Responsible Conduct of Research, Scholarship, and Creative Activities

The Continuum from Research Integrity to Research Misconduct

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Objectives

- Define these terms and demonstrate understanding by giving examples from your field
 - Research integrity
 - Research misconduct
 - Whistle-blowing
 - Falsification
 - Fabrication
 - Plagiarism
- List at least three ways in which you can facilitate integrity in your own research, scholarly work, or creative activities

Objectives, continued

- Describe possible threats to scholarly integrity in your work (what might tempt you to do the wrong thing?)
- Learn where to go at MSU if you have a concern related to research misconduct

The Continuum from Research Integrity to Research Misconduct



Research integrity

Questionable research practices

Unacceptable research practices

Research misconduct

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Research integrity = best practices

Questionable research practices = may refer to sloppy work, lack of expertise, or ignorance of policies and regulations (other possibilities exist!)

Unacceptable research practices = failure to correctly observe applicable policies and regulations

Misconduct = deliberate efforts to plagiarize, fabricate, or falsify research data

What is Integrity of Research, Scholarship, and Creative Activities?

"Research integrity broadly refers to the thoughtful and honest adherence to relevant ethical, disciplinary, and financial standards in the promotion, design, conduct, evaluation, and sharing of research in their field."

MSU Research Integrity Council, http://grad.msu.edu/ric

Considerations Related to Research and Scholarly Integrity

- · Personal honesty, ethics, and morals
- Expertise in the field of study doing good science
- Professional codes of conduct and research practice, including publication policies established by professional journals

Do the right thing!

- Institutional policies and regulations
- Governmental policies and regulations

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Sample professional codes of conduct:

- Ethical Principles of Psychologists and Code of Conduct (http://www.apa.org/ethics/code2002.html)
- Code of Conduct of the Institute of Biology (http://www.iob.org/userfiles/file/847.pdf)
- Code of Ethics of the American Anthropological Association (http://www.aaanet.org/committees/ethics/ethcode.htm)

Sample journal policies:

• Publication Ethics Policies for Medical Journals (http://www.wame.org/resources/ethics-resources/publication-ethics-policies-for-medical-journals/)

<u>Sample MSU policies and regulations about integrity of research, scholarship, and creative</u> activities:

- Office of Regulatory Affairs (http://www.regaffairs.msu.edu/)
- Faculty Handbook section on sponsored research and creative endeavors (http://www.hr.msu.edu/documents/facacadhandbooks/facultyhandbook/sponsoredresearch.htm)

Sample governmental policies and regulations:

- Regulations related to RCR education for student investigators (http://www.nist.gov/admin/legislation_new/PL110-69_8907.pdf)
- Animal Use and Care (http://www.animalresearch.msu.edu/)
- Protection of Human Subjects in Research (http://www.humanresearch.msu.edu/)
- Lab Safety (http://www.orcbs.msu.edu/)

Research and Scholarly Integrity in Your Discipline

- Think about a topic that you wish to investigate
 - What knowledge, skills, and mentoring will you need to achieve good science in your discipline?
 - What else can you do to facilitate research integrity?
 - What questions do you have for your mentor or for the presenter?
 - Where can you learn more about research integrity?
 - What do you need to know in the creative arts?

Research Misconduct: U.S. Office of Research Integrity Definition

- <u>"Fabrication</u> is making up data or results and recording or reporting them."
- <u>"Falsification</u> 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."
- <u>"Plagiarism</u> is the appropriation of another person's ideas, processes, results, or words without giving appropriate credit."

http://ori.dhhs.gov/policies/fed_research_misconduct.shtml

Research Misconduct: MSU Definition

"Misconduct means fabrication, falsification, plagiarism, or any other practice that seriously deviates from practices commonly accepted in the discipline or in the academic and research communities generally in proposing, performing, reviewing, or reporting research and creative activities."

MSU Procedures Concerning Allegations of Misconduct in Research and Creative Activities,

http://rio.msu.edu/June 2009 Procedures.pdf

Research Misconduct: MSU Definition, continued

- "Misconduct does not include appropriative practices in the creative arts insofar as they accord with accepted standards in the relevant discipline."
- "Misconduct does not include honest error or honest differences in the interpretation or judgment of research data."

MSU Procedures Concerning Allegations of Misconduct in Research and Creative Activities,

http://rio.msu.edu/June 2009 Procedures.pdf

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Note that "misconduct does not include honest error or honest differences in the interpretation or judgment of research data."

This provision does not excuse ignorance about the responsible conduct of research!

Unacceptable Research Practices: MSU Definition

"Unacceptable research practices means practices that do not constitute misconduct but that violate applicable laws, regulations, or other governmental requirements, or University rules or policies, of which the researcher had received notice or of which the researcher reasonably should have been aware."

