

Spatial Structures in the Social Sciences 2017 Summer GIS Institute

Final Presentation Program

June 9, 2017 Population Studies and Training Center
Seminar Room

9:30 – 9:45 am	Welcome
9:45 – 10:45 am	Session I: GIS Applications in the Social Sciences
10:45 – 11:15 am	Session II: Historical Geography
11:15 am – 12:15 pm	Session III: Spatial Aspects of Economic Development
12:15 – 1:30 pm	Lunch
1:30 – 2:45 pm	Session IV: Spatial Analysis of Environmental Issues
2:45 – 3:45	Session V: GIS and Spatial Analysis for Health Research
3:45 – 4:00 pm	Certificate Presentation
4:00 pm	Close of Conference

PARTICIPANTS

Chinyere Agbai (Sociology)

Jose Belmar (Economics)

Keegan Cothorn (History)

Guadalupe Garcia (John Carter Brown Library)

Elizabeth Heath (John Carter Brown Library)

Ariel Hoadley (School of Public Health)

Matteo Iudice (Economics)

Augustine Kang (Behavioral and Social Sciences)

Masahiro Kubo (Economics)

Ken Miura (Economics)

Marcel Peruffo (Economics)

Diego Ramos Toro (Economics)

Marie Schenk (Political Science)

Lauren Schlichting (Hassenfeld Child Health Innovation Institute)

Rebecca Thorsness (Health Services, Policy, and Practice)

Shunsuke Tsuda (Economics)

Maggie Unverzagt Goddard (American Studies)

Richard Vachula (Earth, Environmental and Planetary Sciences)

Ieva Zumbyte (Sociology)

PROGRAM

SESSION I: GIS APPLICATIONS IN THE SOCIAL SCIENCES

Ieva Zumbyte, *Spatial Disparities in Women's Empowerment in Bangladesh*

Jose Belmar, *Income Inequality in Chilean Urban Centers*

Maggie Unverzagt Goddard, *The Optics of Drone Strikes: Reading Dronestre.am*

Marie Schenk, *Youth Voter Turnout and High School Characteristics in US Cities*

SESSION II: HISTORICAL GEOGRAPHY

Elizabeth Heath, *Indigo, Coffee, and Sugar: Visualizing Race Making in Saint-Domingue Through Shifting Commodity Frontiers*

Guadalupe García, *Black Geographies and Colonial Logic in Havana*

SESSION III: SPATIAL ASPECTS OF ECONOMIC DEVELOPMENT

Marcel Peruffo, *Road Tolling and Economic Development*

Masahiro Kubo, *Economic Consequences of Cambodian Refugees*

Shunsuke Tsuda, *Interlinked Market and Non-Market Transactions across Amazonian Communities*

Matteo Iudice, *Ethnic Persistence*

LUNCH BREAK, 12:15–1:30 PM

**SESSION IV:
SPATIAL ANALYSIS OF ENVIRONMENTAL ISSUES**

Richard Vachula, *Calibrating Paleofire Proxies with Spatial Analysis*

Diego Ramos Toro, *Pollution and Cohesion*

Ken Miura, *Does Pollution Lead to Labor Reallocation?: Evidence from Japanese Metal Mines*

Chinyere Agbai, *Race and Proximity to Hazardous Waste Facilities in Los Angeles*

Keegan Cothorn, *Insuring Japan: Earthquake Distribution, Insurance Ratings, and Perceptions of Risk*

**SESSION V:
GIS AND SPATIAL ANALYSIS FOR HEALTH RESEARCH**

Rebecca Thorsness, *Travel Distance for Hemodialysis: An Exploratory Analysis*

Lauren Schlichting, *Risk Factors for Preterm Birth in Rhode Island*

Ariel Hoadley, *Geographic Relationships Between Alcohol Outlets, Violent Crime, and Residents' Perceptions of Daytime and Nighttime Safety in San Francisco*

Augustine Kang, *Food Deserts and Poor Dietary Intake in Black Women - A GIS Analysis of Dietary Intake Patterns of Black Women in Providence, RI and Boston, MA*

PRESENTATION ABSTRACTS

Chinyere Agbai – Race and Proximity to Hazardous Waste Facilities in Los Angeles

This project explores the racial composition of the people who live in close proximity to hazardous waste facilities in Los Angeles County. I make use of census data and publicly available locations of hazardous waste disposal sites in Los Angeles County to explore this question. Previous research has found that residents of neighborhoods adjacent to manufacturing zones are disproportionately non-white, earn low incomes, and experience high rates of cancer, asthma and other conditions (Maantay 2001; Morello-Frosch, Pastor, and Sadd 2001). Because black residents have a disproportionately high likelihood of living near these hazards (Downey 2006), Los Angeles provides an interesting case because just 6% of the population is Black, but more than 40% identifies as Latino (Sastry, Pebley, and Zonta 2000).

