Spatial Demography

Sociology 579

Course Credits = 3

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All course materials are on ANGEL
https://cms.psu.edu/

Scheduled Class Time & Location

Tuesday 1.25pm – 4.25pm Room 6 Sparks Building

Office Hours
Wednesday
10.00am-12.00pm
507 Oswald Tower

Teaching Assistant
None Assigned

Course Description

Recent Changes in this Course

This graduate seminar includes several revisions since it was last offered.

At the most fundamental level I have changed the number and format of the assignments and streamlined the workload across all components. While I have assigned two workbooks they are both intended as a resource to work through at your own pace and are designed to help you gain familiarity with ArcGIS (the workbooks also provide time-limited software licenses). ArcGIS is the package you are most likely to use to help you build databases but in many cases it will not be the package you use to 'analyze' your data. That is, the material in the two workbooks is primarily intended as a guide to some fundamental GIS-like data manipulation, mapping and analysis operations. Working through these workbooks, at your own pace, will improve your confidence level for handling geospatial data in other packages and will provide a foundation for using more advanced spatial analysis software introduced later in the course. It is important to note that I will selectively draw on some of the materials in the workbooks book during our lab sections. Lab sessions will also be supplemented with additional exercises.

I have also reformatted the syllabus. I used to include a great deal of background material (I saw them as useful resources). I have changed track, and will now post these materials on the GIA Core website and on ANGEL. This shrinks the syllabus but you will have easy access to relevant content (i.e., resources).

General Introduction

This graduate seminar is part lecture, part demonstrations, part discussions, and part lab. The goal is to expose sociologists, anthropologists and demographers to the vast array of geospatial data that are available, encourage them to think critically and creatively about how different forms of geospatial data can be integrated in their research, and introduce them to the spatial analytical methods that are increasingly encountered in demographic inquiry. More specifically the course will examine the characteristics of geospatial data (represented as points, lines, areas and surfaces), discuss the implications of choices regarding scale, aggregation, and spatial weights as well as focus on techniques for identifying spatial autocorrelation, spatial heterogeneity, and non-stationarity and the methods appropriate for modeling such data.

The emphasis in the course will be on area (or lattice) data though spatial point pattern analysis and geostatistics methods will be discussed. The seminar will focus on applications and demonstrations drawn from a wide array of topics such as urban poverty, neighborhood research, racial/ethnic diversity, maternal and child health and wellbeing, and population-environment relations.

I have not designed this as a GIS course but throughout the semester you will have plenty of opportunity to learn *ArcGIS 9.x* and other software, namely *GeoDa* (and *OpenGeoda*) and *Geographically Weighted Regression 3.x.*, (and also exposure to *CrimeStat* and perhaps *R* [spdep] for spatial analysis). *Geoda* is a program that facilitates exploratory spatial data analysis

and can be used for spatial regression modeling, while *GWR* facilitates an exploration of spatially varying relationships and 'local' models.

Participants will learn practical techniques associated with the analysis and visualization of demographic data ranging from how to communicate with maps and create maps for use in PowerPoint, the use of address-matching (geocoding), data integration tools, use of ethnographic data, and statistical measures for area analysis (e.g. spatial regression models and spatial autocorrelation tests). Throughout the seminar we will discuss GIS in academic, government, and applied demographic settings and new directions and challenges associated with GIS technologies.

There are **THREE assignments** totaling 80 percent of the course grade
(describe between pages 25-28);

20 percent is assigned for
attendance, in-class exercises, discussion and participation.

Course Objectives & Outcomes

There are both primary and secondary objectives for this course. The <u>primary objectives</u> are:

(1) to gain a better understanding of the potentials and pitfalls of using geospatial data;

(2) to enhance spatial thinking as applied to demographic, social, behavioral and health research,

and,

(3) to develop skills and understanding of exploratory spatial data analysis and spatial econometric approaches (testing for the presence of spatial dependence and estimating models with spatial dependence).

In addition to these primary goals I want you to have fun.

Along the way you will gain a better understanding of the potentials of spatial analysis and become familiar with methods for using GIS-related technologies at multiple stages of a research process – from study design and data collection strategies though to data visualization and spatial analysis. This is important as GIS and spatial analysis are not a panacea. Adopting a spatial perspective requires the careful reconsideration of some fundamental conceptual and theoretical issues in aspatial social science. I will try to cover all such issues in this graduate seminar.

Semester at a Glance – page 6

Detailed Weekly Descriptions – page 13-24

Reading Materials

Please note currently no "demography" text covers GIS and spatial analysis, and very few GIS or spatial analysis texts focus on demographic themes. As many of you are in the demography dual degree program I will assume that during your training you will read extensively on demographic methods but that you are unlikely to read any GIS or spatial analysis literature.

Most articles will be placed on ANGEL https://cms.psu.edu/.

Class Workbooks ($)

Kurland KS, Gorr WL. 2007. *GIS Tutorial for Health*. ESRI Press: Redlands, CA. (approx $55.00 on Amazon).

Parker RN, Asencio EK. 2008. *GIS and Spatial Analysis for the Social Sciences: Coding, Mapping, and Modeling*. Routledge/Taylor & Francis: New York, NY. (approx $48.00 on Amazon). This book and the exercises it contains are complicated by poor documentation. I have a 7-page guide to some of the problems you will encounter in Sections 1 & 2 of the workbook.

The expectation is that you work thorough these workbooks at your own pace and use these as a way to build up your confidence and abilities in handling geospatial data. In the interests of time I will identify the 'must do' tutorials; there are several we will work through in the lab components of the course. There is some duplication of general areas across these workbooks and my own labs (e.g., geocoding) and there is no need to do all exercises 9except for honing your own skills). However, one should note that while there is overlap there are also differences. Recognizing these differences and having some familiarity with the topical coverage of those tutorials not completed may be useful when we come to preparing material for the final project.

FREE Class Workbooks and materials YOU WILL USE:

These workbooks will be supplemented with exercises and materials from my own training programs (Advanced Spatial Analysis and GISPopSci workshops) and from other online workbooks (listed below).

Anselin L. 2005. *Exploring Spatial Data with GeoDa: A Wookbook* UC Santa Barbara, CA: Center for Spatially Integrated Social Science. The workbook, software and many related materials are available online at the current GeoDa homepage: http://geodacenter.asu.edu/.

Fortheringham, AS, Charlton M, Brunsdon C. 2008. On-line GWR resources. National Center for Geocomputation, National University of Ireland: http://ncg.nuim.ie/ncg/GWR/software.htm

de Smith MJ, Goodchild MF, Longley PA. 2006-2008. *Geospatial Analysis: A Comprehensive Guide to Principles, Techniques and Software Tools*. Available online at http://www.spatialanalysisonline.com/. This is perhaps the most comprehensive single on-line

source for material on both concepts and methods available. It includes links to several excellent resources such as software (http://www.spatialanalysisonline.com/software.html).