MSU Procedures Concerning Allegations of Misconduct in Research and Creative Activities,

http://rio.msu.edu/June 2009 Procedures.pdf

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Examples of applicable rules, policies, etc. include, but are not limited to:

- Institutional Review Board (IRB) regulations for human research
- Institutional Animal Care and Use Committee (IACUC) regulations for animal research
- Export control laws
- MSU Conflict of Interest policy
- Other provisions of the MSU Faculty Handbook (http://www.hr.msu.edu/documents/facacadhandbooks/facultyhandbook/index .htm)

Questionable Research Practices: MSU Definition

"Questionable research practices means practices that do not constitute misconduct or unacceptable research practices but that require attention because they could erode confidence in the integrity of research or creative activities."

MSU Procedures Concerning Allegations of Misconduct in Research and Creative Activities,

http://rio.msu.edu/June 2009 Procedures.pdf

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Examples of questionable research practices include:

- Failure to retain research data
- Maintaining inadequate research records
- Authorship without a significant research contribution
- Refusing reasonable access to unique research materials or data
- Misrepresenting speculations as fact or releasing preliminary research results, without sufficient data to allow critical review
- Inadequate supervision or exploitation of subordinates
- Using inappropriate statistics to enhance the significance of research findings
- Selecting and reporting data to improve the "appearance" of the data or to increase its significance
- Failing to manage a conflict of interest that may result in biasing the interpretation and reporting of data
- Suppression of negative data that may result in needless repetition of studies involving risk to human subjects

Sources for the above information:

- Wright, D.E. (2008). Responsible Research Data Management, Oversight and Presentation, presented at a Poynter Center Workshop, Bloomington, IN
- Responsible Science: Ensuring the Integrity of the Research Process, National Academies Press, 1992,
 - http://www.nap.edu/catalog.php?record_id=1864http://www.nap.edu/catalog.php?record_id=1864.
- Pascal, C. (2003, December). Harvard Medical School.

News: Researcher admits fraud in grant data: Ex-Vermont scientist won nearly \$3m from U.S.

"In the worst case of scientific fakery to come to light in two decades, a top obesity researcher who long worked at the University of Vermont admitted yesterday that he fabricated data in 17 applications for federal grants to make his work seem more promising, helping him win nearly \$3 million in government funding."

Carey Goldberg & Scott Allen, *Boston Globe*, March 18, 2005 http://www.boston.com/news/nation/articles/2005/03/18/researcher admits fraud in grant data/

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Researcher admits fraud in grant data: Ex-Vermont scientist won nearly \$3m from US By Carey Goldberg and Scott Allen, Globe Staff | March 18, 2005

In the worst case of scientific fakery to come to light in two decades, a top obesity researcher who long worked at the University of Vermont admitted yesterday that he fabricated data in 17 applications for federal grants to make his work seem more promising, helping him win nearly \$3 million in government funding. ... Former University of Vermont researcher Eric Poehlman faces possible prison time, \$196,000 in fines and restitution, and a lifetime ban on federal funding in what investigators say is the worst US scientific fraud in 20 years. Under a plea agreement, Poehlman will correct or retract 10 published research papers, while admitting to the following (see article in the *Boston Globe* for remaining content).

Above information quoted directly from http://www.boston.com/news/nation/articles/2005/03/18/researcher_admits_fraud_in_gr ant_data/

Other sources of information about the Eric Poehlman case:

- http://www.nytimes.com/2006/10/22/magazine/22sciencefraud.html
- http://www.ahrp.org/cms/content/view/370/70/
- http://www.annals.org/content/144/8/609.full
- http://ori.dhhs.gov/misconduct/cases/press release poehlman.shtml

News: Geneticist investigated for misconduct

"An investigation into the work of Elizabeth Goodwin, a former associate professor of genetics and medical genetics at the University of Wisconsin, has found "several publications in which at least one figure was questionable" ... Allegations concerning Goodwin's work arose in late 2005, after graduate students in her lab became suspicious of preliminary results in a grant application."

The Scientist, June 2, 2006, http://www.the-scientist.com/news/print/23520/

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More information quoted from The Scientist, http://www.the-scientist.com/news/print/23520/

- The papers containing the questionable data appeared in Molecular Cell (in which Goodwin is the senior author), Nature Structural & Molecular Biology, and Developmental Biology.
- Goodwin resigned her position at the university in February, where she had received over \$1.8 million dollars in federal grants. She held a \$1 4 million NIH grant between 2002 and 2006 and a \$300,000 NIH grant scheduled to run from 2005 to 2009. She also received more than \$94,000 in funds from the U.S. Department of Agriculture.
- Allegations concerning Goodwin's work arose in late 2005, after graduate students in her lab became suspicious of preliminary results in a grant application. The students notified the chair of her department, which triggered preliminary and more detailed investigations, said Mellon. A committee of three university researchers conducted the probe.

