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I. Research Misconduct
Case Study: Truth or Consequences

Julio Cruz and Samantha Bergen are both graduate students working with Dr. Mark Chan, an eminent environmental chemist. Although both are in their fourth year of study, neither has published a manuscript. Both are beginning to worry that if they do not publish soon they will not be able to obtain good postdoctoral positions.

Finally, Julio’s project starts to look promising. After many months of effort, he believes he has been able to synthesize RG198, a compound that is to serve as an intermediary in the formation of his thesis molecule, WX5, which he believes will degrade plastic in an environmentally sound way. Julio now has to repeat his experiment to make more RG198 and perform a series of analyses on the compound to verify some of its properties.

Dr. Chan is very excited about Julio’s progress, and tells him to repeat his experiment and to begin to write up the results, because even the synthesis and some properties of the intermediate molecule are unique enough to be published in an important journal, such as Nature.

Although only small amounts of RG198 are available, Julio and Dr. Chan agree that they must push ahead and work quickly. In order to help Julio as he works on manufacturing more RG198 for the next set of experiments, Dr. Chan recruits Samantha to assist Julio in some analyses.

Samantha has not been very successful with her project, which involves transforming asbestos into a non-toxic compound, and Dr. Chan feels that performing the analyses will teach her some skills that she could apply to her own project. Dr. Chan promises her a second authorship on the paper if the results of her analytic studies pan out. Although Julio does not think highly of Samantha, believing her to be sloppy, he wants to move ahead with his research. He gives her the RG198 in two batches for the analytic studies.

Samantha completes the first set of analyses on the first batch and is excited by the results, which verify three of the four chemical groups that RG198 is supposed to have. On the next batch, Samantha performs another set of experiments, using another analytical tool that will identify the fourth chemical group. On the day she is doing the first experiment on the second batch of RG198, she phones Julio from the analytical facility across the street from the lab and asks him if a contaminant might have gotten mixed up in the compound, since the spectral pattern is not what is expected for the molecule.

Julio asks Samantha to save the remaining material from the second batch, telling her that he will perform the second round of analyses. But when Samantha comes back to the lab a few hours later, she does not give him the leftover RG198. She tells Julio that she obtained positive results and that her mistake in the original interpretation was due to tiredness, and to the fact that she had focused inadvertently on a reference sample, not on RG198. There is no way for Julio to validate her findings, since there is not enough RG198 left to do another run. Samantha tried to reassure Julio by showing him the graphical readout from the instruments from the experiments on the second batch, pointing to the results for the fourth chemical group.

Dr. Chan is ecstatic about the findings, and tells Julio to quickly write up a manuscript. Julio doesn’t want to accuses Samantha of manipulating research results, but later in the day he looks through her research notebook and sees a written procedure and data for the first batch of experiments. For the
second batch, he sees that she has put only the readout in the notebook, which looks too clean to him. It also has no accompanying text. He wonders what might have happened. Perhaps she used a reference sample and some mechanical manipulation to make the fourth chemical group peak appear so pure.

Julio is unsure about whether he can trust Samantha's findings, but he proceeds to write up the manuscript about his synthesis of RG198 and its analysis by Samantha. The article is published in Nature, but in the next several months other scientists who repeat his synthesis are finding different spectra than what he reported in his second batch of experiments. During that time, Julio has been able to synthesize more of the compound, and even succeeds in making WX5. When he repeats the analysis on the fourth chemical group in RG198, he finds a different spectral pattern from what Samantha found and what was published. He believes that she must have done something to the data.

1: How can the pressure to publish influence the conduct of research?

2: Was it appropriate for Dr. Chan to promise Samantha second authorship based on performing some assays?

3: Trust is one of the central issues in science. What might Julio have done to feel better about working with Samantha if he didn't think highly of her?

4: At this point, it remains unclear whether Samantha has done anything wrong, even though she did not follow Julio's instructions to let him do the second analytic experiment. What action should Julio take?

5: Data collection and management are important issues in the responsible conduct of research. Independent of the possibility that Samantha might have engaged in manipulating research data, what is the major problem in the way she kept her laboratory notebook?

6: What is misconduct? If it is found that Samantha engaged in misconduct, is Julio also guilty of misconduct, because he did not report his concerns earlier?

7: If science is self-correcting, as it is in this case study, why are there federal laws and regulations against misconduct?

8: It seems clear that there was a problem with Samantha's data. What should Julio do now?

