



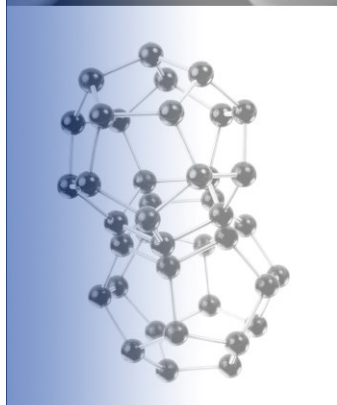
Fostering a Hybrid Imagination in Nanotechnology Education

Professor Andrew Jamison has recently become affiliated with Center for Bioethics and Nanoethics. It is the intention hereby to strengthen the collaboration between Aarhus University and Aalborg University. In this article Jamison and Mejlgaard give an overview of a recent project in nanotechnology education.

By Andrew Jamison & Niels Mejlgaard

Since the 1980s, there have been major efforts throughout the world to stimulate closer ties between universities and private companies, and while the subsequent commercialization of science and engineering has led to many new products, it has also brought with it a number of unintended and undesirable consequences. In particular, the broader social, environmental and ethical implications of science and engineering have tended to be bracketed out of the educational process.

As the contentions over genetic engineering, stem cells, global warming, and evolutionary theory have demonstrated, there is a lack of agreement in society about the value of scientific knowledge and a growing “backlash” against reason and rationality in general, and so it is crucially important that the relations between science, technology and society be given proper attention in the education of scientists and engineers. But instead of receiving instruction in the cultural implications of their particular scientific and technological field, the extra-curricular material that most students receive tends to revolve almost exclusively around marketing and what are often referred to as entrepreneurial skills, as if social concern can be met by salesmanship and public relations.



At Aalborg University, project work usually involves a scientific citizenship. contextual knowledge is a component part of the project work of all first year science and engineering students. We offer short courses and provide advisory assistance to the student groups, as they carry out their projects in the first and second semesters. The general ambition has been to add some non-

market analysis of the particular technical or scientific product that the students are learning how to make. A second approach provides a more academic, or professional understanding of contextual knowledge. The courses offer an introduction to philosophy and science and technology studies, and, in their project work, we have advised the students as to how they might address, and, at best, assess the cultural and/or ethical implications of their emerging field.

Workshop. September 24, 2009. CBN

Andrew Jamison and Niels Mejlgaard's contribution to this Newsletter is a brief version of a paper presented by Jamison at a workshop organized by the Center for Bioethics and Nanoethics September 24, 2009 at Aarhus University.

The workshop's general subject was 'The Nanoscientist's Moral Responsibility'. Besides Jamison, Kristian Hvidtfeldt (CBN) and Duncan Sutherland (iNANO) presented papers on 'Individual and Collective Responsibility for Nanotechnology' and 'Making Scientists Responsible?', respectively.

technical instruction into the technical/scientific curriculum in a way that fits the "Aalborg model" of problem- and project-based learning.

The most common approach, as at many other universities, aims to provide students with an understanding of the commercial conditions in their field, and the pro-

The projects that several of the groups carried out in the academic year, 2006-2007, combined an impressive understanding of the relevant scientific theories and experimental practice with insights derived from the social and human sciences. One group, which made solar cells that used nanoengi-

neered raspberry and spinach molecules to improve the electrical efficiency, combined an ambitious, and highly enterprising technical research activity with a serious exploration

of the climate change debate who are sometimes – and braces scientific competence and an assessment of the role sometimes not – well-informed and social responsibility. that their solar cells could play about the field of science and These examples of stu- in dealing with climate change. technical activities in question, dent project work in the The project is a good example but who are not themselves nanotechnology program at of the hybrid imagination in knowledge producers within Aalborg University show that it action. The students gained ex- the field. The nanotechnology is possible to combine contex- perience in working with scien- students’ surveys represent a tual knowledge with scientific/ tific laboratory equipment, as direct link between producers technical knowledge in a mean- well as in analyzing policy and (potential) users of nano- ingful and integrated fashion. documents. knowledge. Another result of Unfortunately, the science and engineering teachers in the nanotechnology program were not impressed, and they succeeded in removing the contextual knowledge advising from the second semester project work in the following year, 2007-2008. Whether it remains possible to foster the hybrid imagination among nanotech- nology students at Aalborg University is an open question.

Bioethics seminar. October 23, 2009. CBN

October 23, 2009 Center for Bioethics and Nanoethics organized a seminar with a view to interdisciplinary teaching of bioethical issues in the Danish gymnasium.

The seminar offered presentations on bioethics in general, environmental ethics, animal ethics, genetic testing and genetic enhancement. Moreover it included group work about teaching bioethics in the gymnasium. The seminar was attended by 55 teachers of biology, philosophy, religion and social science.

Two groups of students in their learning process was the our program investigated pub- development of a strong com- mitment to engaging in dia- nology in their project work. Nor- logue with lay citizens. By fos- mally, survey based research tering their hybrid imagination, on the public understanding of the students developed a kind science and technologies is per- of “scientific citizenship” formed by social scientists, which simultaneously em-

(Co-author, Niels Mejlgaard is affiliated with Center for Research Analysis and Research Policy (AU) and is doing a PhD on scientific citizenship with Jamison as supervisor. The article was first published in Prism, November 2009). ■

Nyhedsbrevet udgives af Center for Bioetik og Nanoetik ved Aarhus Universitet og udkommer flere gange årligt. Ansvarshavende redaktør for nyhedsbrevet er centerleder Ulrik B. Nissen. Indholdet i artiklerne er forfatterens ansvar. Abonner på nyhedsbrevet ved at sende en e-mail til bioetik@teo.au.dk eller brug den automatiske tilmelding på www.bioetik.au.dk.