

# THE CHRONICLE OF HIGHER EDUCATION

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## Universities Experiment With Classes in Scientific Ethics

**Pilot programs tackle a difficult topic amid questions about such education's efficacy**

By *JEFFREY BRAINARD*

Art, a postdoctoral researcher, faces a sticky ethical dilemma, one he received no guidance on how to handle when he was a graduate student.

To reduce costs, a professor, Matt, who is also Art's mentor, has asked him to cut a corner in a laboratory procedure, even though that may produce inaccurate test results. What to do? Art depends on Matt for his livelihood, professional development, and job recommendations.

Art voices a half-hearted protest and starts to go ahead with the dubious procedure. Then — cut! — the scene ends.

Art Gruenberger and Matt Tabora-Roberts are actors, playing out a scenario last month before postdoc students in a laboratory-management workshop at the University of California campus here. The session's leader, John C. Galland, asks the students how Art might engage Matt in a polite but assertive conversation about the problem, and Art and Matt then begin Take 2 of the same scene.

In the coming weeks, the students will explore other knotty issues, like negotiating with colleagues over credit for authorship and handling financial conflicts of interest.

The university's use of actors and interactive role-playing is a novel example of a small but growing number of institutions that are teaching research ethics as a distinct subject.

Their programs have taken on a new urgency in light of a series of recent scandals involving research misconduct and ethically dubious research practices. Indeed, this week, **the Council of Graduate Schools is hoping to spur more such efforts by publishing "best practices" for teaching responsible research.**

While the federal government has provided a modest amount of money for ethics programs, including the graduate council's project, a forthcoming report by Minnesota researchers suggests that ethics education does not necessarily produce better behavior among scientists.

"What a lot of people are asking today is, Are these courses really doing anything?" says Nicholas H. Steneck, an emeritus professor of history at the University of Michigan at Ann Arbor who studies the programs, "and the simple answer is, We don't know."

### **Driven by Scandal**

Recent headlines have provided plenty of fodder for classes on research ethics.

Last December allegations broke that a South Korean stem-cell researcher had fabricated parts of a landmark study published in 2004. This year Eric T. Poehlman, a former medical researcher at the University of Vermont, was sentenced to one year in prison for making up data in numerous grant applications and studies in what federal regulators called the worst research-misconduct case in 20 years.

While cases of outright fraud are rare, more common are ones where scientists behave in ways considered unprofessional or ethically questionable. In 2005 a study in the journal *Nature* reported that one-third of scientists surveyed admitted engaging in at least one of 10 practices that were potentially sanctionable by university compliance officers. Those included failing to present data contradicting their work and circumventing minor requirements of human-subject research.

Federal rules require universities to police fraud, fabrication, and plagiarism in research paid for by the government, but several of the other practices, like suppressing conflicting data, are discouraged only by professional custom.

Experts have long recommended education in ethics as a kind of immunization for all forms of questionable research conduct. The National Academies issued reports in 1992 and 2002 with that suggestion.

A federal watchdog office, the Office of Research Integrity, proposed in 2000 requiring such education for any researcher receiving funds from the Department of Health and Human Services, of which the National Institutes of Health is part. The government shelved the proposal after protests from universities and researchers who said it would be too onerous and costly.

Most universities offer some kind of education in research ethics, but only about two dozen of them have developed comprehensive programs that are likely to be effective, says Mr. Steneck, who advises the federal research-integrity office on the issue. Some offer a Web-based tutorial, which Mr. Steneck and other observers say is a useful reference but not a replacement for face-to-face instruction.

When the **Council of Graduate Schools** started its project to develop best practices in 2004, a common reaction from university officials was "we already do that," recalls Paul Tate, a senior scholar there who leads the program.

While many colleges teach research ethics, they are often part of a broader course and risk receiving insufficient attention, he says. Surveys of students and faculty members indicate that the professors think students are getting more out of the courses than students report receiving.

Scientists have also traditionally assumed that mentors covered ethics and standards during informal interactions with trainees.

"What we've come to learn is that investigators are very busy, labs are very large, and students aren't learning these things" consistently, says Mr. Steneck.

### **Toward Mandatory Training**

The project by the Council of Graduate Schools is intended to develop a more comprehensive and deliberate approach.

