

# Panel - Ethics in modern universities of technology

## Challenges of the 21<sup>st</sup> century

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**Keywords—academic industry collaborations, engineering ethics education**

**Abstract -** The challenges of the 21<sup>st</sup> century will fully reflect on universities of technology. The world population is growing while we pursue higher levels of global well-being. The increasing energy demands and the resulting problems of climate change will be only two of the many major challenges humanity is facing in this century. Indeed, universities of technologies have an essential role to play in meeting these challenges by generating scientific knowledge, achieving technological breakthroughs and educating scientists and engineers to think and work for the public good.

A forthcoming Special Issue of *Science and Engineering Ethics* [1] will address some of the ethical issues that arise for institutions of higher education in the field of engineering and applied science. Several contributors to this Special Issue are invited to discuss two main issues: namely i) academic industry collaborations and ii) teaching engineering ethics.

## I. ACADEMIC INDUSTRY COLLABORATION

It has been argued that an important indicator for measuring social relevance is the willingness of industry to invest in research. In many countries, there is an upsurge in government policies aimed at encouraging academic-industry

collaborations. Universities are expected to facilitate *knowledge transfer* to industry, by means of systematic collaborations. The main idea behind these policies is that research in which industry is willing to invest is marketable and, hence, socially relevant. A university's research income - especially for universities of technology - will increasingly depend on these collaborations. This raises the question of how to design and implement institutional arrangements in order to anticipate and deal with potential conflicts of interest that might occur, and the effects these could have on the independence of scientific judgment. In addition, the fact that more scientists will be working in academia and industry could raise intricate ethical questions. The first talk will be about the latter issue.

### *A. The Janus-faced Nature of University-Industry Co-operations: The Case of Academics Working at Universities of Technology*

Speakers: Rafaela Hillerbrand and Claudia Werker

In the applied sciences and in engineering there is often a significant overlap between academic research and industry. For the individual scholar, this may lead to serious conflicts when (s)he is working on joint university-industry projects.

Differences in goals, such as universities aiming at disseminating knowledge while industry aiming at appropriating knowledge, might lead to multifaceted situations. When looking at scholars getting involved with industry it is important to clearly distinguish academic engagement from commercialization.

In order to identify potential conflicts academics engaging both in academia and industry face we use an inductive approach. Based on qualitative interviews with engineers and architects at universities of technology, we aim to identify the hot spots of value conflicts for the individual scholar. The Janus-faced nature of engagement of university researchers with industry is argued to be best addressed in terms of value. A design-for-value perspective is developed for the specific requirements to analyze university-industry collaborations. Major differences to common design for value approaches are that here the research process is of more importance and that non-moral values need to be taken into consideration. Building on this theoretical framework, we identify various value-conflicts and show how making value conflicts apparent may improve the decisions of individual researchers in the light of the Janus-faced nature of university-industry cooperation.

Theoretically, we will enhance the value-sensitive design (VSD) approach by focusing on the values industry and university may have. This allows, amongst others, to incorporate also epistemic values in a VSD approach. We aim to show how possible conflicts between values of universities and of industry may be resolved.

## II. TEACHING ENGINEERING ETHICS

Modern universities of Technology aims at educating a new generation of engineers that is well-equipped to deal with the future challenges that mankind faces, while observing the highest standards of academic conduct and research ethics. The two following contributions report on endeavours for teaching engineering ethics at universities of technology.

### A. Teaching engineering ethics to PhD students: a Berkeley-Delft initiative

Speakers: Mary Sunderland and Behnam Taebi

Ethics is recognized as a part of the engineering curriculum, but students usually perceive ethics as a list of rules and codes rather than as a potential source of innovative research material. This perception is prevalent at both the undergraduate and graduate levels, but institutional constraints make it exceedingly difficult to engage engineering graduate students in ethics work. The importance of doing so, however, continues to grow. With these challenges in mind, we developed a new graduate program, *Global Perspectives: Engineering Ethics Across International and Academic*

*Borders*. The program's design builds on the engaged-STS scholarship that seeks to develop strategies to make science and engineering more aware of its larger socio-ethical contexts. Much of the engaged-STS scholarship centers on intervention-oriented research with a theoretical focus on questions of public engagement. This paper shifts the theoretical focus from public engagement to student engagement by bringing together scholarship from education, in particular, student voice theory, with STS scholarship. Student voice theory is introduced as a way to frame students as active agents in educational reform. The paper offers a preliminary analysis of the program's initial offering at the University of California, Berkeley in collaboration with Delft University of Technology, and outlines techniques for building student-centered communities that are committed to responsible research and innovation.

### B. Ethics 'upfront': generating an organizational framework for a new university of technology

Speakers: Penelope Engel-Hills, Christine Winberg and Arie Rip

A powerful set of projections has constructed post-apartheid higher education in South Africa. Among these is the expectation that technikons (institutions similar to the British polytechnics) would become universities of technology, with a mission to drive the technology of national reconstruction and development. The five South African universities of technology are still under construction, trying to identify their institutional 'distinctiveness', including the types of undergraduate and postgraduate qualifications they will offer and the research centers they will support. In this paper, we use one of the new universities of technology as a case study in which we explore ethical issues in how the university manages itself. We are inspired by the future scripting methods developed by De Laat [2] and Den Boer, Rip and Speller [3] to sketch broad scenarios of possible futures for the new university. Through these scenarios we consider the ethical issues that emerge in how the university of technology organizes itself implied in the different 'futures'. This allows conclusions to be drawn with regard to a management structure that is hierarchical and entrenches compliance or one that enables mutual appreciation and allows for ethical leaders to emerge within the new university of technology.

## References

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