

Spatial Structures in the Social Sciences Summer 2012 GIS Institute

Final Presentation Program

June 1, 2012 Population Studies and Training Center, Seminar Room

9:30 – 9:45 am	Welcome
9:45 – 10:30 am	Session I: Geography and HIV
10:30 – 11:15 am	Session II: The Spatial Analysis of Health and Wellbeing
11:15 am – 12:15 pm	Session III: Spatial Perspectives on History and Governance
12:15 – 1:15 pm	Lunch
1:15 – 2:45 pm	Session IV: Spatial Analysis in Socio-Economic Research
2:45 – 3:00 pm	Certificate Presentation
3:00 pm	Close of Conference

PARTICIPANTS

Yelena Biberman (Political Science)

Philip Chan (Medicine)

Andrew Elzinga (Economics)

Bruno Gasperini (Economics)

Sarah Gleason (Community Participant)

Rachel Goldberg (Sociology)

Priya Hirway (Community Health)

Karida Johnson (Sociology)

Shiva Koohi (Economics)

Hwajin Lee (Human Biology/History)

Juyoung Lee (Sociology)

Margaret Mulcahy (Sociology)

Rodrigo Rodrigues-Silveira (Watson Institute)

Allison Shertzer (University of Pittsburgh)

Andrew Tobolowsky (Religious Studies)

Yi Wang (Epidemiology)

Colin Wilder (University of Wisconsin)

Edwina Williams (Public Health)

PROGRAM

SESSION I: GEOGRAPHY AND HIV

Philip Chan, *Molecular and Geographic Investigation of a Statewide HIV Epidemic*

Hwajin Lee, *HIV and HCV in Philadelphia*

Rachel Goldberg, *An Invisible Demographic? Children Living with HIV-Positive Adults in Sub-Saharan Africa*

SESSION II: THE SPATIAL ANALYSIS OF HEALTH

Edwina Williams, *Spatial Patterns of Breast Cancer Diagnosis in Rhode Island (1990-2010)*

Priya Hirway, *Using GIS to Examine the Association of Neighborhood Characteristics with Emergency Department Use Among Kids in Rhode Island: A Study from the Hasbro Clinics*

Yi Wang, *Long-Term Exposure to Traffic Pollution and Subclinical Atherosclerosis in African Americans: Results from the Jackson Heart Study*

SESSION III: SPATIAL PERSPECTIVES ON HISTORY AND GOVERNANCE

Colin Wilder, *The Provenance of Library Collections in Early Modern Germany*

Andrew Tobolowsky, *"Mutual" Sites in the Ancient Mediterranean*

Yelena Biberman, *Political Violence across Space and Time*

Rodrigo Rodrigues-Silveira, *Water and Sewerage Governance in the Global South: Brazil, Mexico and South Africa Compared*

SESSION IV:
SPATIAL ANALYSIS IN SOCIO-ECONOMIC RESEARCH

Andrew Elzinga, *The Effect of Ethanol Mandates on Gasoline Prices*

Bruno Gasperini, *Exploring Patterns of Political Participation in Massachusetts*

Margaret Mulcahy, *Siting Schools in Massachusetts*

Shiva Koohi, *Did College Towns Avoid the Great Recession? A Spatial Analysis*

Karida Johnson, *Before They Were Diamonds: The Intergenerational Mobility of Harlan County Coal Camp Blacks*

Juyoung Lee, *Immigrant Residential Patterns in South Korea*

PRESENTATION ABSTRACTS

Yelena Biberman - Political Violence across Space and Time

My project examines the spatial dynamics of political violence committed by nonstate actors around the world, and in South Asia in particular, over the past four decades. Have there been significant shifts in nonstate actor violence across countries and regions? Which countries and regions have witnessed a decline and which countries and regions have witnessed an increase in nonstate violence? Nonstate actor violence is currently viewed as the greatest threat to security in South Asia. Where does South Asia stand in relation to other regions when it comes to nonstate actor violence? How has violence spread across the region, in particular in Pakistan, India, Afghanistan, Bangladesh, and Sri Lanka? To answer these questions, I will use a dataset of all known incidents of terrorism between the years 1970 and 2010.