Ward MD, Gleditsch KS. 2008. *Spatial Regression Models*. Sage Publications: Thousand Oaks, CA. (approx $17.00 on Amazon). An early version of this book is available at: http://faculty.washington.edu/mdw/pdfs/SRMbook.pdf

Required and Supplemental Readings

Required and supplemental readings will be distributed throughout the course via the ANGEL site. On ANGEL I have created folders for each LESSONS / Week xx. These will contain PDFs (usually) of required and supplemental articles and associated materials. I have usually limited required readings to 2 articles per week; with the exception of Weeks 1-2 and 8-9. Supplemental readings are there for those interested in specific topics. There is no obligation to read any of the supplemental readings. Note that throughout the semester I will inevitably add to the supplemental readings posted on ANGEL. These additions are NOT required readings.

NOTE: a series of extensive literature searches on substantive applications of GIS and spatial analysis were completed in early 2008 and later in Summer 2009. These reference lists can be found on the PRI GIA Core website – specifically at URL: http://www.pop.psu.edu/gia-core/litsearches.htm. This webpage should be consulted frequently during the course.

Please note numerous reference materials will be included on the ANGEL site (specifically under LESSONS/ Course Resources). Again, these are intended as resources. It is hoped you will look at them and draw on them, as needed, throughout the course.

Course Links

The ANGEL site will include a host of suggested Internet links. Some highly recommended web-links include:

> PRI's GIA Core   http://www.pop.psu.edu/gia-core/ (and associated links)
> GIS and Population Sciences Project http://csiss.ncgia.ucsb.edu/GISPopSci/
> Center for Spatially Integrated Social Science (CSISS) http://www.csiss.org/
> ESRI Virtual Campus http://training.esri.com/gateway/index.cfm
> > ESRI Podcast series http://www.esri.com/news/podcasts/instructional_series.html
> US Census Bureau   http://www.census.gov

PowerPoint slides prepared for each class

The PowerPoint files will be placed on ANGEL as soon after each lecture/lab as is practicable. Please note, I rarely use "notes" format when preparing slides and so it is important that you take your own notes while listening to my lecture. That is, many slides can be images (i.e., maps) that I explain in my lecture but detailed comments are not offered in the PowerPoint file.

Week	Date	Lecture themes
Week 1	August 25	Demography as a Spatial Science
Week 2	September 1	Demography as a Spatial Science (continued)
Week 3	September 8	Cartography & Basic Spatial Analysis
Week 4	September 15	Principles of GIS/Privacy and Confidentiality
Week 5	September 22	The Potential and Pitfalls of Spatial Data
Week 6	September 29	Defining & Operationalizing Neighborhoods
Week 7	October 6	Exploratory Spatial Data Analysis
Week 8	October 13	Local Indicators of Spatial Association (LISA) & G*
Week 9	October 20	OLS and Spatial Regression
Week 10	October 27	Spatial Lag an Error Regression Models
Week 11	November 3	Geographically Weighted Regression
Week 12	November 10	Geographically Weighted Regression
Week 13	November 17	Point Pattern Analysis
Week 14	December 1	New directions and challenges
Week 15	December 8	Presentation today (15 minutes each, including questions)
	December 14	**Research paper due**

Other key dates:

Assignments

1: Spatial Demography Classic	October 6, 2009
2: ESDA/spatial regression project	November 3, 2009
3: Final term paper	October 13, 2009 (draft)
	December 8, 2009 (presentation)
	December 14, 2009 (term paper)
4: Participation	Ongoing

Assignments: Titles, due dates, and grade points

There are **THREE** assignments totaling **EIGHTY percent** of the course grade. These assignments are for you to complete **outside** of class hours.

All assignments are to be submitted via ANGEL – drop box.

Students are encouraged to work with – and learn from - one another but each student is required to prepare and submit assignments on their own. If you receive significant assistance in preparing an assignment you are expected to acknowledge this assistance in an acknowledgement section. *No changes in due dates for any assignments are anticipated. Any change can only be made by me and will not be official unless it is revealed in an e-mail to the entire class.*

TWENTY percent is assigned for <u>attendance, in-class labs, participation and discussion</u>. Please note to facilitate class discussion two students will be assigned to lead discussion on specific readings/topics. Depending on enrolment level students should expect to lead discussions at least twice and possibly three times during the semester.

Below is a listing of assignment titles, due dates and percentage of grade allocated to each assignment.

Titles	Due Date	Points
1. Spatial Demography 'Classic' (the subject of the 'classic' must be approved by me by September 22, 2009).	October 6, 2009	20
2. ESDA Project	November 3, 2009	20
3: Final Project (this includes grades for a draft proposal, an in-class presentation, and the final paper.	October 13, 2009 – draft (5%) December 8, 2009 – presentation (15%) December 14, 2009 – term paper (20%)	40
Participation/Class Discussion	Ongoing	20
Total		**100**

A description of each assignment is included at the end of this syllabus (pp. 25-28) and these will also be posted on **ANGEL**. Brief descriptions and salient issues appear below.

Please note … all projects are due by 11.59pm Eastern Standard Time on the dates specified above (unless otherwise stated). Please post to ANGEL dropbox.

For the **spatial demography classic** you are expected to identify the subject of your report and receive approval from me before **September 22, 2009**. This is a written assignment of approximately 2,500 words. This assignment is due on **October 6, 2009**. You will make a brief 5-minute presentation on your selected spatial demography classic on October 6.

For the **ESDA assignment** you are expected to use the ESDA and basic OLS/spatial regression options in GeoDa (and ArcGIS) to complete an analysis of a data set of your choice (excluding GeoDa sample data sets). This is a report/short paper format assignment of approximately 3,000 – 5,000 words, including figures and tables. The assignment is due on **November 3, 2009**.

For the **final project** (presentation and term paper) you are encouraged to **find a data set** early in the semester. This final project has several components – all of which contribute to the grade. I would like to see a 3-4 page draft of your proposed project by **October 13, 2009**, a copy of your PowerPoint file by **December 7, 2009** to be used in the presentation later on December 8, 2009 and the written term paper is due Noon (12.00pm Eastern) on **December 14, 2009**. The term paper will be approximately 5,000-6,000 words in length in the format of a 'publishable' research paper.

For **attendance, in-class labs, participation and discussion** an important part of 'participation' will be the discussion of the readings, labs and lectures. Please note that throughout the course I expect to use e-mail as the primary mode of communication outside of the class meeting times (see below under "Communication" p.10).

I expect that all **In-class labs** will be completed, if not within the class meeting time than at a later date (on your own time). In the past I have incorporated a small grade percent for each in-class lab assignment but I have since decided to do away with this. The in-class assignments/lab times will be used for discussing progress through workbooks as well as supplemental labs designed to introduce you to selected data extraction, integration and analysis tasks. I maintain that it is in your own best interests to complete workbooks and in-class labs as they will provide hands-on experience, tips, and analysis options to help you throughout the semester and specifically the final project.

<mark>Attendance Policy</mark>

Please note TWENTY percent of the grade is assigned for attendance, in-class lab assignments, discussion and overall course/class participation.

Special Fall 2009 Flu Protocols

In compliance with Pennsylvania Department of Health and Centers for Disease Control recommendations, students should NOT attend class or any public gatherings while ill with influenza. Students with flu symptoms will be asked to leave campus if possible and to return home during recovery. The illness and self-isolation period will usually be about a week. It is very important that individuals avoid spreading the flu to others.

