

Piedmont Project VI Course Impact Statement

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I attended the Piedmont Project in 2007 to learn more generally about sustainability, particularly related to inequalities in exposure to environmental hazards and the effects on public health, and more specifically Emory University's sustainability initiatives. I plan to use my experience in the Piedmont Project to enhance a class I taught once previously, INFO 530: Geographic Information Systems (GIS) for Public Health, in the Rollins School of Public Health. The course is intended for graduate students in public health, across all the many sub-disciplines that comprise the school. The previous incarnation of the course was largely a technical overview of GIS software and methods, and lacked a specific and unified substantive theme. In reshaping the course for the future, I chose to focus the content more on environmental health and sustainability issues. Specifically, the course project, which comprises a substantial portion of the course evaluation, will involve a written assessment of an environmental justice situation in the Atlanta area using GIS technology. One example of a local situation for possible analysis that came up during the project was the concentration of industrial and Superfund sites, as well as sewage overflow locations, in predominantly minority residential areas in southern Atlanta. There will also be assigned readings related to environmental justice assessment to serve as background for the course project, and as foundation for group discussion. In addition, one of the weekly lab assignments will be comprised of a data collection exercise using global positioning system (GPS) devices that focuses on the sustainable initiatives of Emory University through visiting numerous LEED certified green and EarthCraft buildings, sustainable gardens, and recycling locations around campus. As background for the GPS lab exercise, I will present in lecture introductory material related to the three components of sustainability, while focusing primarily on the environmental component. In addition to the focusing of the course project and GPS lab on some environmental issues related to sustainability, I will include more readings and applied examples in the course that address environmental hazards and their relation to public health. There are many examples in the literature of using GIS technology to model and visualize air, water, and soil quality, so there is a rich set of resources from which to draw material.

INFO 530: GEOGRAPHIC INFORMATION SYSTEMS FOR PUBLIC HEALTH

INFO 530
Geographic Information Systems for Public Health
David C. Wheeler, Ph.D.

- Number and title:* INFO 530
GEOGRAPHIC INFORMATION SYSTEMS FOR PUBLIC HEALTH
- Instructor:* David C. Wheeler, Ph.D.
348 Grace Crum Rollins Building, (404) 727-8059
dcwheel@sph.emory.edu
- Time and location:* Lecture: M 3-4:50 PM, Room 111 SPH
Lab hours: W, 3-4:50 PM, Room P05 SPH
- Office hours:* M 5-6 PM and W 5-6 PM, or by appointment
- Prerequisites:* Experience computing using the Windows environment
- Brief description:* The course introduces the use of geographic information systems (GISs) in the analysis of public health data. We develop GIS skills through lab work, and particularly address basic GIS operations such as buffering, layering, and spatial query. In addition to GIS issues, we address introductory cartography, data collection using GPS technology, and aspects of basic spatial analysis. We also will discuss issues related to sustainability and environmental justice.
- Goals:* Develop practical GIS skills
Gain knowledge of applying GIS technology appropriately to data
Acquire experience using GPS to collect primary data
- For whom intended:* The course is designed for graduate students in throughout the Rollins School of Public Health.
- Required texts:* Cromley, E., and S. McLafferty (2002) *GIS and Public Health*. New York, NY: The Guilford Press. ISBN: 1572307072
- Ormsby, T., E. Napoleon, R. Burke, L. Feaster, and C. Groessl (2004) *Getting to Know ArcGIS Desktop, Second Edition*. Redlands, CA: ESRI Press. ISBN: 158948083X
- Additional texts:* Krygier, J., and D. Wood (2005) *Making Maps: A Visual Guide to Map Design for GIS*. New York, NY: The Guilford Press. ISBN: 1593852002
- Koch, T. (2005) *Cartographies of Disease: Maps, Mapping, and Medicine*. Redlands, CA: ESRI Press. ISBN: 1589481208
- Mitchell, A. (1999) *The ESRI Guide to GIS Analysis. Volume 1: Geographic Patterns & Relationships*. Redlands, CA: ESRI Press. ISBN: 1879102064
- Monmonier, M. (1996) *How to Lie with Maps, Second Edition*. University of Chicago Press. ISBN: 0226534219

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<i>Attendance:</i>	Mandatory
<i>Evaluation:</i>	Labs, 50% Final project, 30% Attendance and Participation, 20%
<i>Next offered:</i>	Fall 2008
<i>Continuation:</i>	INFO 560

Evaluation methods:

1. Weekly labs (six) involve guided exercises using ArcGIS software. You will use the Ormsby (2004) book as a practical reference. You will start lab assignments during the scheduled lab sessions, and may complete them on your own time. Each lab requires a written report to be submitted to me at the start of the following lab session. You may help one another when working on the lab, but turn in your own written report. Your written work should be your own. The report will be graded. Due dates will be clearly delineated on each assignment.