The council financed pilot efforts at 10 institutions, including Duke, Florida State, and Old Dominion Universities, focusing on graduate students in biomedical and behavioral research. The council has since secured a grant from the National Science Foundation to continue the project with eight more institutions, this time with a focus on the physical sciences and engineering.

Among the best practices recommended by the council is that colleges encourage all graduate students engaged in research, including those in the social sciences and humanities, to take an introductory, interdisciplinary course in research ethics. The classes should be supplemented with campuswide workshops and with additional courses in the students' home departments, tailored to the circumstances of each discipline.

A potentially controversial recommendation is that universities move toward making the education mandatory for all graduate students engaged in research. That will require graduate deans, who are being asked to lead the new efforts, to exercise diplomacy and expend their "political capital" to persuade the departments to go along, Mr. Tate says.

In the end, the council recommended no specific curriculum or teaching method, recognizing that colleges already use many different approaches.

That is underscored by the program at the University of California campus here, which is not a participant in the graduate council's project. Faculty members lead discussions about research ethics during a yearlong series of workshops sponsored by the university's new Laboratory Management Institute, created in 2005 to teach postdoctoral researchers a variety of professional skills, among them how to resolve conflicts and develop good interpersonal relationships.

To run role-playing exercises that show students those skills, Mr. Galland, the institute's director, and Jade R. McCutcheon, an assistant professor of theater, recruited Mr. Gruenberger and Mr. Tabora-Roberts, who were graduate students in theater.

During last month's session, the actors asked the postdocs to contribute anonymous tales of their own professional dilemmas. That request yielded the role-playing exercise about cost cutting, and the students talked about how Mr. Gruenberger might work out a better solution than simply knuckling under to his mentor's request and disregarding the potential distortion of scientific findings.

"Part of the problem is that you just want the PI [principal investigator] to take your word for it that the procedure won't work," Rachel Diana told Mr. Gruenberger. Ms. Diana is a psychologist who started a postdoctoral appointment in the university's Center for Neuroscience this fall. "Maybe you could show some respect for the PI" and explain why, she suggested.

Back in character, Mr. Gruenberger and Mr. Tabora-Roberts eventually struck a deal based on the scientific method: The mentor granted the postdoc's request to spend a few hours trying to prove experimentally whether the proposed cost-cutting approach would in fact distort the findings.

(Although the two theater majors have picked up an impressive amount of scientific lingo to aid their improvisations, the audience chuckled at times when their patter veered toward the improbable, such as when Mr. Gruenberger seemed lost trying to use a workhorse tool of biological labs, the pipette.)

Ms. Diana, who aspires to become a principal investigator, volunteered to help the actors play a different scenario, in which her mentor asked her opinion about firing a colleague. Afterward, she said of the exercises, "It seemed obvious what the right outcome was. The question was how to get to that point."

Mr. Galland says the postdocs will discuss other scenarios that illustrate the same point: Clear and honest communication might help avoid misunderstandings and resolve disputes before they balloon into serious improprieties. Such "courageous conversations" are often difficult for a subordinate but become easier if a student practices them, he says.

A postdoc in chemistry who took the workshop last year, Nabil Saad, says that the sessions left him with "a take-home message that was very helpful."

"I was kind of naïve" about the pervasiveness of questionable research practices, he says, but after the workshop "I definitely have my antenna more out for it."

Still, new programs like California's have a way to go before they can offer a robust model for ethics education. For starters, they reach relatively few students compared with the total number of graduate students and researchers on each campus. The Davis program includes 26 postdocs this year, out of about 650 on the campus.

Also, the programs operate with little money: The Council of Graduate Schools had only enough funds to give \$15,000 to each of the 10 participating institutions. Some of the universities divided that money among multiple departments.

The federal research-integrity office has awarded 50 grants totaling \$1.3-million since 2002 to universities and other organizations to develop research-ethics programs and curricula.

The amounts provided by the office and the council are modest compared with the sums given by the NIH in 2002 and 2003 to help colleges improve their programs for protecting human research subjects. The NIH gave more than 150 institutions one-time grants of up to \$250,000 each.