Most students should be able to complete a successful semester despite aflu-induced absence. Faculty will provide students who are absent because of illness with a reasonable opportunity to make up missed work. Ordinarily, it is inappropriate to substitute for the missed assignment the weighting of a semester's work that does not include the missed assignment or exam. Completion of all assignments and exams assures the greatest chance for students to develop heightened understanding and content mastery that is unavailable through the weighting process. The opportunity to complete all assignments and exams supports the university's desire to enable students to make responsible situational decisions, including the decision to avoid spreading a contagious virus to other students, staff, and faculty, without endangering their academic work.

Students with the flu do not need to provide a physician's certification of illness. However, ill students should inform their teachers (but not through personal contact in which there is a risk of exposing others to the virus) as soon as possible that they are absent because of the flu. Likewise students should contact their instructors as quickly as possible to arrange to make up missed assignments or exams.

If you have questions about academic policy-related issues, please call the Associate Dean/Chief Academic Officer of your college. For health-related questions you can email Dr. Margaret Spear, director, University Health Services, at uhsinfo@sa.psu.edu.

<mark>Grading Policy</mark>

Each assignment will be graded on a scale of 0-10. *Please note that assignments are worth 5, 15, or 20 percent of the overall course grade. That is, a score of 8 for an assignment worth 20 percent of the course grade will be worth 16% of the overall grade.* A score of 7 is a good competent piece of work. Scores of 8 would represent very good, 9 excellent, and 10 is reserved for outstanding work (where extra initiative/innovation clearly sets the work apart). Late assignments will be reduced by a score of 1 (10%) for each day they are late. A grade of zero will be assigned to assignments not turned in.

For any completed assignment submitted on-time but where the original grade score is 5 or below (i.e., judged to be poor) it can be re-done and re-submitted within seven days of its return to you for a revised grade. The revised grade will be penalized a grade of 2 points (maximum grade available = 8). This option does not apply to submissions that are incomplete.

Examination Policy

This is a work intensive course. There is no final exam but there is a final in-class presentation on December 8, 2009 and term paper due December 14, 2009 (see above).

Communication

By far the best way to communicate with me is via e-mail; I check e-mail several times a day and as often as practicable when traveling.

As much as possible I will communicate with the class through E-mail (matthews@pop.psu.edu). All students are encouraged to send questions or comments on lectures, texts, readings or exercises. Where appropriate I will send responses to questions to all students enrolled in the course, redacting individual identifiers when necessary. If you raise a question but you do not want a reply sending to the class please put SOC 579 - PRIVATE in the subject line of the e-mail.

Please note that some e-mails relating directly to the course content may count towards the 'participation' grade.

Technical Needs and Recommendations

The course is not intended as a GIS software course, though of course you will have plenty of exposure to packages, including but not limited to ArcGIS and GeoDa.

ArcGIS

I am expecting you to work on your own a great deal on GIS exercises and to come up to speed within on ArcGIS 9.x by working through the material in *GIS Tutorial for Health* and the *GIS and Spatial Analysis for the Social Sciences* (by mid-semester). The assigned texts come with a time-limited single-use site license for ArcGIS 9.3. Please note that the single-use ArcGIS license requires the Microsoft Windows XP, Windows 2000, or Windows NT (Service Pack 6a) operating system.
  Hardware requirements: A minimum 800 MHz processing speed; 256 MB RAM; 800 MB hard disk space, including 50 MB on the operating system drive; an additional 225 MB hard disk space is required for the exercise data. If you do not have your own laptop that meets these specifications not to worry as ArcGIS 9.x is installed in all public labs on Penn State's University Park campus (and in PRI's 806 lab for those with access).
  Other supplemental ArcGIS training materials are available via the PRI GIA Core webpage and the GIS Council webpage at Penn State as well as the ESRI Virtual campus webpage (see page 5 above).

Other recommendations
Other recommendations include that you become comfortable with generic file management issues and that you consider purchasing a high-capacity flash-drive.

Academic Integrity Policy: As suggested by the College of the Liberal Arts "Penn State defines academic integrity as the pursuit of scholarly activity in an open, honest and responsible manner. All students should act with personal integrity, respect other students' dignity, rights and property, and help create and maintain an environment in which all can succeed through the fruits of their efforts (Faculty Senate Policy 49-20). Dishonesty of any kind will not be tolerated in this course. Dishonesty includes, but is not limited to, cheating, plagiarizing, fabricating information or citations, facilitating acts of academic dishonesty by others, having unauthorized possession of examinations, submitting work of another person or work previously used without informing the instructor, or tampering with the academic work of other students. Students who are found to be dishonest will receive academic sanctions and will be reported to the University's Judicial Affairs office for possible further disciplinary sanction." Faculty and students alike are part of an academic community in which the sharing and advancement of knowledge are core values. High standards of academic integrity must be in place to ensure that this intellectual enterprise functions smoothly. Honoring the principles of academic integrity is a fundamental responsibility of all scholars, and the College of the Liberal Arts and the University is firmly dedicated to maintaining an environment in which practicing academic integrity is the norm. Below are web-links to resources to aid both faculty and students in understanding and properly engaging the College's academic integrity policy and procedures. This website is divided into two resource sections: one intended for faculty, and one intended for students.

Introduction page	http://www.la.psu.edu/undergrad/integrity/integrity.htm
Faculty resource page	http://www.la.psu.edu/undergrad/integrity/facultypolicy/facultyres.htm
Student resource page	http://www.la.psu.edu/undergrad/integrity/studentpolicy/studentres.htm

Disability Access Statement: Penn State welcomes students with disabilities into the University's educational programs. If you have a disability-related need for modifications or reasonable accommodations in this course, contact the Office for Disability Services, ODS, located at 116 Boucke Building at 1-814-863-1807 (V/TTY). For further information regarding ODS please visit their web site at http://www.lions.psu.edu/ods/.   Instructors should be notified as early in the semester as possible regarding the need for modification or reasonable accommodations.

Sexual Harassment: Sexual harassment of faculty, staff or students is prohibited at The Pennsylvania State University. It is the policy of the University to maintain an academic and work environment free of sexual harassment. Sexual harassment violates the dignity of individuals and impedes the realization of the University's educational mission. The University is committed to preventing and eliminating sexual harassment of faculty, staff and students through education and by encouraging faculty, staff and students to report any concerns or complaints about sexual harassment. Prompt corrective measures will be taken to stop sexual harassment whenever and wherever it occurs (Policy AD41). Sexual harassment has been defined by the U.S. Equal Employment Opportunity Commission as unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature when: submission to such conduct is a condition for employment, promotion, grades, or academic status; submission to or rejection of such conduct is used as the basis for employment or academic decisions affecting an individual; such conduct has the purpose or effect of interfering unreasonably with the individual's work or academic performance or creates an offensive, hostile, or intimidating working or learning environment. If you believe that you have been subject or witness to sexual harassment on campus, please discuss the matter with the Instructor, or contact the Penn State Office of Affirmative Action or the Penn State Center for Women Students: http://www.psu.edu/dept/aaoffice/sexharass.htm and http://www.sa.psu.edu/cws/

A Suggested Workplan for Workbooks and Tutorials

Of the two assigned workbooks by far the better organized and structured is the GIS Tutorial for Health. Both books focus on data manipulation and basic forms of analysis. These are fundamental tasks you need to know how to use if you are to build a more complex data base for your own more sophisticated analysis. I have prepared a correspondence file listing the topics (and their page numbers) that are covered in the two workbooks. This will be posted on ANGEL.