The GPS (global positioning system) lab is different and involves using hand-held GPS units to find the latitude and longitude of various landmarks that highlight green building and sustainability practices around Emory University's campus. This lab will align in theme with the readings and lecture of the same week. I will assign students into small teams and provide a list of landmarks to locate. Data from the GPS unit will be transferred to ArcGIS using special data conversion software and mapped for comparison with the results from other teams.

2. A final individual project with written report. The project will require application of many of the GIS skills acquired through lab exercises. Unlike the weekly lab exercises, however, ArcGIS instructions will not be provided. You will be required to address questions related to an assigned set of data. Your answers should also draw on knowledge gained from weekly readings. The substantive content of the project will be related to environmental justice issues in the Atlanta area.
3. Attendance and participation in group discussion drawing from weekly reading assignments from Cromley (2002) and topical journal articles. Each week you will send me via email (dcwheel@sph.emory.edu) **one** question related to the reading. I will pick questions to address and discuss during the weekly lecture. Send your question to me by midnight Sunday for class on Monday. In addition, we will have a discussion session related to numerous assigned papers dealing with applications of GIS to address public health concerns.

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Topic list:

1. Basic Cartography
 - Elements of maps: scale, generalization, and projections
 - Map symbolization and display
 - Choropleth map classification
2. GIS Fundamentals
 - GIS data models (vector, raster)
 - Locations and attributes
 - Points, lines, and polygons
 - Spatial queries, distances, buffers, data summaries
 - Relational joins, map layering
3. Public Health applications
 - Data sources and acquisition
 - Assessment of the spatial pattern of disease locations (points) and disease rates
 - Assessment of environmental justice
 - Awareness of environmental health and sustainability issues

Timeline:

- 1/22 *Classroom:* Course introduction. Introduction to maps and GIS
- 1/24 *Lab 1:* Introduction to ArcGIS. Navigating in ArcMap, using layers, selecting a subset by attributes, and creating a map
- 1/29 *Classroom:* Introduction to spatial data: points, lines, and polygons. Spatial location and attribute data. GIS data models: raster and vector
Reading: Cromley Introduction, Chapter 1-2
- 1/31 *Lab 2:* Using attribute tables, selecting records, using multiple maps in a layout, and adding map features
- 2/5 *Classroom:* GIS operations. Map elements and scale. Choropleth mapping. Projections, coordinate systems, and distortions
Reading: Cromley Chapter 3-4
- 2/7 *Lab 3:* Joining tables through a shared attribute, adding points from a text file, making choropleth maps, buffering, and generating data summaries
- 2/12 *Classroom:* Environmental hazards and public health. Georeferencing. Data acquisition using the global positioning system (GPS)
Reading: Cromley Chapter 6
- 2/14 *Lab 4:* Collecting primary data around Emory University using GPS (outside)
- 2/19 *Classroom:* Disease mapping. Environmental justice
Reading: Cromley Chapter 7-8
- 2/21 *Lab 5:* Importing GPS data, overlaying GPS and raster data, buffering, and making choropleth maps

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- 2/26 *Classroom:* Case studies of GIS applications for public health
Assign individual project
Reading: Kitron et al. (1994), GIS in Malaria Surveillance; Guthe et al. (1992),
Reassessment of Lead Exposure in New Jersey Using GIS Technology
- 2/28 *Lab 6:* Address matching, color choice and symbology, and setting a projection in
ArcMap
- 3/5 *Classroom:* Geovisualization and disease cluster analysis (GeoDa, ESTAT, SaTScan, R
software)
Reading: Cromley Chapter 5
- 3/7 *Lab:* Project work time
- 3/9 Individual projects due at 5 PM