



Online Ethics Center  
FOR ENGINEERING AND SCIENCE

# A Global Context for Reflective Practice in Engineering and Technology Ethics

## Author(s)

William Marcy  
Roman Taraban

## Description

The EthicalEngineer project brings together multiple academic institutions and organizations to discuss the ethical practice of engineering in an international environment. The focus of this project is a website dedicated to engineering undergraduates with the goal of providing students with a global portal through which they can share their comments on engineering dilemmas. The OEC Project Pages are intended to cultivate a community of practice and allow ethics researchers, educators, and practitioners to more effectively disseminate their work.

## Abstract

The OEC Project Pages are intended to cultivate a community of practice and allow ethics researchers, educators, and practitioners to more effectively disseminate their work. This Project Page provides a detailed overview and relevant resources for an on-going science or engineering ethics project. Once you've explored this project, visit the "Projects" section under "Resources" to see more ethics projects.

## Body

# Description

The EthicalEngineer project brings together multiple academic institutions and organizations to discuss the ethical practice of engineering in an international environment. The focus of this project is a website dedicated to engineering undergraduates (EthicalEngineer.ttu.edu). The goal of the website is to provide students with a global portal through which they can share their comments on engineering dilemmas. Current dilemmas were composed by colleagues at Texas Tech, London Churchill College, and Amity University- Kolkata, India. Web analytics show active participation by students in the U.S. and abroad. Archival comments are accessible on the website.

## Project Background

The EthicalEngineer project was developed in response to a call from the Center for Global Communications (CGC) at Texas Tech to improve students' global awareness and communication skills with audiences here and abroad. With support from the CGC, we began work on the EthicalEngineer project in May 2017. Our project is structured around issues in engineering ethics. Engineering ethics draws on the moral principles of numerous theories of morality, and translates these principles into codes of behavior for professional engineers based on their obligations to clients and to the profession. The moral theories on which EthicalEngineer draws include utilitarianism, virtue ethics, and respect for persons. The primary professional code for engineers is the National Society for Professional Engineers (NSPE) code, which is also included in EthicalEngineer. Engineering ethics is a rich and active area of discussion and development among engineering educators in the U.S. University engineering programs in the U.S. must include ethics instruction in order to receive accreditation from the national accrediting agency, ABET. A major channel for the presentation of new ethics curricula, instructional methods, and theory is the annual conference of the American Society for Engineering Education (ASEE).

## Project Personnel

The primary project personnel are Dr. William Marcy (College of Engineering) and Dr. Roman Taraban (Department of Psychological Sciences, College of Arts & Sciences). Dr. Sukant Misra provides support for the project through the Office of International Affairs. Dr. Shiva Prasad, Professor, Department Humanities and Management, Manipal Institute of Technology, Karnataka, India, serves on the Advisory Board, and Dr. Serhii Zasiakin, Associate Professor, Department of Applied Linguistics, Lesya Ukrainka East European National University, Lutsk, Ukraine, also serves in an advisory role. Texas Tech currently has Letters of Understanding with Manipal Institute of Technology and Lesya Ukrainka East European National University based on the EthicalEngineer project.

## **Overall Goals of the EthicalEngineer Project**

The primary goal of the EthicalEngineer project is to link Texas Tech engineering students with peers in India, Ukraine, and other partnering countries, through shared exchanges on topics of ethics in engineering and technology applications. More specific goals are to improve undergraduate education in the area of global communication, to involve large numbers of students, to exploit current technology in creative ways, and to raise the visibility of supporting institutions in promoting the development of ethical sensibilities in students. The Texas Tech course ENGR 2392 Engineering Ethics & Impact on Society, led by Dr. William Marcy, and the website <https://EthicalEngineer.ttu.edu> are the primary channels through which this project is being developed and implemented. The project combines traditional pedagogical theory with cutting-edge instructional and assessment technology. Our intent is to internationalize the curriculum of this course and provide an interface for Texas Tech students to learn about and benefit from cultural differences associated with ethical thinking. The website home page is shown in Figure 1.

Figure 1. Website Home Page

Image

## Welcome to the Ethical Engineer

The Ethical Engineer brings together multiple academic institutions and organizations to discuss the ethical practice of engineering in an international environment.

If you are interested in contributing a Case Study or Featured Article, please contact Dr. Roman Tarboan (roman.tarboan@ttu.edu) or Dr. William Marcy (william.marcy@ttu.edu).

## Submit a Comment

As you read and analyze case studies your reflective comments are invited on some or all of the following. As part of your analysis include information on the stakeholders and how they are impacted both positively and negatively.

1. What knowledge and skills are needed to implement sophisticated, appropriate and workable solutions to the complex global problems facing the world today?
2. What interdisciplinary perspectives would help identify innovative and non-obvious solutions?
3. What regions can you articulate, based your culture and other cultures with which you are familiar, to help understand your worldview and enable greater civic engagement?
4. What is your position on the right thing(s) to do?

To submit a comment, you must register as a Member. To become a member, simply click on Sign Up in the upper right corner of the screen.

There is a comment box at the end of each article. Reflect on the ethical issues in an article in a 200-500 word response. Try to organize and structure your response – don't worry about spelling or grammar.

