

# Design in Engineering and Architecture

## Towards an Integrated Philosophical Understanding

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### 1 Introduction

The present collection of essays provides an overview of current work by philosophers and ethicists on the design process and its products. We have collected a group of essays on topics which are not usually considered together. The volume contains essays on engineering and architecture, focusing on a broad spectrum of items, ranging from cars to software, from nano-particles to cities, and from buildings to human beings. As such the volume trades on the ambiguous meaning inherent in the general term “design” which we will consider in the broadest sense of “changing existing situations into preferred ones.”<sup>1</sup> By bringing these diverse essays together, current thinking about design can be presented in all its facets, permitting us to consider the broad category of design, despite its different meanings, as an activity with a common root.

One of the conclusions which can be gleaned from these essays is that new developments in engineering allow for a more integrated understanding of engineering and architectural design, two areas of design which may have been thought to be too far apart to be comparable. But in these chapters engineering is presented as an activity that is not merely concerned with composing material products. Due to the emergence of new technological capabilities and the growth in demands that society puts on the implementations of technology, engineers are forced to consider how the material products they create interact with human agents. For philosophers and ethicists this is a familiar observation. Philosophy of technology, emerging after World War II as an independent field, first concerned with the social impacts of technology, and now more robustly directed toward the

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<sup>1</sup>Simon (1972, 55).

empirical dimensions of the metaphysics and epistemology of specific technologies, has always been focused on the ways in which technology shapes individual human lives and a range of social institutions.<sup>2</sup> This focus has now been extended to the analysis of engineering design itself. Engineering design is identified as a process in which technologies materialize into products, and thus as a process that substantively shapes and reshapes our lives and our societies. The essays in this volume on engineering design in the classical “nuts-and-bolts” sense provide more examples of this phenomenon. In the essays on design in the new emerging technologies, this focus on shaping lives and society becomes even more visible. To take just one example, the convergence of informatics and genetic engineering raise questions not only about the relationship of humans to each other but also about our understanding of what it means to be human.

If these developments of emerging technologies reveal thoroughgoing moral and social dimensions of engineering in general, what follows? No doubt, many things. We will focus here on how these developments push a more robust description of engineering design toward a more accepted description of architectural design. If the gap between these two forms of design can be bridged, then we are on our way to an understanding of a more integrated philosophy of design.

To help to frame the discussion which follows, take for example the growing interest in the design of *socio-technical systems*. Even older forms of these systems, such as the electrical power grid, consisted of material hardware and human agents as an integrated component for the operation of that hardware. Though more recent developments such as cellular telephone networks may not yet represent a difference in kind of system from these older systems, they certainly compound the social dimensions of those systems to an impressive degree.<sup>3</sup> We would argue that a fully responsible design of such systems necessarily requires engineers to pay attention to the human agents and to the social institutions they inhabit, inclusive of technical manuals, company regulations, national or international law, and the larger framework of social capital implied by the production of such systems. The interest of engineers in designing these complexes of hardware and social institutions bring us to architecture. Our contention is that the growing complexity of engineering design reduces the distinction between it and design in architecture. Architects that design our buildings and living environments have been consciously influencing the interaction and social organization of human beings at least since the late 19<sup>th</sup> century. Their works, and the history of their enterprises, are thus immediately relevant to engineering as it is developing today. In that context this volume seeks to provide an overview of current philosophical and ethical work on design by bridging the literature on design in engineering and architecture. It also provides the means to help practitioners and

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<sup>2</sup>See for example several recent anthologies which have come out on philosophy of technology including, Kaplan (2004), Katz, Light, and Thompson (2003), and Scharff and Dusek (2002). A thorough history of philosophy of technology is found in Mitcham (1994). For the recent analytic turn in philosophy of technology see Pitt (2000), Baird (2004), and Kroes and Meijers (2006).

<sup>3</sup>Biometric markers in cell phones may greatly magnify the social dimensions of these systems to create a difference in kind from older technologies. See McGee (2003).