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On Moral Grounds: Bioethics Training for Scientists

NATALIE DAWSON

The philosophical exploration of ethical concerns in the life sciences—"bioethics"—has focused largely on research protocols involving research subjects in medical studies. Now, however, the application of biotechnology to environmental problems is triggering ethical questions.

Today's scientists confront this question: "Can an understanding of climatic processes associated with global warming help us understand the sociological implications of how humans relate to the natural world?" They must also deal with other such questions that are outside the traditional framework of human/medical bioethics but pertinent to the growing interdisciplinary applications of the natural sciences to the solution of environmental problems. Holmes Rolston, at Colorado State University, says buzzwords in bioethics now include "sustainability, biodiversity, global warming, and intrinsic values in nature." What are the implications of these and other topics for training scientists in contemporary ethics for research outside human health and medical programs?

In 1998, UNESCO (United Nations Educational, Scientific and Cultural Organization) established the World Commission on Scientific Knowledge and Technology (COMEST) to "formulate, on a scientific basis, ethical principles that can shed light on the various choices and impacts occasioned by new advancements in scientific and technological fields." Topics of discussion at their November 2008 conference included the ethics of climate change, science outside of medicine, and nanotechnology, as well as the ethical dimensions of the information society. COMEST has also set up the Ethics Education Programme, which is focused on training teachers in bioethics; 108 of these teaching modules have been established around the world, although

none has yet been used in the United States.

The National Institutes of Health (NIH), through the Fogarty International Center, offers funding opportunities for organizations and institutions to expand graduate training in bioethics in developing countries. In November 2008, Indiana University was awarded a grant to partner with Moi University in Kenya to develop parallel master's degree programs in bioethics.

Independent of international funding efforts, individual universities and education groups are providing opportunities for bioethics training. The University of Verona, Italy, offers a bioethics course for graduate students enrolled in agricultural biotechnology. The UK science syllabus dictating curriculum requirements for students ages 11 to 18 now includes a bioethics training component. UK policymakers recently established two programs—the Bioethics Education Project and the Physics and Ethics Education Project—to train teachers to teach ethics in the sciences.

Within the United States, several organizations focus on bioethics in human medicine, but fewer organizations and institutional frameworks exist to address ethical concerns outside the health sciences. The NIH and the National Science Foundation (NSF) recommend that bioethics training be a component of their research awards. The NSF has funded the University of Pennsylvania's Jackson Laboratory to provide bioethics training to high school students and college students participating in summer research programs at the laboratory.

A 2001 survey conducted by the American Society for Bioethics and Humanities found that most graduate training programs in bioethics were housed in schools' medicine or philosophy departments. For example, the Alden March Bioethics Institute, which

offers graduate training in bioethics, is housed within Albany Medical College in New York. Many universities offer majors and minors in bioethics, and a growing number of students are pursuing advanced degrees in bioethics, according to a study published in *Nature Biotechnology*. These advanced degree programs offer classes ranging from medical ethics to environmental ethics and ethical reasoning courses. Often the interests of faculty members in these programs guide the design of the curricula.

Universities are taking other steps to incorporate bioethics training in their programs. Iowa State University's graduate programs in bioinformatics and in computational biology require students to participate in the Scientific Ethics Workshop and to take at least one course in bioethics. In the workshop, students discuss scientific misconduct, ethics in research, and related topics aimed at helping them become ethically responsible scientists. The University of Chicago offers a course on ethics and public policy in the Harris School of Public Policy. Stanford University requires life science graduate students to enroll in a course on "responsible conduct of research."

Whether requiring training in bioethics will produce the desired results, however, is not yet clear. David Magnus, a Stanford University professor and associate editor of the *American Journal of Bioethics*, comments: "I'm not sure that courses are the best way to really address key issues,...partly because many issues that arise are specific to a field or even a research project. In addition, the data on 'misbehavior' seem to indicate that courses have only a very limited impact on people's behavior."

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