

Teaching Ethics in GIS&T

Final Results of NSF Funded Research on Ethics in GIS&T Education

Francis Harvey, Dawn Wright, and David DiBiase

Organization

- Objectives of presentation
- Background
- Seven-step approach (20)
- Small group activity (20)
- Discussion (15)



Objectives

Goals

- Present and provide opportunity to work with outcomes of project
- Consider what does applied ethics mean for GIS&T education
- Focus on pedagogical practice and resources for American students and academics

Resources at gisprofessionalethics.org



Background

Ethics and GIS&T

- Well known issues (Crampton, Dobson, Griffith, Monmonnier, Pickles, Proctor etc)
- Surveillance potential of GIS&T
- Growing potential for pervasive and autonomous sensing devices

Engagements with Ethics

- GIS&T field has seen broad engagement with ethics over the years
- Computer science has developed curricula and resources for teaching ethics
- **Can't teach ethics:** instead teach a framework for evaluating situation and making decisions involving value-laden technologies through explicit ethical analysis (Martin & Holz 2005)

Project activities

- Context is variety in GIS&T curricula for 50,000 students/year
- Met with experts from applied ethics field: discussed case method to strengthen moral reasoning following a framework
- Consider relevance of Davis (1999) work and the seven-step method to integrating ethics teaching in GIS&T education

Different approaches

- Developed resources and evaluated teaching approaches at OSU, PSU, and UMN
 - PSU: formal ethics training required for all graduate students; MGIS students take 2-credit class or 2-week workshop
 - OSU: in 3 credit online class, “Responsible GIS Practice” required for online GIS certificate students
 - UMN: in 3 credit seminar and two week in required courses, integrated in required course for MGIS students



Seven Step Approach

Ethical Analysis

- Step 1. State problem.
- Step 2. Check facts. Many problems disappear upon closer examination, while others change radically.
- Step 3: Identify relevant factors. For example, persons involved, laws, professional code, other practical constraints.
- Step 4: Develop list of options. Be imaginative, try to avoid "dilemma";
- Step 5: Test options using seven tests
- Step 6: Make a choice
- Step 7: Review steps 1-6

Source: DiBlase et al under review

Example: Mapping Muslim Neighborhoods

Refer to handout...

Example: Mapping Muslim Neighborhoods

1. Problem(s)?

Conflicts in mission?
Others?

2. Facts

List of facts from case
description

3. Identify relevant factors

Compare problem(s) and
facts

4. List of options

5. Test options

6. Select choice

7. Review steps 1-6



Small Group Activity

Organization

- In packet find sheet formatted following the seven steps
 - Use this sheet to write down results for each point from group discussion
 - Ask to summarize in plenary
- Have twenty minutes
 - Form groups with 2-5 people
 - Choose from three cases in packet
- Before beginning, any questions?



Discussion

Group Reports

- Each group
 - case title
 - choice and rationale
 - notes about the process



Wrap-up

Key points

- Teaching ethics by engaging values of a situation and through analysis coming to a choice
- Case studies can be used in various ways and integrated into existing courses/modules
- Resources at gisprofessionalethics.org



Thank you



Ethics Education for Geospatial Professionals

gisprofessionalethics.org

About this Project

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Summary

The National Science Foundation provided support needed to develop and institute graduate seminars at Penn State, Oregon State, and the University of Minnesota that rigorously explore ethical implications of geographic information science and technology (GIS&T). Open educational resources designed and produced by a team of professional ethicists and GIS&T educators are available from the **Products** section of this site.



Dawn Wright (PI) is Professor of Geography at Oregon State University. She directs OSU's GIScience Certificate program.



David DiBiase (Co-PI and project manager) is Senior Lecturer of Geography and Director of Penn State's Dutton e-Education Institute. He manages Penn State's online professional Certificate and Masters degree programs in GIS.



Francis Harvey (Co-PI) is Associate Professor of Geography at the University of Minnesota. He will supervise ethics seminars for Minnesota's professional Mater of GIS degree program.



Michael Solem is Educational Affairs Director at the Association of American Geographers (AAG). Michael is responsible for project evaluation.



Michael Davis is Senior Fellow at the Center for the Study of Ethics in the Professions and Professor of Philosophy, Illinois Institute of Technology, Chicago.