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II. Responsible Authorship and Peer Review
Case Study: Who is an author?

Susan Jacobs, a Ph.D. student from a small university, sets up, as part of finishing her dissertation, a
six-month internship at a prestigious larger institution in order to learn a new molecular-biological
technique. Ms. Jacobs contacted the laboratory leader, Dr. Marvin Frank, a world-renowned
scientist, in the hope of developing new skills for her research and also to foster a relationship with
Dr. Frank, who is well connected in her field of biochemistry.

When Ms. Jacobs comes to Dr. Frank’s laboratory, she is greeted warmly as a member of the team.
Dr. Frank, the graduate students, the postdoctoral fellows, and the technicians include Ms. Jacobs in
the weekly laboratory meetings, in which everyone participates in a free exchange of ideas about
the ongoing projects in the laboratory, and which last for hours. In the meetings, Ms. Jacobs finds
some of the ideas helpful but others less so, and gives her point of view concerning the ongoing
projects. In addition, she meets weekly, one on one, with Dr. Frank, who provides significant
scientific advice and one or two recommendations, which advance her work and move her in a
slightly different direction. She discusses the results of her research with her mentor, Dr. Melissa
Seabrook, back at her home college, by weekly e-mails and occasional phone calls, interactions that
also push ahead the project she started in Dr. Seabrook’s lab three years ago.

Ms. Jacobs makes great progress during the six months she spends in Dr. Frank’s laboratory, and
she writes a paper reflecting some important findings. Ms. Jacobs puts herself down as first author,
Dr. Frank as second author, and Dr. Seabrook as last author on the paper. At the end of the paper,
she gives an acknowledgment to a technician who showed her several techniques and worked with
her on a few experiments.

Ms. Jacobs based her listing of authors on her understanding of the guidelines put forth by the
International Committee of Medical Journal Editors (ICMJE), which say that an author is someone
who has made significant contributions to the conception and design, or to the acquisition of data,
or to the analysis and interpretation of data; was involved in drafting the article or revising it
critically for important intellectual content; and provided final approval of the version to be
published. The guidelines, which are followed by approximately 500 medical journals, say that all
three criteria must be met for authorship. Ms. Jacobs would like to send her manuscript to a journal
that follows ICMJE guidelines as soon as possible, because of what she feels is the importance of her
results.

Ms. Jacobs gives Dr. Frank and Dr. Seabrook a draft of her manuscript for review on a Friday, hoping
for feedback by Monday. Dr. Seabrook sends her comments by e-mail to Ms. Jacobs. Dr. Frank sends
his comments back to Ms. Jacobs and changes the authorship listing to include Ms. Jacobs, the
technician, two postdocs in his lab, two graduate students in the lab, himself, and Dr. Seabrook. Dr.
Frank also gives a copy of the draft to all the members of his laboratory for discussion at the next
meeting.
Ms. Jacobs is shocked that Dr. Frank added the other laboratory members to the draft, explaining to him the ICMJE guidelines and maintaining that the major intellectual and physical work in preparing the paper was done by her and by Dr. Seabrook and Dr. Frank. Dr. Frank is equally surprised by Ms. Jacobs’s feelings, responding that he and Ms. Jacobs benefited from the input of all the other lab members. Dr. Frank adds that a graduate student in the laboratory, Lisa Bain, is writing a short paper that is based on some very exciting preliminary findings, and that Ms. Jacobs would be included in the list of authors. Dr. Frank says that the results of Ms. Bain’s research would need further elaboration in the laboratory and that a second paper using the same data and additional studies would be more comprehensive, and that Ms. Jacobs would be included on the second one, too.

Dr. Frank insists to Ms. Jacobs that the contributions of all the laboratory members were sufficient to satisfy the ICMJE guidelines for both papers, adding that the idea of a scientist acting as an independent entity is an outdated concept and that those who work around a scientist contribute significantly, helping him or her to function.

Ms. Jacobs tells Dr. Frank that she does not want to be included on Ms. Bain’s paper, feeling that she did not contribute adequately. Dr. Seabrook, who follows ICMJE guidelines but was intimidated by Dr. Frank’s stature, advises Ms. Jacobs not to rock the boat, to use Dr. Frank’s revisions and some of the changes suggested during the laboratory review and to submit the paper to the journal with the authorship he suggested.