More information quoted from A Can of Worms, published in the University of Wisconsin Alumni Magazine,

http://www.uwalumni.com/home/alumniandfriends/onwisconsin/owspring2008/worms.aspx

- The chief evidence against Goodwin came from Hubert and her graduate student
 colleagues, and the aftermath of the scandal has taken nearly as heavy a toll on them as it
 did on Goodwin. Of the seven people working in her lab six graduate students and one
 research specialist five are no longer at UW-Madison. Hubert hopes to complete her
 doctorate soon, which would make her the first member of the lab to do so.
- "We met with the students and with the professor, and we looked at the grant proposal and the data provided by the students, and it seemed clear that there was some attempt at deception," says Goldman. "Betsy was giving one set of numbers to NIH [National Institutes of Health] and another to the students. This was clearly not a frivolous accusation."

Test Your Knowledge

- Read Case Studies A through K
- For each case:
 - Determine whether the problem is fabrication, falsification, or plagiarism, or none of these – be prepared to explain your answer
 - Identify possible consequences of the researcher's actions – if the misconduct is or is not detected
 - Suggest ways in which the problem could be prevented
- Discuss your conclusions with the presenter or with your mentor

Case A

Jay is submitting a grant application to support a large-scale research project. The grant agency requires evidence that experimental methods have been successful in smaller-scale projects. Jay hasn't conducted any preliminary investigations, but he believes his methods will be successful, so he created a "make-believe" report about preliminary studies to include in the grant proposal.

Questions

- 1. Is this plagiarism, fabrication, or falsification?
- 2. What consequences could Jay be facing?
- 3. How could this problem be prevented?

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<u>Fabrication</u>. Jay created a make-believe report. He doesn't have any actual data to write about.

Consequences if Jay's fabrication is detected:

- Jay's misconduct may be reported to the profession in a publication such as the Chronicle of Higher Education. As a result, his reputation may be profoundly affected.
- Jay will not receive the grant. As a result, his research productivity will be negatively affected. Also, he may be barred from future funding applications to the same agency.
- Jay may lose his job or suffer other penalties at his university.

Consequences if Jay's fabrication is not detected:

- Because Jay did not do a pilot study, his research may be poorly planned, and the
 outcomes may be unsuccessful. This in turn may affect Jay's probability of securing
 future funding. Also, Jay's self-concept as a researcher may suffer, possibly leading
 to lower motivation to do further research.
- Jay may conclude that he "got by" with falsification. This may cause Jay to attempt falsification again in the future.

<u>Prevention</u>. There are no short-cuts. Jay needs to do the work associated with good scholarship.

Case B

Clara is a member of a lab group in which everyone uses variations of the same experimental methods. In the first draft of her dissertation, Clara used language from one of her mentor's publications to describe her experimental methods. Clara was not concerned because she knew that her mentor used exactly the same wording in multiple publications.

Questions

- 1. Is this plagiarism, fabrication, or falsification?
- 2. What consequences could Clara be facing?
- 3. How could this problem be prevented?

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<u>Plagiarism</u>. Clara stole her mentor's description of experimental methods. Her mentor is guilty of self-plagiarism (copying his own previously published work). For more information about self-plagiarism, see Michael Roig, 2006, *Avoiding plagiarism, self-plagiarism, and other questionable writing practices: A guide to ethical writing, http://facpub.stjohns.edu/~roigm/plagiarism/.*

Consequences if Clara's plagiarism is detected:

- Clara's plagiarism could be detected early by her mentor or later by members of her dissertation committee, the Graduate School, or readers. Plagiarism is easy to detect.
- If Clara is knowledgeable about plagiarism and copied her mentor's words anyway, Clara
 could be dismissed from her degree program and university. There probably will be a
 record of Clara's misconduct on her transcript or other official records that will follow Clara
 to other universities or places of employment.
- If Clara is truly ignorant about this aspect of plagiarism, or if she was given incorrect advice by her mentor, she may be given an opportunity to correct the situation. This might involve a re-write of the methods section, a "do-over" of the dissertation, or other penalty.
- Clara may use the "my advisor does this all the time" defense. If this claim is investigated, Clara's mentor may also have problems.

Consequences if Clara's plagiarism is not detected:

• Clara may remain ignorant, never realizing that she did plagiarize. As a result, she may repeat this behavior. (Given that mentors have a responsibility to educate their advisees about responsible conduct of research, this outcome should be very improbable.)

Prevention:

- Clara should write about the methods in her own words.
- Clara should provide a reference citation(s) to her mentor's published works.
- Clara should use quotation marks to note phrases or sentences that are copied verbatim from her mentor's publications. In addition, those passages should be attributed to her mentor with a reference citation.

Case C

Sam obtained funding from the XYZ corporation to support his research. XYZ expects that Sam's research will demonstrate effectiveness of their product. Sam's research does show that the product works, but there are side effects. In an effort to help secure continued funding, Sam chooses to publish only those findings that satisfy XYZ's expectations, ignoring the side effects.

