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### EMBEDDING ELEMENTS OF GEOETHICS IN AN INTRODUCTORY PHYSICAL GEOLOGY LAB COURSE

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Ethical behavior is essential to science. Why, then, is geoethics so poorly represented in the curriculum of most geoscience programs? Do we hope students will develop as ethical geoscientists through osmosis? Geoethics is a core concept in geoscience. We must become much more intentional in our approach to developing student knowledge of geoethics.

The American Geosciences Institute (AGI; [www.americangeosciences.org](http://www.americangeosciences.org)) recently revised its *Guidelines for Ethical Professional Conduct*, with input from member societies. Individual geoscientists are expected under the *Guidelines* to -- among other things -- be honest, responsible, respectful, act with integrity, separate facts/observations from interpretations, estimate uncertainty, admit errors, and provide full attribution of the sources of their information (data, ideas). The *Guidelines* also describe geoscientists' collective responsibility to "protect public health, safety, and welfare, and to enhance the sustainability of society," to provide society with clear information about resources and hazards, and for stewardship of Earth. If these are our expectations, geoethics must be incorporated in undergraduate geoscience courses.

An introductory lab course in physical geology is ubiquitous in American colleges offering geoscience at any level, making it a perfect vehicle for familiarizing students with geoethics. For geoscience majors, an early introduction to geoethics establishes a foundation for continued moral growth through subsequent coursework. We should teach students from the beginning how to participate in geoscience in an ethical manner, and to include estimates of uncertainty in our results. For the non-major, consideration of geoethics can deepen their understanding of science, and can illumine the relationship of geoscientists to society. Undergraduates exist a world saturated by marketing, where half-truths and outright falsifications are common. Geoscience, on the other hand, is an enterprise that seeks the most reliable understanding of our planet based upon reproducible observations, responsible assessment of uncertainty, and testable hypotheses. The antidote to misinformation and misconceptions is knowledge, and only reliable knowledge is useful in a society that faces critical environmental challenges.

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