1. Why should Ms. Jacobs and Dr. Frank have discussed the laboratory's approach to authorship issues when she started working in his laboratory?
2. Why is the order of authorship and the listing of authors important in a research paper?
3. What is the difference between an acknowledgment and a listing as an author?
4. Although many journals subscribe to the guidelines of the International Committee of
5. Who among the authors takes responsibility for submitting the paper to a journal and following up with the editor and peer-review revisions?
6. What are some potential problems with Dr. Frank's submitting a paper on preliminary findings and not performing sufficient corroboratory experiments?
7. What kind of problems may arise if the same data is used in multiple papers in the research literature?
8. What might happen if someone is listed as an author on a paper for which he or she did not do any work?
9. What might have been done to resolve Ms. Jacobs's ethical dilemma with Dr. Frank about the authors on the paper?

This case is adapted, with permission, from: "When in Rome: Conventions in Assignment of Authorship" Research Ethics: Cases and Commentaries Volume 2, Section 1, Authorship. Brian Schrag, ed. Association for Practical and Professional Ethics Bloomington, Indiana, February, 1998 Prepared under NSF grant No. SBR 9241897
III. Mentoring
Case Study: The Business of Mentoring

Susan Smith is a fourth-year biology graduate student at Paradise University. 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 unproductive. She feels stuck and has tried to discuss this with Dr. Michaels, but he tells her to just keep working. "You'll get results eventually" is all Dr. Michaels ever tells Susan.

Recognizing that mentoring is of the utmost importance in the training of graduate students, the Biology Department at Paradise University has a policy that lab directors are to act as formal mentors for their trainees. Susan has therefore relied on Dr. Michaels and has not formed a personal relationship with anyone else in the department. She thinks that Dr. Michaels is not giving her the attention she needs because of his other activities. Dr. Michaels has a personal interest in computers and computer programming. As the instructor for the department's molecular-biology course, he develops a computer program that generates a video demonstration of transcription (DNA Whiz) and uses it to teach the class. DNA Whiz is a hit with the students and with other faculty. Realizing that the program has broad appeal, and that he has a talent for programming, Dr. Michaels sets up his own business, BioProgram. He markets the program, and others he develops, commercially to faculty at other universities via the Internet, but he shares the programs with Paradise faculty free of charge.

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. Susan knows that Dr. Michaels, owing to his excellent reputation and his extensive contacts in the field, can be very helpful to her in securing a postdoctoral appointment. She also hopes that in the next year Dr. Michaels will arrange for her to make presentations within the department as well as at a national meeting.

In Susan's department, comprehensive examinations are given in part on a take-home basis. She has completed two drafts for one of her examinations, but it is being held up before approval by a particularly exacting member of the review committee, who has a reputation for unreasonable demands. She has shown her most recent draft to specialists in the field, who believe that her exam has earned well beyond a passing grade and cannot understand why it is being held up. When Susan discusses the exam with Dr. Michaels, in the hope that he will intercede in some way with the difficult faculty member, he refuses to get involved. "It is not my responsibility," he says.

To add to her feelings of neglect, Susan has not had a committee meeting to discuss her research in more than a year, and Dr. Michaels shows no signs of calling one anytime soon. Susan is quite frustrated and has thought of talking to Dr. Evelyn Chen, a more senior faculty member in the department and another member of her committee. Susan has seen Dr. Chen work with other graduate students, and Dr. Chen seems to take an active part in fostering their graduate work and careers.

Susan decides to talk to Dr. Chen, who suggests that Susan should have a committee meeting and initiates the scheduling of one. At the meeting, the other members of Susan's committee express concern about her progress; they believe that she is not likely to finish by the end of her fifth year,
her expected completion date. Susan is upset, because she believes that she has been doing exactly what was asked of her by Dr. Michaels, assuming that her work would eventually lead to a thesis. Dr. Michaels points out to the committee that he never asked Susan to answer the phone or troubleshoot the programs, that Susan did those things by her own choice and in doing so drew time away from her thesis and exam work.

Susan decides that even at this point in her graduate education she is better off starting over in another lab. She asks Dr. Michaels for a letter of recommendation. He tells Susan that he can't write a strong letter, but he would be willing to describe her accomplishments, the coursework she completed, her time in the lab, etc. Susan schedules an appointment with the dean to discuss her graduate-student career and her timetable in working toward her degree.

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 is his responsibility 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?

4: Is it appropriate for a lab director to advocate for a graduate student who is in a difficult academic situation? If so, what form should that advocacy take?

5: Whose responsibility is it to call committee meetings? What are the committee members’ responsibilities in this situation? Should anyone monitor the supervisor-trainee relationship?

