Fritz Allhoff and Patrick Lin, eds. *Nanotechnology & Society: Current and Emerging Ethical Issues.* Xxxiv + 200 pp. New York, NY: Springer, 2008.

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Nanotechnology & Society is the second anthology published by The Nanoethics Group (www.nanoethics.org) and is a welcome addition to the emerging field of nanoethics. Editors Fritz Allhoff (Western Michigan University) and Patrick Lin (California Polytechnic State) are among the leading philosophers in nanoethics and founders of The Nanoethics Group. While their first anthology, *Nanoethics: The Ethical and Social Implications of Nanotechnology* (2007, with editors James Moor and John Weckert), presented a general introduction to critical issues in nanoethics, in this new book Allhoff and Lin recognize nanotechnology's "strange schizophrenia"—as a brave new science filled with unlimited futuristic vision contrasted with the exaggerated hype of research progress—and strive to foster a solid foundation for nanoethics (p. xxi).

Between nanotechnology's speculative futuristic vision and its current research progress, there exists an epistemological gap that leaves plenty of room for ethical and social issues to be considered. Both the foreword by Jean-Pierre Dupuy and the editors' introduction emphasize the importance of scientific responsibility: science must be "forced to abandon its splendid isolation" (p. xi) from the community, and scientific uncertainty cannot relieve us from any moral obligation to investigate relevant issues. These themes and the need for a distinct disciplinary identity for nanotechnology and nanoethics echo throughout the anthology through a systematic collection of fifteen papers (original and reprinted) written by prominent scientists, philosophers, policy-makers, lawyers, and other scholars in the nanotech field, addressing some of the most relevant current and near-term issues facing nanotechnology.

The anthology is divided into five sections: Foundational Issues (Fritz Allhoff, Paul B. Thompson, Arthur Zucker); Risk and Regulation (Commission de l'Éthique de la Science et de la Technologie, David M. Berube, Thomas M. Powers); Industry and Policy (Ashley Shew, Jeroen van den Hoven, Drew L.

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Harris); The Human Condition (European Group on Ethics, Raj Bawa and Summer Johnson, Jason Scott Robert); and Global Issues (Todd F. Barker *et al*, Joachim Schummer, Evan S. Michelson and David Rejeski). The anthology limits itself to current and near-term issues, and some of the most pertinent contemporary concerns are given center stage—especially issues of human enhancement, toxicology, privacy, patents, risk and risk assessments, drug delivery systems, environment and energy, and politics.

Each of these papers provides a diverse vantage point, establishing a sense of the depth and variety of the issues at hand. The anthology is littered with differing but often overlapping definitions of nanotechnology and nanoethics, which while allowing each paper to stand on its own, lends weight to the argument that a clear disciplinary identity has yet to emerge. This point is best argued by Shew (Virginia Tech), who notes that while funding broadly defines what nanotechnology is, this type of forced (and abstract) identity will only lead to cynicism on the researchers' parts (p. 134). A distinct identity and a unified code of ethics is desired, Shew argues, for it is a useful way to create dialogue between members of the nanotech community to promote responsibility, especially as an "imperative for those working with the dangerous or unknown" (p. 136). Schummer (University of Darmstadt) also notes that there is no universal definition of nanotechnology—let alone nanoethics—and that this vaguely defined technology might shape the perception of ethical issues differently in different societies and communities (p. 266). In another sense, a unified identity will downplay any misinterpretation about the hard science of nanotechnology. Zucker (Ohio University), in recognizing nanoscience as a "breeding ground for a new kind of science" (p. 55), argues that scientists have a duty to clarify the public's hyped-up worries about nanotechnology; by doing so, scientists might insure their autonomy.

Yet Zucker also recognizes there is nothing "new" about the ethical problems raised by nanotechnology, only old philosophical questions revived. Allhoff and Lin also claim that no new ethical concerns are raised simply by asking old questions in new contexts. Allhoff, in particular, argues that while nanoethics may fail to identify novel ethical concerns, at least it raises ethical attention (p. 3), which can justifiably lead to a new dimension of applied ethics. However, his ostensible skepticism is *not* aimed at deterring any progress made in nanoethics, but rather at emphasizing that while ethical questions are important, they cannot impede the development of our empirical knowledge of nanotechnology and its impacts on industry and society. For me, this is a key point: how much can we really learn about nanotechnology's impact by ethics alone?

The question is perhaps best answered by van den Hoven (Delft University), who writes: "One of the problems with nano-ethics is that it is concerned with problems of future and speculative applications of nano-science.

In the first decade of the twenty-first century we still have very few examples of widely used nanotechnology. It is difficult to start a process of reflection on the social and ethical implications of new technology at the early stages of its development" (p. 147). Following the theme set out by the editors, van den Hoven redirects us to look at the hard science of nanotechnology and urges us to build our epistemic knowledge and *then* apply our ethical concerns. He does this by analyzing RFIDs (Radio Frequency Identity Chips) (p. 148), while Bawa and Johnson (Rensselaer Polytechnic Institute and Alden March Bioethics Institute, respectively) describe the role of pharmaceuticals in nanomedicine, and Barker *et al* analyse the role nanotechnology—as a "transformative technology"—can have on developing countries and the poor.

But is there anything really ethically novel about nanotechnology, or are we reading too much into the nano-hype, blinding ourselves with high expectations for the future? This is one of the many issues subtly touched upon in the anthology, but mostly set aside for later discussions. *Nanotechnology & Society* focuses mainly on issues of identity and epistemology, and does leave out some important ethical and social concerns. However, this book would make an excellent source for any introductory course in nanoethics, or at least an intriguing read for anyone wishing to indulge their curiosity about emerging issues in nanoethics and nanotechnology.

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