## Index: Case Studies

Title	Contributor	Institution	Country
-------	-------------	-------------	---------

## Supporting Institutions



Three case studies are currently posted to the Ethical Engineer website. These were updated in Fall 2018. The cases are: “Which Is More Important – Environmental Concern or Economic Growth?” by Sudipta Majumdar, Ph.D. (Amity University, India), “Outsourcing Manufacturing to Developing Countries” by William Marcy (Texas Tech University, U.S.), and “Bhopal Gas Tragedy” by Rhyddhi Chakraborty (London Churchill College, UK). In the instructions on the website, students are invited to contribute reflections that address four areas related to global ethics: stakeholders, knowledge and skills, interdisciplinary perspectives, and cultural insights. They are also asked to express their personal position on the issues described in the case study. Website participants post their reflections on these case studies under a pseudonym, although their country of origin appears with the post. In this way the identity of contributors is masked, but their country is not, the latter being important towards achieving the goal of expanding students’ knowledge and appreciation of cultural similarities and differences.

# Invitation to Participate and Collaborate

The EthicalEngineer project has two related research goals, one that involves applied research and one that involves basic research. We invite you to participate with us in one or both of these goals.

The applied goal is related to the ethical development of undergraduate students. We are currently focusing on engineering students, but we are open to working with

students in other majors as well. The most visible part of this work can be found at the EthicalEngineer website, and consists of comments that students submit to the case studies posted on the website. In addition to those comments, we develop and administer brief essay assignments to students enrolled in Dr. Marcy's class. For instance, recently, we asked students to write a brief essay on their perceptions of the attitudes and behaviors of ethical engineers. We assigned and collected these essays at the beginning and end of the course in order to assess changes in students' knowledge and beliefs.

The website and class assignments provide qualitative data related to students' ethical knowledge and beliefs. As part of our basic research we are applying various machine-based tools in order to develop quantitative models of students' mental representations. At present, these analyses involve naïve Bayesian approaches and Latent Dirichlet Allocation.

From the outset, we have been committed to involving students from other countries in order to enrich the exchange of ideas from a variety of cultural perspectives. Because of current globalization in all areas of engineering and technology, there is the possibility of significant mutual benefit from connecting students from diverse cultures and ethical orientations, and in mutual academic collaboration and cooperation toward shared goals.

By way of brief outline, there are several ways for faculty to further mutual relationships:

1. Recruit students in an ad hoc manner to participate on the EthicalEngineer website
2. Engage students in the website through an organized course, like an ethics course through Philosophy, Humanities, or Engineering
3. Work together to develop new website and class activities for students
4. Work together to analyze and interpret student data
5. Present our work at conferences and through journal publications

We are currently publishing the applied and basic work in various engineering education outlets, and are presenting this work at national and regional conferences. We would be happy to share copies of our most recent work and to discuss ideas for further developing collaborative projects. Contact Roman Taraban (roman.taraban@ttu.edu) to initiate a project.

# Leadership

Roman Taraban, PhD  
Department of Psychological Sciences  
College of Arts & Sciences  
Texas Tech University

William M. Marcy, PhD, PE  
Murdough Center for Engineering Professionalism  
Edward E. Whitacre College of Engineering  
Texas Tech University

Sukant Misra, PhD  
Office of International Affairs  
Texas Tech University

# Funding

Texas Tech University Center for Global Communications

# Recipient Organization

Texas Tech University College of Arts & Sciences, Edward E. Whitacre College of Engineering, and Office of International Affairs

# Start and End Dates

May 2017 - ongoing

# Contact Information

Roman Taraban (roman.taraban@ttu.edu)

# Relevant Links

Ethical Engineer Website: <http://EthicalEngineer.ttu.edu>

## Publications, Presentations, and Other Products

1. Taraban, R., Marcy, W. M., Koduru, L., Schumacher, J., & Iserman, M. (accepted). Using machine tools to analyze changes in students' ethical thinking. *Proceedings of the American Society of Engineering Education (ASEE) Annual Conference*, Tampa, FL.
2. Mcgallian, J., Taraban, R., Marcy, W. M. (2019). Teaching engineering ethics using interactive computer scenarios. *Proceedings of the American Society of Engineering Education - Gulf Southwest (ASEE-GSW) Annual Conference*, Tyler, TX.
3. Taraban, R., Marcy, W. M. (2018a). Using technology to develop ethical choice in engineering students. *Proceedings of the American Society of Engineering Education -Gulf Southwest (ASEE-GSW) Annual Conference*, Austin, TX.
4. Taraban, R., Marcy, W. M. (2018b). Tools to assist with collection and analysis of ethical reflections of engineering students. *Proceedings of the American Society of Engineering Education (ASEE) Annual Conference*, Salt Lake City, UT.
5. Taraban, R., Marcy, W. M., LaCour, M. S., Pashley, D., & Keim, K. (2018). Do engineering students learn ethics from an ethics course? *Proceedings of the American Society of Engineering Education -Gulf Southwest (ASEE-GSW) Annual Conference*, Austin, TX.
6. Taraban, R., Marcy, W. M., LaCour Jr., M. S., & Burgess II, R. A. (2017). Developing machine-assisted analysis of engineering students' ethics course assignments. *Proceedings of the American Society of Engineering Education (ASEE) Annual Conference*, Columbus, OH.

### Rights

Use of Materials on the OEC

### Resource Type

Projects

## **Parent Collection**

STEM Ethics Projects (2017-Present)

### **Discipline(s)**

International Perspectives

Teaching Ethics in STEM