6: Does Dr. Chen have any responsibility after Susan comes to talk to her?

7: Should Susan take any further actions with regard to Dr. Michaels and his lab before she decides to transfer?

8: Is Dr. Michaels acting reasonably in response to Susan’s request for a letter of recommendation? What other options did Susan have in attempting to handle this situation?

9: What departmental policies might prevent, or help address, such a situation?

This case study is adapted from: "The Successful Side Business" Research Ethics: Cases and Commentaries Volume 1 Brian Schrag, ed. Association for Practical and Professional Ethics Bloomington, Indiana February, 1998 Prepared under NSF grant No. SBR 9421897
IV. Data Acquisition and Management
Case Study: Who Owns Research Data?

Jessica Banks, a Ph.D. student working with Professor Brian Hayward, a sociologist studying urban sprawl, has recently defended her dissertation and is now ready to file it and leave for her new job. During her second year, when starting research with Hayward, Banks divided her time among three projects. Then, in her third year, after consultation with Hayward, she decided to continue and expand upon one of the three lines of investigation for her dissertation research. This was also the project most closely related to Hayward's grant at the time. Later, Banks's experimental plan and early results were included in Hayward's grant renewal. The other two promising lines of research were left incomplete. Banks's new job is a tenure-track position in a midsize Western liberal-arts college.

Shortly before leaving for her job, Banks comes to Hayward's office to make copies of research data stored only on Hayward's computer using special software, which she also plans to copy. Although her new faculty position will place a heavy emphasis on teaching, she is looking forward to continuing to do some research as well. In particular, she is eager to pick up where she left off with the two incomplete projects she worked on earlier. Hayward comes in as Banks is downloading her material, and asks her what she is doing. She tells him, and he then says to her that she cannot take the data. "They belong to me," he says. Banks is confused. "But I did the work, and I wanted to follow up on it. I can't do that without the data." Hayward is adamant. "I'm sorry, but you should understand this. Our research project was a joint enterprise, and all the work you did was funded by money I brought in via grants. The data do not belong to you or to me; they actually belong to the university, and the work will be continued with other students. I've already talked to one of the new students about working on those projects this fall." Banks, seeing her plans fall apart around her, protests, but Hayward is implacable.

After a few minutes, she stalks away. Later that afternoon, Banks gets together with her classmate Paul Larson, and she tells him about her run-in with Hayward. "Look," Larson says. "Hayward has no right to deny you access to data. You did the work that generated all the data." "I know!" Banks says. "But Hayward wouldn't listen to that argument when I made it." "Here's my suggestion," Larson says after some reflection. "Just stop by his office and copy it sometime during the weekend. I happen to know Hayward will be out of town, so he'll never know. That's the fair thing to do." Banks seems uncertain, but she says she'll think about Larson's suggestion and decide before the weekend.
1: Who owns research data?

2: How could this problem of access to the research notebooks and manuals have been avoided?

3: Under what conditions should copying of data been done?

This case was adapted from “The Jessica Banks Case” Moral Reasoning in Scientific Research: Cases for Teaching and Assessment Developed by Muriel J. Bebeau, University of Minnesota With Kenneth D. Pimple, Karen M.T. Muskavitch, Sandra Borden, and David H. Smith, Indiana University Indiana University, December 1995, pages 21-29 Developed for project entitled “Teaching Research Ethics: A Workshop at Indiana University” (TRE)
I. Research Misconduct
Case Study: Truth or Consequences (Q&A)

1. How can the pressure to publish influence the conduct of research?

As graduate students, Julio and Samantha are worried that they need to publish a paper in order to help them get a good job after they graduate. Some studies have found that people might engage in misconduct if they are feeling career pressure and believe that they can take a shortcut to get a research answer.

2. Was it appropriate for Dr. Chan to promise Samantha second authorship based on performing some assays?

The 2000 American Chemical Society guidelines to ethical practices in authorship say that an author is someone who has made a significant scientific contribution to a paper and will share responsibility for the accountability of results. All others should be listed in the acknowledgments. Do you think that Samantha has fulfilled the requirements? Also, do you think that Dr. Chan exerted undue pressure on Samantha by tying authorship to her ability to get certain results?

3. Trust is one of the central issues in science. What might Julio have done to feel better about working with Samantha if he didn't think highly of her?