Below is a suggested workplan. Please note, **you do not need to complete the exercise assignments** at the end of each chapter but for improving your own skill-sets you should plan to complete some of them. Below I have made some suggestions of which exercises to prioritize.

 I will set aside time during class time to discuss tutorials and exercises.

Week	By	GIS Tutorial for Health		GIS & Spatial Analysis		Geoda Workbook	
		On own by …	In-class	On own by …	In class	On own by …	In class
1							
2	**Sept 1**	Ch 1 *Exer 2-2*	Ch 2				
3	**Sept 8**	Ch 3 *Exer 3-1* *Exer 4-1*	Ch 4	Ch 2			
4	**Sept 15**		Ch 6	Ch 1			
5	**Sept 22**	Ch 5 *Exer 5-1*					
6	**Sept 29**	Ch 7 *Exer 7-2* Ch 8*				Ch 1-6	Ch 15-16
7	**Oct 6**					Ch 7-12, Ch 18	
8	**Oct 13**					Ch 19-21	
9	**Oct 20**			Ch 3		Ch 22-23	
10	**Oct 27**					Ch 24-25	
11	**Nov 3**						
12	**Nov 10**						
13	**Nov 17**	Ch 9*					
14	**Dec 1**						
15	**Dec 8**						

*GIS Tutorial for Health – Chapter 8 and 9 at your leisure as well as the case study Chapters 10 and 11

Week 1& 2 **August 25** **Overview and Motivation for the Course**
September 1 **Demography as a Spatial Science**
Discussion of all Assignments

August 25 Lab: **Introduction to geospatial data and software**
September 1 Lab: **GIS & Health Tutorial 2**

Suggested Work before Sept 1 GIS & Health Tutorial 1

Required Reading

Paul Voss. 2007. Demography as a spatial social science. *Population Research and Policy Review* 26: 457-476. (plus Introduction to the special issue of *PRPR* on 'Spatial Demography' pp. 455-456).

John R. Weeks. 2004. The role of spatial analysis in demographic research. Chapter 19 (pp. 381-399) in M.F. Goodchild and D.G. Janelle (eds.) (2004) *Spatially Integrated Social Science* New York, NY: Oxford University Press.

Marcia Caldas de Castro. 2007. Spatial demography: an opportunity to improve policy making at diverse decision levels. *Population Research and Policy Review* 26: 477-509.

Michael Reibel. 2007. Geographic Information Systems and Spatial Data Processing in Demography: A Review.*Population Research and Policy Review* 26: 601-608.

Barbara Entwisle, Ronald R. Rindfuss, Stephen J. Walsh, Tom P. Evans and Sara R. Curran. 1997. Geographic Information Systems, spatial network analysis, and contraceptive choice. *Demography* 34(2): 171-187.

Optional Reading

Kenneth W. Watcher. 2005. Spatial Demography. *Proceedings of the National Academy of Sciences*. 102 (43), 15299-15300. This accompanied a special issue of PNAS on spatial demography. There are six papers in this special issue all worth browsing (they will be on ANGEL).

Stephen A. Matthews. 2003. GIS and spatial demography. PRI-GIA Core Resource Document 03-63 available at http://www.pop.psu.edu/gia-core/pdfs/gis_rd_03-63.pdf This commentary became the basis for my first R25 GIS and Population Science training grant (2005-2007). I used some of this text in the 'background and significance' sections of my proposal. The full text of the most recent Advanced Spatial Analysis Training Program proposal is available online at: http://www.csiss.org/GISPopSci/about/proposal.php

Michael F. Goodchild and Donald G. Janelle. 2004. Thinking spatially in the social sciences. Chapter 1 in Michael F. Goodchild and Donald G. Janelle [Editors] *Spatially Integrated Social Science*. New York, NY: Oxford University Press. – HANDOUT.

Michael F. Goodchild, Luc Anselin, Richard P. Applebaum, and Barbara Herr Harthorn. 2000. Toward Spatially Integrated Social Science. *International Regional Science Review* 23, 139-159. See also: Spatial social science for research, teaching, application and policy. *CSISS Brochure*

Thomas F. Gieryn. 2000. A space for place in sociology. *Annual Review of Sociology* 26:463-95.

Some 'selected' recent demography-related papers using basic spatial analysis

Douglas Anderton, Andrew B. Anderson, John M. Oakes and Michael R. Fraser. 1994. Environmental equity: the demographics of dumping. *Demography* 31, 229-48.

S. Bryn Austin, Steven J. Melly, Brisa N. Sanchez, Aarti Patel, Stephen Buka, Steven L. Gortmaker. 2005. Clustering of fast-food restaurants around schools: a novel application of spatial statistics to the study of food environments. *American Journal of Public Health* 95 (9), 1575-1581.

Jason P. Block, Richard A. Scribner and Karen B. DeSalvo. 2004. Fast food, race/ethnicity, and income: a geographical analysis. *American Journal of Preventive Medicine* 27 (3), 211-217.

Glynis Daniels and Samantha Friedman. 1999. Spatial inequality and the distribution of industrial toxic releases: evidence from the 1990 TRI. *Social Science Quarterly* 80 (2), 244-262.

Pamela Davidson and Douglas L. Anderton. 2000. Demographics of dumping II: a National Environmental Equity Survey and the distribution of hazardous materials handlers. *Demography* 37, 461-466.

Liam Downey. 2003. Spatial measurement, geography, and urban racial inequality. *Social Forces* 81(3): 937-952.

Amy Hillier. 2008. Childhood overweight and the built environment: making technology part of the solution rather than part of the problem. *The Annals of the American Academy of Political and Social Science* 615, 56-82.

Hanna Jordon, Paul Roderick, David Martin, and Sarah Barnett. 2004. Distance, rurality and the need for care: access to health services in south West England. *International Journal of Health Geographics* 3 21 (online at http://www.ij-healthgeographics.com/).

Latetia V. Moore and Ana V. Diez Roux. 2006. Associations of neighborhood characteristics with the location and type of food stores. *American Journal of Public Health*. 96 (2), 325-331.

Thomas B. Richards, Linda W. Pickle, and Gerard Rushton [Editors]. 2006. Prostate cancer and GIS (special supplement). *American Journal of Preventive Medicine* February, 2006. Check GET IT Penn State/Science Direct. Introduction by Charlotte Seidman posted to ANGEL.

Ann R. Tickamyer. 2000. Space Matters! Spatial inequality in future Sociology. *Contemporary Sociology* 29 (6), 805-813.

Shannon N. Zenk, Amy J. Schulz, Barbara A. Israel, Sherman A. James, Shuming Boa, and Mark L. Wilson. 2005. Neighborhood racial composition, neighborhood poverty, and the spatial access of supermarkets in metropolitan Detroit. *American Journal of Public Health* 95 (4), 660-667.

Week 3   September 8   Cartography & Fundamental Spatial Concepts
Lab: Basic Cartography & Projections
GIS & Health Tutorial 4

Suggested Work before Sept 8   GIS & Health Tutorial 3
Parker & Asencio Chapter 2

Required Reading

David J. Martin. 1996. Spatial representation; the social scientist's perspective. Chapter 6 (pp. 71-80). – HANDOUT.

