Yakov Ben-Haim, The innovative engineer: Qualitative reasoning in response to uncertainty, in the book *The Engineer with a Humanistic Soul. The place and role of humanistic issues in technological discourse,* edited by Krzysztof Baranowski, to appear.

Abstract   An innovative engineer seeks new and better solutions to current problems, or even constructive and beneficial disruption of existing norms. However, not all engineering innovation is universally beneficial, therefore engineers must incorporate ethical and social values in their analysis and design. Furthermore, such an engineer needs artistic creativity in order to achieve this innovative ideal. The ethical and artistic elements of technological innovation require modes of reasoning that are fundamentally distinct from the modes of thought in science, mathematics and engineering that comprise most engineering education. Finally, the focus of this paper is that the engineer must understand and responsibly respond to the uncertainty that is inherent in disruptive technological innovation. To change the way people live and think about themselves and their world is a fine ideal, however it is very difficult to predict how those changes will actually develop. Some technological innovations emerge gradually, while others develop rapidly and deliberately. Awareness and management of uncertain outcomes of technological innovation is part of an innovative engineer's responsibility. We use info-gap decision theory to develop modes of engineering thought for modeling and managing both the propitious and the pernicious uncertainties in technological innovation.