

Collaborative Research: Graduate Ethics Seminars for Future Geospatial Technology Professionals

This project will institute, within three prominent graduate programs of geography, regularly-offered graduate seminars that rigorously explore ethical implications of geographic information science and technology (GIS&T). A model seminar curriculum developed by a team of professional ethicists and GIS&T educators will be disseminated freely to the GIS&T education community in the U.S. and overseas. These plans reflect that GIS&T is a large and rapidly-growing multidisciplinary field concerned with the nature, use, and societal impacts of information derived from geospatial technologies.

Technologies such as the Global Positioning System (GPS), satellite remote sensing, and geographic information systems (GIS) enable analysts to track people and things, to evaluate natural resources and monitor land uses, to identify optimal sites and routes, and to target areas for further investigation or intervention. The variety of applications of GIS&T has led the U.S. Department of Labor to highlight “geospatial technology” as a key high growth job field for the 21st century. While the potential benefits of geospatial technologies are becoming well known, the ethical issues they pose are less widely appreciated. For instance:

Geospatial technologies are surveillance technologies. The data they produce may be used to invade the privacy, and even the autonomy, of individuals and groups.

Data gathered using geospatial technologies are used to make policy decisions. Erroneous, inadequately documented, or inappropriate data can have grave consequences for individuals and the environment.

Geospatial technologies have the potential to exacerbate inequities in society, insofar as large organizations enjoy greater access to technology, data, and technological expertise than smaller organizations and individuals.

Society will rely upon future leaders of GIS&T professions to ensure awareness of ethical issues and compliance with the Codes of Ethics and Conduct, such as those established by the Geographic Information Systems Certification Institute (GISCI).

Intellectual merit

Unlike professional graduate programs in some related fields, degree programs in GIS&T seldom include courses that focus on the ethical issues. Neither a recognized standard curriculum for professional graduate education, nor an accrediting body responsible for assuring that degree programs comply with curricular standards, exists in the GIS&T domain. The best way to promote formal ethics education in GIS&T may be to demonstrate its effectiveness in three prominent graduate programs and to promote adoptions by other programs through the Association of American Geographers (AAG). Oregon State University, Penn State University, and the University of Minnesota conducted an experimental “virtual seminar” in Ethics for GIS Professionals in Fall 2005. Now, with the benefit of that experience, and of comments received from NSF reviewers in 2006, we propose to institute a recurring ethics seminar based on a common curriculum developed by GIS&T educators and specialists in practical and professional ethics. We will convene a panel of ethicists and domain

experts to outline a seminar curriculum that engages students in the philosophical foundations of ethics, in techniques for assessing and strengthening moral reasoning abilities, and in the particular ethical issues posed by GIS&T. The curriculum will emphasize interactions among graduate students and practicing GIS&T professionals. Students' interviews will illuminate the state of awareness and ethical reasoning ability of GIS&T practitioners, and will lead to development of a series of case studies that will be deployed as part of GISCI's outreach and professional development activities.

Broader impacts

The proposed research will have a national and international impact. Each year, an estimated 50,000 students enroll in GIS classes in U.S. higher education institutions, and more than 200 U.S. institutions offer academic certificate programs in GIS. Through desktop Web conferencing and a learning management system hosted by Penn State, the "virtual seminar" will be available for participation by faculty members and students affiliated with the 84-member University Consortium for Geographic Information Science, as well as overseas institutions affiliated with the Worldwide Universities Network and the UNIGIS Network. Courseware developed for the seminar will be freely available for use within other higher education institutions and professional societies. GISCI, which has certified over 1,400 GIS Professionals since 2004, and the AAG, which represents over 10,000 academic geographers and GIS&T practitioners, will promote the courseware on a national scale. The project will also inform the ethics education components of existing geography-related NSF IGERT programs throughout the country (e.g., Ecosystem Informatics at Oregon State, GIScience at SUNY-Buffalo, Urban Ecology at U. Washington, etc.).