A Collaborative Effort to Build a Modular Course on GeoEthics

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ABSTRACT. The need to promote ethical practice in the geosciences has long been recognized. Governmental boards for licensing professional geoscientists commonly require participation in continuing-education courses or workshops about professional ethics as part of the license-renewal processes. Geoscience-based companies and organizations of professional geoscientists have developed ethical codes for their members or employees. Ethical problems have been reported that involve the practice of science applied to Earth studies, interpersonal relationships within geoscience departments, business practices in geoscience-based companies, field work and the destructive modification of geologic sites, public policy development or implementation related to Earth resources, extractive resource industries, development that modifies landscapes in significant ways, interactions with the press and other media professionals, and even interactions with individuals or groups that have a significantly different worldview.

We are working toward the creation of a modular semester-long course in GeoEthics. The modules will be free-standing, so each could be repurposed for use in a different course; however, the GeoEthics course will provide a useful overall introduction to a variety of topics in ethics applied in the context of geoscience. Such a course might be an excellent capstone course for undergraduate geoscientists, or an introductory course for graduate students. The first module will cover basics intended to provide a common vocabulary of words, ideas and practices that will be used throughout the course. The remaining 5-6 modules will focus on aspects of geoscience in which ethical considerations play an important role. We feel that the geoscience classroom can provide a safe, controlled environment in which students can confront a representative sample of the types of ethical issues they might encounter in their professional or academic careers. Our goal is to help students develop effective strategies for working through these dilemmas. Our modules will utilize formal discussion, role-playing, debate, and reflective writing, among other techniques. We hope that this will lead students to internalize these lessons so that they lead careers in which ethical practice is an essential element.

A functional knowledge of applied ethics is not imparted at birth or awarded along with academic diplomas.

It is something that each generation must help the next generation to develop. It's our generation's turn now.

We try to equip our students with the scientific knowledge and skills necessary to make a positive impact on our understanding of Earth and its processes and products.

We should exert the same effort to prepare them for the ethical challenges they will face during their careers.

"The only ethical principle which has made science possible is that the truth shall be told all the time.

If we do not penalize false statements made in error, we open up the way, don't you see, for false statements by intention.

And of course a false statement of fact, made deliberately, is the most serious crime a scientist can commit."

Physicist and author C.P. Snow,
quoted in *Honor in Science,*
published in 2000 by Sigma Xi,
the Scientific Research Society

You are part of this collaborative effort. Today, *right now*, tell us about a problem, an opportunity, a resource, a technique, a case study, a way of viewing the world that we might use in this course. Join us, and let us keep in touch with you as our project develops.

Why a modular course?

We want the educational resources we develop for geoethics to be used in a broad range of geoscience courses, only some of which might be devoted wholly or in large part to geoethics. Hence, we envision a strategy that will yield a granular array of resources that can be used in different ways, for different people over different time periods.

Minutes. In some cases, we want to provide small bursts of information that students can use for homework or for a few minutes in class: text, video, slides.

Tens of Minutes. In some cases, we want students to work with a little bit more information, or for a longer time, in a project that might take all or much of a class period, or that might be a homework project.

Class Periods. A topic might over one or more class periods, use a variety of resources, and employ several learning strategies.

2-3 Weeks. A ***module*** would be an integrated set of resources considered over the course of two or three weeks that would provide students with the opportunity to develop a deeper and more multi-dimensional understanding of material with an ethical dimension.

A Semester. A course in geoethics would be compiled from a selection of modules.

An individual teacher would choose to adopt or adapt the resource that fits the situation.

What is the target group of students?

The target audience for these resources includes mid- to upper-level geoscience undergraduates and early-stage geoscience graduate students. The individual modules will likely be useful in other courses as well, in geoscience departments and perhaps in departments of geography, environmental science, and geotechnical engineering. Many of the smaller bits will be useful even in the lowest-level undergraduate geoscience course.

How will course resources be made available?

We anticipate that course resources will be made available in association with the InTeGrate Program, utilizing the online resources maintained by SERC (serc.carleton.edu). We will also make resources available via the IAPG website (www.iapg.geoethics.org).

We plan to collaborate with professional organizations to help us promote these resources through presentations, workshops, short courses, newsletter articles, and other appropriate means. These groups will include the SERC community, National Association of Geoscience Teachers (NAGT; www.nagt.org), Geological Society of America (GSA; www.geosociety.org), American Geophysical Union (AGU; sites.agu.org), American Association of Petroleum Geologists (AAPG; www.aapg.org), American Institute of Professional Geologists (AIPG; www.aipg.org), Association of Environmental and Engineering Geologists (AEG; www.aegweb.org). We welcome other suggestions for groups we might collaborate with in developing or promoting educational resources for geoethics.

Is this aligned with other efforts in geoscience ethics?

The coauthors are all members of the International Association for Promoting Geoethics (IAPG; www.iapg.geoethics.org). IAPG is affiliated with the International Union of Geological Sciences, and the American Geosciences Institute. The coauthors met as part of a workshop on *Teaching Geoethics Across the Geoscience Curriculum* that was organized by Dan Mogk and others, with sponsorship from the National Science Foundation and participation from SERC (serc.carleton.edu). The current group that is working on developing a geoethics course are active members of many prominent geosciences organizations, including organizations that have their own codes of ethics. We plan to build upon this community of interest in developing educational resources.