If Julio didn't feel comfortable with Samantha performing the analytic experiments, he probably should have said something to Dr. Chan about his concerns. Even though there was some pressure to move the synthesis experiments along, he could have insisted on doing the analytic experiments himself or watched as Samantha did them to ensure that they were done correctly.

4. At this point, it remains unclear whether Samantha has done anything wrong, even though she did not follow Julio's instructions to let him do the second analytic experiment. What action should Julio take?

Rather than continuing along as if nothing has happened, Julio should probably talk to Samantha about what might have occurred and to Dr. Chan about concerns that he has about Samantha's findings.

5. Data collection and management are important issues in the responsible conduct of research. Independent of the possibility that Samantha might have engaged in manipulating research data, what is the major problem in the way she kept her laboratory notebook?

Clearly, after four years as a graduate student, she should have known to write down in her laboratory notebook what she had done in the second experiment. Maintaining a laboratory notebook, which includes writing down procedures and results, is part of the practice of the responsible conduct of research. But, in this case, Samantha was probably concerned about putting anything down in writing about her experience with the second experiment, committing the sin of omission rather than the sin of commission.

6. What is misconduct? If it is found that Samantha engaged in misconduct, is Julio also guilty of misconduct, because he did not report his concerns earlier?
Chemical research as performed in this laboratory was probably funded by the National Science Foundation. According to the NSF, "Research misconduct is defined as fabrication, falsification, or plagiarism in proposing, performing, or reviewing research, or in reporting research results. Fabrication is making up results and recording or reporting them. Falsification is manipulating research materials, equipment, or processes or changing or omitting data or results such that the research is not accurately represented in the research record. Plagiarism is the appropriation of another person's ideas, processes, results, or words without giving appropriate credit".

7. If science is self-correcting, as it is in this case study, why are there federal laws and regulations against misconduct?

In the 1980s, several high-profile cases of misconduct became the subject of congressional investigations. Since the federal government funds research at academic institutions with taxpayer dollars, agencies felt that they had to develop regulations about how research institutions should deal with misconduct allegations and how oversight departments within federal agencies should monitor the actions of research institutions to investigate accusations.

8. It seems clear that there was a problem with Samantha's data. What should Julio do now?

Julio has several options for how to proceed. First, he should document any allegations that he might have about Samantha's findings. Then he should probably relay his concerns to Dr. Chan, who might follow up with the research integrity office in his institution. Universities that receive federal funding for research have an office or administrator that addresses allegations of misconduct. At Columbia University Medical Center's campus, people can bring their concerns to the Committee on the Conduct of Science. At Columbia University's Morningside campus, people should bring concerns to their departments. These offices follow guidelines set by the federal government about various phases in a misconduct allegation, including inquiry, investigation, and adjudication. Sanctions against those who are found guilty of misconduct might range from a reprimand to being barred from obtaining research funding for a period of time. In this case, if misconduct were determined to have occurred, the researcher would also have to contact the journal to retract the false results from the published paper about the fourth molecular group.
II. Responsible Authorship and Peer Review
Case Study: Who should be an author? (Q&A)

1. Why should Ms. Jacobs and Dr. Frank have discussed the laboratory's approach to authorship issues when she started working in his laboratory?

Journals usually have guidelines for authors regarding how researchers should submit a manuscript to the publication. But the process of responsible authorship begins before the writing of a manuscript, with good scientific study design and with researchers abiding by ethical guidelines concerning research involving animals and human subjects. Another important aspect of authorship that should occur before the writing of the paper, though, is that potential authors should know the policy of their laboratory, department, and institution with respect to what constitutes an author. When a graduate student first comes to a laboratory, or a postdoctoral fellow or technician interviews for a job, or colleagues collaborate in a multidisciplinary project, a discussion about the practice of credit and authorship for research work should take place as soon as possible. Each party should have an understanding of what kind of work merits authorship, with the knowledge that, as the research project progresses, who is an author on a paper and the position of a name on a list of authors may change. Often, conflicts arise because people feel that they have been promised authorship on a paper but ultimately do not get it or it is given to someone else.

2. Why is the order of authorship and the listing of authors important in a research paper?

Many scientific disciplines look at the first author as the most significant contributor to a research paper. As a result, being first author provides the most credit for potential career advancement in the form of promotions or grants.

3. What is the difference between an acknowledgment and a listing as an author?

Usually, authors play a significant role in the design and execution of the research, in its writing, and in its revision after peer review. Acknowledgments are often granted to funding agencies, to people who provided editorial advice, or to individuals who performed experiments or collected samples but who did not necessarily contribute to the major intellectual aspects of the research. Authors are listed at the beginning of a paper, while acknowledgments are placed at the end.

