Author's Commentary On
Ethics of Recognizing Contributions of Undergraduate Engineering Students

This case aims to provide a space to explore and discuss ethical challenges of recognizing student contributions in engineering projects. As engineering students prepare to step into the professional world, early education about what to expect in relation to recognition of their contributions and how to navigate difficult conversations are crucial. In Amir's situation, he contributed to a research project during his internship, yet he faced a dilemma when his efforts were not recognized in ways he expected - i.e., being listed as an author on the resulting publication.

The case prompts undergraduate engineering students to reflect on their contributions, the ethics of authorship, and how these can sometimes be interpreted differently. Through discussions and debates about this case, students are encouraged to explore issues such as: contributions that deserve authorship credit and the involved process to become an author, the difference between authorship and acknowledgement, and the conditions under which inventorship status is granted. By wrestling with these issues and the different perspectives involved, students will be better prepared to navigate similar situations in their engagement with professional environments and develop a deeper understanding of the role of ethics in engineering practices.

Below are discussion tips for the discussion questions.

1. Is being employed or being part of a team at the time of the publication a criterion for authorship?
   Students can refer to commonly used authorship criteria for engineering students (e.g., AAAS authorship decision tree; Northwestern University authorship guidelines).

2. What is the difference between being an author and being recognized in the acknowledgements section?
   Students can refer to authorship criteria suggested by their university or other reputable/relevant organizations in specific subfields. Furthermore, they can find a published paper with an acknowledgements section and explore recognized contributions.

3. Did Amir's contributions to the project warrant authorship?
   This is a follow-up question to the one above. Students can discuss Amir's contributions to the project and reference commonly used authorship criteria for engineering students or refer to authorship criteria suggested by their university.

4. In case the group decides to register a patent for the new TPMS, does Amir's contribution qualify him for inventorship? What if the idea of generating power from the tires' rotation was Amir's?
   Students can refer to commonly used inventorship guidelines (e.g., AAAS inventorship guidelines; Northwestern University inventorship guidelines).

5. In industrial environments, various publication types other than journal articles and patents could be used for research communication including blog posts, white papers, application notes, technical reports, and case studies. Could Amir share information about the TPMS in a blog or white paper without notifying the R&D center?
   Students can engage with codes of ethics for engineers (e.g., the code of ethics provided by the National Society of Professional Engineers) to learn more about violation of confidentiality and intellectual property rights, violation of the terms of non-disclosure agreements, and risks such as damage to the project, possible termination of contract, or a lawsuit against Amir.

6. What would you do if you were in Amir's situation?
   Students can propose reviewing the terms of employment or internship agreements, seeking guidance from authorship guidelines and codes of ethics, or reaching out to a supervisory figure at their university for advice.

7. How could Amir have prevented this situation?
   Students can highlight awareness about authorship and inventorship norms in specific fields, engagement with guidelines, and inquiries about these issues in early stages of the internship.