Mr. Steneck argues that the NIH should require research-ethics training as a condition of more of its regular research grants. The agency, which is the largest source of funds for university research, has required since 1990 that colleges provide training on ethics to all graduate students receiving NIH training grants and fellowships. (The NIH mandates no specific curriculum for the training.)

However, the 9,634 trainees and fellows affected by this requirement in 2005 represented only about one-tenth of all graduate students in the life sciences.

### **Does Training Work?**

By far, the toughest challenge faced by participants in the Council of Graduates Schools project was how to measure what the students had learned, says Mr. Tate, the project's leader.

Part of the problem was that university officials disagreed over what the courses should teach. Some preferred to focus on professional standards and government rules regarding research ethics and proper lab practice. Others believed that knowledge of those details alone would not necessarily change scientists' behavior, and that fledgling researchers should be trained in the skills of ethical reasoning.

Measuring the latter is notoriously difficult. Mr. Tate and graduate deans involved in his project say they are still developing tools to assess students' learning before and after the ethics education.

Whether teaching research ethics has any effect on the behavior of scientists remains unclear. The same team of scholars that produced last year's study in *Nature* about questionable research practices tracked research-ethics training received by members of that study sample, 3,247 midcareer scientists and postdocs who received NIH grants between 1999 and 2001.

Those who received training in research ethics engaged in most of the questionable behaviors at the same rates as those who did not get training, says Brian C. Martinson, a co-author of the studies and a researcher at the HealthPartners Research Foundation, in Minneapolis. The results, which he called "disappointing," have been submitted for publication in *Academic Medicine*, a journal of the Association of American Medical Colleges.

Education on research ethics, Mr. Martinson says, "may not be enough to overcome the competing forces that are out there operating on scientists."

For example, scientists who believe that professional advancement in science is unfair appear more likely to use questionable research practices, according to a separate study published last year by Mr. Martinson and his academic collaborators.

Scientific careers have become more difficult in recent years, especially for younger scientists, he notes. The share of the NIH's major research grants that go to scientists aged 35 or younger has steadily fallen, to 4 percent in 2001. And the percentage of all applications financed by the agency has reached 10-year lows.

For younger scientists particularly, he says, "you've kind of set them up for a situation where maybe it's a bit more likely that they say, Maybe I have to cheat to get ahead," even though that behavior is "not excusable." Mr. Martinson notes that Mr. Poehlman, the former Vermont researcher, said at his sentencing that he acted in part to make sure his lab kept running and its workers were employed.

"I don't know how you address these factors in training programs," Mr. Martinson says.

Institutions should work much harder to provide accurate information to graduate students and postdocs about the tough prospects for succeeding in academic science, he adds, a suggestion also made by the Council of Graduate Schools. Of course, Mr. Martinson says, universities rely on those same young scientists to help run research laboratories, and so institutions have a conflict of interest that might discourage them from painting too gloomy a portrait of the researchers' futures.

Mr. Martinson and other scholars argue that more research is needed about the best methods of helping scientists to behave responsibly.

Mr. Tate predicts that as the field develops, ethics training will become as broadly accepted within university science departments as it has in medical schools, which resisted its introduction in the 1980s. He hopes that academic scientists will come to regard ethics training as enhancing the quality of research and not simply as yet another regulatory burden.

But to continue the momentum for more training, there's a wry joke in education circles, Mr. Tate says, that "what we really need is one good scandal a year."

### **TEACHING THE ETHICS OF RESEARCH**

The **Council of Graduate Schools** has recommended how universities should set up effective programs to teach students to conduct research ethically:

- Make the topic a visible and regularly discussed aspect of institutional culture. For example, provide well-publicized public forums.
- Make ethics education mandatory for all graduate students.
- Teach ethical-reasoning skills, not just the content of rules and regulations.
- Offer at least two tiers of instruction — introductory, cross-departmental courses and seminars, as well as more-specialized courses in specific departments.
- Establish a campuswide advisory board to foster support among department chairmen, deans, and graduate students.
- Develop effective assessments of ethics instruction.
- Eliminate real or perceived injustices in how research resources, like research assistantships, are distributed.

**SOURCE:** "Graduate Education for the Responsible Conduct of Research," Council of Graduate Schools