4. Although many journals subscribe to the guidelines of the International Committee of Medical Journal Editors, many do not, and many researchers do not follow the practices that it recommends. What tends to happen, and how are ICMJE standards being challenged?

At some institutions and laboratories, it is common for someone who may not have played a significant role in research to be included as an author. Such a person might be a department head. At other institutions, everyone listed on a research project is included as an author, although they may have played very different parts. Today, certain journals, including the Journal of the American Medical Association and Lancet, require all authors to account for their role in a paper as part of the manuscript submission process. The British Medical Journal asks that authors be either guarantors of research or contributors. The guarantor/author takes full responsibility for the published work, while the contributor, listed at the end of an article, is someone who participated in the research to some degree and may not be an author. The American Physical Society also recommends that some
co-authors should have responsibility for the entire paper, especially regarding the critical data presented, the analysis of the data, and the scientific leadership of junior colleagues. For more information about publication policies in other disciplines, see the Resources section of this module for a listing by discipline.

5. Who among the authors takes responsibility for submitting the paper to a journal and following up with the editor and peer-review revisions?

Being the author who coordinates the efforts among the researchers is an important responsibility, so the members of a research group should decide who assumes that role.

6. What are some potential problems with Dr. Frank’s submitting a paper on preliminary findings and not performing sufficient corroboration experiments?

So-called “salami science,” in which the least publishable unit of an incremental finding gets written up as a paper, wastes space in journals, peer reviewers’ time, and a reader’s time.

7. What kind of problems may arise if the same data is used in multiple papers in the research literature?

Repetitive data is most problematic in clinical research. If the same data is used in multiple papers, without acknowledgment by the author, the literature becomes biased because it gives too much weight to one set of data. If the finding is about the beneficial effects of a drug, for example, an analysis of the literature would give the drug more positive weight than it probably should have.

8. What might happen if someone is listed as an author on a paper for which he or she did not do any work?

Unfortunately, in the recent history of science there have been a few examples of people being so-called “gift authors” - i.e., those who did not do work on a paper or did not participate in the editorial review - on research papers that end up having problems of fabrication or falsification. Some might think that being a gift author on a paper just adds to the credits on a curriculum vitae, but authorship involves having some level of accountability for the work. To protect against the problem of gift authorship, some journals, such as the Journal of the American Medical Association, require each author to sign a form attesting to his or her contribution to the article. If someone is put on a manuscript as an author without knowledge beforehand, and finds out about it after publication, then the individual has several options in addressing the situation, such as contacting the first author of the paper or the journal editor.

9. What might have been done to resolve Ms. Jacobs’s ethical dilemma with Dr. Frank about the authors on the paper?

Ms. Jacobs is in a difficult situation, because her mentor is not standing behind her. But if she wanted to pursue the situation further she could contact the ombudsperson at the guest institution or at her home college. The ombudsperson is a neutral party who, if he or she is a subscriber to the standards of the national ombudsperson’s organization, will discuss the situation and will not keep records of the conversation. The ombudsperson can discuss the concerns confidentially, help identify the issues, and offer a range of options for dealing with the issue. One of these options might be mediation, in which the two parties meet with the ombudsperson and attempt to come to a mutual agreement. If negotiation and mediation fail to work, the injured party may then choose to
make a more formal complaint with the dean’s office at the guest institution, which would have a committee that investigates these kinds of issues.
III. Mentoring  
Case Study: The Business of Mentoring (Q&A)

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?

Mentees have significant responsibilities in the training process, and one of those responsibilities is being their own strongest advocate. We live in an individualistic society that places a premium on individual responsibility. In any profession, it behooves the trainee to consistently evaluate their situation early on, with long-term and short-term goals in mind. The trainee should never think that a neglectful, unproductive, unethical, or demeaning situation will somehow work itself out in the long run. When difficult situations arise with direct supervisors, the trainee should seek the counsel of a senior person in the department, someone who has a reputation of assisting more junior individuals in awkward or problematic circumstances, or perhaps go to the ombudsperson’s office at the institution to decide on a course of action. Difficult situations occur even in the best of training milieus, and in many departments and schools special committees have been developed to handle these circumstances, with the explicit understanding that students and postdocs can come to the committee without fear of confidentiality infringement or retribution. Some departments have gone so far as to create special funds that will support students or postdocs when the conclusion has been reached that it is in the best interests of the student and the department to move the trainee to another environment. However, it is still incumbent on the trainee to seek the assistance of the committee. Ideally, the trainee should have done a significant amount of research on the department and program he or she is entering long before coming to the institution that he or she decides on. Part of that research process should be dedicated to a personal evaluation of the faculty one might be working with, being especially mindful of those who most probably will have direct oversight and evaluative functions over him or her during the training process. This preliminary research should include looking into the time it has usually taken others to progress to degree conferral and/or training completion after they have started working with a particular individual. One shouldn’t be hesitant to ask about the quality of the relationship that evolved over time for others who have worked under particular individuals.

