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Review of Nanoethics

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Review of *Nanoethics*

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Abstract

Nanoethics: The Ethical and Social Dimensions of Nanotechnology, is an anthology of essays on the political, ethical, and societal dimensions of nanoscale science and engineering. The collection explores a wide range of perspectives on the history of nanotechnology, risk issues, policy and public engagement issues, and the challenges of deliberating about and governing new and emerging technologies. Though uneven in quality and sparsely referenced, the collection nonetheless provides a fair and useful introduction to many of the key topics in the field of nanoethics.

Nanoethics: The Ethical and Social Dimensions of Nanotechnology, eds. Fritz Allhoff, Patrick Lin, James Moor, and John Weckert (Hoboken, NJ: Wiley Interscience, 2007). ISBN 978-0-470-08416-8 (cloth); ISBN 978-040-08417-5 (paper). US 89.95 (cloth); \$39.95 (paper).

Nanotechnology – or nanoscale science and engineering – exploits our understanding of matter at the nanoscale, roughly 1-100 nanometers. At this scale, the chemical and physical properties of matter vary quite dramatically than at larger scales; for instance, where a material may be brittle in bulk form, at the nanoscale this material may be exceptionally strong. Characterizing and controlling these properties at the nanoscale affords new opportunities for manufacturing and manipulation across many industries and sectors, including the potential for fundamental changes in agrifood, electronics, engineering, medicine, and national security. But at what cost will these changes be achieved – and at whose expense? Who will benefit – and who will not? How can research and development at the nanoscale be governed – if at all?

Nanoethics: The Ethical and Social Dimensions of Nanotechnology is a new collection of essays on these and related topics. As the editors of *Nanoethics* recognize, one cannot both proclaim the revolutionary prospects of nanotechnology from atomic force microscopy to zinc oxide nanoparticles and simultaneously disclaim the potential for nanotechnologies to impact our well being – individually, socially, economically, environmentally. Hence the value of exploring the moral and societal dimensions of nanotechnology. Indeed, even the United States Congress appears to recognize this point, too, as the Congress *mandated* such exploration as part of the enabling legislation for its significant nanotechnology investment, the *21st Century Nanotechnology Research and Development Act of 2003*. This legislation specifically required that “ethical, legal, environmental, and other appropriate societal concerns” be “considered during the development of nanotechnology”. These might include health and safety issues regarding the potential toxicity of nanoparticles, regulatory and intellectual property considerations, issues of equity and access to new developments, and prospects for enhancing intelligence, whether human or otherwise, beyond current limits.

To this end, Congress stipulated various mechanisms for addressing these issues, including adding societal-and-ethical-implications-of-nanotechnology (SEIN) projects to science and engineering research proposals, and establishing a separate research initiative for SEIN (an important mechanism affording somewhat more independence from particular nanotechnology research projects). One outcome of the latter has been the establishment of several National Science Foundation *Nanotechnology Science and Engineering Centers* focused on SEIN issues, the largest of which is at Arizona State University – the *Center for*

Nanotechnology in Society – of which I am a member. There are numerous other SEIN initiatives at the National Science Foundation and elsewhere, including several that predated the 2003 legislation, such that there is a small but growing cadre of SEIN scholars in the United States and internationally. Nanotechnology is on the agenda not only in the US; the European Union and Japan have strong research efforts in nanotechnology, as do Japan, Israel, South Korea, Germany, and the United Kingdom. In some jurisdictions, primarily the European Union and the United Kingdom, SEIN research is also underway, as are initiatives to include the citizenry in deliberation about the virtues and vices of nanotechnology research and development.

Nanoethics is an uneven collection – to be expected, one presumes, of any nascent field, but virtually guaranteed by the inclusion of an eclectic and international mix of disciplines and professions and simultaneously edited in four voices. A chief concern, though, is that many of the book's chapters are only sparsely referenced, leaving the reader with no sense that these topics connect with other literatures in ethics and science policy. I do not know whether this is because the authors themselves are unfamiliar with these literatures, or whether the problem stems from an increasingly common publisher's dictum that 'thou shalt minimize thy reference list'. This is, however, worrisome, as the collection cannot stand alone as an adequate introduction to the issues.

The 26 chapters of the book are loosely organized into 7 sections: an introduction to nanotechnology and nanoethics; an extended introduction to the history and current context of nanotechnology research and development; an overview of the challenges of ethical and societal deliberation about largely promissory technologies; issues of health, risk, and safety; policy and public engagement issues; broader social issues; and issues associated with the distant potential future of nanotechnology research and development. I found this organizational scheme lacking, inasmuch as some chapters seemed out of place in their section (or at least would have been more at home in another section), and also insofar as the criteria for distinguishing shorter-term from longer-term implications of nanotechnology seemed contrived for organizational rather than scholarly purposes. But the fairly comprehensive index, while not perfect, nonetheless helps the befuddled reader to navigate through the collection.

Some of the essays are bound to become staples of undergraduate curricula focused on science and society. Topics that are especially 'hot' in such courses, such as democracy and science, are well-covered in this collection. Especially valuable are Colin Farrelly's discussion of the need for and challenges of deliberative democracy, and Jack Stilgoe and James Wilsdon's delineation of lessons learned from British and international experiments in nanodemocracy. Farrelly, a Canadian political philosopher, articulates the desirability of an informed citizenry empowered to participate actively in the development of

regulations for nanotechnology research, development, and application. Stilgoe and Wilsdon work with Demos, a UK-based research institute for ‘everyday democracy’; here they provide generalizable insight into the why, who, how, what, and when of public engagement in nanoscale science and engineering.

Similarly engaging are the scattered chapters on human enhancement technologies, another ‘hot’ topic in science and society curricula. (For more on this topic, consult the first issue of *Studies in Ethics, Law, and Technology* devoted to human enhancement.) With regard to human enhancement technologies, heterogeneous religious and secular worldviews collide in more and less productive ways. Debates may get hung up on the particulars of imagined futures at the expense of actual values; where actual values do come into play, debates may nonetheless be hampered by dogmatism or derailed by unfair stereotypes. But several chapters in this book provide genuine insight into not only the issues but also the framing of the issues related to human enhancement technologies. Of special note is David Guston, John Parsi, and Justin Tosi’s analysis of enhancement from the perspective of democratic (rather than moral) values, affording a home for both secular and religious arguments about the anticipated benefits, risks, and governance of nanotechnologies for human enhancement.¹ Elsewhere in the collection, Daniel Moore offers several frameworks for addressing military uses of human enhancement technologies. With regard to clarifying, rather than framing, the debates, Ted Peters explores the complexities of the notion of ‘playing God’ in the context of human enhancement technologies, arguing that what matters morally is not transformative change itself, but whether such changes are conducive to (Christian) relationships with God. Another attempt to clarify the debates is made by Sebastian Sethe, who discusses themes of virtue, utility, and aesthetics with regard to life-extension nanotechnologies.

Beyond these few examples, there is much to commend *Nanoethics*. The rich variety of topics covered will leave readers primed for more. Despite some worries about organization and incomplete referencing, this collection is a useful contribution to the small but growing literature on the societal and ethical dimensions of nanotechnology.

¹ In the interest of transparency, I should disclose that Guston directs the NSF-funded Center for Nanotechnology in Society at Arizona State University, within which I am a theme leader, and that I am acknowledged in a footnote to this chapter.