Questions

- 1. Is this plagiarism, fabrication, or falsification?
- 2. What consequences could Sam be facing?
- 3. How could this problem be prevented?

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<u>Falsification</u>. Sam falsified his research findings by not telling the whole story. Readers will not have a full appreciation of his research findings because he omitted results about side effects.

Consequences if Sam's falsification is detected:

- Sam may be investigated for misconduct. If misconduct is found, Sam's behavior could affect his reputation, as well as the reputation of his lab, department, and university.
- Sam's misconduct may be reported to the profession in a publication such as the *Chronicle of Higher Education*, with more damage to reputation.
- The journal to which Sam submitted his manuscript might censure Sam, and possibly issue a retraction of any published article.
- Sam may lose his job or suffer other penalties at his university.

Consequences if Sam's falsification is not detected:

- Sam may conclude that he "got by" with falsification. This may cause Sam to attempt falsification again in the future.
- Because Sam omitted the side effects findings, the scientific community and public may conclude from his research that the product is safe.

Prevention:

- Researchers should be cautious when entering into agreements about corporate funding of research, and should not agree to provisions that affect scientific integrity and/or dissemination of results, especially when students are members of the research team.
 Researchers should consult with the MSU Contracts and Grants Office to learn more about protecting their rights.
- Of course, Sam should include findings that are contrary to his hypotheses when reporting the results of his research.

Case C, continued

Another concern: If Sam's research involves human subjects, he is required to seek IRB (Institutional Review Board) approval for his research protocol prior to contacting potential participants.

- IRBs exist to help protect the rights of human subjects in research
- IRB regulations specify that investigators report adverse outcomes immediately upon discovery
- Depending upon the nature of the adverse event,
 Sam's research might be halted or his experimental protocol might require change

- If Sam followed the IRB regulation about reporting adverse events, any "I didn't know" defense regarding the falsification would be invalid.
- If Sam has an approved IRB protocol and failed to submit an adverse event report, he will face additional consequences for that failure.
- If Sam did not submit his research protocol for IRB review, and he conducted the study anyway, the likely consequences are even greater. The IRB cannot issue post-hoc approvals. If Sam is a student, his dissertation may not be accepted by the Graduate School and he may not be allowed to complete his degree program. Also, some journals will not publish manuscripts without evidence of IRB approval.

Case D

Maria is writing a book about a literary figure. She found an obscure journal article that includes many of the same points Maria was hoping to make, but includes primary sources Maria had not previously located. To save time, Maria decides to paraphrase the article and cite the primary sources in her book. She does not cite the journal article directly, but only mentions it in a general footnote on "other sources."

Questions

- 1. Is this plagiarism, fabrication, or falsification?
- 2. What consequences could Maria be facing?
- 3. How could this problem be prevented?

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Likely plagiarism:

- Maria may not be guilty of plagiarism if her footnote clearly attributes the paraphrased passage to the author of the obscure journal article.
- Maria is guilty of plagiarism if she simply footnoted the paraphrased passage as "see also this journal article for background" because this would not give appropriate credit to the author of the article.

Consequences if Maria's plagiarism is detected:

- Maria's plagiarism could be detected by any person who reads her book and who knows the research literature. Plagiarism is easy to detect.
- If Maria is knowledgeable about plagiarism and fails to cite the author of the obscure article anyway, she faces serious consequences. If Maria is employed, she could be dismissed from her job or face other penalties. If Maria is a student, she may be dismissed from her degree program and the university. In addition, there is likely to be a record of Maria's misconduct on her transcript or other official records that will follow her to other universities or places of employment.

Consequences if Maria's plagiarism is not detected:

 Maria may think that she "got away" with plagiarism. As a result, she may repeat this behavior.

Prevention:

- Maria should follow the best practices of her discipline when giving credit to authors of the material cited in her book.
- One possibility is to attribute the archival research to the author by saying something like "[author] has uncovered additional sources, and then use secondary citations to the primary sources.
- A better solution, if possible, is for Maria to locate the primary sources and do her own work.
- Maria could benefit from education about responsible conduct of research and about the best practices of her discipline.

Case E

Susan forgot about the application deadline for a prestigious fellowship to study music composition – the application is due tomorrow. In a rush to update her vita, Susan could not find the volume number and page numbers for one of her publications. So she entered some fake information.

Questions

- 1. Is this plagiarism, fabrication, or falsification?
- 2. What consequences could Susan be facing?
- 3. How could this problem be prevented?

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<u>Fabrication</u>. Susan entered a make-believe volume number and page numbers. Susan's behavior is definitely wrong, but it may not be serious enough to qualify as research misconduct.

Consequences:

- Anyone who tries to locate the publication will be frustrated because of the incorrect data.
- If reviewers check the citations in Susan's vita, they will not be impressed by the incorrect information. They may conclude that Susan is sloppy about her work, and may therefore decide that she is not deserving of a fellowship.
- Susan may think she "got by" with the fabricated information, and may repeat this behavior in the future.