2: Dr. Michaels has many responsibilities as a professor, and he is also running a business. What is his responsibility as Susan’s supervisor and mentor?

Most academic research institutions in this country make it very clear in their faculty policies that education and research officers must commit at least 80% of their time to institutional responsibilities including education, research, and committee assignments. The understanding is that academic professionals can work at times on personal ventures - which might include outside speaking engagements or business development - that are in some way related to professional enrichment and, concomitantly, to the reputational enhancement of the institution. However, these outside commitments are never expected to interfere with one’s primary professional institutional responsibilities of education and research, which include trainee supervision and development. It is clear in this case that Dr. Michaels is neglecting his responsibilities to a trainee that he brought into his lab to conduct research and receive guidance on the most productive and enriching research methods and processes currently in use in this particular area of biology. He has placed his own personal professional interests above those of the institution that employs him and, subsequently, the trainees in his care.
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?

In our society, it is the trainee’s ultimate responsibility to insure that he or she is not diverted inappropriately from a productive and efficient path of professional advancement. However, "ultimate" responsibility should never be misinterpreted as "sole" responsibility. Institutions, departments, academic committees, advisers, mentors, and many others can and should give counsel and advocacy as the trainee progresses along a path of professional development. They should be ready to intercede at the first signs of faltering or diverted progress. For example, it should be departmental policy for advisers to meet regularly with the trainee to appraise and advise the trainee on his or her progress and to make sure that the best courses of action are being devised and acted on. In this case, it seems apparent that failsafe mechanisms should have been in place within the department to insure that responsibility for Susan’s progress wasn’t in the hands of a single individual. It is unethical and unwise for a mentoring faculty member to place his or her own priorities above those of the student. It is unwise because the potential for exploitation, or the appearance of exploitation, is too great to ignore for the institution and the researcher. It is also possible that the process of cognitive dissonance could obscure the mentor’s ability to be aware of the potential for not fully placing the need for an effective trainee development process above his or her own priorities. When dealing with issues related to trainees, their best interests should always be the ethical guidepost. This is one of the reasons that having multiple mentors is usually the best option for trainees, allowing awareness and oversight from objective third parties. That said, however, it is not uncommon for students to work for pay in areas outside their particular field of interest in the employ of faculty members who are not involved in the trainee’s academic development. As long as it is understood that the arrangement is purely financial, then it is appropriate.

4: Is it appropriate for a lab director to advocate for a graduate student who is in a difficult academic situation? If so, what form should that advocacy take?

A particularly important mentoring role is that of advocate. Silen1 used the term "protector," but, whatever phrase one uses, there are times when the mentor has to step forward and defend or advocate for the trainee. A specific academic example might be the situation in which a mentor's doctoral student is in the midst of his or her comprehensive examinations and has been instructed to rewrite an essay multiple times for a particular question. A member of the review panel for the exam has a reputation for demanding perfection from students and keeps sending the essay back. After the mentor reviews it thoroughly and perhaps discusses it with others, it is clear that the student’s answer is well worth a pass or better. In that situation, it would not be inappropriate for the mentor to step in to move the process along. Other advocacy initiatives could stem from complaints from one’s trainee about harassment or unequal treatment by others.

5: Whose responsibility is it to call committee meetings? What are the committee members’ responsibilities in this situation? Should anyone monitor the supervisor-trainee relationship?

It is usually the responsibility of the chair or head of the trainee’s advisory committee to call meetings. However, any member of the committee can and should ask for meetings to be scheduled on an as-needed basis. The department chair always has the authority and responsibility to call for special review if the situation dictates. In addition, many schools and departments have special entities to watch over graduate and postgraduate students to insure that difficulties are not allowed
to fester, ignite, and burn. Appropriate individuals are charged with the responsibility to meet regularly with the students and to deal immediately with any problems that arise. Departments in some schools will even go so far as to set up a fund to deal with those rare circumstances in which the relations between trainees and their supervisors are irreparably impaired, so that they can move the trainees with funding to other research positions.