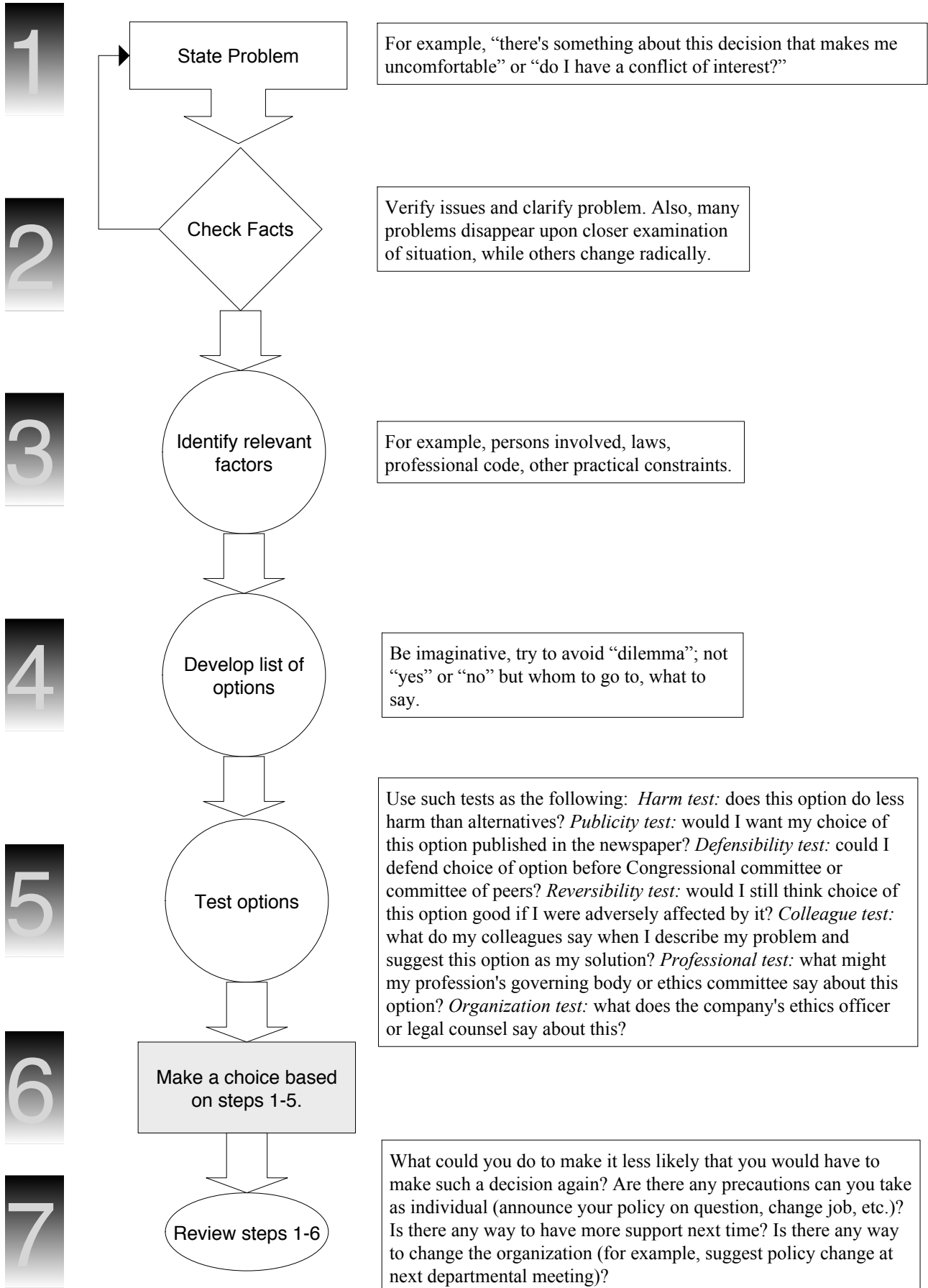
Chuck Huff is Professor of Psychology at St. Olaf College. He was a member of the panel that designed the curriculum standards in Social and Professional Issues for the ACM/IEEE Computing Curricula 2001.



