

# Adventures of the Mad Scientist: fostering science ethics in ecology with case studies

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Who is the Mad Scientist? In pop culture, the Mad Scientist is caricatured as a wild-eyed man obsessed with a clever invention, be it a device to desalinate the oceans and provide an unending supply of freshwater, a formula to grow an army of megamonkeys that free mankind from drudgery, or the ever-popular quantum trickery to produce free energy. In current public perception, the Mad Scientist may simply be anyone studying embryonic stem cells or genetically modified crops. The common feature is that generally well-meaning scientists make choices that may be considered unethical, either through unintended consequences or because opinions differ regarding the balance between conflicting values. In practice, most scientists are not trying to reshape the world, nor are they working on topics that are controversial in themselves. The typical ethical pitfalls we face are more mundane. Thus, the Mad Scientist, measured against the ideals of scientific integrity, may often be someone who has simply made poor choices in the course of everyday activities.

Increasing public scrutiny of science has encouraged a growing emphasis on training scientists in professional ethics. This has been partly motivated by a number of widely publicized scandals. None of these have involved ecological research, and consequently one might infer that ecologists need not concern themselves with ethics training. After all, ecologists are apparently doing a rather good job as it is. This is dangerous logic, since complacency is unlikely to be a basis for good practices. Fortunately, in our experience, ecologists are concerned with how ethics applies to ecological science, and are interested in learning both how to negotiate ethical pitfalls and how to teach these skills to their students. Funding agencies have also made major efforts to foster an ethical dimension in scientific training. Yet despite the widespread agreement about its importance, formal applied ethics education is still viewed by some as burdensome, or a distraction from core discipline training. In part, this may stem from a belief that ethics are self-evident and can be learned osmotically, or that suitable tools for teaching ethics are unavailable.

Because most available materials for science ethics education have been developed in other contexts, we sought to develop tools aimed specifically at ecologists – in this

case in the form of a series of case studies. We had two objectives. First, we wanted to produce materials that could be used with no formal training in ethics and were suitable for a variety of educational formats. Second, we wanted the materials to be framed in an appropriate context for ecologists. People find it easier, more relevant, and more enjoyable to dissect ethical issues that are framed in relation to their own work. Some of the case studies address broad, fundamental issues of science ethics in an ecological context. Others are based on issues that emerge specifically from the nature of ecological research.

## ■ The case study approach

The case study is a common pedagogical tool in practical ethics (Penslar 1995). Cases present brief scenarios that usually focus on one or two related ethical issues. The cases may be fictional or based on actual events – ours are fictional. Typically, a protagonist will have a decision to make, where some options are considered unethical or ethical principles appear to conflict. Some cases present characters in situations where others are acting unethically and ask what they should do about it. At the end of each scenario, specific questions zero in on aspects of the ethical dilemmas. The materials are meant to facilitate small group discussions of the ethical issues involved. As such, they can be incorporated into formal courses, lab meetings, or in-house seminars, or may simply be the topic of lunchtime conversation.

By discussing the ethical ramifications of behavior in these situations, scientists should become better equipped to make decisions about ethical dilemmas as they occur in real life. People are more likely to make poor ethical choices when under pressure; having thought about them in advance makes it easier to choose wisely in the heat of the moment. Because our cases are fictional abstractions, they provide a platform for analyzing professional behavior rationally and calmly – something that is not always possible when people are reacting to real situations in which they are involved.

## ■ Case studies in practice

One person will normally prepare in advance to lead the discussion, including reviewing the explanatory commentaries that accompany each scenario. Other participants need not do any preparation; the cases are short enough to

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be read at the beginning of a session that may last 20–60 minutes. The group's thoughts could inadvertently be restricted by the ideas presented in the commentary if everyone reads this section in advance, so we recommend that most participants do not read the commentary. The leader's preparation should include making some basic decisions: What is your goal for the discussion? What issues do you want to focus on? Who is your audience and what is their background?

It is also useful to imagine alternative scenarios for the case you are discussing. You may wish to modify the case to focus the ethical issues more narrowly, thereby better meeting your goals. Can you imagine other scenarios that raise the same issues? You might try thinking about the case as you would a manipulative experiment. Which details can you change that affect whether particular actions are viewed as ethical by your group? To what degree do they need to be changed? Which details make no difference if they are changed? Having these ideas ready will make things easier when your group becomes stuck viewing an issue in only one particular way. They will also make it easier for you to be ready with a summary statement at the close of the discussion. It is rare for everyone to agree that there is only one right way to handle a particular issue. This is fine; it should be easier to get everyone to agree that there are some clearly wrong ways and that some options are better than others.

An ethics discussion can be awkward for many reasons. Being prepared with a few generic questions can help get things going or move them along when the group gets bogged down. Two important topics to explore are what values are at stake and what factors influence the balance between those values. One goal of discussing the practical application of ethics is to help participants make their own values explicit and at the same time examine the implications, thus allowing people to see why some choices are better than others.

Challenging the group to brainstorm various lists can also open people up and get everyone to participate. A particularly useful question is who could be affected, positively or negatively, directly or indirectly, by each decision? The list is often longer than participants initially realize. This can be followed by asking what, if any, are the decision maker's ethical obligations to each individual on the list. Most participants will probably not be formally trained in moral philosophy; one advantage of the case study approach is that the inexperienced need not be intimidated. However, your discussion could hit a wall if participants simply assert different views of what makes something (un)ethical. One way around this sort of impasse is to ask if anyone or anything could be harmed, directly or indirectly, by a particular course of action. Does the action restrict the ability of others to act in their own self-interest? These questions can help elucidate the basis of differing views, thus helping all participants to gain a better understanding of a variety of different perspectives – including their own. Clearly, this series of case

studies does not provide an overview of an entire branch of philosophy. Readers interested in a more in-depth treatment of moral philosophy should consult general texts such as Hinman (1998) or Rachels (1993).

### ■ Cases for ecologists

We have developed seven cases to illustrate potential ethical issues that ecologists may confront. They will appear consecutively in the next several issues of *Frontiers*. The cases span a broad range of issues, including aspects of research practices, scientific training, and the role of scientists in society. Two cases (“Planning an invasion” and “The methods actor”) deal with “questionable research practices”, which is research ethics jargon for actions that aren't specifically prohibited, but nonetheless may compromise the scientific ideal. Two other cases (“The stats guy” and “The job offer”) address issues associated with training scientists. Two cases (“The big story” and “Is the PR job tenure-track too?”) address the role of ecologists in society. Finally, one case (“Polluted objectivity?”) tackles potential conflicts of interest between the ecologist and the environmentalist. We chose not to include cases that involve issues such as falsification/fraud/plagiarism, human subjects, financial conflicts of interest, and sexual entanglements – all these are well-covered by existing material (NAPSRCR 1992; Penslar 1995; Elliott & Stern 1997; Stern and Elliott 1997). Many of the issues are also governed by institutional regulations and we encourage you to become familiar with your own institution's policies.

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