How can I keep in touch with this project?

First, you should consider becoming a member of the International Association for Promoting Geoethics (www.iapg.geoethics.org). IAPG has a blog that we will be using to solicit input. Second, please communicate with any of the coauthors of this poster and let us know about your ideas and potential contributions.

Can I join the group and help build course resources?

It is safe to say that all of the current participants in this project are personally aware of our shortcomings. Nobody appointed us as Grand Poobahs of geoscience ethics. We have simply offered to contribute our experience, reflection, background reading, the fruits of our discussions, and our willingness to put honest, good-faith effort into the development of these resources. We would be delighted to have your help.

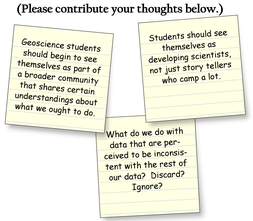
What do we hope geoscience students will gain from coursework in GeoEthics?

In addition to being able to understand and use the basic vocabulary employed in discussions of ethics (*e.g.*, terms such as ethics, morals, integrity, virtue, utility, character, justice, *etc.*), we would like students to be able to articulate informed commentaries that expand on the following:

- Why ethical behavior is important to our personal health and that of our community.
- The range of a geoscientist's responsibilities, from personal to global.
- That the health of a geoscience community is based on common understandings of right and wrong in the context of their disciplines.
- That formal frameworks exist within geoscience communities to address ethical issues, based on our community's understanding of moral philosophy. In some cases, this is codified the form of "codes of ethics" or "professional practice manuals."
- How a geoscientist can develop the ability to recognize and anticipate ethical issues, so that they can act appropriately.
- The community, legal, and employer-specified contexts for defining whether an action is appropriate often differ from one another in important ways.
- Resources are available to help a geoscientist navigate ethical issues as they occur.
- Intellectual processes have been developed over many years that can be used to help you discern viable solutions to ethical dilemmas, in which two "goods" are in conflict with one another. We would like to help students develop decision-making skills that will help them make appropriate ethical choices within the geosciences.
- We want to help students learn how to effectively communicate the rationale for ethical decisions.

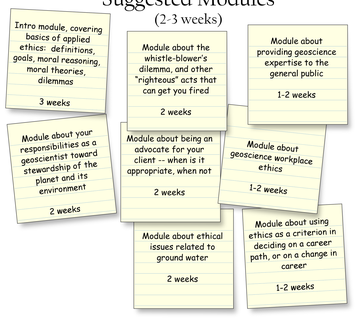
What other ethical competencies do you believe should be included in this course? What should students know or be able to do after this course?

(Please contribute your thoughts below.)

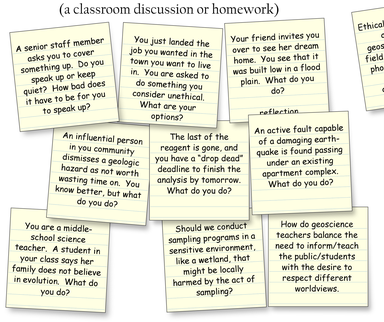


Please put your ideas on a Post-It Note and contribute to this poster!
If you do, please also give us a legible email address so we can follow-up.

Suggested Modules
(2-3 weeks)

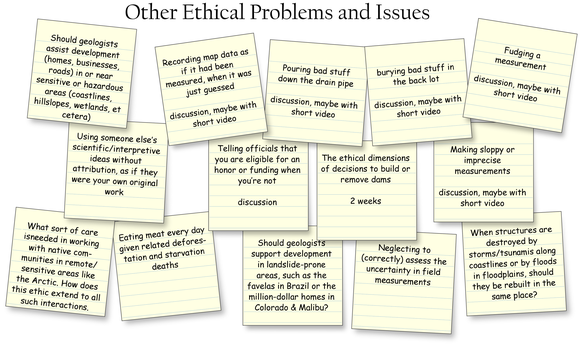


Geoethical Exercises
(a classroom discussion or homework)

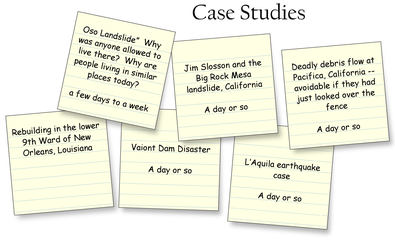


Project Ideas
(a couple of classes to a week)

Other Ethical Problems and Issues



Geoethical Case Studies



Worthwhile Texts

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MacIntyre, Alasdair, 1998, A short history of ethics -- A history of moral philosophy from the Homeric Age to the Twentieth Century [2nd edition]: Notre Dame, Indiana, University of Notre Dame Press, 280 p., ISBN 0-268-01759-X.

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Text Suggestions?

Does moral philosophy have anything to offer the geosciences that will help each of us to do what we *ought* to do: to tell the truth, to be a good scientist, to be an informed voice for our planet and its inhabitants, to act with justice?

Teaching GeoEthics Across the Geoscience Curriculum
http://serc.carleton.edu/geoethics/index.html

INTERNATIONAL ASSOCIATION for PROMOTING GEOETHICS

Join Us!
http://www.iapg.geoethics.org