Philip Chan - Molecular and Geographic Investigation of a Statewide HIV Epidemic

The human immunodeficiency virus (HIV) is the cause of acquired immunodeficiency syndrome (AIDS) and is most commonly transmitted by sex or contaminated blood products including needles. In the United State, the HIV/AIDS epidemic disproportionately affects minority populations, intravenous drug users, and men who have sex with men (MSM). The propensity of the epidemic to affect a given risk group depends on geographic location. In many places, including Rhode Island, infection among MSM is increasing despite numerous statewide prevention interventions. This project seeks to evaluate the geographic nature of the HIV epidemic in Rhode Island using geographic information systems (GIS) and molecular phylogenetics. Molecular phylogenetics uses HIV sequences to identify transmission patterns and networks in the community. HIV infected individuals will be identified through The Miriam Hospital Immunology Center, the largest HIV clinic in Rhode Island providing care to over 1,200 patients. Data collected includes HIV sequences, addresses (street, city, state, zip code), and risk factor for infection. The project will: 1) Determine the geographic distribution of current HIV infections in Rhode Island; 2) Identify 'hotspots' of HIV infection in major urban centers; 3) Apply molecular phylogenetics to determine association of geography with transmission networks. The project will also evaluate subpopulations including MSM, the most common risk factor associated with HIV infection. The project will map HIV testing centers in Rhode Island in relation to the regions most affected. The results of this study will help identify targets for prevention in the state and focus local HIV prevention efforts.

Andrew Elzinga - The Effect of Ethanol Mandates on Gasoline Prices

A total of 19 states banned MTBE in gasoline from 2000--2006 before the chemical was phased-out nationwide in the summer of 2006. We estimate that MTBE bans increased reformulated gasoline prices by nearly 6 cents in states for which the bans were binding. As expected, price impacts are larger for states located outside of the Midwest and for time periods in which the price of ethanol is high relative to MTBE. As expected, we estimate that MTBE bans had little effect on average prices for conventional gasoline. While ethanol and MTBE are close substitutes in the gasoline additives market, MTBE production near oil refineries and distribution at low cost via refined product pipelines is more similar to that of gasoline, and MTBE prices track gasoline prices very closely. Thus, in areas using MTBE to comply with minimum oxygenation requirements, MTBE bans approximate direct ethanol blending mandates.

Bruno Gasperini - Exploring Patterns of Political Participation in Massachusetts

Why do some people vote while others do not? Why do some regions exhibit high political participation while others do not? A number of factors have been posited as having an impact upon how many people turn out to vote. These include institutional factors such as the type of electoral system and competitiveness of the political environment. Socio-economic factors such as education levels, population size, and economic development have also been proposed as having a direct impact upon political participation.

The understanding of potential explanations is motivated by a belief that high rates of voter participation are desirable and an expectation that this will have electoral consequences. This project aims to take a first explanatory analysis at variation in political participation and understand its determinants. For that, I will look at cross-county variation in voting registration rates for the 2008 presidential election in Massachusetts. Which socioeconomic characteristics at the county level correlate with registration rates? Do we see any spatial pattern or spatial correlation in political participation? This project constitutes a first step in producing baseline results for future in-depth research in understanding the driving forces behind political participation.

Rachel Goldberg - An Invisible Demographic? Children Living with HIV-Positive Adults in Sub-Saharan Africa

While attention to orphans in sub-Saharan Africa has grown immensely in the past decade, attention to the population of children living with HIV-positive adults has received relatively little attention. With the successful expansion of AIDS treatment, this population of children can be expected to grow in the short-term. When research has been conducted, it suggests that children living with HIV-positive or ill adults may experience higher mortality rates, compromised health and nutrition, and schooling disadvantage than children who do not. This research will use data from the Demographic and Health Surveys to document the prevalence of child co-residence with HIV-positive adults across countries in sub-Saharan Africa. We will map the trends in such prevalence across the region, as well as overlaps between orphan status and co-residence with an HIV-positive adult. Since the implications for children may depend on their relationship to the person infected, we will also examine in particular co-residence with HIV-positive mothers and fathers. After reviewing the patterns across sub-Saharan Africa, we will describe the set of challenges children living with HIV-positive adults may face, and argue for more attention from researchers and policy-makers to this “invisible demographic.”

