

SSCI 600: Geography of Life and Death

Units: 4

Term—Day—Time: Fall, 2016, Mondays, 9-12 noon

Location: Spatial Sciences Institute, AHF 145D

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Course Description

This course explores the various ways place (and space) have been invoked and used to better understand human health outcomes and determinants in the past few decades. The course will examine the current approaches, methodological issues, and enduring challenges in spatial epidemiology, quantitative approaches used for disease mapping and modeling, the various ways in which individual-level exposures can be resolved with place-based information, how place-based human behaviors might mediate these health-related exposures, and the kinds of data and tools that are now available for conducting research synthesizing population, health, and place. The current state-of-the-art will be introduced with an assortment of weekly readings and discussions and a series of individual and group projects will allow class participants to develop their own proposals for more detailed research.

Learning Objectives

On completion of this course, students will be able to:

- Describe the various ways place (and space) have been invoked to better understand human health outcomes and determinants.
- Describe the settings, populations, and issues that are often skipped, ignored, or overlooked in the empirical literature on population, health, and place.
- Discuss how place affects different groups of people in different ways and how place can be used to accomplish meaningful social change.
- Discuss the ways in which research to date has linked environment, genetics, and behavior to inform our understanding of human health outcomes.
- Discuss how genomic and proteomic knowledge and databases might support individual- and population-level geographic research on human genetics and health outcomes.
- Discuss the various ways in which we can resolve individual-level exposures and place-based information.
- Discuss some of the ways in which place-based human behaviors mediate health-related exposures and whether or not simulation and gaming approaches can yield lasting salubrious health behaviors.
- Discuss the current approaches, methodological issues, and enduring challenges in spatial epidemiology.
- Describe the quantitative approaches that have been used for disease mapping and modeling during the past few decades.
- Describe the kinds of data and tools that are currently available for conducting research synthesizing population, health, and place.

Prerequisite(s): None

Co-Requisite (s): None

Concurrent Enrollment: None

Recommended Preparation: Students must be enrolled in an existing USC Ph.D. program

Course Notes

The course will be taught as a seminar and class meetings will be used to discuss the assigned readings and any questions and related topics that arise from the readings. The learning and teaching strategies are student-centered. They aim to encourage a deep-learning approach by using reflection and self-evaluation. The individual class sessions will be organized around class readings that are designed to provide the essential background and framework for study. Students will be required to reflect on their learning through in-class discussions and a series of carefully crafted assignments.

Technological Proficiency and Hardware/Software Required

The modeling software and geospatial data required for course assignments will be accessed using computing resources provided by the Spatial Sciences Institute.

Required Readings and Supplementary Materials

The weekly readings will be accessed via the USC Library's electronic collections and/or provided by the instructor via Blackboard.

Description and Assessment of Assignments

Students must prepare a lecture, an abstract, a research paper, and participate in class discussion on a regular basis.

Class Participation (10%): A class participation grade for the semester will be assigned based upon how actively students engage in the course. Students will be required to read all material outlined for each week of the course, and be prepared to lead and participate in group discussions about the readings in class. Failure to attend, or not be adequately prepared to discuss the readings will lead to the assignment of a lower grade for that week. Students should also maintain a written log of insights and observations from the classroom discussions and accompanying homework projects.

Weekly Briefs (20%): Each week students will use the Blackboard Discussion Forum to respond to an assigned article or critique one of their own choosing. These electronic commentaries are for sharing among the class, and the overall quality of the contributions will be considered in the semester evaluation. To help simulate discussion, each student should comment on a least one other student's critique each week.

Project Reports (25%): Written reports will be assigned regularly to document steps in project formulation and/or to reflect upon assigned readings. Different criteria will be specified for model construction and deconstruction.

Class Presentation (15%): Students will conduct a seminar on a topic determined in consultation with the instructor. A one-page summary will be distributed in advance of the class itself and the topic may be an evaluation of a model or software (Caline, RePast, etc.), a complex systems subject (fractals, modifiable areal unit problems, neural networks, etc.) or some specific technique or application that is relevant but not otherwise covered in the course.

