

## **As ethics is a core attribute of science, so geoethics must be at the core of geoscience**

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**<slide 1>** As ethics is a core attribute of science, so geoethics must be at the core of geoscience.

On behalf of my nine co-authors, I thank AGU and AGI for providing the leadership and opportunity to participate in this session on "What it means to be a geoscientist."

**<slide 2>** My co-authors and I are members of the International Association for Promoting Geoethics, which seeks to develop and advance geoethics worldwide.

We developed our interest in geoethics in different ways. Many of us have been directly impacted by the unethical actions or behaviors of others, and all of us have observed unethical behavior involving geoscientists. Examples are not difficult to find, although we observe that examples of geoscientists performing their work ethically and sometimes even heroically are also abundant.

We become more personally invested in the need to promote peace when violence causes us harm.

**<slide 3>** Our understanding about how people *ought* to act is a legacy of how we were taught, through words and more importantly through actions and behaviors. It is our personal and professional responsibility to share and extend that legacy, so that novice geoscientists can better understand how *they* ought to act as they come to understand our shared responsibility in shaping the future.

Talking about ethics provides an excellent opportunity for us to expose ourselves as **<slide 4>** hypocritical, **<slide 5>** judgmental, **<slide 6>** sanctimonious, and **<slide 7>** boring individuals who waste time and energy arguing that water is wet.

**<slide 8>** But if we choose not to talk about our personal and professional obligations to do what we ought to do -- to act ethically and in the public interest -- we choose in effect to say that ethics is not important. My co-authors and I assert the opposite **<slide 9>** -- that geoethics is at the core of geoscience.

The struggle is not with others who act in unethical ways, although we have a responsibility to oppose unethical behavior within our professional community. Rather, the more important struggle is within ourselves. Striving for professional integrity is a battle that is not won once and for all time, but continues every day throughout an entire career.

**<slide 10>** This is not an unimportant struggle. Society depends on professional geoscientists to provide reliable information and unbiased expert advice about the

challenges we face in our interactions with the natural world. If the results of geoscience are not reliable -- if our results are driven by financial, political, or social agendas rather than solely by good science -- the professional work of geoscientists will not be sought or valued by society. And in the vacuum that would result, critical decisions will be made based solely on ego, ignorance, and perceived self-interest. We hope and work for a distinctly more positive outcome.

**<slide 11>** Geoscience is a profession, meaning that it requires specialized knowledge and extensive advanced academic training to develop the ability to undertake certain tasks and responsibilities on behalf of society. An important and perhaps essential feature of professions is that their principle purpose is service to the public.

Contemporary moral philosopher Anthony Weston tells us that ethics asks us to pay attention to something beyond ourselves. **<slide 12>** Weston writes that "to think or act ethically is to take care for the basic needs and legitimate expectations of others as well as our own." We are part of an ethical continuum that began long before our time here, and our decisions and actions affect the coming generations.

So ethical behavior involves thinking beyond ourselves, and even beyond our times. The Great Law of the Iroquois Nation challenges its chiefs to make decisions based on their effect on people they will never know, seven generations in the future. **<slide 13>** Can we accept and embrace the imperative to balance the needs of our children's children seven generations and more to come with the supposed need to generate positive metrics in the next fiscal quarter?

**<slide 14>** What does it mean to be a geoscientist? If we act without honesty, without ethics, without integrity, it means nothing.

Our job as geoscientists is to seek and provide reliable information about Earth. In a brief essay about ethics and science, Albert Einstein wrote, **<slide 15>** "Truth is what stands the test of experience." As the Nazi regime grew around him, Einstein was a direct witness of how society can be distorted by ignorance, greed, self-interest, and bigotry. A free and open society requires truth. Only truth has meaning, and it is our responsibility as geoscientists to speak the truth about Earth.

**<slide 16>** We collect data that allow us to unravel Earth's history.  
We describe and study Earth's materials

**<slide 17>** We help to secure and manage our water resources .  
We pursue a full scientific understanding of Earth's processes.

**<slide 18>** We seek out and produce the mineral, construction, and energy resources necessary to undertake modern industrial and agricultural enterprises. As we enrich society by helping to provide these resources, we must also use our expertise to help manage finite resources responsibly **<slide 19>** and to lead society from a mindset of consumption -- *use, discard, forget* -- to a commitment to sustainability.

**<slide 20>** Geoscientists identify and characterize natural geologic hazards. Given our long view of history, geoscientists also provide society with warnings about long-term hazards -- global warming, rising sea level, possible changes in ocean circulation leading to significant climate effects, and so on.

**<slide 21>** All geoscientists share in the quest to provide reliable information about Earth, regardless of whether we wear a lab coat, business suit, or field boots to work. ...Regardless of whether our income depends on a company, the government, a university, or a client's check.

All geoscientists share a responsibility to serve society. After all, **<slide 22>** society made the investment in science and education that supported the development of geoscience, and our development as geoscientists. Society also made the investments **<slide 23>** that enabled the development of the commercial ventures that utilize geoscience.

What does society expect in return for that investment? **<slide 24>** It just wants reliable information about Earth. Society wants to know what we have discovered about Earth through our scientific investigations, and it wants some indication of how well we think we know these things.

Society needs this information so that it can make good, informed decisions about resources, risk, and our shared environment. Unreliable geoscience information, if represented as valid, might do irreparable harm.

**<slide 25>** Geoethics is based on the moral imperative for geoscientists to use our knowledge and expertise about Earth for the benefit of humankind. Informed by the geologic record of the intertwined history of life and our planet, that moral imperative extends beyond our time, our culture, and even our species.

**<slide 26>** Ultimately, Earth is a small lifeboat in space. Geoscientists form the essential interface between our human society and Earth, and we must act for the health and benefit of both.

**<slide 27>** The challenges we face together -- securing raw materials, energy, potable water, soil conservation, sea-level rise, climate change -- are too serious for geoscientists to be mute. Voices motivated by narrow self-interest might fill the void left by our indifference, and that would endanger us all.

**<slide 28>** My co-authors and I invite you to join us in the ongoing work of developing and promulgating a coherent understanding of geoethics throughout our community. Very little of the work ahead is obvious, particularly as we seek to balance the needs for raw materials and energy resources with the needs of our environment.

**<slide 29>** ...Particularly as we seek to balance the human need for economic and social development in much of the world with the existential imperative to adopt ways of living sustainably on the only home we have -- a pale blue dot in the vastness of space.

**<slide 30>** Our work is focused on Earth. We work on behalf of *all* its inhabitants, now and in the future.

Our children's children's children will expect us to have done our job well in our time: to be honest, to be good scientists, to provide reliable expertise about Earth, to help reorient society toward sustainability, and to pass-on a healthy ecosystem to those who follow.

**<slide 31>** Thank you for your attention.