Matthew Keefer is Associate Professor and Chair of the Division of Educational Psychology, Research and Evaluation at the University of Missouri at St. Louis.

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

Seven Step Guide to Ethical Decision Making



TEACHING ETHICS IN GIS&T: FINAL RESULTS OF NSF FUNDED



Image from gotanga.com

RESEARCH ON
Ethics in GIS&T Education

Sample Cases

David DiBiase, Francis Harvey, and Dawn Wright



Case study: Mapping Muslim Neighborhoods

A GIS Professional employed as director of a research laboratory called the Center for Risk and Economic Analysis of Terrorism Events at a private university in southern California receives an inquiry from a senior officer of the Los Angeles Police Department (LAPD).

The officer seeks the laboratory's assistance in a "community mapping" project whose purpose is to "lay out the geographic locations of the many different Muslim population groups around Los Angeles," and to "take a deeper look at their history, demographics, language, culture, ethnic breakdown, socio-economic status, and social interactions." The community mapping project is to be one component of a counter-terrorism initiative that aims to "identify communities, within the larger Muslim community, which may be susceptible to violent ideologically-based extremism..." (Downing 2007, p. 7). The director invites the officer to send the laboratory a Request for Proposal (RFP).

Soon after the telephone contact, the police officer is invited to Washington DC to explain the LAPD plan to the U.S. Senate Committee on Homeland Security and Governmental Affairs. The Committee chairperson cites it, among other similar projects, as an example of effective local-level counter-terrorism strategy.

News of the Senate Hearing and the LAPD plan is reported by the major media outlets including the New York Times, KNBC Los Angeles, and National Public Radio. Within days, representatives of three local Muslim groups along with the American Civil Liberties Union sent a letter to the officer expressing "grave concerns about efforts by the Los Angeles Police Department ("LAPD") to map Muslim communities in the Los Angeles area as part of its counter-terrorism program." The signatories argued that the community mapping project

...seems to be premised on the faulty notion that Muslims are more likely to commit violent acts than people of other faiths. Singling out individuals for investigation, surveillance, and data-gathering based on their religion constitutes religious profiling that is just as unlawful, ill-advised, and deeply offensive as racial profiling (Natarajan et al 2007, p. 1).

Meanwhile, the LAPD's RFP arrives at the University lab. The well-funded project will involve considerable GIS work, involving support for both student interns and professional staff. The potential project's stated purposes align with the Center's mission, which is to "to improve our Nation's security through the development of advanced models and tools for the evaluation of the risks, costs and consequences of terrorism." However, the associate director worries about the unfavorable publicity and possible legal action that might attend the project, particularly since the University describes itself as "pluralistic, welcoming outstanding men and women of every race, creed and background" in its mission statement. How should the director respond to the RFP?

References

Downing, Michael P. (2007). Statement before the Committee on Homeland Security and Governmental Affairs, United States Senate. Washington DC, October 30. Retrieved 12 June 2008 from

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Natarajan, Ranjana, and five others (2007) Letter to Commander Downing, LAPD. Retrieved 12 June 2008 from <http://www.npr.org/templates/story/story.php?storyId=16162012>

Resources for educators

Suggested discussion points, relevant GISCI Rules of Conduct, and further resources related to this case study are available on request. Send request to David DiBiase (dibiase@psu.edu) along with contact information (including your position and affiliation) and a brief description of how you plan to use the case.

Suggested citation: DiBiase, David, Francis Harvey and Dawn Wright (2009) Case Study: Mapping Muslim Neighborhoods. GISProfessional Ethics Project <http://gisprofessionalethics.org>

Reviewers: Michael Davis (Center for the Study of Ethics in the Professions, Illinois Institute of Technology), Chuck Huff (Department of Psychology, St. Olaf College), and Matthew Keefer (Division of Educational Psychology, University of Missouri-St. Louis).

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Case study: Public Access to Government Data

In the early 1990s the County of Santa Clara, California signed an agreement with a private contractor to convert the County's existing 1"=500' (1:6000)-scale parcel maps to a "digital cadastral base map" (County of Santa Clara 1993, p. 1). To finance the project the County issued a government bond to cover half of the contractor's up-front costs. It executed a cost-sharing agreement with the Santa Clara Valley Water District to pay the other half.