Team Project (30%): In the second half of the course, students will work in teams on projects determined in consultation with the instructor. The team will construct a spatial model to address some geographically relevant health problem. The final report and class presentation will summarize insights from each phase of the modeling process as experienced in the problem context.

Grading Breakdown

Assignment	No. of Assignments	% of Grade
Class Participation	13	10
Class Presentation	1	15
Project Reports	5	25
Team Projects	1	30
Weekly Briefs	13	20
TOTAL	33	100

Assignment Submission Policy

Assignments will be submitted for grading via Blackboard using the due dates specified in the Course Schedule below.

Additional Policies

Students are expected to attend and participate in every class session and to complete and upload all assignments before the deadlines detailed in the Course Schedule. Late work will be assessed a penalty of 10% per day and zero grades will be assigned for work that is more than one week late.

Course Schedule: A Weekly Breakdown

	Topics/Daily Activities	Readings and Homework	Deliverables/Due Dates
Week 1 8/22	Introduction to Class Brief introductions coupled with a discussion of class goals, projects, technology, reading assignments.		No deliverables.
Week 2 8/29	Place Foundations The first part of a three-part discussion exploring the various ways in which place has been conceptualized and used to better understand human health outcomes and determinants. This week's readings focus on the meaning of place in people's everyday lives.	Kemp (2011) . Place, history, memory: Thinking time within place. In Burton et al. (eds.) <i>Communities, Neighborhoods and Health: Expanding the Boundaries of Place</i> . Berlin, Springer: 3-19. Matthews (2011) . Spatial polygamy and the heterogeneity of place: Studying people and place via egocentric methods. In Burton et al. (eds.) <i>Communities, Neighborhoods and Health: Expanding the Boundaries of Place</i> . Berlin, Springer: 35-55. Gehlert et al. (2011) . Placing biology in breast cancer disparities research. In Burton et al. (eds.) <i>Communities, Neighborhoods and Health: Expanding the Boundaries of Place</i> . Berlin, Springer: 57-72. Leung & Takeuchi (2011) . Race, place, and health. In Burton et al. (eds.) <i>Communities, Neighborhoods and Health: Expanding the Boundaries of Place</i> . Berlin, Springer: 73-88.	Submit briefs on Blackboard no later than 5:00 p.m. on Thursday, 8/25. Comment on at least one other brief on Blackboard no later than 9:00 a.m. on Monday, 8/29.
Week 3 9/7	Place and Health The second of a three-part discussion exploring the various ways in which place has been conceptualize and used to better understand human health outcomes and	Meade (2012) . The geography of life and death: Deeper, broader, and much more complex. <i>Annals of the Association of American Geographers</i> 102: 1219-27. Stamp (1964) . <i>The Geography of Life and Death</i> . Ithaca, NY, Cornell University Press.	Submit briefs on Blackboard no later than 5:00 p.m. on Thursday, 9/1. Comment on at least one other brief on Blackboard no later than 9:00 a.m. on Wednesday, 9/7.