Stephen A. Matthews. 1999. Working with PopMap: integration of population, reproductive health and geographic databases. United Nations Statistics Division, United Nations. (Chapter 4).

NOTE: Excellent cartography texts include:

D.J. Cuff and M.T. Mattson. 1982. *Thematic Maps: Their Design and Production*. Routledge: London, UK.;

J.S. Keates. 1982. *Understanding Maps*. John Wiley: New York, NK. USA;

A.H. Robinson, R.D. Sale, J.L. Morrison and P.C. Muehrcke. 1984. *Elements of Cartography* (Fifth Edition). John Wiley: New York, NY, USA;

B.D. Dent. 1985. *Cartography Thematic Map Design*. W.C. Brown Publishers: Dubuque, IA, USA;

M. Monmonier and G. A. Schnell. 1988. *Map Appreciation*. Prentice Hall: Englewood Cliffs, NJ, USA;

M. Monmonier. 1991. *How to Lie with Maps*. University of Chicago Press: Chicago, IL, USA.;

P.C. Muehrcke. 1992. *Map Use: Reading, Analysis and Interpretation* (Third edition) JP Publications: Madison, WI, USA;

M. Monmonier. 1993. *Mapping it Out: Expository Cartography for the Humanities and Social Sciences.* University of Chicago Press: Chicago, IL, USA;

A.M. MacEachren. 1994. *SOME Truth with Maps: A Primer on Symbolization and Design*. Association of American Geographers: Washington DC, USA.

Resources:

ColorBrewer – http://colorbrewer2.org/ This is the best website for guidance regarding color selection and the fundamentals of map design.

Week 4   September 15   Principles of GIS/Privacy & Confidentiality
Lab: Geocoding GIS & Health Tutorial 6
Review of Assignment 1 – Spatial Demography Classic

Suggested Work before Sept 15   GIS & Health Tutorial
Parker & Asencio Chapter 1

Required Reading

Myron P. Gutmann, Kristine Witkowski, Corey Colyer, JoAnne McFarland O'Rourke and James McNally. 2008. Providing spatial data for secondary analysis: issues and current practices relating to confidentiality. *Population Research and Policy Review* 27: 639-665.

Marc P. Armstrong. 2002. Geographic information technologies and their potential erosion effects on personal privacy.

Optional Reading

Marc P. Armstrong, Gerald Rushton, and D.L. Zimmerman.1999. Geographically masking health data to preserve confidentiality. *Statistics in Medicine* 18, 497-525.

Maged N. Kamel Boulos, Andrew J Curtis and Philip AbdelMalik (2009) Musings on privacy issues in health research involving disaggregate geographic data about individuals. *International Journal of Health Geographics* 8:46 (available online at: http://www.ij-healthgeographics.com/content/8/1/46).

Andrew J. Curtis, Jacqueline W. Mills and Michael Leitner. 2006. Spatial confidentiality and GIS: re-engineering mortality locations from published maps about Hurricane Katrina. *International Journal of Health Geographics* 7:22 (available online at: http://www.ij-healthgeographics.com/content/5/1/244).

Leah K. VanWey, Ronald R. Rindfuss, Myron P. Gutmann, Barbara Entwisle, and Deborah L. Balk. 2005. Confidentiality and spatially explicit data: concerns and challenges. *PNAS* October 2005 102 (43), 15337-15342.

Sarah E. Wiehe et al 2008. Using GPS-enabled cell phones to track the travel patterns of adolescents *International Journal of Health Geographics* 7:22 (available online at: http://www.ij-healthgeographics.com/content/7/1/22).

Useful resources:

Myron P. Gutman and Paul C,.Stern (eds). *Putting People on the Map: Protecting Confidentiality with Linked Social-Spatial Data* (2007). Washington D.C.: National Research Council.
http://books.nap.edu/openbook.php?isbn=0309104149

Stephen A. Matthews. 2003. GIS and privacy. PRI-GIA Core Resource Document 03-51 available at
http://www.pop.psu.edu/gia-core/pdfs/gis_rd_03-51.pdf

Week 5   September 22   The Potential and Pitfalls of Spatial Data
**   Lab: Modifiable Areal Unit Problem**

Suggested Work before Sept 22   GIS & Health Tutorial 5

<u>Required Reading</u>

Stanley Openshaw. 1984. *The Modifiable Areal Unit Problem.* CATMOG Series #38 GeoBooks: Norwich, UK. http://qmrg.org.uk/files/2008/11/38-maup-openshaw.pdf

A. Stewart Fotheringham and David W.S. Wong. 1991. The modifiable areal unit problem in multivariate statistical analysis. *Environment and Planning A* 23, 1025-1044. – HANDOUT

<u>Optional Reading</u>

Stanley Openshaw and Peter J. Taylor. 1979. A Million or so correlation coefficients: three experiments on the modifiable areal unit problem. Pp. 127-144 (Chapter 5) in Neil Wrigley (Ed.) *Statistical Applications in the Spatial Sciences* Pion: London, UK.

David W.S. Wong. 2002. Spatial measures of segregation and GIS. *Urban Geography* 23, 85-92.

David W.S. Wong. 2004. Comparing traditional and spatial segregation measures; a spatial scale perspective. *Urban Geography* 25 (1): 66-82.

John P. Hipp. 2007. "Block, Tract, and Levels of Aggregation: Neighborhood Structure and Crime and Disorder as a Case in Point." *American Sociological Review* 72:659–80.

Sean F. Reardon, Stephen A. Matthews, David O'Sullivan, Barrett A. Lee, Glenn Firebaugh, Chad R. Farrell, Kendra Bischoff. (2008) The geographic scale of metropolitan racial segregation. *Demography* 45 (3):489-514.

Barrett A. Lee, Sean F. Reardon, Glenn Firebaugh, Chad R. Farrell, Stephen A. Matthews, David O'Sullivan. (2008). Beyond the census tract: patterns and determinants of racial segregation at multiple geographic scales. *American Sociological Review* 73:766-791.

Lee R. Mobley, Tzy-Mey (May) Kuo, and Linda Andrews. 2008. How Sensitive Are Multilevel Regression Findings to Defined Areaof Context? A Case Study of Mammography Use in California. *Medical Care Research and Review* 65(3): 315–337

Week 6   September 29   Defining & Operationalizing Neighborhoods
                                        Lab: Spatial Weights
                                        Discussion of Assignment 2 & 3

Suggested Work before Sept 29   GIS & Health Tutorial 7
                                       GeoDa Chapters 1-6 (basic intro)

Required Reading

Robert J. Chaskin. 1997. Perspectives on neighborhood and community: a review of the literature. *The Social Service Review* 71 (4):521-547.

Steven C.J. Cummins, Sarah Curtis, Ana V. Diez-Roux, Sally Macintyre S. 2007. Understanding and representing 'place' in health research: a relational approach. *Social Science and Medicine* 65:1825-38.

David Darmofal (forthcoming). Defining Neighbors via a spatial weights matrix. Chapter 2 in a forthcoming book on *Spatial Analysis for the Social Sciences* (under contract) – HANDOUT

Nathaniel Beck et al. 2006. Space is more than geography: using spatial econometrics in the study of political economy. *International Studies Quarterly* 50, 27-44.

