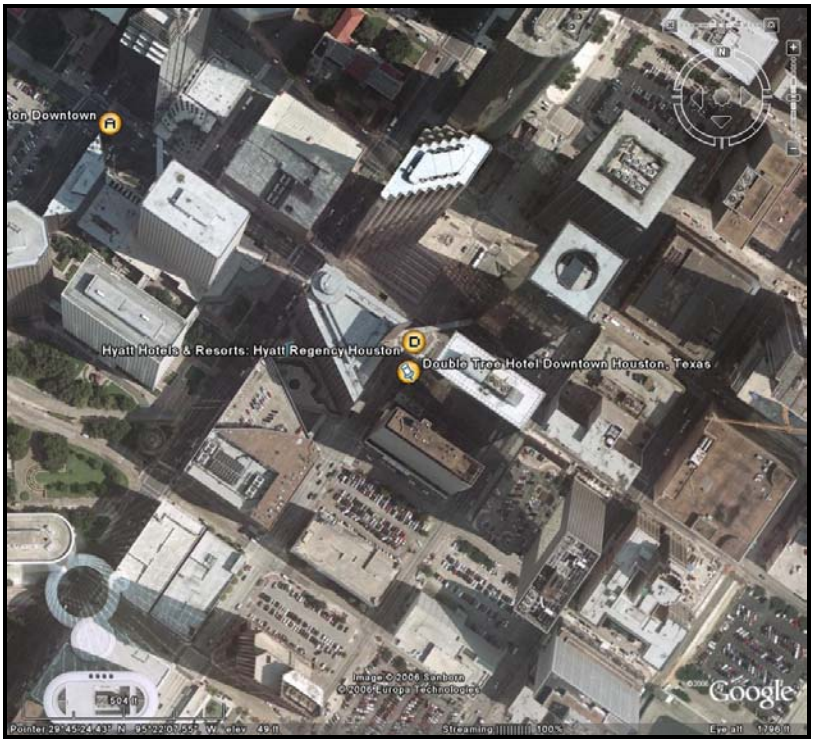
SPATIAL ANALYSIS, INTERACTIVE DATABASES, GEOGRAPHIC INFORMATION SYSTEMS AND SOCIAL SCIENCE RESEARCH



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> If a Nation expects to be ignorant and free in a state of civilization, it expects what never was and never will be.... [I]f we are to guard against ignorance and remain free, it is the responsibility of every American to be informed. (Thomas Jefferson, Letter to Colonel Charles Yancey, January 6, 1816)

Please forgive the quote from the elitist sage from Monticello but he does have a point on this subject. We live in a digital age. Computers and the Internet changed forever the way we work, play and educate ourselves. More than ever, it is important to have quick access to reliable and comprehensive data to inform and help shape the critical decisions affecting our lives. Just as important, is cultivating the ability to work with computer-mediated information. If a healthy democracy depends on an informed citizenry as Jefferson said, then you cannot exercise your democratic birthright without having the technical competence to work with fast machines as well as the ability to manipulate and interpret qualitative and quantitative data. I will go further and state, students and citizens in the late twentieth century must have cultural, historical, political, scientific, mathematical and spatial literacy. Developing political and spatial literacy is one the major challenges facing academics, students and activists concerned about social change and improving their communities. The purpose of this workshop is to introduce you to freely available geospatial and database tools. While these resources are user friendly, you will need to put forth time effort to get maximum benefits. The workshop will focus specifically on the tools needed to develop political and spatial literacy.

According to geospatial scholars and experts, most problems facing the world today, cultural, environmental, economic, political, or social—exist in a geographic context. Scholars estimate that eighty percent of all data has a spatial aspect. Geography and place are important components of many disciplines such as political science agriculture, geology, biology, environmental science, mathematics, sociology, economics, literature, and many more. Geographic Information Systems, Interactive Electronic Databases and Data manipulation and Data Visualization software properly utilized can give students, academics and activists tools needed to conceptualize socio-economic and political problems accurately and therefore create appropriate solutions. I will go further and suggest developing skill and expertise with these can help all of us to become more effective citizens and good stewards of our society.