	determinants. This week's class will focus on the classic book entitled "The Geography of Life and Death" that was authored by L. Dudley Stamp and first published in 1964.		
Week 4 9/12	Population, Health, and Place The third and final part of a three-part discussion exploring the various ways in which place might be conceptualized and used to better understand human health outcomes and determinants in the next few decades. This week's readings, in particular, explore some of the ways in which modern geospatial technologies can be used to characterize the key relationships linking people, health, and place.	Goodchild (2011). Formalizing place in geographic information systems. In Burton et al. (eds.) <i>Communities, Neighborhoods and Health: Expanding the Boundaries of Place</i> . Berlin, Springer: 21-33. Mitchell et al. (2000). <i>Inequalities in Life and Death: What If Britain Were More Equal?</i> Bristol, UK, The Policy Press. National Research Council (2011). How does where people live affect their health? In <i>Understanding the Changing Planet: Strategic Directions for the Geographical Sciences</i> . Washington, D.C., National Academy of Sciences: 67-82. Torrens (2010). Geography and computational social science. <i>GeoJournal</i> 75: 133-34.	Submit briefs on Blackboard no later than 5:00 p.m. on Thursday, 9/8. Comment on at least one other brief on Blackboard no later than 9:00 a.m. on Monday, 9/12.
Week 5 9/19	New GIS Data Sources A discussion of some of the new data sources and the types of processing that must be performed to yield useful information and/or to use them with other kinds of digital data in spatial models.	Buzzelli et al. (2006). A GIS spatiotemporal model of ambient air pollution exposure. <i>Epidemiology</i> 17: S112-18. Goodchild (2007). Citizens as voluntary sensors: Spatial data infrastructure in the World of Web 2.0. <i>International Journal of Spatial Data Infrastructures Research</i> 2: 24-32. Johnson & Barton (2004). Where in the world are my field plots? Using GPS effectively in environmental field studies. <i>Frontiers in Ecology and the Environment</i> 2: 475-82. Mavoa et al. (2011). Linking GPS and travel diary data using sequence alignment in a study of children's independent mobility. <i>International Journal of Health Geographics</i> 10: 64.	Submit briefs on Blackboard no later than 5:00 p.m. on Thursday, 9/15. Comment on at least one other brief on Blackboard no later than 9:00 a.m. on Monday, 9/19.

		<p>Nuvolone et al. (2011). Geographical information system and environmental epidemiology: a cross-sectional spatial analysis of the effects of traffic-related air pollution on population respiratory health. <i>Environmental Health</i> 10: 12.</p> <p>Skidmore (2002). <i>Environmental Modeling with GIS and Remote Sensing</i>. London, Taylor and Francis (Ch. 2: New Environmental Remote Sensing).</p> <p>Zielstra & Hochmair (2011a). A comparative study of pedestrian accessibility to transit stations using free and proprietary network data. <i>Transportation Research Record</i> 2117: 145-52.</p> <p>Zielstra & Hochmair (2011b). Digital street data: Free versus proprietary. <i>GIM International</i> 25: 29-33.</p>	
<p>Week 6 9/26</p>	<p>Justice in Places A discussion of the ways in which place affects different groups of people in different ways and especially of how place can be used to accomplish meaningful social change.</p>	<p>Pastor et al. (2004). Waiting to inhale: The demographics of toxic air releases in 21st century California. <i>Social Science Quarterly</i> 85: 420-40.</p> <p>Peña (2011). Structural violence, historical trauma, and public health: The environmental justice critique of contemporary risk science and practice. In Burton et al. (eds.) <i>Communities, Neighborhoods and Health: Expanding the Boundaries of Place</i>. Berlin, Springer: 203-18.</p> <p>Spencer et al. (2011). Environmental justice and the well-being of poor children of color. In Burton et al. (eds.) <i>Communities, Neighborhoods and Health: Expanding the Boundaries of Place</i>. Berlin, Springer: 219-33.</p> <p>Stack (2011). Attachment and dislocation: African-American journeys in the USA. In Burton et al. (eds.) <i>Communities, Neighborhoods and Health: Expanding the Boundaries of Place</i>. Berlin, Springer: 237-47.</p>	<p>Submit briefs on Blackboard no later than 5:00 p.m. on Thursday, 9/22.</p> <p>Comment on at least one other brief on Blackboard no later than 9:00 a.m. on Monday, 9/26.</p> <p>Prepare and submit first project report on Blackboard no later than 5:00 p.m. on Monday, 9/26.</p>
<p>Week 7 10/3</p>	<p>Genetic GIS A discussion of the research to date that has linked environment, genetics, and behavior to inform our understanding of</p>	<p>Sloan et al. (2009). Ecogeographic genetic epidemiology. <i>Genetic Epidemiology</i> 33: 281-88.</p> <p>Biek & Real (2010). The landscape genetics of infectious disease emergence and spread. <i>Molecular Ecology</i> 19: 3515-31.</p>	<p>Submit briefs on Blackboard no later than 5:00 p.m. on Thursday, 9/29.</p> <p>Comment on at least one other brief on Blackboard no later than 9:00 a.m. on Monday, 10/3.</p>