Optional Reading

George Galster. 2001. On the nature of neighborhood. *Urban Studies* 38 (12): 2111-2124.

Narayan Sastry, Anne Pebley, Michela Zonta. 2002. Neighborhood definitions and the spatial dimensions of daily life. California Center for Population Research UCLA (on-line working paper) CCPR-033-04.

Ana V. Diez Roux 2003. The examination of neighborhood effects on health: conceptual and methodological issues related to the presence of multiple levels of organization. Chapter 3 in Ichiro Kawachi and Lisa F. Berkman [Editors] *Neighborhoods and Health*. New York, NY: Oxford University Press.

Sally Macintyre and Anne Ellaway. 2003. Neighborhoods and health: an overview. Chapter 2 in Ichiro Kawachi and Lisa F. Berkman [Editors]. *Neighborhoods and Health*. New York, NY: Oxford University Press.

Stephen A. Matthews, James E. Detwiler and Linda M. Burton. 2005. Geo-ethnography: coupling geographic information analysis techniques with ethnography methods in urban research. *Cartographica* 40(4), 75-90.

Thomas A. Glass and Matthew J. McAtee. 2006. Behavioral science at the crossroads in public health: extending horizons, envisioning the future. *Social Science and Medicine* 62, 1650-1671.

Nancy Krieger 2008. Proximal, distal, and the politics of causation: what's level got to do with it? *American Journal of Public Health* 98 (2), 221-230.

Stephen A. Matthews. (unpublished manuscript). The salience of neighborhoods: observations and lessons from geo-ethnography.

Resources
Luc Anselin. 2005. *Exploring Spatial Data with GeoDa: A Wookbook* (Chapters 15-16)
This workbook is used over the next five weeks. See http://geodacenter.asu.edu/

**Week 7   October 6   Exploratory Spatial Data Analysis
                                     Lab: Introduction to ESDA in Geoda
                                     Brief presentations on Spatial Demography Classics**

Suggested Work before Oct 6   GeoDa Chapters 7-12, and 18

Required Reading: ESDA

Luc Anselin, Ibnu Syabri and Youngihn Kho. 2006. GeoDa: An Introduction to Spatial
Analysis. *Geographical Analysis* 38 (1), 5-22.

Sanjeev Sridharan et al. 2007. An exploratory spatial data analysis approach to understanding the
relationship between deprivation and mortality in Scotland. *Social Science and Medicine* 65:
1942-1952.

Required Reading: Spatial Autocorrelation

Christophe Z. Guilmoto and S. Irudaya Rajan. 2001. Spatial patterns of fertility transition in
Indian districts. *Population and Development Review* 27 (4), 713-738.

Barry Glick. 1979. The spatial autocorrelation of cancer mortality. *Social Science and Medicine*
13D, 123-130.

Optional Reading:

Waldo Tobler. 1970. A computer movie simulating urban growth in the Detroit region. *Economic Geography* 46:
234-40.

Michael F. Goodchild. 1986. *Spatial Autocorrelation* CATMOG Series #47 GeoBooks: Norwich, UK.
http://qmrg.org.uk/files/2008/11/47-spatial-aurocorrelation.pdf

Sandy Dall'erba. 2005. Distribution of regional income and regional funds in Europe 1989-1999: An exploratory
spatial data analysis. *Annals of Regional Science* 39: 121-148.

Resources

Luc Anselin. 2005. *Exploring Spatial Data with GeoDa: A Wookbook* (Chapters 7-12, and 18)

Michael D. Ward and Kristian Skrede Gleditsch. 2008. *Spatial Regression Models*. Sage
Publications: Thousand Oaks, CA. (Chapter 1).

Resource Links associated with GeoDa
http://www.pop.psu.edu/gia-core/pdfs/R25-software-document-GeoDa.pdf

**Week 8   October 13   Local Indicators of Spatial Association (LISA)
                                and G* statistics
                                Labs: LISA in Geoda and G* in ArcGIS
                                Discussion of Assignment 2**

Suggested Work before Oct 13   GeoDa Chapters 19-21

<u>Required Reading</u>

Luc Anselin. 1995. Local Indicators of Spatial Association – LISA. *Geographical Analysis* 27 (2), 93-115.

Keith J. Ord and Arthur Getis. 1995. Local spatial autocorrelation statistics: distributional issues and an application. *Geographical Analysis* 27, 286-306

Michael Poulsen, Ron Johnston and James Forrest. 2009. Using local statistics to portray ethnic residential segregation in London. Centre for Market and Public Organisation Working Paper No. 09/213.

Andrea I. Frank. 2003. Using measures of spatial autocorrelation to describe socio-economic and racial residential patterns in US urban areas. Pp. 147-162. In David Kidner, Gary Higgs, and Sean White [Editors] *Socio-Economic Applications of Geographic information Science (Innovations in GIS 9)*. London, UK: Taylor and Francis. – HANDOUT.

<u>Optional Reading</u>

Marcia Castro et al. 2006. Malaria risk on the Amazon frontier. *PNAS* 103 (7), 2452-2457.

Arthur Getis and J.Keith Ord. 1992. The analysis of spatial association by use of distance statistics. *Geographical Analysis* 24 (3): 189-206.

<u>Resources</u>

Luc Anselin. 2005. *Exploring Spatial Data with GeoDa: A Wookbook* (Chapters 19)

Week 9   **October 20**   **OLS and Spatial Regression**
                                           Lab: GeoDa for OLS and Spatial Diagnostics
                                               (Optional Lab: OLS in ArcGIS)

Suggested Work before Oct 20   GeoDa Chapters 22-23
                                              Parker & Asencio Chapter 3

<u>Required Reading</u>

Paul Voss, David D. Long, Roger B. Hammer, Samantha Friedman. 2006. *Population Research and Policy Review* 25:369-391.

Guangqing Chi and Jun Zhu. 2008. Spatial regression models for demographic analysis. *Population Research and Policy Review* 27: 17-42.

Patrick Doreian. 1980. Linear models with spatially distributed data: Spatial disturbances or spatial effects? *Sociological Methods & Research* 9, 29-60.
See http://csiss.ncgia.ucsb.edu/GISPopSci/resources/classics/content/77

Colin Loftin and Sally K. Ward. 1983. A spatial autocorrelation model of the effects of population density on fertility, *American Journal of Sociology* 48, 121-128.
See http://csiss.ncgia.ucsb.edu/GISPopSci/resources/classics/content/61

<u>Optional Reading</u>

Susan Kennedy. 1988. A geographic regression model for medical statistics. *Social Science and Medicine* 26: 119-129.

Luc Anselin, Jacqueline Cohen, David Cook, Wilpen Gorr, and George Tita. 2000. Spatial analysis of crime. *Criminal Justice* 4 213-262.

Omer R. Galle; Walter R. Gove; J. Miller McPherson. 1972. Population Density and Pathology: What Are the Relations for Man? *Science*, New Series, Vol. 176, No. 4030. (Apr. 7, 1972), pp. 23-30.

Patrick Doreian. 1981. Estimating linear models with spatially distributed data. *Sociological Methodology* 12, 359-388.