Priya Hirway - Using GIS to Examine the Association of Neighborhood Characteristics with Emergency Department Use Among Kids in Rhode Island: A Study from the Hasbro Clinics

Hasbro Children’s Hospital is the main emergency department in Rhode Island and southeastern New England. Over 39,000 children received care at the Hasbro Emergency Department (ED) in 2010. Two implications of ED use are that a) patients are sicker by the time they receive treatment and b) the cost of treatment is higher than if they had received timely care at their pediatrician’s office. This finding is especially pertinent to low income families who use Medicaid, face unique barriers to using primary care doctors’ offices (such as language barriers, racial disparities, etc.) and frequently use the emergency department to receive care.

Previous research in Rhode Island showed that children with Medicaid insurance use the emergency department as much as twice those with commercial insurance. The Rhode Island Medicaid managed care program RItE Care emphasizes primary care to improve health, reduce costly ED use and subsequent hospitalizations for its patients. More than half the children who receive care at the primary care clinics at Hasbro are RItE Care patients. In this study, we propose to use geographic data from the 2010 US Census combined with data from the primary care clinics at Hasbro to examine potential patterns in neighborhood characteristics and associated rates of emergency services use. The primary care clinic data provides a unique opportunity to follow patients' use of services longitudinally. Understanding geographic and demographic characteristics can aid in targeting interventions and educational programs.

Karida Johnson - Before They Were Diamonds: The Intergenerational Mobility of Harlan County Coal Camp Blacks

Between 1940 and 1970 approximately 5 million African Americans left the Southern region of the United States and migrated to urban cities in the Northern and Western regions of the country. This epoch event, referred to as The Great Migration, is one of the most dynamic episodes in American history; as it forever changed the country's interaction with African Americans. Sparked by industrialization, the exponential increase in labor supply and the opportunity for upward social mobility enticed millions of African Americans to migrate. Much has been written about the details of this historic event. However, there were tens of thousands of blacks whose journey to the urban North was temporarily suspended for a generational hiatus to work in the Appalachian coalmines of Kentucky and West Virginia. Between 1955 and 1970, the progenitors of these African American coalminers joined their contemporaries from the South, and migrated to the large urban cities in the Northern and Western regions of the United States. The Eastern Kentucky Social Club (EKSC) is an organization that strives to reunite African Americans from the coal towns of Lynch and Benham, Kentucky. Over the past 42 years, thousands of migrants have gathered from across the country to reunite with fellow coal miner's children. Using the 2005 address list from the 38th EKSC reunion, I will map the diaspora of 1,300 Lynch, KY migrant families. I intend to analyze this data in order to better understand how space and geography played a role in this diaspora and as a tool to guide future ethnographic research on this subpopulation of African American migrants.

Shiva Koohi - Did College Towns Avoid the Great Recession? A Spatial Analysis

In this project, I will analyze the relationship between county-level unemployment rates during the "Great Recession" (2008-2012) and proximity to a four-year college or university. I will utilize unemployment data from the Bureau of Labor Statistics and I will obtain the location of colleges from the "U.S. colleges" shapefile in the Tutorial Data. Preliminary analysis indicates that major "college towns" typically had much lower unemployment rates than their respective state average. I will further shed light on this finding by analyzing two channels through which this relationship could occur. The first channel that may lead to decreased unemployment in college towns is the increase in the supply of highly-skilled labor (assuming that some of the institution's alumni stay in the same county after graduation). The second channel is the growth of service industry establishments (restaurants, shops, etc) to cater to the college crowd. These two channels will be examined using census data.

Hwajin Lee - HIV and HCV in Philadelphia

Philadelphia has an HIV and HCV infection rate that is five times the national average, with one of the widest racial disparities in HIV and HCV infection in the United States. Professor Amy Nunn has undertaken a community-based approach to HIV prevention in medically underserved communities in Philadelphia with high infection rates. Her innovative interventions are designed to address the social determinants of HIV infection along with clinical interventions in geographic pockets of Philadelphia with high infection rates. How is the HIV and HCV infection rate distributed in Philadelphia, and how are census tracts 70 and 74 different from tracts 72, 73, 78, 77, 71.02, 71.01, 65, and 66, in terms of the infection rate and possible socioeconomic status and health indicators?

