Editorial: Nanotech Challenges, Part I (Techné)

Joachim Schummer
Editor of *Hyle*
Davis Baird
Editor of *Techné*

Some fifteen years ago, when the term "nanotechnology" was almost unknown, ideas about molecular manufacturing or "producing new materials at the nanometer scale" would clearly have been associated with synthetic chemistry or materials science. Nowadays, almost all of the natural and engineering sciences are engaged in nanotechnology, in some disciplines even as much as 10 percent. The rapid emergence and growth of nanotechnology across the disciplines, fuelled by visions of a new technological revolution and huge governmental funding, present many great challenges not only to scientists and engineers, but also to those whose profession is to reflect on science and technology and their place in society.

As the nanotechnology movement spreads across the disciplines and ignores classical boundaries, scholars in the humanities and social sciences are required to do likewise, which their institutions should not hinder. We can no longer afford to create our own disciplinary identities in correspondence to the disciplinary landscape of the 19th century or earlier, if we wish to reflect on current research. Particularly in areas such as nanotechnology, where the boundary between science and technologies increasingly blurs, philosophers of science and philosophers of technology need to cooperate.

With their particular audiences of philosophers of technology and philosophers of chemistry, respectively, *Techné* and *Hyle* have joint forces to address these challenges. Since we, the editors of these journals, believe that the two audiences share too much interest in this topic to go separate ways, we have decided to undertake the experiment of cooperatively editing a joint special issue. The overwhelming response to our Call for Papers [www.hyle.org/journal/issues/9-2/cfp_nano.htm] does not only support our decision, but also forces us to publish the special issue in two sequential parts in two issues of either journal. Thus, simultaneously with the current *Techné* issue (8.2), we publish a *Hyle* issue (10.2) [http://www.hyle.org/journal/issues/10-2/index.html] with five different but related papers, which together form the first part of *Nanotech Challenges*. In spring 2005, we will publish the second part divided up among *Techné* (8.3) and *Hyle* (11.1). Readers of *Techné* are strongly encouraged to read the

corresponding papers in *Hyle* [http://www.hyle.org] and vice versa, as they altogether form an editorial whole.

This issue of *Techné* includes five papers that address societal and ethical interactions of nanotechnology. Jochen Hennig documents the history of how data from probe microscopy—particularly scanning tunneling microscopy—has been presented as images of the nanoscale. He thus gives an instrumental inside view of how images of the nanoscale became what they are. Since these images have become the poster children of nanoscience, Hennig's contribution helps us understand how we—scientists and the broader publics—"see" and understand the nanoscale.

The four other contributions to this issue of *Techné* take the question of how we understand the nanoscale forward, each providing a different perspective on how the development of nanotechnology will interact with the broader societies in which it will find itself. Chris Toumey examines the role of hyperbole in the public understanding of nanotechnology; he draws lessons from previous technological developments—cold fusion and recombinant DNA—about how nanotechnology might be received in the future. Joachim Schummer provides an analysis of the different social groups that are involved in nanotechnology, including science fiction authors, scientists, science policy experts, business leaders, transhumanists, the media and publics, and cultural and social scientists. He examines how these different groups differently view societal and ethical issues raised by nanotechnology, and argues that the social dynamics of these groups could lead to a major anti-science backlash. Sven Ove Hansson provides a new analysis of how to think about the risks and benefits posed by nanotechnology. Instead of approaching this issue from standard probabilistic risk assessment, Hansson presents a way to assess arguments for the mere possibility of future harms or benefits. Finally, Jean-Pierre Dupuy and Alexei Grinbaum develop a metaphysical/epistemological analysis of how we can and should project nanotechnology and its societal and ethical interactions into the future. Foregoing both "forecasting" and "scenario analysis"—because, in different ways, both approaches ignore the interactive role of humans predicting and making our nanotechnological future—Dupuy and Grinbaum develop an alternative approach they call "prophecy" that builds the understanding and actions of "nano prophets" into the prediction/production of our nanotechnological future.

We may add that also the reflection on nanotechnology has both a past and a future. The past is well documented in an online bibliography [http://www.hyle.org/service/biblio/nano.htm], which among others includes another anthology that we have just edited together with Alfred Nordmann (*Discovering the Nanoscale*, IOS Press: Amsterdam, 2004). The near future will be found in *Nanotech Challenges, Part II*, in the forthcoming issues of *Techné* and *Hyle*.