The agreement with the contractor stipulated that the County would own (claim copyright over) the digital base map. However, the County and contractor agreed to split revenues earned through sales of the database to "the broadest possible base of potential users, including, but not limited to, the real estate industry, the community development market, public safety organizations, private industry, government agencies and the general public" (County of Santa Clara 1993, p. 1). The County and contractor anticipated annual sales revenues of \$300,000 each within five years of the base map's production. The County planned to use the earnings to subsidize base map maintenance and related GIS services.

In 2005, at the request of a state legislator, the California Attorney General issued an opinion that "parcel boundary map data maintained by a county assessor in an electronic format is subject to public inspection and copying under provisions of the California Public Records Act" (Locklear and Stone 2005, p. 2). Consistent with that Act, the Attorney General's opinion held that government agencies should respond in a timely manner to requests to digital cadastral data, and should provide the data at nominal cost.

A 2006 survey by the Open Data Consortium revealed that 36 of California's 58 counties licensed parcel data at no cost or at the cost of reproduction. Thirteen counties, including Santa Clara, continued to offer their data for sale at higher costs despite the Attorney General's opinion. In October 2006 the California First Amendment Coalition (CFAC) filed suit against the County, claiming that the parcel data are public documents subject to the California Public Records Act, which states that state agencies "shall make the records promptly available to any person upon payment of fees covering direct costs of duplication" (State of California 2004). In its opposition to the suit Santa Clara County argued that the digital cadastral basemap constituted proprietary software (which is specifically excluded from the Public Records law) and that the loss of licensing fees would undermine support for the County's mapping activities.

With the Superior Court ruling still pending, Santa Clara County suspended sales of its cadastral database in April 2007, citing concerns that "about alerting potential terrorists to the location of pipelines feeding San Francisco water from the Hetch Hetchy reservoir" (San Jose Mercury News 2007a). The County subsequently requested that the database be designated as "critical infrastructure information" by the U.S. Department of Homeland Security. CFAC replied that "there's nothing sensitive in the database that isn't already available in other public information" (San Jose Mercury News 2007b).

On May 22, 2007 County Superior Court judge James Klienbergr ruled that a digital cadastral basemap is a public record, and that Santa Clara County must provide public access to the data

at reasonable cost. On June 14 the County appealed the decision to California Superior Court, stating that the further court action was required “to help us with the balancing act between the public’s interest in knowing and public safety” (San Jose Mercury News 2007b). In February 2009 the California Court of Appeal rejected the County’s claim that its cadastral database should be considered “critical infrastructure information.” And in October 2009, Santa Clara County was ordered to pay \$500,000 in legal fees to the California First Amendment Coalition, and to make the County’s cadastral basemap data available to the public at the cost of reproduction—\$3.10 per disk.

In 2010, however, the Superior Court of Orange County ruled that the County’s “O.C. Landbase” met the definition of “computer software” in the California Public Records Act, and was therefore exempt from disclosure rules. Rejecting the Sierra Club’s argument that the Santa Clara case was a controlling precedent, the Court ruled that the County was acting within the law when it charged the Club \$375,000 to license the Landbase (Joffe 2010).

Sarah is a Certified GIS Professional who is employed as the GIS Manager of another county in California. Sarah has recently overseen development of an expensive GIS database that will support operations of several county departments. Sarah’s bosses, the county commissioners, are sharply divided about how their county should respond to the equivocal court decisions. Some commissioners feel strongly that the database is a public record, and should be distributed accordingly. Other commissioners are convinced that the database is software, and that county should charge licensing fees to recoup the substantial costs of maintaining the database. The commissioners summon Sarah to a closed-door meeting about the issue. Sarah knows that the commissioners respect decisiveness, and will insist that she not equivocate. What should Sarah recommend?

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<http://gisprofessionalethics.org>

Reviewers: Mary Tsui (Land Systems Group, Monterey CA), Bruce Joffe (GIS Consultants & Open Data Consortium), Michael Davis (Center for the Study of Ethics in the Professions, Illinois Institute of Technology), Chuck Huff (Department of Psychology, St. Olaf College), and Matthew Keefer (Division of Educational Psychology, University of Missouri-St. Louis).

