

## **Case Studies for Discussion**

### **Mentoring Undergraduates in Research**

#### **Case Study 1: Project Envy**

I mentored an undergraduate student who came from another university for the summer. I explained the project to him and taught him the standard statistical analysis techniques for our type of data. Because my professor and I did not think he had sufficient background for a sophisticated project, we gave him some basic statistical analysis to do. He was very quiet for the first ten days of the project and then he went to my advisor and complained about the project. He said he wanted a project “like Emily’s.” Emily was a student with a strong disciplinary background and her project addressed an area of high visibility and practical importance. My advisor insisted that my mentee keep the project I had designed for him, but the student became sulky. As time went on and his productivity declined, I began to wonder if he understood what we were doing or even cared about it.

1. How do you decide what level of sophistication to assign to an undergraduate student?
2. How might you decide when to allow a student to change projects?
3. What could you do as the graduate student mentor to prevent this unfortunate outcome?
4. If you were the faculty advisor, what would you do in this situation?

#### **Case Study 3: Caught in the middle**

I am an undergraduate student who is working on a research project with a graduate student and a faculty advisor. There appears to be poor communication between them, and I often feel caught in the middle. When I tell my advisor about issues with the experiments he often responds with frustration because he had not heard about them from the graduate student. The graduate student, on the other hand, is upset that I had divulged too much information to the advisor. These communication problems between the graduate student, the faculty advisor, and me are resulting in poor productivity in the lab.

1. How can the communication between the graduate student and the faculty advisor impact an undergraduate student’s research progress and productivity?
2. In establishing a productive relationship among a faculty advisor, a graduate student, and an undergraduate, what is the best way to maintain effective communication throughout the course of study? What should you tell your mentee about effective communication with his or her faculty advisor?
3. As a graduate student, do you differentiate between “need to know” information and information to “keep from the boss”?

### **Case Study 2: Running out of time**

When we decided to accept a summer undergraduate research student my faculty advisor and I discussed possible projects and settled on one that we thought had a high probability of success in a short period of time. Moreover, the project would help strengthen the conclusions of my dissertation research. Unfortunately, the project just didn't work. The student was conscientious and the experiments were carefully conducted, but after seven weeks it was apparent that the approach we had designed was not going to yield results. As we reached week seven of the ten week summer program, the student was becoming very anxious. She was required to present a research poster to a campus-wide symposium at the end of the ten week program and she felt that she had nothing to say. I was concerned that this was going to reflect badly on me and on our research program.

1. How important is it that an undergraduate research project have definitive results?
2. What can you do to help a student prepare an effective presentation when there are no results?
3. What is the role of the faculty advisor in assuring success of an undergraduate project?
4. How important is the productivity of your undergraduate mentees to the perception of your capabilities by your advisor and peers?

### **Case Study 8: Missed Opportunities**

Last summer I worked with a fantastic undergraduate mentee. He was very intelligent and generated a fair amount of data directly relevant to my thesis project. I think that he had a positive summer research experience, but there are a few questions that still linger in my mind. This particular mentee was a man from a small town. I always wondered how he felt on a big urban campus. I also wondered how he felt about being the only person from a rural area in our group. In fact, he was the only person not from a major city in our entire department that summer. I wanted to ask him how he felt, but I worried that it might be insensitive or politically incorrect to do so. I never asked. I still wonder how he felt and how those feelings may have affected his experience.

1. What are some ways you can better understand your mentee's attitudes and experiences?
2. What might be the benefits of better understanding your mentee's background and attitudes toward your research program?
3. How do you know if your mentee is having problems, related or non-related to research?

#### **Case Study 4: Bad habits are hard to break**

A graduate student mentor was frustrated because her student was not running successful experiments. While the undergraduate had great enthusiasm for the project, each experiment failed because of some sloppy error—forgetting to properly prepare materials, forgetting to add a critical component, or forgetting to adjust equipment. After a month of discussions, and careful attempts to teach the student habits that would compensate for his forgetfulness, the graduate student was ready to give up. She spoke with her advisor and asked for advice, hoping that she could fix the problem and start getting useful data from her undergraduate. The advisor offered to work with the undergraduate mentee. When the undergraduate walked into his office, the faculty member said, “I hear you’re a slob in the lab. You gotta clean up your act if we’re going to get any data out of you.” Seeing the crushed and humiliated look on the undergraduate’s face, he quickly added, “I’m a slob too—that’s why I’m in here pushing papers around and not in the lab doing the hard stuff like you guys!”