Prevention. Susan should maintain complete records about her scholarly productivity.

Case F

Mitchell attended a departmental seminar at which faculty and students presented works in progress. One of the speakers described an innovative way of analyzing data that had not yet been published. Mitchell decided use the new method to re-analyze his dissertation data. Because Mitchell regards statistical methods as "tools of the trade", he did not provide a citation to the new method.

Questions

- 1. Is this plagiarism, fabrication, or falsification?
- 2. What consequences could Mitchell be facing?
- 3. How could this problem be prevented?

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<u>Plagiarism</u>. Mitchell stole the information about the new data analysis method without citing the source of that information.

Consequences if Mitchell's plagiarism is detected:

- Mitchell's plagiarism could be detected *early* by his mentor, or *later* by members of his dissertation committee, the Graduate School, or readers. The "owner" of the new method may also be in a position to detect Mitchell's theft. Plagiarism is easy to detect.
- If Mitchell is knowledgeable about plagiarism and used the new data analysis method anyway, he could be dismissed from his degree program and university. There probably will be a record of Mitchell's misconduct on his transcript or other official records that will follow him to other universities or places of employment.
- If Mitchell is truly ignorant about this aspect of plagiarism, especially if the problem is detected at an early stage of writing the dissertation, he may be given an opportunity to correct the situation. This might involve a re-write of the methods section, a "do-over" of the dissertation, or other penalty.

Consequences if Mitchell's plagiarism is not detected:

- Mitchell may remain ignorant, never realizing that he did plagiarize. As a result, he may repeat this behavior. (Given that mentors have a responsibility to educate their advisees about responsible conduct of research, this outcome should be very improbable.)
- Mitchell's plagiarism could be detected well after completing his degree. A reader of his dissertation or of journal articles that he writes about this study may notice the plagiarism.

Prevention:

- Mitchell should request permission from the speaker to use the new data analysis method.
- Mitchell should provide a reference citation to the speaker. If there is no published article, Mitchell could cite a "personal communication" with the speaker.
- Mitchell should consider an acknowledgement to the speaker in the dissertation, as well as
 possibly including the speaker as a co-author on subsequent publications and
 presentations, especially those that emphasize the data analysis method.

Case G

Vern was assigned by his mentor to collect data at the same early-morning time every day of the week. Vern attended a football game and then partied with friends on Saturday night. As a result, Vern overslept on Sunday morning and did not collect data at the scheduled time. Vern decided to report some fake data for Sunday morning, reasoning that his mentor would not notice.

Questions

- 1. Is this plagiarism, fabrication, or falsification?
- 2. What consequences could Vern be facing?
- 3. How could this problem be prevented?

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<u>Fabrication</u>. Vern created fake data. He did not have actual data for the Sunday morning data collection session.

Consequences if Vern's fabrication is detected:

- Depending upon the severity of the incident, Vern could be fired from his graduate assistantship position. He could also be reassigned to a different activity or project with less responsibility and less potential for publications.
- Vern might be dismissed from his degree program or from the university. The fabrication might be part of his permanent record.
- Vern's reputation as a scholar will be negatively affected.

Consequences if Vern's fabrication is not detected:

- Vern's fake data may alter the outcome of the research so that the research findings are not trustworthy.
- Vern might think he "got by" with the fabrication and might repeat that behavior in the future.

<u>Prevention.</u> Vern's mentor should establish clear expectations for Vern's work, and Vern should fulfill those expectations. There should be a back-up plan for data-collection in the case that Vern is ill or experiences an emergency. (Attending a football game and partying are not legitimate excuses.)

Case H

Penny's research involves in-depth interviews and subsequent qualitative data analyses. As she transcribed the interviews, Penny noticed that 1 of the 17 participants responded to her questions in a very different manner than the others. Penny rationalized that this participant really didn't belong in the sample, so she chose to disregard the data.

Questions

- 1. Is this plagiarism, fabrication, or falsification?
- 2. What consequences could Penny be facing?
- 3. How could this problem be prevented?

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Possibly falsification. Possibilities include:

- This situation could be falsification if Penny deliberately "drops" the unusual subject from her data set because she wants "clean" results that she can easily explain.
- It is possible that Penny did not administer her subject-selection criteria carefully, and that the unusual subject really doesn't belong to the population of interest. In this case, falsification did not occur. Penny should discuss the situation with her mentor.

<u>Consequences</u>. If Penny "drops" the unusual subject from her data set, she could be altering the findings of her study by ignoring contradictory outcomes.

<u>Prevention</u>. Penny should establish appropriate criteria for subject selection and exclusion, and then she should follow her plan.

- Assuming that the subject selection process was carefully implemented, if a
 participant does give unusual responses, Penny should include those data and look
 for an explanation of those results.
- If the subject selection process was not carefully implemented, Penny could justify deleting the data from the unusual subject, but she should explain that decision in research reports.