So what is a GIS? In the strictest sense, a GIS is a computer system capable of assembling, storing, manipulating, and displaying geographically referenced information, i.e. data identified according to their locations. Practitioners also regard the total GIS as including operating personnel and the data that go into the system.

The role of GIS and spatial analysis in social science was recently discussed in an article by University of California- Santa Barbara Geographer, Dr. Michael F. Goodchild. The article was published in the spring 2004 issue of *Arc News Online*. You can find a copy of the article by following the link below:

http://www.esri.com/news/arcnews/spring04articles/social-sciences.html

Goodchild's article explores some the ways in which modern social scientist are currently making use of GIS and spatial analysis. According to Goodchild, social scientists lag behind business and economist in the use of GIS and are for the most part late comers to using spatial analysis in their research and investigations. We may now be at the front end of a kind of research renaissance as social scientists scramble to retool and catch up to their colleagues in the use of this research tool and methodology.

Below you will find a selected list of my favorite and hopefully useful Public Policy, Data and GIS related websites. I have found these sites to be of particular interest to social science researchers, students and community activists.

1) The US Census Bureau maintains one of the most useful and data rich sites on the net for social and political scientists. Their redesigned web site and especially the **American FactFinder** provides easy access to a large number of demographic and spatial variables. Time spent exploring the resources of the Census is time well spent.

   A. http://www.uscensus.gov
   http://factfinder.census.gov/home/saff/main.html?_lang=en

   B. From time to time the Census Bureau will also collect data on topical issues and special subjects such as Minority Voting Behavior, Census Transportation Planning Package, State, County and City Facts sheets. Most recently the Census has collected a set of resources related to the "Hurricane Katrina" Disaster.

   http://www.census.gov/Press-Release/www/2005/katrina.htm

   C. US Census Bureau Estimates of Population Change for Counties

   http://www.census.gov/popest/counties/CO-EST2005-02.html

   D. Poverty Data from the US Bureau of the Census

   http://www.census.gov/hhes/www/poverty/poverty.html

   E. Census 2000 Briefs and Special Reports

   http://www.census.gov/population/www/cen2000/briefs.html

2) US Geological Survey

   Geographic information systems (GIS) technology can be used for scientific investigations, resource management, and development planning. For example, a

GIS might allow emergency planners to easily calculate emergency response times in the event of a natural disaster, or a GIS might be used to find wetlands that need protection from pollution.

http://geography.usgs.gov/

http://nmviewogc.cr.usgs.gov/viewer.htm

3) US National Atlas

Work on a new **National Atlas of the United States**® began in 1997. This Atlas updates a large bound collection of paper maps that was published in 1970. Like its predecessor, this edition promotes greater national geographic awareness. It delivers easy to use, map-like views of America's natural and sociocultural landscapes. Unlike the previous Atlas, this version is largely digital.

http://www.nationalatlas.gov/

4) Environmental Systems Research Institute. ESRI, Inc.

This site contains a wealth of information, including free software, free geospatial data, and free on line courses on using GIS. The site changes frequently so visit often. ESRI also makes the most popular software packages available for GIS analysis: *ArcView, ArcGIS, ArcIMS* and other products.

http://www.esri.com

The free GIS dataviewer, *ArcExplorer 9.1 Java Edition for Education*, allows you to view and query local data sets as well as access ARCIMS Server services. You can download this software along with instruction manuals.

http://www.esri.com/software/arcexplorer/about/arcexplorer-education.html

5) GIS.COM

The site is intended to educate anyone interested in geographic technology on the value that technology brings to their day-to-day activities. The site also provides GIS users with resources to help them in their work. GIS.com is a portal to GIS information on the Web and was created by ESRI, a GIS software developer. The site is intended to educate anyone interested in geographic technology on the value that technology brings to their day-to-day activities. The site also provides GIS users with resources to help them in their work.