6: Does Dr. Chen have any responsibility after Susan comes to talk to her?

As part of Susan’s advisory committee, Dr. Chen has mentoring responsibilities as well. She did in fact see a need and called for a committee meeting, which was appropriate. Considering what transpired at the meeting, and if she thought that Susan had not received the best guidance from Dr. Michaels, it would have been fitting for Dr. Chen to perhaps step in directly and go to the chair of the department to work out a solution that might be in the best interests of Susan. If she had a feeling that Dr. Michaels’ perception of Susan was not well founded, she could have perhaps assisted Susan directly in the transfer to another lab by using her influence and support.

7: Should Susan take any further actions with regard to Dr. Michaels and his lab before she decides to transfer?

The consideration, much less the decision, to move in this case is not one to be undertaken hastily or without support and advice from others who are more senior in the department or school. If this is to be done, which sounds reasonable in this case, it should be precipitated by a senior member of the advisory committee, such as Dr. Chen, or perhaps by the chair of the department. By trying to move independently and unilaterally, Susan could be hurting her future professional opportunities. At a time like this, Susan needs wise and strong advocates and should be making every attempt to find such people. Another option that Susan could try is seeking the counsel of the ombudsperson at her institution, whose office is charged with assisting individuals in finding fair, equitable, and effective solutions to problems, and also with providing referrals to sources of expertise for particular problems or procedures.

8: Is Dr. Michaels acting reasonably in response to Susan’s request for a letter of recommendation? What other options did Susan have in attempting to handle this situation?

Considering that the core of mentoring responsibilities is the simple admonition to make oneself available, it appears that Dr. Michaels has been seriously deficient. To have allowed a trainee he has so little regard for to keep working in his lab for so many years was inconsiderate and unprofessional. However, it would be compounding an already strained and difficult situation to write a letter that he did not completely agree with. In this case, it would behoove Susan to seek out other individuals who are more aware of and impressed by her work to write letters for her.

9: What departmental policies might prevent, or help address, such a situation?

See questions 1, 2, 3, 5, and 7. In addition, institutions that set out to support and reward mentoring activities need to obtain increased support for enhancing mentoring efforts at the highest levels. One approach is to begin by holding school- and department-level discussions on how to enhance mentoring activities. Some ideas for programs include: implementing a formal approach and matching mentors and trainees; developing group mentoring approaches; continuing with informal mentoring but heightening awareness of the benefits of mentoring and instituting more recognition or rewards; assisting senior professionals in developing their mentoring skills; implementing
additional incentives for mentoring; and including documentation of mentoring in the annual evaluation process.
IV. Data Acquisition and Management

Case Study: Who Owns Research Data?

1: Who owns research data?

In federally sponsored research, the university owns the data but allows the principal investigator (PI) on the grant to be the steward of the data. The PI takes responsibility for the collection, recording, storage, retention, and disposal of data. The people in a laboratory or on a research project are essentially working for the academic institution, which assigns the rights of the data to the PI. When data are published, the copyright is retained by the PI, who then assigns it to the publisher of the journal. Had the faculty member undertaken a research project on behalf of the university, the university would have the copyright to the data. But since faculty members generally perform research on their own, the copyright belongs to them. Data and data books collected by undergraduates, graduates, and postdoctoral fellows on a research project belong to the grantee institution, and students should not take their data—although retaining copies of data is allowed, with permission. With industry-funded research, data can belong to the sponsor.

2: How could this problem of access to the research notebooks and manuals have been avoided?

Clearly, Jessica Banks and her fellow student were unaware of the nature of the ownership of data in the laboratory. Professor Hayward and other faculty members in the department should have made it clear—to her and all other students—who owns research data. This is one of those areas in research where, as with authorship, an ounce of prevention in the form of early discussion and agreement can negate the need for a bitter and acrimonious pound of cure.

3: Under what conditions should copying of data been done?

Had Banks known who owned the data, she could have asked Professor Hayward for permission to copy the data and software and discuss the possibilities of collaborating with him when she starts her new position. Banks would no doubt like to continue work that she has started and maintain good relations with her former mentor, who would give her a recommendation for future employment. Stealing data would not be the best way to start a professional relationship.