# CAN WE BUILD A BRIDGE BETWEEN PHILOSOPHY AND ENGINEERING?[1]

**Ovidiu CARAIANI[2]**

**ABSTRACT:**
*IF PHILOSOPHY AND ENGINEERING ARE REGARDED AS (APPARENTLY) INCOMMENSURABLE PARADIGMS WE CAN MAKE THEM COMPATIBLE BY ANALYZING THEIR BASIC ASSUMPTIONS MADE IN DIFFERENT THEORETICAL AND PRACTICAL CONTEXTS. AND THUS, THE BUILDING OF OUR BRIDGE DEPENDS ON HOW WE SEE THE WORLD, AS AN UNIVERSAL OR A FRAGMENTED ONE? THE CENTRAL CLAIM OF THIS PRESENTATION IS THAT BY ADOPTING THE PRINCIPLE OF A "THIN UNIVERSALISM" WE CAN CREATE A COMMON GROUND FOR PHILOSOPHERS AND ENGINEERS TO SUSTAIN COHERENTLY THEIR ARGUMENTS. AND THUS THE BUILDING OF A THEORETICAL BRIDGE WOULD INVOLVE THE EXERCISE OF OUR PRACTICAL REASON BY WHICH WE GAIN COMMON SENSE AND REASONABILITY.*

**KEY WORDS:** PARADIGM, ASSUMPTIONS, THIN UNIVERSALISM, PRACTICAL REASON, THEORETICAL BRIDGE.

## INTRODUCTION

For most people, engineering and philosophy has not too much in common. Engineers could build a bridge without philosophical knowledge. But can philosophers build a "theoretical" bridge between (apparently) incommensurable paradigms? The central claim of this presentation is that philosophy, and also humanities and social sciences, has a double-task in engineering education:

a) to provide tools for conceptual clarification and for a better understanding of our multiple social engagements in a plural world;

b) to contribute to the decisions regarding internal or ethical and professional issues of engineering design.

## A BRIDGE BETWEEN PHILOSOPHY AND ENGINEERING

The study of epistemology and philosophy of science would point out that the source of our misunderstandings about the nature and objectives of scientific knowledge rests upon different theoretical presuppositions we assume when taking about science, truth or reality. The reconstruction of these assumptions, and of some historical debates Kuhn vs. Popper or

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[2] Associate Professor, University POLITEHNICA of Bucharest, ROMANIA

Bohr vs. Einstein, would improve students ability to use the proper meaning of the concepts and to shape their arguments and research interests. Could we give a more consistent account of virtual reality by using the distinction between nature and convention in Greek philosophy? Is Kant's view on a priori conditions of experience useful for understanding the role of experimental conditions in quantum mechanics? But the reconstruction of various philosophical, theoretical and cultural assumptions made in different historical contexts is also important for explaining and understanding social practices and political ideas which necessarily involve evaluation. Are there differing criteria of rationality? How can we understand beliefs, practices and personal projects of the others without recourse to our own assumption about what is rational? Is then possible to establish a set of minimum conditions, or thin universalism, for a reasonable public space of reciprocity and mutual respect?

At this point, humanities and social sciences play an important role for a critical judgment and evaluation of our complex social arrangements and social responsibility in a global world (figure 1).

As citizens we are making immense demands on one another. These cannot be idly undertaken or easily dispatched. Our personal projects and preferences will have to be compatible with the projects and preferences of (relevant) others. Our attention will necessarily have to be focused on ways of co-operating rather than on specific objectives. Why we should accept the burden of mutual restraint is a matter that must be settled discursively.