http://www.gis.com

6) Caliper Corporation

This GIS Software company makes and markets **Maptitude** as its main product. The company is focused on providing Transportation and Redistricting solutions.

http://www.caliper.com

7) Center for Spatially Integrated Social Science

CSISS is one the best and most comprehensive resources on spatial analysis and data visualization. The site provides a GIS Cookbook, Course Syllabi, free software, and information about workshops and training.

http://www.csiss.org/

8) Fairdata2000.com
This site contains a free Maptitude GIS server focused mainly on Redistricting and Voting Behavior.

http://www.fairdata2000.com

9) Environmental Protection Agency (EPA) GIS Mapping Tool

EnviroMapper provides a dynamic way to view and query environmental information. EnviroMapper maps several types of environmental information, including drinking water, toxic and air releases, hazardous waste, water discharge permits, and Superfund sites. EnviroMapper also links to text reports, which provide even more information. If you have a web browser, you can use EnviroMapper

http://maps.epa.gov/enviromapper/

10) Environmental Defense

This organization is a leading national nonprofit representing more than 300,000 members. According to their self description, "Since 1967, we have linked science, economics, and law to create innovative, equitable, and cost-effective solutions to the most urgent environmental problems. " The organization is also responsible a the Environmental Score Card web site that allows users to conduct analysis of his or her neighborhood, city and state for the location and danger of environmental pollutants and hazardous wastes.

http://www.environmentaldefense.org/
http://www.scorecard.org/

11) The Bureau of Transportation Statistics (BTS)

The BTS is a data rich site for those interested conducting research in this area of public policy.

http://www.bts.gov/programs/geographic_information_services/

12) Federal Highway Administration (FHWA)

FHWA creates and maintains a wide variety of GIS related resources and GIS web based applications, including a very user friendly GIS called **HEPGIS.**

http://hepgis.fhwa.dot.gov/hepgis_v2/welcome.aspx

13) Geospatial and Statistical Data Center, University of Virginia Library

This site allows users to explore a variety of variables over time. Students and researchers can track the growth and decline of slavery by state and county from 1790 to 1860. The site contains historical census as well as voting data.

http://fisher.lib.virginia.edu/

14) Data on the Net from University of California San Diego

This resource provides a comprehensive compilation of data sources that can be used to create customized data sets.

http://odwin.ucsd.edu/idata/

15) National Neighborhood Indicators Partnership

The NNIP is a collaborative effort spearheaded by the Urban Institute. You will find research and guidelines for building a community and neighborhood database useful for developing and shaping public policy (see link 22).

http://www2.urban.org/nnip/

16) Neighborhood Change Database from Geolytics Software

One of the key challenges of work with temporal data is the problem of normalization. This commercial site provides normalized historical census products so that valid comparisons and trends and can be analyzed properly.

http://geolytics.com/USCensus,Neighborhood-Change-Database-1970-2000,Products.asp

17) National Institute for Technology and Liberal Education (NITLE)

NITLE provides workshops and for faculty at Liberal Arts Colleges and Universities. Their web site contains papers outline the experience of integrating technology in the classroom and neighborhoods. A short paper by Dr. Glennwood Ross II, of Morehouse is a useful resource.

http://nitle.org/index.php/nitle

18) Community Economic Toolbox

This site is an excellent example of the use of technology to gain rapid and easy access to vital information with policy implications. The main focus of this site is community economic development at the county level. Here you will find trend data, economic indicators and living wage estimations. Data are presented in an easy to understand graphical format.

http://www.economictoolbox.geog.psu.edu/

19) Policylink

The Policylink web site provides several guides and toolkits for academics, students and activists to create community specific policy focused research. The Equity Development Toolkit and the Community Mapping Tool are especially useful.

http://www.policylink.org/default.html

20) CitizenJoe

This site provides a more or less non-partisan resource on issues, policy and legislation. You will find it is similar to the Almanac of Policy, Factcheck.org, Project Vote Smart and Public Agenda.

http://citizenjoe.org/

21) GovTrack.us (Tracking the US Congress)