<u>Resources</u>

Luc Anselin. 2005. *Exploring Spatial Data with GeoDa: A Wookbook* (Chapters 22-23)

Robert Nash Parker and Emily K. Asencio. 2008. *GIS and Spatial Analysis for the Social Sciences: Coding, Mapping, and Modeling*. Routledge/Taylor & Francis: New York, NY. (Chapter 3).

Week 10   October 27   Spatial Lag and Error Regression Modeling
**   Lab: Spatial Regression Modeling**

Suggested Work before Oct 27   GeoDa Chapters 24-25

<u>Required Reading</u>

Robert D. Baller, Luc Anselin, Steven F. Messner, Glenn Deane and Darnell F. Hawkins 2001. Structural covariates of U.S. County homicide rates: incorporating spatial effects. *Criminology*, 39(3), 561-590.

Michael D. Ward and Kristian Skrede Gleditsch. 2008. *Spatial Regression Models*. Sage Publications: Thousand Oaks, CA. (Chapter 2 & 3).

Kathryn J. Brasier. 2005. Spatial Analysis of Changes in the number of farms during the farm crisis. *Rural Sociology* 70 (4), 540-560.

<u>Optional Reading</u>

Luc Anselin. 2002. Under the hood: Issues in the specification and interpretation of spatial regression models. *Agricultural Economics* 27 (3), 247-267. Draft copy on ANGEL.

Luc Anselin. 2004. Spatial externalities, spatial multipliers and spatial econometrics. *International Regional Science Review*. Draft copy on ANGEL.

Robert J. Sampson, Jeffery D. Morenoff and Felton Earls, 1999 "Beyond social capital: spatial dynamics of collective efficacy for children" *American Sociological Review* 64: 633-660.

Jeffrey D. Morenoff, Robert J. Sampson, R. J., and Stephen W. Raudenbush. 2001. Neighborhood inequality, collective efficacy, and the spatial dynamics of urban violence. *Criminology* 39, 517-560.

Jeffrey D. Morenoff. 2003. Neighborhood mechanisms and the spatial dynamics of birth weight. *American Journal of Sociology* 108 (5) 976-1017.

Gordon F. DeJong, Deborah Roempke Graefe, Shelley K. Irving, and Tanja St. Pierre. 2006. Measuring state TANF policy variations and change after reform. *Social Science Quarterly* 87(4), 755-781.

Basile Chaix, Juan Merlo, S.V. Subramanian, John Lynch, and Pierre Chauvin. 2005. Comparison of a spatial perspective with a multilevel analytical approach in neighborhood studies: the case of mental and behavioral disorders due to psychoactive substance use in Malmö, Sweden, 2001. *American Journal of Epidemiology* 162 (2), 171-182.

Basile Chaix, Juan Merlo and Pierre Chauvin. 2005. Comparison of a spatial approach with the multilevel approach for investigating place effects on health: the example of healthcare utilization in France. *Journal of Epidemiology and Community Health*. 59, 517-526.

<u>Resources</u>

Luc Anselin. 2005. *Exploring Spatial Data with GeoDa: A Wookbook* (Chapters 24-25)
Roger S. Bivand, 2002. ''Spatial econometrics functions in R: classes and methods.'' *Journal of Geographical Systems* 4, 405–21

Week 11   November 3   Geographically Weighted Regression
**   Lab: GWR**
**   Discussion of Assignment 3**

Required Reading

Fotheringham, AS, Charlton M, Brunsdon C. 2008. GWR Workbook. National Center for Geocomputation, National University of Ireland. Sections 1-4

Ian N. Gregory and Paul S. Ell. 2005. Analyzing spatiotemporal change by use of National Historical Geographical Information Systems. *Historical Methods* 38 (4): 149-167.

Optional Reading – GWR

Jeremy L. Mennis. 2006. Mapping the Results of Geographically Weighted Regression. The Cartographic Journal 43(2), 171-179.

Jeremy L. Mennis and Lisa M. Jordan, 2005. The distribution of environmental equity: exploring spatial nonstationarity in multivariate models of air toxic releases. *Annals, Association of American Geographers* 95 (2), 249-268.

Roger S. Bivand, 2006. Implementing spatial data analysis software tools in R. *Geographical Analysis* 38 (1), 23-40.

Useful Resources

Resource Links associated with GWR http://www.pop.psu.edu/gia-core/training.htm

GWR Lit Search http://www.pop.psu.edu/gia-core/litsearches/SAM_GWR_list.pdf

GWR site: http://ncg.nuim.ie/ncg/GWR/software.htm

Week 12   November 10   Geographically Weighted Regression
**   Lab: Poisson and Logistic GWR**
**   Review of Assignment 2**

Required Reading/Exercise:

Fortheringham, AS, Charlton M, Brunsdon C. 2008. GWR Workbook. National Center for Geocomputation, National University of Ireland. Sections 5-8

Week 13   November 17   Point Pattern Analysis
**   Lab: PPA in ArcGIS & CrimeStat**

Required Reading

Anthony C. Gatrell, Trevor C. Bailey, Peter J. Diggle, and Barry S. Rowlingson. 1996. Spatial point pattern analysis and its application in geographical epidemiology. *Transactions, Institute of British Geographers NS* 21, 256-274.

Ned Levine. 2006. Crime mapping and the *CrimeStat* program. *Geographical Analysis* 38, 41-56.

Week 14   December 1   New Directions and Challenges in Spatial Demography
**   Lab: Open lab for work on final project**

Optional Reading

Itzhak Benenson. 2004. Agent-based modeling: from individual residential choice to urban residential dynamics. Chapter 4 in M.F. Goodchild and D.G. Janelle (eds.) (2004) *Spatially Integrated Social Science* New York, NY: Oxford University Press. – HANDOUT.

Daniel G. Brown and Yichin Xie. 2006. Spatial agent-based modeling (guest editorial for special issue). *International Journal of Geographical Information Science* 20 (9), 941-943. Use GET IT @ Penn State/Informaworld.com for other articles.

Useful Resources

Agent Based Modeling references:
http://www.pop.psu.edu/gia-core/litsearches/SAM_ABM_liust.pdf

On-line Guise to ABM in the Social Sciences
http://www.econ.iastate.edu/tesfats/abmread.htm

Week 15   December 8   Final Presentations (Assignment 3)

Week 16   December 14   Term Paper due (Assignment 3)

Assignment 1   Spatial Demography Classic

Due Date: October 6, 2009   *Worth 20% of the course grade*

Overview

Start by consulting the CSISS Classics website at http://www.csiss.org/classics/. This site includes reference to 40+ scholars from across the social sciences and their unique contributions to spatial thinking and analysis. Usually each "CSISS Classic" is a short document of approximately 2,500 words plus images and references. Please read at least 3-4 of these CSISS Classics to get a sense of their structure and content. Note, the definition of a "spatial" component varies quite widely across the examples. Also note that the emphasis in the CSISS classics is on research prior to 1980.

Task

To identify a leading social science scholar, **preferably a demographer**, who has demonstrated innovative approaches to substantive research questions based on a spatial perspective. Develop a 2,500-word document with a synthesis of the scholar's work, their key spatial ideas, and their contribution to demographic science. There are no restrictions on the research idea/having to be based on pre-1980 work (as on the CSISS site).

