors time constraints and be flexible with your own time. In the span of a few minutes, a mentor can effectively assist trainees by being attentive to a few key elements, such as careful listening and keeping in touch.

2. **Listen Carefully**

Be attentive to responses of the Mentor and ask thoughtful questions. This will open the way for clear communication and a feeling of support and encouragement.

3. **Keep in Touch**

Regular communication with the Mentor is essential. Before you attempt something untried and/or concern check in with your Mentor for guidance.



4. **Allow for Differences in Style/Personality**

Mentees should reflect on their own learning style and be mindful of the personality and teaching style of the Mentor while deciding on a Mentor.

5. **The Ultimate Decision's is the Trainees**

The role of the mentor is to provide advice, help, and encouragement. However, the trainee is not bound to follow suggestions made by the mentor. Ultimately, the trainee must act responsibly in the context of his or her own values, goals, and experience.

6. **Learn by Words and Example**

Mentees should be aware that they are learning the skills of research by more than just following advice, they also learn by observing the behavior of the Mentor and other colleagues. This is especially true for observers who have a different cultural background.

7. **Troubleshooting Mentor Related Issues**

For issues of concern to the Mentee that cannot be discussed comfortably with the Mentor the trainee should their Adviser, a trusted friend, the Department Chair or the Office of Compliance.

Case Studies

I. A set up for failure

Jill Johnson, a master's student, is preparing her thesis when one of her committee members is hospitalized. She approaches Dr. Wood, a tenure track professor who is new to the department, and asks if he would be willing to serve on her thesis committee. Dr. Wood indicates that he is interested in the project and asks about the timeline involved. Jill reports that her thesis adviser Dr. Morris, a tenured professor who is also the department chair, is hoping to stick to the originally planned meeting date for her prospectus meeting, which is in four days.



The committee assembles for Jill's thesis prospectus meeting. It is common practice for all committee members to review the paper's contents prior to the meeting and then make suggestions or revisions during the meeting. The committee discusses recommendations with the student and then either approves or disapproves the study. If the committee approves Johnson's study, it gives her the green light to spend the next semester or two working on the project.

Dr. Wood arrives at the meeting with a clear understanding of the study's methodology based on a clearly written prospectus. Following Jill's oral presentation, the committee members ask questions of her. Wood begins by asking questions to get an idea of Jill's general knowledge of the methods she proposed to use. When Jill is unable to answer, Dr. Morris jumps in with a response.

Dr. Wood is concerned that, despite having written clearly about her study, Jill appears unable to answer even basic questions about her protocol. Dr. Story, the outside committee member and a close friend of Dr. Morris's, also poses some basic questions to Jill, and she responds in a similar fumbling, unsure manner. Dr. Morris is quick to interject answers each time Jill is asked a question.

Discussion Questions:

1. As Jill's adviser, what are Dr. Morris's professional obligations in this situation?
2. What are the potential benefits of allowing Jill to proceed with her work?
3. What are the potential repercussions of allowing Jill to proceed with her work?
4. Should Dr. Wood sign off on Jill's prospectus and allow her to proceed?

II. Misplaced Attribution

Lisa is a post-doc who has been working at a major research university for the past year and a half. Since she arrived, she has gotten along well with her boss, Dr. Richard Bell. The work in his lab relates to the synthesis and characterization of anti-cancer agents. Lisa's first project was the synthesis of Divialan, which has been difficult to synthesize in the lab. About six months after her arrival, she developed a few more steps of the synthesis, and things looked very promising.



Lisa told Dr. Bell, "Rick, you have to take a look at this result on a reaction I performed. I believe that it is a derivative of Divialan." Bell looked at the data, "Lisa, this is great," he said. "I will have to study the data more closely to know for sure. Let me look at it in more detail and if it looks good I will start writing a paper for submission." Lisa had a lot of work to do on other characterizations, and she agreed.

A month and a half later, Lisa was talking with Pete, a post-doc in another lab. Lisa was saying, "I have been having a lot of trouble trying to get the final steps in the synthesis of Divialan, but I did get a surprising derivative along the way." She went on to describe the procedure to obtain the derivative. Pete was a little surprised. He said, "I was just at a meeting, and Dr. Bell presented that same synthesis. The thing is that your name wasn't mentioned in the presentation or on the accompanying paper."

Discussion Questions:

1. What should Lisa do to get the credit she deserves? Should she confront Dr. Bell?
2. What kind of rights do trainees have concerning their work?
3. Could Lisa or her department have avoided this situation?

