Online Ethics Center
FOR ENGINEERING AND SCIENCE

Project Selection and Authorship in Biomedical Engineering Research

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Description

These cases describe incidents regarding (A) the appearance of favorable treatment of an advisor towards a trainee with regards to authorship, and (B) the appearance of a misaligned project assignment and breach of intellectual property by an advisor during doctoral training.

Body

Case A: A Graduate Student in Biomedical Engineering

Ahmad was a doctoral student of Biomedical Engineering in the US; he worked in Dr. Goldstein's lab. During the first two months and during a lab meeting, Ahmad suggested an alternative artifact suppression approach in an MRI method previously developed in Dr. Goldstein's lab. After the meeting and following Dr. Goldstein's recommendation, Ahmad started working on this idea. Almost a month later, Dr. Goldstein mentioned to Ahmed that Steven, a post-doctoral researcher in one of his collaborator's labs, had already found a solution based on Ahmad's alternative approach and asked Ahmad to reach out to Steven to learn about his solution. Ahmad reached out to Steven and they started working together on the problem;

the new solution was based on a deep learning method. A few months later, Dr. Goldstein and two of his trainees (Stephanie a senior doctoral student, and Peter, a new post-doctoral researcher) attended an out-of-town workshop to learn more about deep learning. Ahmad felt confused about why he was not asked/invited to attend the workshop as he was the sole person in Dr. Goldstein's lab to use deep learning in his research project.

A year and a half later, Ahmad performed all the experiments and data analysis of his project and finished writing a manuscript on the work. His list of contributors included himself, Steven, Steven's PI, and Dr. Goldstein. After final editing of the manuscript and before the submission, Dr. Goldstein asked Ahmad to include Peter (the post-doc in his lab) as a co-author due to his intellectual contribution to the work. Ahmad was again confused, and asked Dr. Goldstein for an explanation. He was told that Peter and Dr. Goldstein had a conversation during the earlier workshop that shaped the idea of the work. Still perplexed, Ahmad replied that this work was initiated before the workshop. Dr. Goldstein asked Ahmad if he was accusing him of lying and further complained that Ahmad does not perform well in receiving advice from his advisor.

To Ahmad, Peter had no contribution to the work. In fact, throughout the project Peter demonstrated no intention of helping Ahmad in progressing. Nevertheless, Ahmad felt he had no choice but to include Peter as a co-author, as this was instructed by his advisor, Dr. Goldstein.

Discussion Questions:

- What should Ahmad do at this point?
- What could Ahmad have done differently?
- Is there a possibility that Dr. Goldstein was biased against Ahmed, and in favor of Peter?
- Ahmad felt misled regarding credit for authorship:
- What criteria should be used to determine authorship?
- Who should make the final call on the author list of a manuscript?
- How should co-authors be able to identify each other's contribution?
- How should co-authors have confidence in everyone's contribution?
- What should a graduate student do if he/she experiences a breach of research ethics and trust with their advisor?

Case B: A Graduate Student in Biomedical Engineering

Ahmad is a graduate student of Biomedical Engineering with a strong interest in the physics of magnetic resonance imaging (MRI) and its application in diagnosis of cardiac diseases working in Dr. Goldstein's laboratory. Ahmad's educational background emphasized computational methods, theory of imaging, and signal processing. After Ahmad's doctoral qualifying exam, his committee recommended he take an additional class related to human physiology to expand his knowledge especially in the physiology of heart.

During the human heart module of the physiology class, Ahmad came up with the idea of mapping human heart's mechanics during the propagation of electrical signals that initiate the contraction of heart muscles as an indicator of cardiac disease. Ahmad discussed the idea in one of their lab meetings and Dr. Goldstein indicated that he thought it was very interesting, but never mentioned anything else about it after the meeting. A few months later when Ahmad was conducting some MRI experiments on human subjects, Dr. Goldstein asked Ahmad to acquire additional images and try to optimize the MRI parameters to pursue his idea. Ahmad got very excited and demonstrated that the idea was feasible through multiple iterations of parameters optimizations and conducting human experiments on 4-5 human subjects. Dr. Goldstein and Ahmad both agreed that this idea should become the 3rd research aim of Ahmad's doctoral dissertation.

When it was time for Ahmad to write his proposal and defend it, he discussed the proposed research aims of his doctoral dissertation in a meeting with his doctoral committee and received initial approval from everyone. He spent additional time and reviewed related works to his 3rd aim to provide enough scientific background. However, when discussing this later, Dr, Goldstein, told Ahmad that the 3rd aim was initially his idea and no longer available for Ahmad to pursue. Dr. Goldstein added that he intended to pursue that idea with another trainee and asked Ahmad to replace the 3rd aim with one of his own research grant's aims.

Discussion Questions:

- What should Ahmad do at this point?
- Does he have any choice other than to do as his advisor has told him?
- Has Dr. Goldstein done anything wrong, ethically?

- Who should be able to work on the novel idea of a graduate student?

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Resource Type

Case Study / Scenario

Topics

Mentors and Trainees
Authorship
Intellectual Property and Patents

Discipline(s)

Engineering
Biomedical Engineering and Bioengineering

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