Case I

Antonio's research results include photographic images. Antonio decided to enhance certain aspects of the photographs using computer software to emphasize the significance of his results. The altered images were included in manuscripts that Antonio submitted for publication in professional journals, as well as presentations delivered at scholarly conferences.

Questions

- 1. Is this plagiarism, fabrication, or falsification?
- 2. What consequences could Antonio be facing?
- 3. How could this problem be prevented?

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<u>Falsification</u>. Antonio changed the original images in a way that might lead to incorrect conclusions about his research results.

Consequences if Antonio's falsification is detected:

- His research might not be accepted for publication.
- Antonio's misconduct may be reported to the profession in a publication such as the Chronicle of Higher Education. As a result, his reputation may be profoundly affected.
- Antonio may lose his job or suffer other penalties at his university.

Consequences if Antonio's falsification is not detected:

- The conclusions based upon his results may be incorrect. The public and scientific community may have an incorrect understanding of the topic under investigation because of the falsification.
- Antonio may conclude that he "got by" with falsification. This may cause Antonio to attempt falsification again in the future.

<u>Prevention</u>. Antonio should become an expert in correct ways to analyze data from photographic images. If it is necessary to "clean-up" images prior to presentation and publication, Antonio should establish some checks and balances to make certain that he does not alter the images in a fundamental way. For example, Antonio could ask his mentor or another expert to do some before-and-after inspections of the photographs.

Note: Inappropriate and fraudulent image manipulation is a growing problem. Examples include:

- Adding or deleting bands in blots and gels is gross misrepresentation.
- Adjusting brightness or contrast adjusting the intensity of a single band in a blot constitutes a
 violation of the widely accepted guideline that "no specific feature within an image may be
 enhanced, obscured, moved, removed, or introduced."
- "Cleaning up" background with programs like Rubber Stamp is inappropriate because "what may
 seem to be a background band or contamination may actually be real and biologically important and
 could be recognized as such by another scientist."

Sources: (1) Wright, D.E. (2008). *Responsible Research Data Management, Oversight and Presentation*, presented at a Poynter Center Workshop, Bloomington, IN. (2) Rossner, M. & Yamada, K. (2004). What's in a picture? The temptation of image manipulation. *The Journal of Cell Biology*.

Case J

Rodney and Ann share lab equipment. Ann did not follow the equipment use protocol when she ran her research samples. Her error led to a calibration problem. Ann recognized the problem, but did not report it. Rodney ran some of his research samples later in the day. He was delighted with unexpected, but very positive results. He and his mentor subsequently published an article using those data.

Questions

- 1. Is this plagiarism, fabrication, or falsification?
- 2. What consequences could Rodney or Ann face?
- 3. How could this problem be prevented?

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Falsification. Rodney's results and conclusions based upon those results probably are incorrect.

<u>Consequences for Rodney:</u> Rodney did not exercise sufficient care in data collection. He should have checked the equipment calibration before running his samples, and should have recorded the calibration and data collection session in his lab notebook. Thus, Rodney is guilty of unintentional falsification. He must face the consequences which include: (a) retracting the journal article; (b) loss of reputation; and (c) possible penalties from his university or place of work.

<u>Consequences for Rodney's mentor:</u> The mentor should have reviewed Rodney's lab notebook on a regular basis – definitely prior to publication of a journal article. The mentor failed in this responsibility and is likely to face the same consequences as Rodney.

<u>Consequences for Ann:</u> Ann's failure to follow an approved equipment use protocol is an unacceptable research practice. Her failure to report the calibration problem is another unacceptable research practice.

- If Ann's unacceptable research practices are discovered, she may face a misconduct investigation, with consequent loss of reputation and possible penalties from the university or place of work. If this misbehavior becomes widely known, Ann may have difficulty finding a position at another lab, with another mentor, or with another employer.
- If no one ever learns about Ann's unacceptable research practices, she may simply face the consequences of guilt and possible loss of self esteem. Ann may also engage in such behavior again, causing similar problems in the future.

Prevention:

- All students and trainees should have education in responsible conduct of research.
- Lab directors should teach and review lab protocols regularly.
- Equipment should be calibrated at the beginning of each data-collection session (more often if needed).
- All members of the research team should use lab notebooks to record detailed notes about the conduct of their research, including equipment calibration.

Case K

Tim analyzed his dissertation data using suggestions generated by an online statistical software package. Tim proceeded to complete and defend his research. None of the dissertation committee members noticed that the statistical methods were inappropriate, and also inconsistent with plans approved at his proposal meeting. Tim's dissertation was approved by the Graduate School.

Questions

- 1. Is this plagiarism, fabrication, or falsification?
- 2. What consequences could Tim be facing?
- 3. How could this problem be prevented?

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<u>Falsification</u>. If Tim selected inappropriate/incorrect statistical methods, the results of his data analyses and conclusions about those results are likely to be incorrect. As such, Tim is guilty of misrepresenting the truth.