	human health outcomes.	<p>Janies et al. (2011). The Supramap project: Linking pathogen genomes with geography to fight emergent infectious diseases. <i>Cladistics</i> 27: 61-8.</p> <p>Mantooth & Riddle (2011). Molecular biogeography: The intersection between geographic and molecular variation. <i>Geography Compass</i> 5: 1-20</p> <p>Storfer et al. (2007). Putting the 'landscape' in landscape genetics. <i>Heredity</i> 98: 128-42.</p>	Prepare and submit second project report on Blackboard no later than 5:00 p.m. on Monday, 10/3.
Week 8 10/10	<p>Genetics</p> <p>A discussion exploring how genomic and proteomic knowledge and databases might support individual- and population-level geographic research on human genetics and health outcomes.</p>	<p>Kolf (2012). Scientific team sequences 1,092 human genomes to determine standard range of human genetic variation. <i>E! Science News</i> (feature article).</p> <p>Mefford (2012). Diagnostic exome sequencing: Are we there yet? <i>New England Journal of Medicine</i> 367: 1951-53.</p> <p>Meissner (2012). What can epigenomics do for you? <i>Genome Biology</i> 13(10): 420.</p> <p>The 1,000 Genomes Project Consortium (2012). An integrated map of genetic variation from 1,092 human genomes. <i>Nature</i> 491: 56-65.</p>	<p>Submit briefs on Blackboard no later than 5:00 p.m. on Thursday, 10/6.</p> <p>Comment on at least one other brief on Blackboard no later than 9:00 a.m. on Monday, 10/10.</p> <p>Prepare and submit third project report on Blackboard no later than 5:00 p.m. on Monday, 10/10.</p>
Week 9 10/17	<p>Environment</p> <p>A discussion exploring some of the ways we can resolve individual-level exposures and place-based information.</p>	<p>Balshaw & Kwok (2012). Innovative methods for improving measures of the personal environment. <i>American Journal of Preventive Medicine</i> 42: 558-59.</p> <p>Balshaw et al. (2005). Research strategies for safety evaluation of nanomaterials, Part III: Nanoscale technologies for assessing risk and improving public health. <i>Technological Sciences</i> 88: 298-306.</p> <p>Meliker & Jacquez (2007). Space-time clustering of case-control data with residential histories: Insights into empirical induction periods, age-specific susceptibility, and calendar-year-specific effects. <i>Stochastic Environmental Research and Risk Assessment</i> 21: 625-63.</p> <p>Qi & Du (2013). Tracking and visualization of space-time activities for a micro-flu transmission study. <i>International Journal of Health Geographics</i> 12(1): 6.</p>	<p>Submit briefs on Blackboard no later than 5:00 p.m. on Thursday, 10/13.</p> <p>Comment on at least one other brief on Blackboard no later than 9:00 a.m. on Monday, 10/17.</p> <p>Prepare and submit fourth project report on Blackboard no later than 5:00 p.m. on Monday, 10/17.</p>