III. Justifying Plagiarism?

Bonnie Hogan, a doctoral student in the Department of History and Philosophy of Science, has a research assistantship with Dr. Todd Simpson, who is also her dissertation adviser. Bonnie chose Dr. Simpson as her adviser because his research background was closely related to the topic on which she wanted to focus her dissertation. Although he offered helpful suggestions on her research, she was never able to develop the sort of relationship that with him that enabled her to discuss her long-term career plans and life goals.



Dr. Simpson hired Bonnie as a research assistant to help him with the literature review and proofreading necessary for a book he has contracted to write. As she is proofreading a draft of Dr. Simpson's work, Bonnie finds approximately four pages of text that have been directly plagiarized from another author. She recognizes that a section of his chapter is taken verbatim from an article she reviewed earlier in her literature review for Dr. Simpson. She confirms the plagiarism by comparing Dr. Simpson's work to a copy of the original article.

Bonnie realizes that this chapter is a draft that has not yet been sent to the publisher. At first, she does not know what to do. If she confronts Dr. Simpson with this information, what might the repercussions be? She wonders if she will lose her assistantship and, more importantly, what effect this situation might have on her future career. After contemplating her choices, Bonnie decides to bring the plagiarism to Dr. Simpson's attention, so that he can correct the draft before publication. When she shows him the article from which he plagiarized, Dr. Simpson tells her to "grow up and understand that this goes on all the time. After all, no one ever gets hurt."

Discussion Questions:

1. Should Bonnie's fears about her future be a determining factor in her decision to blow the whistle against Dr. Simpson?
2. As a graduate student, does Bonnie have an obligation to report Dr. Simpson's unprofessional behavior?
3. What other options does Bonnie have besides taking "formal action" against Dr. Simpson?
4. What should Bonnie's obligations be if Dr. Simpson's shortcomings were not egregious (i.e., plagiarism), but instead consisted of repeatedly displaying unprofessional behavior, such as having poor communication with her?

IV. Case of the Missing Data

Sherry is a doctoral student in the lab of Dr. Buddy Norman. Her dissertation research is near completion when Norman asks her to begin writing a paper for publication. When she shows him what she has written, he asks for a copy of her disk, which includes her unfinished manuscript and data: "How much longer will it take you to complete the experiments and write your conclusion?" he asks. "About two to three months," she replies.



A few months later, Sherry arrives early in Dr. Norman's office for a progress meeting and sees a manuscript acceptance notice on his desk. Looking at the slip of paper, she sees that it refers to her work. She is surprised, since her research is incomplete. She decides not to say anything, thinking that Dr. Norman will bring it up. He does not.

Later that night, Sherry looks for the manuscript on Dr. Norman's desk. She finds a completed document describing the experiment that she is working on, with positive results and a detailed graph. She decides to confront her professor concerning his suspicious behavior. Although the results reported in the graph are consistent with what she has found and expects to find, they report results that she does not have.

Sherry confronts Dr. Norman the next day. She demands that the paper be recalled. He replies that the paper has already been accepted and is probably in press by now. He informs her that she is listed as first author and that submitting a retraction at this point would look very bad, likely affecting her career as well as his.

Dr. Norman goes on to say that the lab has been waiting for a breakthrough for a long time. The grant that pays the salaries of the technicians and other students is up for renewal soon. Without this publication, there is almost no chance for his grant to be renewed, and the lab may have to be shut down. He explains that all he did was extrapolate a line and write the conclusions, submitting the article a little early.

Discussion Questions:

1. Should Sherry attempt to have the paper recalled or should she say nothing and hope that her research backs up Dr. Norman's "predictions"?
2. If Sherry decides to retract the paper, should her action be classified as "whistle-blowing"?
3. What effect could recalling the paper have on her career as a young scientist?
4. What are the most significant ethical issues raised by Dr. Norman's actions?

V. Free worker?

Joe McGrath is a second year graduate student who will begin to write his master's thesis at the end of the term. Joe has worked extremely hard during the two years of his master's program, regularly working six or seven days a week. The effort has paid off. Joe already has four publications and, most importantly, a starting date for a new job at a small pharmaceutical company. The company is very excited to have hired Joe because they are starting a new initiative and need Joe's expertise to get the project off the ground. This situation puts Joe on a very tight time schedule to finish his last set of experiments and write his thesis.