Consequences:

- Readers of the dissertation may rely upon Tim's inaccurate account of the phenomena under study.
- Readers may discover and report the inappropriate statistical treatment of the data. Tim
 (and members of his dissertation committee) may be investigated for possible misconduct.
 The dissertation committee should have exercised due diligence to make certain that Tim's
 research was acceptable before giving their approval to the final product.
 - If misconduct is found, Tim's behavior could affect his reputation, as well as the reputation of his lab, department, and university. In addition, Tim's degree may be revoked or he may be required to re-do the dissertation. The fabrication might be noted on his permanent record.
 - If misconduct is found, Tim's dissertation committee may also suffer damage to their reputations as scholars, and they may be penalized by the university for failing to properly mentor Tim.
- Tim may conclude that it is OK to use software-generated suggestions for data analysis. He may attempt the same methods again in the future.

Prevention:

- Tim should have developed greater expertise in statistical/research methods, and his advisor/guidance committee should have insisted that he successfully complete appropriate courses.
- Tim should have followed the research plan approved by his dissertation committee, and his dissertation committee should have insisted upon such behavior. Tim should have obtained an OK from his dissertation committee if significant revisions were needed to the approved plan.

Integrity and Misconduct in Creative Activities

For creative activities, appropriation of the work of others is sometimes done for aesthetic purposes

- Music that includes melodies from other well known sources, e.g., Copeland's Appalachian Spring (includes the folk melody Simple Gifts)
- Paintings that incorporate elements from masterworks, e.g., Duchamp's Mona Lisa (he added a mustache)
- Novels that include characters from famous literary works, e.g., the novel Ahab's Wife (includes characters from Moby Dick)

Integrity and Misconduct in Creative Activities, continued

- Such appropriation is acceptable if the composer, artist, or author wants the audience to recognize the reference – the original work must be wellknown
- In addition, the reference must have some additional aesthetic quality – the composer, artist, or author must be making some aesthetic statement about the original
- Taking anything that is not well known and passing it off as one's own creation is plagiarism

Integrity and Misconduct in Creative Activities, continued

- Artists and writers must be aware of any relevant copyright restrictions
 - Recent creative works are still under copyright,
 e.g., the use of characters from the Harry Potter series is not permitted by the author
 - Copyright law allows certain exceptions (such as satire)

The MSU Technologies web site includes copyright information (http://www.technologies.msu.edu/copyright.html)

Why Does Misconduct Happen?

- Possible reasons
 - Sloppiness when conducting the literature review (e.g., cut & paste & forget the original citation)
 - Inadequate knowledge of research literature
 - Inadequate expertise in research methods
 - Pressure from others to produce data quickly
 - Time crunch
 - Malfunctioning equipment
- Other reasons???

Misconduct in Your Discipline

- Discuss cases of fabrication, falsification, and plagiarism in your discipline
- Discuss possible reasons for that misconduct

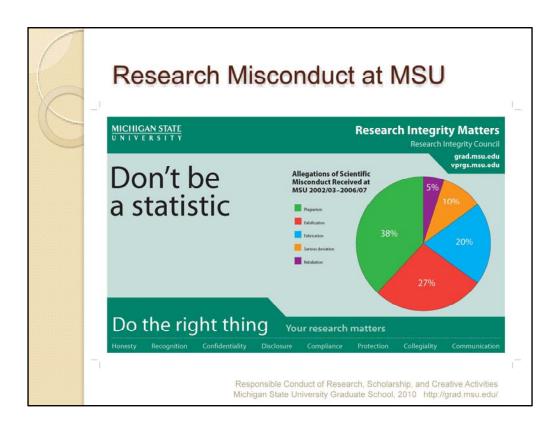
Refer to the specific PowerPoint presentation about plagiarism in this series for additional information about this topic

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The presenter should describe some actual cases of fabrication, falsification, and plagiarism from the discipline. Use examples that involve the research methods of the discipline.

Help students to understand how and why such misconduct can and does occur in the discipline. Discuss factors that can lead to misconduct (e.g., pressure to meet a deadline or complete a degree, ignorance, etc.)

Discuss ways to prevent misconduct. Include education about responsible conduct of research from a variety of sources, including the student's mentor.



Plagiarism, falsification, and fabrication are categories of research misconduct according to both federal and MSU definitions.

Serious deviation refers to an unacceptable research practice according to the MSU definition of research misconduct.

"Retaliation means an adverse action taken against an individual who has, in Good Faith, participated in a Misconduct Proceeding (as Complainant, witness, Review Panel member, Inquiry Panel member, Investigative Committee member, Counsel, Advisor, Responsible Administrator, or RIO) or otherwise cooperated in the review of an Allegation under these Procedures, where there is a clear causal link between the participation or cooperation and the adverse action. The context in which an adverse action has occurred, including its materiality, is a relevant and important factor to be taken into account in determining whether it constitutes Retaliation." MSU Procedures Concerning Allegations of Misconduct in Research and Creative Activities, http://rio.msu.edu/June 2009 Procedures.pdf

What Should You Do?