This remarkable resource allows users to monitor issues, legislation and lawmakers. It is more user friendly than the official Library of Congress legislative look-up device Thomas.

http://www.govtrack.us/

22) Urban Institute

This site contains interactive databases on Accessing the New Federalism project as well as the National Survey of American Families project. The site also contains a very useful Research Toolkit.

http://www.urban.org/index.cfm

23) North Carolina General Assembly Redistricting Homepage

The NC General Assembly has one of the most comprehensive and user friendly and resources available on the subject of Redistricting. The site contains a good explanation of the Reapportionment and Redistricting process, a good chronology of the controversial 1990s round of Congressional Redistricting, as well as, access to ArcGIS Shapfiles and PL-94-171 data.

http://www.ncga.state.nc.us/GIS/Redistricting/index.html

24) Inter-University Consortium for Political and Social Science Research (ICPSSR)

This site contains one of the largest collections of electronic data in the world. The collections includes the National Election Study, the National Archive of Criminal Justice Data, the Health and Medical Care Archive, The General Social Survey Data and Retrieval Information Systems and the International Archive of Education Data. Access to some of the studies and surveys may be restricted to institutional membership.

http://www.icpsr.umich.edu/

25) Project Vote Smart

This non-partisan web site is one the best available for basic information about elections, issues and candidates. You can find out your elected officials by typing in your nine digit Zip Code. You can also examine elected officials voting records and interest group ratings.

http://www.vote-smart.org/index.htm

26) Policy Almanac

This site is a good place to begin background research on critical issues such as criminal justice, education, health, environment, economics, poverty and social welfare.

http://www.policyalmanac.org/

27) North Carolina Board of Elections

Students of politics in North Caroline will find a wealth of useful voting data at this site. This resource contains data on elections and candidates.

http://www.sboe.state.nc.us/

28) The Black Commentator Online

This site provides some of the most interesting and insightful commentary on the current issues of the day from the perspective of African Americans. Students should find the Congressional Black Caucus Monitor or the CBC Monitor especially helpful for keeping up the African American Congresspersons.

http://www.blackcommentator.com

29) The Department of Political Science and Criminal Justice Web Site at North Carolina A&T State University

Our department provides access to past and current research projects conducted by faculty and students utilizing the GIS/CATI Laboratory in 218 Gibbs Hall.

http://www.poli.ncat.edu

30) NCATSU FD Bluford Library: Interactive Databases

The library makes hundreds of databases available for faculty and student use. In my opinion, JSTOR, Wilson Web, PAIS International Archive, Web of Science and Lexis-Nexis are the most useful for social science research.

http://www.library.ncat.edu

31) Electronic Policy Network

The EPN is one of the best places to begin research on policy issues such as Social Security Reform, Social Welfare Reform, and Economic Policy.

http://www.movingideas.org

32) The Center for Budget and Policy Priorities

The CBPP is the best place to go for background and perspective on tax and national budget issues.

http://www.cbpp.org/

33) DIVA GIS

This site contains free shape files of a World Base Maps.

http://www.cipotato.org/DIVA/data/MoreData.htm

34) Google Earth

Google places satellite images of the entire globe on its servers. Users can download free software to make use of this easy to use spatial analysis tool. There are also upgrades available and user communities available.

http://earth.google.com/

APPENDIX A

SOCIAL SCIENTIST TOOLKIT

Every social scientist should develop a set of working tools to carry out investigations of political, economic and social reality. A suggested minimum set should include the following:

1. A laptop and desktop computer and/or access to computers and fast data networks (DSL, Cable Modem, TI, Wireless).

2. A Gigbyte Flash Drive for storing and retrieving working files.

3. A PDA or some sort of device to aid with time management and project scheduling.

4. Microsoft Office Suite: Word, Excel, Access, Publisher, Frontpage.

5. Data Analysis Software such as SPSS or SAS.

6. Bibliographic Utility to store and retrieve references and manage note taking.

7. Adobe Document Reader

8. WinZip or some other Compression/Decompression Utility.

9. Photo Editing Software

10. A digital camcorder and camera.

11. Spatial Analysis and data visualization software such as ArcExplorer2 Java Education Version Geographic Information Systems (GIS) Dataviewer or full GIS software such as ArcExplorer, ArcGIS, Maptitude, GeoDa, and Flow Mapper.