<p>Week 10 10/24</p>	<p>Behavior A discussion of some of the ways in which place-based human behaviors mediate health-related exposures and whether or not simulation and gaming approaches can yield lasting salubrious health behaviors.</p>	<p>Alhqvist et al. (2012). Geospatial human-environment simulation through integration of massive multiplayer online games and geographic information systems. <i>Transactions in GIS</i> 16: 331-35. Cattell et al. (2008). Mingling, observing, and lingering: Everyday public spaces and their implications for well-being and social relations. <i>Health & Place</i> 14: 544-61. Daniel et al. (2008). Framing the biosocial pathways underlying associations between place and cardiometabolic disease. <i>Health & Place</i> 14: 117-32. Smoyer-Tomic et al. (2008). The association between neighborhood socio-economic status and exposure to supermarkets and fast food outlets. <i>Health & Place</i> 14: 740-54.</p>	<p>Submit briefs on Blackboard no later than 5:00 p.m. on Thursday, 10/20.</p> <p>Comment on at least one other brief on Blackboard no later than 9:00 a.m. on Monday, 10/24.</p> <p>Submit one-page summary no later than 9:00 a.m. on Monday, 10/24 and make brief presentation on a modeling system, technique or application not covered in class (1/3rd of students).</p>
<p>Week 11 10/31</p>	<p>Spatial Epidemiology A discussion of the current approaches used in spatial epidemiology and some of the outstanding methodological issues.</p>	<p>Aimone et al. (2013). A systematic review of the application and utility of geographic information systems for exploring disease-disease relationships in pediatric global health research: The case of anaemia and malaria. <i>International Journal of Health Geographics</i> 12(1): 1. Auchincloss et al. (2012). A review of spatial methods in epidemiology, 2000-2010. <i>Annual Review of Public Health</i> 33: 107-22. Beale et al. (2008) Methodological issues and approaches to spatial epidemiology. <i>Environmental Health Perspectives</i> 116: 1105-10 Elliott & Wartenberg (2004). Spatial epidemiology: Methods and applications. <i>Environmental Health Perspectives</i> 112: 998-1006. Ostfeld et al. (2005). Spatial epidemiology: An emerging (or re-emerging) discipline. <i>Trends in Ecology & Evolution</i> 20: 328-36. Varquez-Prokopec et al. (2012). Spatial heterogeneity and risk maps of community infestation by <i>Triatoma infestans</i> in rural northwestern Argentina. <i>PLoS: Neglected Tropical Diseases</i> 6(8): e1788.</p>	<p>Submit briefs on Blackboard no later than 5:00 p.m. on Thursday, 10/27.</p> <p>Comment on at least one other brief on Blackboard no later than 9:00 a.m. on Monday, 10/31.</p> <p>Submit one-page summary no later than 9:00 a.m. on Monday, 10/31 and make brief presentation on a modeling system, technique or application not covered in class (1/3rd of students).</p>

<p>Week 12 11/7</p>	<p>Methods & Modeling A discussion of the quantitative approaches used for disease mapping and modeling during the past few decades.</p>	<p>Goovaerts (2009). Medical geography: A promising field of application of geostatistics. <i>Mathematical Geology</i> 41: 243-64. Kitron (2000). Risk Maps: Transmission and burden of vector-borne diseases. <i>Parasitology Today</i> 16: 324-25. Lawson (2012). Bayesian point event modeling in spatial and environmental epidemiology. <i>Statistical Methods in Medical Research</i> 21: 509-29. Stevens & Pfeiffer (2011). Spatial modeling of disease using data- and knowledge-driven approaches. <i>Spatial and Spatio-temporal Epidemiology</i> 2: 125-33. Waller & Carlin (2010). Disease mapping. In Gelfand et al. (eds.) <i>Handbook of Spatial Statistics</i>. Boca Raton, FL, Chapman and Hall/CRC Press: 217-43.</p>	<p>Submit briefs on Blackboard no later than 5:00 p.m. on Thursday, 11/3.</p> <p>Comment on at least one other brief on Blackboard no later than 9:00 a.m. on Monday, 11/7.</p> <p>Submit one page summary no later than 9:00 a.m. on Monday, 11/7 and make brief presentation on a modeling system, technique or application not covered in class (1/3rd of students).</p>
<p>Week 13 11/14</p>	<p>Data & Resources The first part of a two-part discussion exploring the data and tools that are currently available to characterize the linkages between population, health, and place.</p>	<p>Janies et al. (2012). Analysis and visualization of H7 influenza using genomic, evolutionary, and geographic information in a modular web service. <i>Cladistics</i> 28: 483-88. Linard & Tatem (2012). Large-scale spatial population databases in infectious disease research. <i>International Journal of Health Geographics</i> 11(1): 7. Meliker & Sloan C (2012). Spatio-temporal epidemiology: Principles and opportunities. <i>Spatial and Spatio-temporal Epidemiology</i> 2: 1-9. Tatem et al. (2012). Mapping populations at risk: Improving spatial demographic data for infectious disease modeling and metric derivation. <i>Population Health Metrics</i> 10(1): 8.</p>	<p>Submit briefs on Blackboard no later than 5:00 p.m. on Thursday, 11/10.</p> <p>Comment on at least one other brief on Blackboard no later than 9:00 a.m. on Monday, 11/14.</p> <p>Prepare and submit fifth project report on Blackboard no later than 9:00 p.m. on Monday, 11/14.</p>
<p>Week 14 11/21</p>	<p>Data & Resources (II) The second and final part of a two-part discussion exploring the data and tools that are currently available to characterize the linkages between population, health, and place.</p>	<p>Bian (2013). Approaches to modeling dispersion of communicable diseases: A review. <i>Transactions in GIS</i> 17: 1-17. Rezaein et al. (2007). Geographical epidemiology, spatial analysis, and geographical information systems. <i>Journal of Epidemiology and Community Health</i> 61: 98-102. Richardson et al. (2011). <i>Establishing an NIH-Wide Geographical</i></p>	<p>Submit briefs on Blackboard no later than 5:00 p.m. on Thursday, 11/17.</p> <p>Comment on at least one other brief on Blackboard no later than 9:00 a.m. on Monday, 11/21.</p>

