



Online Ethics Center  
FOR ENGINEERING AND SCIENCE

# Working Ethics into the Conversation: Introducing STEM Faculty to Teaching Ethics Workshop Summary

## Author(s)

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## Description

On October 22-23, 2019, twenty-nine STEM faculty from academic institutions all over the United States took part in a two-day train the trainer workshop.

## Abstract

Below is a summary of presentations and active learning sessions led by the workshop facilitators, as well as the slide decks and further resources developed by teams of participants as part of the workshop.

## Body

### **DAY ONE: Tuesday, October 22nd**

9:30 [Remarks by Dr. Stephanie Bird, Engineering Ethics Education and Policy Consultant](#), Editor, Science and Engineering Ethics

- 10:15 [Ethics and Emerging Technologies using Case Study Discussions](#)  
Joe Herkert and Jason Borenstein
- 11:30 [Professional Codes of Ethics using Classroom Discussion Techniques](#)  
Marshall Thomsen and Kelly Laas
- 1:30 [Professional Responsibility & Self Reflection using Ethics Autobiographies](#)  
Qin Zhu
- 2:45 [Active Learning Approaches and Introduction to Group Presentations](#)  
Karin Ellison and Kelly Laas

## **DAY TWO: Wednesday, October 23rd**

- 10:45 [Ethical Theories Used in Teaching STEM Ethics](#)  
Yvette Pearson
- 11:45 [Assessment in STEM Ethics Education](#)  
Michael Loui

## **Participant - Developed Lesson Plans**

During the final session of day one of the workshop, participants were asked to work in groups to develop a seventy-five-minute lesson plan that engaged with some of the approaches discussed earlier in the day. The goal was that the lesson plans would have clear learning objectives, activities that engaged the students in active learning, and an approach to accessing the effectiveness of the lesson. The five groups chose different audiences (undergraduates, engineering students engaged in study-abroad, faculty) and a wide variety of settings (informal, large and smaller

classes, faculty meetings). Below is a summary of the presentations and links to the groups' slides and supporting materials.

# **Introductory Meeting for Undergraduates in Engineers Without Borders**

These activities were designed for a group of 10 - 12 undergraduate students who are planning for an international development trip. Ideally, this session would occur with students several months before actual travel in an effort to reinforce the significance of ethics in international development work and to establish a foundation for future conduct. This includes how students will conduct themselves during the planning phase of the project as well as how they will interact with community members. Three specific activities were developed that focus on the following:

1. Creating a space for self-reflection on students' motivation for participating in international development projects
2. Analysis of a critical case study to emphasize participatory planning and cultural differences they may encounter
3. Development of a code of ethics that the group will use to guide their future work

The self-reflection component is intended to help students articulate why they have chosen to engage in international development work in the first place. During our group's discussion, we identified a broad spectrum of motivations—some more noble than others—for getting involved in organizations like EWB-USA and similar initiatives. In this activity, students will use Padlet for developing and sharing a list of common motivations that generic students (not necessarily themselves) might have for participating in the project. During a group discussion, students can evaluate the different motivations and discuss the implications that these motivations may have on project outcomes. In smaller groups, students can then move forward to the level of sharing their own motivations with others.

The next activity focuses on a critical case study for an EWB-USA water project that was completed in Cameroon from 2005 through 2013. In 2008, a communications professor at the EWB-USA chapter's school joined the group and produced a documentary entitled "When the West Brings Civilization Back to Africa". The film takes a critical look at international development work and raises a number of ethical concerns surrounding the so-called "white-savior complex" and how a lack of participatory planning can adversely impact relationships in a community. While the entire film is worth watching, this activity will have students watch a brief segment (~ five minutes) and then provide students with an opportunity to reflect on what they have seen.

The final activity for the session will ask students to create what they consider to be an ethical framework for community engagement abroad. Using active learning techniques, such as "think-pair-share", students will identify critical elements of their own code of ethics. Once this is developed, small groups will compare and contrast their work with the [Volunteer Code of Conduct](#) provided by EWB-USA.