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Case study: Tidal Wetland Mapping

Kelly is a GIS analyst and owner of a small environmental consulting firm that specializes in wetlands assessment and mapping. In addition to her GIS skills, she is a trained botanist with years of experience doing field surveys and analyzing soil samples to delineate tidal wetlands. She has recently begun work on a project commissioned by the State of Oregon to identify estuarine areas on the Pacific coast and to prioritize them for conservation and restoration. The contract is a great opportunity for Kelly's firm. If her work is well received, it could lead to similar and even more lucrative contracts in Oregon and elsewhere.

The contract requires Kelly and her team to follow the client agency's established protocol for mapping tidal wetlands. The protocol involves several existing data sources. One is a digital map of probable tidal wetlands in the area (Scranton 2004). The protocol allows removal of polygons from this dataset if aerial photography interpretation, field visits and other ancillary data suggest these do not represent actual tidal wetlands. In addition, areas may be added to the tidal wetlands dataset after field inspection if these areas are already identified and mapped in the National Wetlands Inventory (NWI) database. However, because the protocol is designed to be repeatable and usable by many people who may not have a background in wetland delineation, it does not include methods for adding new wetlands to the database that aren't already mapped in the NWI.

During Kelly's visits to sites of previously identified tidal wetlands, she finds evidence of additional wetlands that aren't mapped in either data source. However, the client agency's protocol doesn't accommodate the soil sampling needed to confirm Kelly's hypothesis. Neither does her project budget and schedule of deliverables provide the money or time needed to perform the extra work. She knows she cannot devote unbillable hours to the tasks either, since the project budget is barely adequate for the scope of work.

There seems to be no way to verify with certainty that these areas are or are not wetlands. Leaving the sites out of her map products could result in important estuarine resources being excluded from conservation and restoration plans. It may even reduce the overall efficacy of the agency's wetland conservation program by leaving out ecologically and spatially important linkages between previously mapped wetlands. But including them would violate the methodology of the protocol and could threaten the perceived integrity of her work. It would also cause her firm to lose money, which a small company cannot afford to do.

What should Kelly do?

References

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Resources for educators

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Reviewers: Dawn Wright (Department of Geosciences, Oregon State University), David DiBiase (Dutton e-Education Institute, Penn State University), Francis Harvey (Department of Geography, University of Minnesota).

Acknowledgment

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Download abstracts, presentations, other resources
http://dusk.geo.orst.edu/aag_ethics09.html

**Geographic Information Ethics and GIScience
Special Sessions, AAG 2009, Las Vegas**

More Info. on AAG
Annual Meeting

Follow-up Session at
AAG 2010





**Association of American Geographers (AAG)
Annual Meeting**
Tues., March 24, 2009
Las Vegas, Nevada, USA
8:00-11:50 a.m., Riviera Hotel,
Skybox 208

Organizers:
Francis Harvey (U. of Minnesota)
Dawn Wright (Oregon State U.)

Images to left courtesy of Las Vegas
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Ethical engagements with the multitude of GIS applications and uses, whether surreptitious or overt, have marked recent developments in the field. Indeed, the variety of applications of geographic information science & technology (GIS&T) has led the U.S. Department of Labor to highlight "geographic technology" as the third largest high-growth job field for the 21st century. While the potential benefits and risks of geographic technologies are becoming well known, the ethical issues are less widely engaged. For instance:

- Geographic 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 geographic technologies are used to make policy decisions. Erroneous, inadequately documented, or inappropriate data can have grave consequences for individuals and the environment.
- Geographic 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.


http://dusk.geo.orst.edu/aag_ethics10.html


**Geographic Information Ethics and GIScience
Special Session, AAG 2010, Washington, DC**

More Info. on AAG
Annual Meeting

Session at AAG 2009

Follow-up Session at
AAG 2011





**Association of American Geographers (AAG)
Annual Meeting**
Sun., April 18, 2010
Washington, DC, USA
2:00-3:40 p.m., Marriott Hotel,
Virginia Suite B

Organizer:
Francis Harvey (U. of Minnesota)
Chair:
Dawn Wright (Oregon State U.)

Also, Ethical Guidance for Pervasive and Autonomous IT Blog
<http://ethicalpait.blogspot.com>