		<p><i>Infrastructure for Medical Research: Opportunities, Challenges, and Next Steps</i>. Washington, D.C., Association of American Geographers.</p> <p>USAID (2012). Measure DHS: Demographic and Health Surveys. WWW document, http://www.measuredhs.com/.</p> <p>Voss (2007). Demography as a spatial social science. <i>Population Research and Policy Review</i> 26: 457-476.</p>	
<p>Week 15 11/28</p>	<p>Final Presentations Students will present their team projects, summarizing the insights garnered from each phase of the modeling process as experienced in their specific problem context.</p>		<p>Teams present their projects and answer questions from audience. Allow 50 minutes per team assuming a maximum of two or three teams per class.</p>
<p>FINAL 12/2</p>			<p>Final team reports to be submitted on Blackboard no later than 5:00 p.m. on Friday, 12/2.</p>

Statement on Academic Conduct and Support Systems

Academic Conduct

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in *SCampus* in Section 11, *Behavior Violating University Standards*

<https://scampus.usc.edu/1100-behavior-violating-university-standards-and-appropriate-sanctions>. Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct, <http://policy.usc.edu/scientific-misconduct>.

Discrimination, sexual assault, and harassment are not tolerated by the university. You are encouraged to report any incidents to the *Office of Equity and Diversity* <http://equity.usc.edu> or to the *Department of Public Safety* <http://adminopsnet.usc.edu/department/department-public-safety>. This is important for the safety of the whole USC community. Another member of the university community – such as a friend, classmate, advisor, or faculty member – can help initiate the report, or can initiate the report on behalf of another person. *The Center for Women and Men* <http://www.usc.edu/student-affairs/cwm/> provides 24/7 confidential support, and the sexual assault resource center webpage <http://sarc.usc.edu> describes reporting options and other resources.

Support Systems

A number of USC’s schools provide support for students who need help with scholarly writing. Check with your advisor or program staff to find out more. Students whose primary language is not English should check with the *American Language Institute* <http://dornsife.usc.edu/ali>, which sponsors courses and workshops specifically for international graduate students. *The Office of Disability Services and Programs*

http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html provides certification for students with disabilities and helps arrange the relevant accommodations. If an officially declared emergency makes travel to campus infeasible, *USC Emergency Information* <http://emergency.usc.edu> will provide safety and other updates, including ways in which instruction will be continued by means of blackboard, teleconferencing, and other technology.