The next several slides focus on actions you should consider if faced with a difficult situation or if you suspect misconduct. Start with these suggestions.

- Ask for confidential advice from the MSU Research Integrity Officer before too many people become involved (http://www.rio.msu.edu/)
- Try to resolve the problem as soon as possible problems usually get worse with time + there are more possible solutions early in a situation
- Use effective conflict resolution methods the MSU Graduate School offers training in conflict resolution (http://grad.msu.edu/conflictresolution/)

What is a Difficult Situation?

- Conflicts with your mentor about expectations for degree completion or research assignments
- Conflicts about issues such as authorship, data management, lab safety, protection of human subjects, animal welfare, or conflict of interest
- Problems with communication or collegiality in the research environment

What is Suspected Misconduct?

- Fabrication
- or serious deviation from commonly
- Falsification
- accepted practices in your discipline
- Plagiarism

Examples of Difficult Situations

The MSU Graduate School offers a conflict resolution program for students and faculty http://grad.msu.edu/conflictresolution/

Watch some or all of the conflict resolution video vignettes for examples of difficult situations http://grad.msu.edu/conflictresolution/vignette.aspx

If You Face a Difficult Situation

- Make notes about your observations
 - Focus on what you know or have observed
 - Do not rely upon hearsay
 - Avoid emotional reactions
- Get the big picture
 - Discuss the matter with the people involved in the situation – understand different perspectives
 - Ask for clarification, e.g., "I don't understand this" or "what is the right thing to do in this situation" or "what did you mean by"
 - Do not make the situation worse avoid rumors

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The suggestions that are offered here and on the next slide may not be appropriate in every situation. Students may consult the MSU Research Integrity Officer (http://www.rio.msu.edu/) to seek guidance about what to do in sensitive or serious situations.

If You Face a Difficult Situation

- Do not take unilateral action talk to someone such as your mentor, advisor, or lab director
 - Ask for advice about resolving the problem
 - Seek education about applicable procedures, policies, and rules
 - Be a responsible adult if you are part of the problem, admit to your mistakes and ask for advice about how to help rectify the situation
- If the matter is not resolved amicably, seek advice from the MSU Research Integrity Officer (http://www.rio.msu.edu/)

If You Suspect Misconduct

- Seek information and advice from the MSU Research Integrity Officer (RIO)
 - Jim Pivarnik, Ph.D. 107 Olds Hall (517) 432-6698
 rio@msu.edu
 - Web site URL http://www.rio.msu.edu/
- Conversations with the RIO are confidential
- Having a conversation with the RIO does not mean you are initiating a complaint – only that you are seeking information and advice

Whistle-Blowing

- A whistle-blower is a person who makes a formal complaint about alleged misconduct
- The MSU Procedures Concerning Allegations of Misconduct in Research and Creative Activities provide protection to whistle-blowers against retaliation (http://rio.msu.edu/June_2009_Procedures.pdf)
- Students should be cautious about whistle-blowing, and should always seek advice from the MSU Research Integrity Officer before taking this action

Misconduct Investigations at MSU http://www.rio.msu.edu/June 2009 Procedures.pdf

| Step | Action |
|---------------------------|--|
| 1. Allegation | Complainant alleges misconduct |
| 2. Preliminary assessment | RIO determines whether the alleged action could constitute misconduct or URP, and whether there is evidence to support the allegation |
| 3. Inquiry | Panel of 3+ members confirms or disconfirms the RIO's conclusions |
| 4. Investigation | Panel of 3+ members determines if misconduct occurred, if the respondent is responsible, and the extent, gravity, and consequences of the misconduct |
| 5. Appeal? | If found guilty of misconduct, the respondent may appeal the decision |

RIO = Research Integrity Officer, URP = unacceptable research practices

Sources

Publications

 National Academy of Sciences, National Academy of Engineering, & Institute of Medicine. (2009). On Being a Scientist: A Guide to Responsible Conduct in Research, (3rd ed.),

http://books.nap.edu/openbook.php?record_id=12192&page=R1

 Steneck, N. H. (2006). ORI Introduction to the Responsible Conduct of Research, http://ori.dhhs.gov/education/products/RCRintro/

Offices

 U.S. Office of Research Integrity http://ori.dhhs.gov/policies/fed research misconduct.shtml

Sources, continued

 MSU Research Integrity Office http://www.rio.msu.edu/

Other Resources

- MSU Research Integrity Council http://grad.msu.edu/ric
- MSU Procedures Concerning Allegations of Misconduct in Research and Creative Activities http://rio.msu.edu/June 2009 Procedures.pdf
- MSU Graduate School Conflict Resolution Program http://grad.msu.edu/conflictresolution/