By **September 22, 2009** – approximately two weeks before the assignment is due – please provide me with the name of the scholar you identified as a "spatial demography classic" and brief (250-500 word) justification for their selection. This can be done over e-mail.

The best CSISS Classics will, with the permission of the student, be forwarded to Donald Janelle at CSISS for consideration for inclusion on the CSISS website. Don Janelle is aware of this project assignment at Penn State and looks forward to receiving suggestions and worked examples from this course.

Things to bear in mind

While not an obligation please try to identify scholars whose work is demographic, who are researchers from your own discipline, whose work is well known, and who are women (there are very few on the CSISS Classic list). Also, please try to avoid using copyrighted material (this is a general rule but happens to be particularly important if the materials are to be considered for inclusion on the CSISS website).

The CSISS Demography Classic is to be completed by **October 6, 2009 and is worth 20% of the course grade.** You will make a brief 5-minute presentation on October 6.

Assignment 2   ESDA and Basic OLS/Spatial Regression

Due Date: November 3, 2009   *Worth 20% of the course grade*

Overview

For the **ESDA assignment** you are expected to use the ESDA and basic OLS/spatial regression options in GeoDa (and ArcGIS) to complete an analysis of a data set of your choice (excluding GeoDa sample data sets). GeoDa is freeware available for download from URL: http://geodacenter.asu.edu/.

Task

This assignment is a report/short paper of approximately 3,000 – 5,000 words, including figures and tables. A model for such a short paper using GeoDa is (see Week 7 reading assignment):

> Sanjeev Sridharan et al. 2007. An exploratory spatial data analysis approach to understanding the relationship between deprivation and mortality in Scotland. *Social Science and Medicine* 65: 1942-1952.

Other suggestions of format are at the end of this assignment description.

The assignment is due on **November 3, 2009 and is worth 20% of the course grade**.

Things to bear in mind

Preparation for this assignment will require that you are familiar with the basic operations of GeoDA. A good way to prepare will be to work through several parts of *Exploring Spatial Data with GeoDa: A Workbook* by Luc Anselin (2005).You will be exposed to this workbook in class especially during weeks 6-10 and I will cover many of the fundamentals of GeoDa in my own lectures. In addition, I will be happy to discuss GeoDa and/or the assignment during scheduled office hours.

If you do not have access to a laptop and cannot install the software on your own machine you can still work through and complete all the exercises by using the data files with any machine in the PRI computer lab in 806 Oswald Tower (Please get a PRI Windows NT PopNet account ASAP) and with special arrangement in the 801 GIA Core lab..

Tips

First, find or generate a data set ASAP and certainly no later than October 20, 2009.

Second, GeoDa has many ESDA tools. You might think about analysis using Geoda that

includes use (and justification for) of some of the following:

a) the creation of a distance and a proximity spatial weights matrix
b) the characteristics of these spatial weights matrix (histogram of weights)
c) simultaneous use of a maps, tables and graphs
d) use of parallel coordinate plots
e) use of Moran's I
f) use LISA measures, LISA clusters and significance maps
g) showing the map of the dependent variable, explanatory variables
h) a basic OLS model output and a map of the OLS model residuals
i) a spatial OLS model output for spatial diagnostics
j) a spatial lag and a spatial error model output

Ideally the same data set will be used in all parts of the analysis.

Assignment 3   Research Paper

Due Date	*Draft Research Paper due October 13, 2009*	*(5% of course grade)*
	Presentation to be given December 8, 2009	*(15% of course grade)*
	Research Paper due December 14, 2009	*(20% of course grade)*
Overall		*Worth 40% of course grade*

Overview

This "Final" project is about pulling it all together. In this project you will be expected to demonstrate some of the many techniques and skills you have acquired during the semester drawing on ArcGIS, GeoDa, CrimeStat and/or GWR.

It is never too early to think about the substantive emphasis of your final project and your data needs as well as the software and skill sets you would likely use. You are likely to work in earnest on this project in bits and pieces, with greater emphasis after Week 9 (October 20, 2009). Around this time you will be comfortable using and mapping geographic data and have begun to encounter more sophisticated spatial analysis tools such as exploratory spatial data analysis and spatial regression statistics within GeoDa. For the final project (presentation and term/research paper) you are encouraged to **find a data set** early in the semester.

You can use <u>any</u> GIS software and the substantive focus can be on any demographic research question, for anywhere in the world, and at any spatial scale (i.e., from a study of a single village all the way up to an investigation of global demographic patterns and trends). I will be there to help if you have no ideas (also see past topics below).

Tasks

The three end products will be

1: a **draft** of the "research paper." The draft should be approximately 3-4 pages, with some of the material presented in bullet form as necessary. The draft should describe the "research question," identify both the data sources and the proposed analysis technique(s) that will be used. This part of assignment is due on October 13,, 2009 and is worth 5% of the course grade.

2: a conference length paper **presentation** in PowerPoint to be delivered to the class during Week 15 (December 8, 2009). NOTE: Conference papers are typically 15-20 minutes. The presentations will occur on December 8, 2009 during the regular class meeting. You will submit your PowerPoint file on Monday December 7, 2009. Points will be deducted for any changes made to the presentation between submission of the file and the presentation a day later. This part of the assignment is due on December 8, 2009 and is worth 15% of the course grade.

3: a final "**research paper**." The term paper will be approximately 5,000-6,000 words in length plus embedded maps/images/tables as necessary. The paper will be submitted in the format of a 'publishable' research paper. The research paper is due on December 14, 2009 and is worth 20% of the course grade.

Sample of Past Projects

US-based projects
Day care availability	Crime and Victimization
Hospital distributions	Population growth
Labor market and industrial restructuring	Natural hazards and population at risk
Crime and race segregation	Demographic/Health of Native Am. Indians
Health and Mortality	Effects of tourism on economic development
Leisure activities for the elderly	School enrollments
The demographics of areas with Superfund sites	The geography of sex offenders
Patterns of Recruitment of college athletes to the NFL	Hypothetical residential preferences
New Immigrant Communities	Poverty in Appalachia
New demographic issues emerging from the US Census	Environmental justice/racism
Racial diversity/segregation	Youth crime and delinquency
Urbanization/suburbanization and neighborhood change	The demographics of the digital divide
Demography of Obesity	Community Asset Mapping and well-being

Some International Projects
(NOTE: a project can be local, regional, national, continental or global in scale)

Women's health status in India	Rice cultivation/food productivity (Philippines)
Population movements in Thailand	Family Planning (Kenya)
Policing and crime in Ontario, Canada	Urbanization and environment (Taiwan)
Fertility in Nepal	Population and environment links (Malawi)
Regional economic development/labor markets in Peru	Regional economic development (China)
Demographics of Taiwan	Population aging (e.g., Japan, Europe)
Population and environment	Post-Apartheid South Africa
Women and child wellbeing	Industrial accidents
Political and human rights	

Demographics and geography of sport – the participation in the Summer/Winter Olympic Games and/or Soccer World Cup.
AIDS (e.g., in Russia, South Africa, etc.) or another health issue (e.g., Avian Flu).
Population movements (e.g., refugees, evacuations, war) tsunami and hurricane events.