My GIS Institute project will explore this question, and try to figure out relationship between the distribution of the HIV and HCV infection rate in the regions with factors that may be contributing to the high HIV/HCV infection rate, such as access to HIV/HCV testing centers, education, age, and possible health indicators. Along with making a comprehensive map on information mentioned above, spatial analysis will be used to determine what factors contribute the most to the high HIV/HCV infection rate in each census tracts. It is also possible to see obtain statistical data on relationship between these factors and the HIV/HCV infection rate if needed.

Juyoung Lee - Immigrant Residential Patterns in South Korea

This project aims to examine immigrant residential patterns in South Korea between 1995 and 2010. The core principle of the original immigration policy in Korea was that of a temporary stay of professionals or skilled workers. Despite this original policy, in the mid-1980s, Korea began experiencing an influx of unskilled and semi-skilled migrant workers. In addition, beginning in the mid-1990s, international marriage migrants have dramatically increased. In 2011, it is estimated that the number of foreign residents living in South Korea accounted for around three percent of the country's total population. Alongside these startling demographic changes in an "ethnically homogenous" country, the Korean immigration policy has undergone a series of changes. Under the current immigration policy, unskilled and semi-skilled migrant workers can work in Korea for three years and can be granted additional three-year work permits. International marriage migrants can become Korean citizens after two years of marriage. Using the data from Statistics Korea, this project investigates where these immigrants live according to their immigrant types and their national origin. In particular, I am interested in the question of whether and how ethnic neighborhoods have developed in South Korea although migrant workers cannot permanently settle there. This project also examines how their residential patterns have shifted over time according to the transformation of immigration policy.

Margaret Mulcahy - Siting Schools in Massachusetts

Where do we send our children to school? This project seeks to map K-12 schools in Massachusetts and hazardous sites such as landfills, solid waste facilities, and oil/hazardous material dumps. I will generate descriptive statistics, such as average distance between schools and hazardous sites, average number of hazardous sites within a one mile radius of schools, which towns have the most hazardous sites, and which towns have the most schools located near hazardous sites. Using 2010 Census Data, I will run a binary logistic regression to see if characteristics such as percent minority population, average level of education, and average

household income of a town or census tract can be used to predict whether or not schools will be sited near hazardous facilities. I anticipate that traditional Environmental Justice communities (high percentage of low income, low education, minority individuals) will have a disproportionate number of hazardous facilities, and a disproportionate number of such facilities sited near schools.

Rodrigo Rodrigues-Silveira - Water and Sewerage Governance in the Global South: Brazil, Mexico and South Africa Compared

The objective of this research project is to perform a comparative analysis of the spatial inequalities in water and sewerage provision in Brazil, Mexico and South Africa and its determinants. In order to achieve this goal, this study proposes the analysis of the distribution of water and sewerage provision and its relations with other infra-structures and social, economic and politico-institutional characteristics in space. The main unit of observation will be the municipalities and the focus of analysis will be put on the subnational variations that both the coverage, socioeconomic and governance indicators can assume across space in these three countries.

Census data and administrative records are the main data employed in order to assess access to water and sewerage policies, local development, socioeconomic conditions and local governance. The concrete material to be presented in the Institute is: (a) the description of the data sources and the difficulties in obtaining data and making them “space-friendly”; (b) an exploratory analysis of the distribution of the two policies and other socioeconomic and politico-institutional indicator at the municipal level for the three countries; (c) the configuration of potential coincidences or causal mechanisms between public policy provision and the local governance of water and sewerage, using some basic spatial analysis techniques as LISA and point pattern analyses.

Andrew Tobolowsky - “Mutual” Sites in the Ancient Mediterranean

In all probability, the verbal map of the Tyrian trading empire in Ezekiel 27 and the various verbal maps presented in Homer’s *Iliad* are separated by only a little more than a century, a fairly small time increment in the data-sparse ancient world. One documents a military expedition heading East, the other a trading empire stretching far to the West—therefore, the arena of each certainly quantities of mutual space.

I study literary influence, the movement of narratives across space. By quantifying these two registers of ancient geographic knowledge by two peoples who are known to have influenced each other but can rarely be said, with any certainty, to have come into contacting each other, I hope to demonstrate some areas of mutual knowledge which are therefore likely to represent border zones.