1. Should the mentor have approached their advisor with this issue?
2. If you were the mentor, how would you have handled the situation?
3. When we discover that a student is disorganized, introverted, or chronically late, what should we do?
4. When is a behavior something that other students should tolerate and when does it violate the rights of others in the lab?

#### **Case Study 5: Different Point of View**

The biggest challenge I’ve encountered so far as a mentor was learning to work closely with someone whose personality and mannerisms are very different from my own. In my first interview with her, my student described herself as very laid-back and mentioned that she frustrates her parents with her “everything will take care of itself” attitude. This is a stark contrast to my personality and I find myself at times frustrated with her different work ethic.

1. How can you encourage different ways of thinking about research?
2. How can you accommodate different working styles?
3. As a graduate student mentor, what is your responsibility to educate your mentee, not just about your research, but also about how to approach academic life?

### **Case Study 6: When is Independence Day?**

An experienced undergraduate researcher was constantly seeking input from the mentor on minor details regarding his project. Though he had regular meetings scheduled with the mentor, he would bombard her with several e-mails daily or seek her out anytime she was around, even if it meant interrupting her work or a meeting that was in progress. It was often the case that he was revisiting topics that had already been discussed. This was becoming increasingly frustrating for the mentor, since she knew the student was capable of independent work (having demonstrated this during times she was less available). The mentor vented her frustration to at least one other lab member and wondered what to do.

1. What is a reasonable amount of interaction between a mentor and a mentee?
2. How do you foster independence in your mentee?
3. How do you know they understand what you are saying?
4. How do you and your mentee establish clear expectations about communication?

### **Case Study 7: Can they be trusted?**

As a graduate student, I supervised an undergraduate in a summer research program. At the end of the summer, my advisor said we should publish a paper that included some of the work done by the undergraduate. I got nervous because I thought I could trust the undergraduate, but I wasn't totally sure. He seemed very eager to get a particular answer and I worried that he might have somehow biased his collection of data. I didn't think he was dishonest, just overeager. My question is: should I repeat all of the student's experiments before we publish? Ultimately, where do we draw the line between being trusting and not knowing what goes into papers with our names on them?

1. How do you know when you can trust the data generated by an undergraduate?
2. What do you do if you can not trust the data generated by an undergraduate?

### **Case Study 9: Project Invention**

I am a graduate student in a large research group. A week ago, an undergraduate student joined me to do an independent research project. She really wanted to work with us and aggressively sought us out. She had seen presentations about our research and had read some of our major papers, so she knew what we worked on. This student was clearly intelligent, and she knew what she wanted out of a research experience. She was exactly the type of student I would love to see go to graduate school. Moreover, she was a first-generation college student. My advisor and I came up with two aspects of my research compatible with the undergraduate's interests that would be feasible for her to work on. When she arrived, I presented the two ideas to her, gave her several papers to read, and told her to let me know by the end of the week which project she preferred. She seemed lukewarm about both projects and, when she returned the next day, she enthusiastically presented her idea for a different project. It was related to what we do, but branched into a field that my advisor was not funded for and about which I knew little. I didn't want to squash her enthusiasm, and wanted to reinforce her creativity and independence, but I felt overwhelmed by the prospect of learning an entirely new field in order to advise her well. Moreover, my advisor was concerned that the agency that funds our work would likely not be supportive of this new area. With only seven weeks of the summer research program remaining before her poster presentation, I was stumped.

1. What is your responsibility for helping define a student's research project?
2. What is your responsibility for mentoring a student who wishes to explore new directions in an existing project?
3. Under what circumstances would you feel comfortable allowing a student freedom to design his or her own project?
4. What can you do if a student does not like his or her project?
5. What could you do as the graduate student mentor to resolve this situation?
6. What is the faculty advisor's responsibility in this situation?
7. What should graduate students discuss with their advisors when asked to mentor an undergraduate student?