It is Friday afternoon. For the past week, Joe has put his experiments on hold. Instead, he has been making graphs and figures for a presentation that Dr. Smith, his research adviser, will be making at a conference the following Wednesday. Dr. Smith has requested specific figures based on data from experiments completed by Joe's office and says, "I hate to ask you to work on a weekend, but will you come in and work tomorrow? It is really important that the presentation is ready on Monday."

Joe replies, "Yes, I can come in and finish up these figures tomorrow." "Thanks, Joe," Dr. Smith says. "I really appreciate the fact that you have spent so much time compiling and analyzing the data collected by Dave and Frank. By the way, I've decided to list you as the fourth author on the presentation, because it was the other students who actually collected the data," Smith says. Although Joe feels disappointed that he will be listed as the last author on the presentation, he doesn't want to quibble about whether doing the data compilation and analysis was more significant than collecting the raw data.

After discussing a few more details about the presentation with Dr. Smith, Joe closes the conversation by saying, "Well, have a good evening and I'll see you tomorrow!" Dr. Smith stops as he is leaving the lab and replies with a surprised tone, "I'm not working tomorrow."

Discussion Questions:

1. Is it appropriate for Smith to ask Joe to work on Saturday, especially considering the fact that Smith is not going to work?
2. Would it seem to be a more reasonable request to complete the figures and graphs if Joe were compiling and analyzing data from his own experiments rather than data from students who left the program?
3. What are the proper roles and responsibilities of graduate students in preparing presentations that include the efforts of an entire research group?
4. Should Joe ask to be placed higher on the list of authors? If so, how should he approach Dr. Smith about his concerns?

VI. Conflicted Commitment

Susan Smith is a fourth-year biology graduate student. She is conducting her research in the lab of Dr. Frank Michaels, a well-respected lab director whose research focuses on DNA transcription. Susan's work has been conscientious but has not yet yielded results. She feels stuck and has tried to discuss this with Dr. Michaels, but he repeatedly tells her to just keep working.

As the instructor for the department's molecular-biology course, Dr. Michaels develops a computer program that generates a video demonstration of transcription (DNA Whiz) and uses it to teach the class. Realizing that the program has broad appeal, Dr. Michaels sets up his own business, BioProgram. He markets the program commercially to faculty at other universities via the Internet.

Since Dr. Michaels is the laboratory director and will likely have a significant say about her future, Susan has not formed a personal relationship with anyone else in the department. Yet Susan thinks that Dr. Michaels is not giving her the attention she needs because of his other activities.

In addition to Susan's concern that Dr. Michaels is not providing her with the guidance she needs, she often ends up answering calls to the lab about BioProgram and troubleshooting programs for Dr. Michaels' business. Along with research, exams, and work on her projected thesis, these activities have left Susan feeling overwhelmed. But she doesn't want to appear unwilling to help Dr. Michaels. Susan knows that Dr. Michaels can be very helpful to her in securing a postdoctoral appointment.



Discussion Questions:

1. It appears early on that Dr. Michaels may have low expectations of Susan, or that he is, for other reasons, relatively passive with regard to Susan's progress. What is Susan's responsibility in this situation?
2. Dr. Michaels has many responsibilities as a professor, and he is also running a business. What are his responsibilities as Susan's supervisor and mentor?
3. Susan's work on behalf of Dr. Michaels' business is diverting her attention from meeting her own academic needs. Whose responsibility is it to insure that this does not happen? Is it ever appropriate for a graduate student to perform, on behalf of a faculty member, work that is not related to the student's own academic work?

Resources

CITI Program:

<http://www.citiprogram.org/>

National Academy of Science (NAS):

http://www.nap.edu/openbook.php?record_id=5789

The Good Work Project (Presidents and Fellows of Harvard College):

<http://thegoodproject.org/>

MentorNet:

<http://www.mentornet.net/>

At Cross Purposes: What the experiences of doctoral students reveal about doctoral education:

<http://www.phd-survey.org/>

National Postdoctoral Association:

<http://www.nationalpostdoc.org/>

USC Center for Excellence in Teaching (CET):

<http://cet.usc.edu/>

USC Center for Excellence in Research (CER):

<http://research.usc.edu/about/vp/cer/>

Mentoring Relationships for USC Graduate Students:

<http://graduateschool.usc.edu/current-students/student-resources/>

USC Contacts

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Health Sciences Institutional Review Board

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University Park Institutional Review Board

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