I hope to add to this map some other datums, such as the Greek heroes mythologically derived from the East (such as the Phoenicians Cadmus and Europa, and the Eastern Anatolian Mopsus, as well as sites of oracular activity such as the Egyptian oracle of “Zeus Ammon”, as well as the Genesis 10 “Table of Nations”, a representation of the known world as a single family. If there is time, I hope to include certain relevant Greek colonies presumed to be contemporaneous with the time of Homer’s writing.

While, naturally, deriving any certain knowledge from the juxtaposition of these multiple data points will require much more in the way of methodology than is currently possible, I have little doubt that what this map will reveal will be both illuminating and highly suggestive towards multiple questions. I strongly suspect, for example, that it will have some bearing on the notion that the Iliad must be a particularly old story because the Greek sites involved were important centers more so in an earlier age than at the time of their writing, as well as the notion that we must look for sites of influence only in the Mediterranean, neglecting the Mediterranean and Black Sea areas.

Yi Wang - Long-Term Exposure to Traffic Pollution and Subclinical Atherosclerosis in African Americans: Results from the Jackson Heart Study

Epidemiologic studies have linked long-term exposure to ambient air pollution in general and living close to a major roadway in particular with excess cardiovascular disease and mortality. Living close to a major roadway is associated with higher levels of traffic-related particulate and gaseous pollutants, in addition to other stressors including noise. Among several plausible biological mechanisms, recent studies have suggested a relationship between long-term air pollution exposure and the development of atherosclerosis. Human epidemiologic studies have evaluated the relationship between urban ambient air pollution and several measures of subclinical atherosclerosis, but the results have not been entirely consistent and this relationship has not been evaluated in cohorts with a significant number of African Americans. Additionally, prior studies have not identified potential mediators or modifiers of this association. Accordingly, within the Jackson Heart Study we propose to: 1) evaluate the association between residential proximity to major roadways and a comprehensive set of established markers of subclinical atherosclerosis, 2) assess whether traditional cardiovascular risk factors mediate these effects, and 3) identify subgroups of participants that may be at greater risk of enhanced atherosclerosis due to residential proximity to major roadway. The results of this study will significantly increase our understanding of the cardiovascular risks associated with living near major roadways, inform future studies in this area, and suggest possible prevention strategies.

Colin Wilder - The Provenance of Library Collections in Early Modern Germany

This project uses spatial analysis to understand patterns of book publication and library acquisitions in Germany in the 17th and 18th Centuries. My broader research concerns the growth of ideas about freedom and equality among lawyers and philosophers. For this reason, the present project focuses on law books in particular. The project has two components. First I will look at where books were published and how this changed over time. Historiography about the spread of printing and professional and cultural relationships between the Germanies, Italy, France and Britain suggests the general hypothesis that there was a shift of the printing of law books (broadly considered) from major Dutch and Italian cities in the 16th century to German cities and smaller towns in the 17th and 18th centuries. I hope both to test this hypothesis and to measure and analyze the results in a way that historians of print culture and erudition have not yet been able to do. Second I will analyze the provenance of specific collections of law books to learn more about where they came from, in measurable detail. (The first study, above, can be thought of as the supply side of the professional book market, this as the demand side.) I have, in aggregate, datasets for 5 libraries in Frankfurt, Hanau, Hersfeld and Marburg (i.e. all in the Hessian region of Germany) at discrete points across 16th through 18th centuries.

Edwina Williams - Spatial Patterns of Breast Cancer Diagnosis in Rhode Island (1990-2010)

Breast cancer is one of the most common cancers among women in the United States. In 2011, an estimated 39, 520 women were expected to die from breast cancer. Breast cancer consists of five stages of invasiveness ranging from stage 0 (ductal carcinoma in situ) which is considered non-invasive to stage IV, which is described, as metastatic or advanced. Breast cancer can also be described by location: local, regional, and distant. The purpose of this project is to investigate the change in breast cancer diagnosis by location among Black, White, and Hispanic/Latino women, in Rhode Island over a 20-year period using data available from the Rhode Island Cancer Registry and the U.S. Census. Furthermore, this project aims to identify areas with the highest proportion of metastatic breast cancer in hopes of identifying areas with gaps in the level of preventative care.