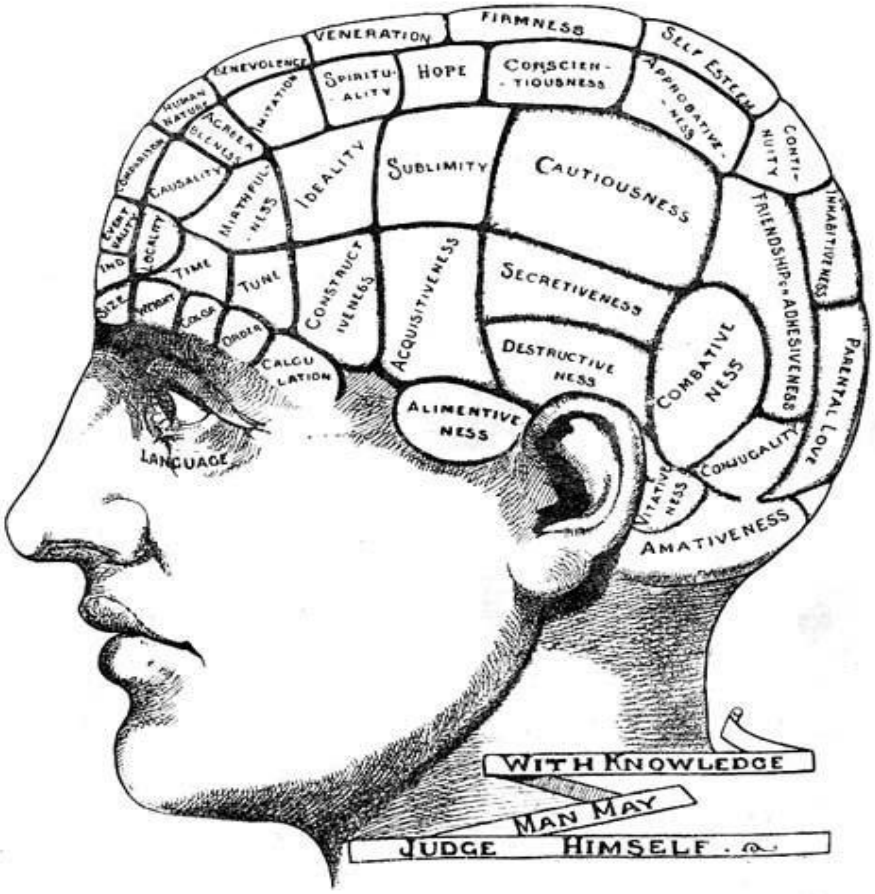


***Figure 1*** *Complex social arrangements and social responsibility in a global world*[3]

[3] *** http://i.dailymail.co.uk/i/pix/2008/04/17/article-1015690-00F34D7100000578-713_468x540.jpg

The study of social sciences is thus relevant for assessing that social cooperation is the only way for realizing our human capacities and practical nature as free and equal moral persons.

What kind of ethical choice is involved in engineering design? Most engineers think that ethical issues refer to human rights or to the good of our life. Others would think that is not ethical to produce parts or components in countries where children labor is exploited.

But professional ethical issues are questions of safety, risk, liability, privacy, environmental protection which cannot be solved with engineering methods. Philosophy (especially ethics) is an internal need for engineering in designing decisions. The main target is to establish a normative framework which contains all obligations given by political regulation and obligations resulting from technical codes and standards and codes of ethics[4]. This normative framework involves an engagement to competitive moral values (for example, utilitarianism, perfectionism or human rights) which would shape practical argument and choices.

Let us briefly examine the criteria of accreditation for engineering education in US. According to the American organization called Accreditation Board for Engineering and Technology (ABET) engineering programs require a minimum of:

a) one year of mathematics and basic sciences.
b) one half year of humanities and social sciences
c) one and half year of engineering topics.

If we add 'skills', competence in written and oral communications, associated with liberal arts, the ABET require students to complete one year of humanities study. These requirements are necessary to meet the objectives of a broad education but also to make engineers fully aware of their social responsibilities so to take into account related factors in the decision-making process[5].

## CONCLUSION

How philosophers and engineers are seeing the world depend upon the values and preferences made in specific circumstances. In building our identities we have to take into account our complex moral, social and practical engagements which shape these identities. According to Clifford GEERTZ we live in a "world in pieces" which involves the radical contingency of our judgments, but this contingency is not an obstacle for our understanding and agreement[6]. Recognizing the principle of a"thin universalism" would define the intelligibility of each context.

[4] Armin GRUNWALD, "Against Over-estimating the Role of Ethics in Technology Development", Science and Engineering Ethics, 6 (2), 2000, 181-196

[5] Carl MITHCHAM, 'The Importance of Philosophy to Engineering', Teorema, vol. XVII/3, 1998, 31-32

[6] Clifford GEERTZ, "The World in Pieces: Culture and Politics at the End of the Century", in his Available Light: Anthropological Reflections on Philosophical Topics Princeton, Princeton University Press, 2000, pp. 218-63

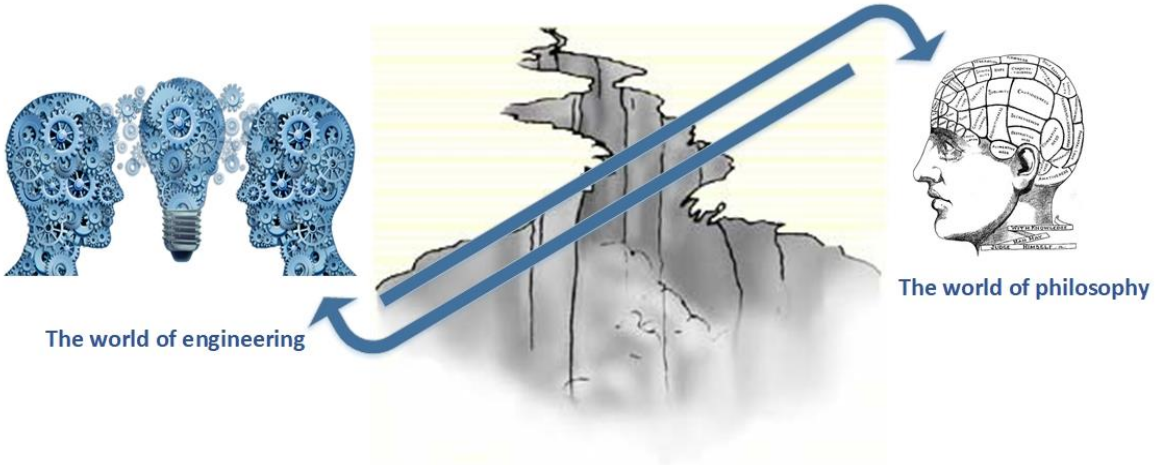


***Figure 2.*** *The bridge between Philosophy and Engineering*

Between Philosophers and engineers should be established a common ground in order to express coherently their arguments (Figure 2). Our practical reason is not a simple floating entity arbitrating neutral between various claims and identities. Far from being just an expression of our rationalized interests, is an exercise by which we gain common sense and reasonability.

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