[Engineers Without Borders Introductory Meeting Slides](#)

## **Flint Drinking Water Contamination Lesson Plan**

Dr. Mark Kennedy of the University of Portland Shiley School of Engineering and his colleagues presented an active learning exercise (75 minutes in length) that would incorporate ethics in an environmental engineering course. This exercise involves role-playing and a jigsaw approach for small group discussions. Students are asked to analyze a current environmental crisis for ethical considerations from multiple stakeholder views, after reading several media accounts, peer-reviewed papers, and professional codes of ethics. This scenario focuses on decision-makers related to technical (i.e. design, management and operational) aspects of the water supply system to highlight the application of professional codes of ethics associated with their engineering or financial roles. The instructor would have flexibility in identifying stakeholders/roles, moderation of group discussions, setting group size, and selecting pre-class reading assignments.

[Flint Ethics Exercise Slides](#)

# Peer Teaching Workshop on Moral Imagination

Dr. Yosef Jalali, Ellen Johnson and Dr. Mahmoud Al-Quzwini took a different approach and developed a lesson plan and envisioned a faculty group that is already using case studies in their teaching, but not pushing through to the importance of moral imagination. The team developed a lesson plan that focused on using a fictional work to identify moral imagination opportunities with other STEM cases. The team chose to use Ursula Le Guin's *The Ones Who Walk Away from Omelas* as the example and offered some suggestions for facilitating the discussion. The goal is to provide the audience with a platform in which they can imagine different ways to incorporate learning modules for the purpose of provoking imaginal capacity in teaching of ethics in their field.

[Peer Teaching Workshop on Case Studies and Moral Imagination Slides](#)

[Introductory Paper by Dr. Yosef Jalai, "Ethics Instruction and the Role of Liberatory Praxis and Theory"](#)

[Full-text of "The Ones Who Walk Away from Omelas" by Ursula Le Guin](#)

## Bias in Facial Recognition Lesson Plan

Dr. Ani Nenkova of the University of Pennsylvania Computer and Information Science Department presented her team's lesson plan, which sought to introduce students to issues of bias in facial recognition algorithms. Students, either individually, in pairs or groups, would analyze a simple scenario where a company has developed a facial recognition algorithm that works well overall but occasionally fails. The groups are asked to identify which failure scenario might be the most problematic and discuss it among their group. In the second scenario, the students are given a scenario where they are the technical advisor to a police unit and are asked to choose between different providers of facial recognition technology and a recommendation if they should deploy it. Following this, the students are asked to begin to devise a plan on how to test the systems and criteria for deciding if the system is ready for deployment.

[Bias in Facial Recognition Algorithms Lesson Plan](#)

[Penn Engineering CIS 400 Senior Project - Fall 2019](#)

*Link to a website describing the CIS 400 capstone senior project which includes the student team considering the legal, ethical and financial implications of decisions in their project.*

## **Conflict of Interest Lesson Plan for a Large Course**

Sam Snyder, a pre-doctoral graduate student at the Virginia Polytechnic Institute and State University, shared his group's lesson plan aimed at introducing a large class of around 200 engineering majors to the concept of conflicts of interest. The purpose of this brief presentation was to describe how a conflict of interest might be discussed in an engineering classroom with non-ideal conditions. The pre-class assignment would be to read a few short new articles of examples of conflict of interest. In class, we would begin with a discussion of what a conflict of interest is and what students learned from the readings so as to get everyone on the same page. After this Think-Pair-Share, the teacher would then give a short discussion on what a conflict of interest was, how it is important to the engineering field, and how it applies to codes of ethics. After this, the group discussed the inclusion of three activities, from discussing case studies through clicker questions, watching and analyzing a prerecorded role play or short film, and using the Frayer model. The goal of all of these activities would be to take their initial understanding of the concepts of conflict of interest, disclosure, and codes of ethics, and apply them to various scenarios to determine how well they understand the material. The Frayer Model at the end of the class tests students' ability to retain the core knowledge of the lecture of what a COI is and what various examples and non-examples look like.

[Conflicts of Interest Slides](#)

[Conflict of Interest Bibliography](#)

### **Resource Type**

Instructor Materials

### **Topics**

Pedagogical Approaches  
Goals of Ethics Education  
Ethical Decision-Making  
Case Study Method

**Discipline(s)**

Engineering  
Computer, Math, and Physical Sciences  
Teaching Ethics in STEM