12. Communications software such as Outlook, Gmail, Hotmail, and or Yahoo.

APPENDIX B

RESEARCH AGENDA OF NCATSU GIS/CATI LABOROATORY

North Carolina A&T State University

Department of Political Science and Criminal Justice

Geographic Information Systems and Computer Assisted Telephone Interviewing Laboratory (GIS/CATI) 218 Gibbs Hall

The purpose of the GIS/CATI Laboratory is to serve as a training and research facility for the students and faculty. The GIS/CATI Lab provides the telecommunications, geospatial research, analysis and teaching tools needed to equip our students and faculty for substantive research efforts. Researchers have the capability to conduct telephone and online surveys as well as conduct geospatial research.

The laboratory was created in 1995 through transportation related grants obtained by Dr. Claude Barnes. Significant enhancements and a major update of the lab was made possible through a Curriculum Enhancement and Focus Grant designed to establish a "Criminal Justice Program.

The GIS/CATI Laboratory is currently configured as a **Desktop GIS** and ***a Blaise Survey Research*** facility and located in 218 Gibbs Hall. The lab contains twelve high performance PCs, ArcGIS Version 9.1, Blaise CATI Software, SPSS Statistical Analysis Software, Microsoft Office Suite, HP Color Scanner, HP Laser Printer, LCD Viewer and two high performance Laptop Computers.

The PSRGIS Laboratory's research and training activities include the following areas:

1) *Service Equity in Urban Transit Using GIS* - This is a multi-year project funded by the US Department of Transportation. The study produces thematic maps of economic development patterns in large urban areas and the ability of central city resident to access areas of dynamic economic growth. The study also produced surveys of transit riders in Atlanta, Baltimore and Philadelphia.

2) *Voting Rights, Race and Redistricting in NC* – Dr. Barnes and a team of three students are completing a study of the impact of Shaw v Reno on democratic representation in North Carolina. The study uses GIS to produce alternative Congressional Districts.

3) *Progress and Stagnation: Profiles of African Americans in the American South 1950-2000* - this research project is a collaborative multi-year effort of social scientists from Norfolk State University, Williams College, Old Dominion, Spelman College, Morehouse College and North Carolina A&T State University. The purpose of this research project is to provide a comprehensive picture of the status of African Americans during the era of Civil Rights and during the Post-civil Rights Era. Preliminary results of

this study will be presented at the 37th Annual Conference of the National Conference of Black Political Scientists, March 22-25, 2006 in Atlanta, Georgia.

4)*Environmental Justice Database*—the purpose of this research is to examine the location of hazardous waste and air pollution and toxic releases in communities populated by people of color.

5) *Criminal Justice Database* – the purpose of this research is to map crime patterns and suggest strategies for reducing crime in neighborhoods.

6) *Racial Profiling and the Greensboro Police Department*- a team of researchers from the social sciences at A&T and a team of interested members of the Greensboro Police Department appointed by Police Chief Robert White worked together to provide a preliminary analysis of traffic stop data. The results of this study can be viewed at http://www.poli.ncat.edu/wwwroot/Research/profiling/index.html .

Future capability enhancements of the lab should proceed along three dimensions: creating GIS Server, Mobile GIS, Remote Sensing and Global Positioning Systems.

The addition of GIS Server capability gives the lab the ability to deploy GIS applications via the Internet and allow any computer connected to our campus network to access mapping and spatial analysis tools. GIS Server capability allows larger classes access to comprehensive data sets and robust spatial analysis tools. The addition of Mobile GIS and GPS capability gives the lab the ability to record live data and create dynamic mapping tools. Remote Sensing gives the lab the ability to bring in real time satellite acquired data for transportation, urban and economic development projects.