Cornell University

2018 Cornell University College of Engineering Responsible Conduct of Research (RCR) Symposium

CASE STUDIES

Case 1: Simulated Simulation?

(Source: http://www.onlineethics.org/Resources/TeachingTools/Modules/19237/resethpages/doubts.aspx, Further adapted from Albert R. Meyers and Caroline Whitbeck's adaptation of a scenario contributed by an MIT Computer Science graduate student (December 1993))

You are a computer science graduate student and for two years have been working on an operating system design in Professor Michelle Carr's group. Professor Carr has designed a set of novel heuristics for file-system cache maintenance. She published performance graphs describing a simulation of a prototype file input/output subsystem in a journal article and included the graphs in the proposal for your group's current grant. The graphs indicate that Carr's heuristic methods will significantly improve file-system cache performance.

You devised a modification to the file-system cache heuristics and asked Professor Carr how to run the simulation code to test the modification. Professor Carr replied that the simulation code had not been used in a long time and had been archived to tape. She also said it was not worth the trouble of trying to remember the archived filenames, because the simulation code was very poor and written in a language that does not run in the group's current computing environment. She told you to write a new, up-to-date simulator.

As you worked on the new simulator, you asked Professor Carr how to simulate several classes of events, but she did not seem to remember these details of the old simulator. When you had finished building a new simulator, your results were considerably worse than those that were reported in the performance graphs that Professor Carr had published.

You now suspect that Professor Carr did not do a previous simulation, but made up the numbers in the performance graphs. Some of your own presentations and papers are based on Professor Carr's performance data.

Discussion Questions:

- What, if any, ambiguities do you face?
- What risks are there in this situation to you or to others?
- What can/should you do?

Case 2: Don't be a Dummy

(Adapted from*: https://oprs.usc.edu/files/2018/08/Human_Subjects_ResearchRCR-8.6.18.pdf*)

Dr. James Smith, an engineering researcher, is seeking to evaluate a new structural material for automobiles. Once the material is integrated into an automobile, it is expected to lessen the impact that a rear-end collision would have on passengers. Dr. Smith intends to ask for volunteers at his university to participate in his research, which would involve placing the volunteers in an automobile that is hit from behind at a low speed. The automobile will be equipped with a lot of sensors and there will be some sensors placed on the people in the car to measure the impact. The primary aim of the research is to assess the new material. The project is not funded by a government agency. Since the tests will only be conducted at a low speed, Professor Smith believes that the test poses no risk to the people who would be in the car, and therefore he wants to do test with some students and other volunteers. When he discusses this project with his colleague, Dr. Shu, she informs him that this project will need to be reviewed by the Institutional Review Board (IRB) for the responsible use of human participants in research. Dr. Smith has never heard of the IRB, and he thinks that this is unnecessary because there is no risk to anyone and he is not conducting a clinical trial. He does not want to be bogged down in bureaucracy.

Discussion Questions:

- What are the issues in this scenario?
- Does Dr. Smith have any responsibilities to the participants involved in his study?
- What are the consequences of not getting review and approval by the Institutional Review Board (IRB)?
- What are some other options that Dr. Smith might consider?

Modification:

- What if, instead of human volunteers, Dr. Smith decides to use animals in the cars? What, if anything, would be needed for those experiments to occur?

Case 3: Non-compliant Data

(Adapted from*: a case study in "On Being A Scientist: A guide to responsible research" Third edition, NAP publication*)

Deborah, a third-year graduate student, and Kamala, a postdoctoral fellow, have made a series of measurements on a new experimental semiconductor material using an expensive neutron test at a national laboratory. When they return to their own laboratory and examine the data, a newly proposed mathematical explanation of the semiconductor's behavior predicts results indicated by a curve.

During the measurements at the national laboratory, Deborah and Kamala observed that electrical power fluctuations that they could not control or predict were affecting their detector. They suspect the fluctuations affected some of their measurements, but they do not know which ones.

Deborah and Kamala begin to write up their results to present at a lab meeting, which they know will be the first step in preparing a proposal to the NSF for further research on the topic, as well as to writing a manuscript for publication. The deadline for proposal submission is in two weeks and the two of them are confident that their data point to a clear trend that will win the next round of funding!

As they start putting together the models, they notice two data points near the horizontal axis from the graph they are preparing. Kamala says that due to their deviation from the theoretical curve and outside the expected error bars calculated for the remaining data points, the low data points were obviously caused by the power fluctuations and they should drop them. Deborah and Kamala discuss that this seems reasonable, as there were many fluctuations and they would certainly have had an effect on the data. They also discuss that they could not be sure of that or even that the theoretical prediction was valid.

Discussion Questions

- What factors should Kamala and Deborah take into account in deciding how to present the data from their experiment?
- Should a draft paper be prepared at this point?
- What if Deborah and Kamala can't agree on how the data should be presented?
- Are the considerations for the use of these data points in a manuscript for publication different than those for a funding proposal? Why or why not?

Case 4: Feeling Left Out

(Adapted from*: Graduate Research Ethics: Cases and Commentaries - Volume 5, edited by Brian Schrag 2001 http://www.onlineethics.org/Resources/gradres/gradresv5/tobe.aspx*)

Upon entering the graduate program, Alyssa decided to start working in the laboratory of Dr. Harry Swift. She started on a project that consisted of administering and evaluating the effects of an antimalarial agent using an animal model. Although six other graduate students were working in the laboratory (not doing rotations), none of them was involved with the project, other than occasionally assisting Alyssa with the animals. She presented her data at weekly laboratory meetings attended by all members of Dr. Swift's lab, including Swift.

Alyssa and Dr. Swift did not get along very well. Swift believed that although Alyssa was a hard worker, she required too much supervision and was not an independent thinker. Alyssa, on the other hand, believed that Dr. Swift expected too much from his students and failed to provide adequate direction. Therefore, after completing the project, which took approximately nine months, Alyssa decided to leave the lab and begin working in another laboratory in the same department. Alyssa's lab book remained in Swift's lab, and he told her that the work did not merit publication.

Approximately one year later, Alyssa learned that her data had been published. The paper did not list her as an author, but it did list the names of other graduate students who had worked in Dr. Swift's lab during Alyssa's tenure. Alyssa decided to bring this situation to the attention of the departmental chairman, who referred her to the Director of Student Affairs.

Discussion Questions

- What are Alyssa’s options?
- What are some possible reasons why Dr. Smith did not include Alyssa in the author list?
- What are the ways in which such authorship disputes can be prevented?
- What do you think will happen now?