Though the causal link between proximity to hazardous waste sites and reduced health outcomes is somewhat tenuous (Downey 2006; Maantay 2001), previous research explores other tangibly negative effects of living near hazardous waste facilities. For instance, proximity to these sites has been linked to heightened levels of psychological stress (Downey and Van Willigen 2005). For this reason, it is important to understand the extent to which particular ethnoracial groups are burdened by this proximity in Los Angeles.

Jose Belmar – Income Inequality in Chilean Urban Centers

Using Night Luminosity and Population raster data, I will approximate income inequality and per capita income in main Chilean urban areas. Using these results, I will explore potential explanations for city level differences that may arise, including city main economic activity, city size, natural resources availability, access to ports and other cities proximity.

Keegan Cothorn – Insuring Japan: Earthquake Distribution, Insurance Ratings, and Perceptions of Risk

Japan only possesses about .5% of the world's land area, yet is shaken by 10-15% of the major earthquakes that occur globally. This high ratio of earthquakes has pushed the Japanese to consider various factors to mitigate damage, including steps ranging from the introduction of seismically-sound building codes, to public education about natural disasters, to making insurance available to a minority of Japanese after 1969. In addition to mapping the distribution of modern seismic events in Japan, I hope to use the visualization tools of ARC GIS to look at how insurance premiums have been determined since this point and what factors might have influenced rates. These include factors of past earthquake history, population and assets, building types, and eventually, the publication of seismic probability maps beginning in 2004/05 and can reveal how perceptions of seismic risk changed over time. Finally, the slow increase of earthquake insurance contracts held by citizens can also be demonstrated over time and space.

Guadalupe García – Black Geographies and Colonial Logic in Havana

Using colonial urban plans and GIS technologies this project maps black barrios (neighborhoods) in and around the walled city of Havana. Working from the premise that colonialism, slavery, and race were intricately inscribed onto colonial landscapes (through the organization of city space, in the architecture of colonialism, and via colonial urban design) the paper locates black colonial subjects within the historical maps of the period.

Maggie Unverzagt Goddard – The Optics of Drone Strikes: Reading Dronestre.am

The U.S. Air Force announced that it is officially moving to retire the MQ-1 Predator drone in early 2018, yet its body remains the iconic image representative of anxieties and attitudes surrounding the operation of unmanned aerial vehicles. Through spatial analysis of data about every reported covert U.S. drone strike, this project explores the politics of visual culture and the ways in which other images of drones—including data visualization—offer other modes of understanding U.S. drone strikes and fostering critical discussion. Inspired by data artist Joshua Begley’s U.S. drone strike reporting app, Metadata+, this project incorporates data from his publicly accessible API, Dronestre.am. Dronestre.am collates real-time and historical data about every reported covert U.S. drone strike—including updated Tweets, a searchable database, narratives, and news articles aggregated by the Bureau of Investigative Journalism—for designers and developers to build data visualizations about covert war. While incorporating visual culture studies, critical theory, and public humanities, this project maps incongruities of reported civilian casualties between the U.S. Director of National Intelligence’s official summaries and the numbers reported by the Bureau of Investigative Journalism and other non-governmental assessments. This research also incorporates human stories into data visualizations and foregrounds ways of reading maps and graphics as a mode of human storytelling. This research builds on a larger project on visual culture as a site of proximity while negotiating the tensions between visibility and erasure.

Elizabeth Heath – Indigo, Coffee, and Sugar: Visualizing Race Making in Saint-Domingue Through Shifting Commodity Frontiers

Drawing upon historical maps and historical census data, this project explores the potential of GIS mapping to reveal changes in export crop production in Saint-Domingue (present-day Haiti) in the eighteenth century. It will be suggested that new ways of visualizing shifting commodity frontiers in the colony can shed new light on the consolidation of slavery and forms of racial thinking in the decades leading up to the French and Haitian Revolutions.

Ariel Hoadley – Geographic Relationships Between Alcohol Outlets, Violent Crime, and Residents’ Perceptions of Daytime and Nighttime Safety in San Francisco

Previous research from variety of urban and rural settings has established a geographic relationship between alcohol outlets and clusters of violence. Moreover, this association is particularly salient in geographic regions with a higher proportion of ethnic minorities and poverty. In addition, hotter days are associated with higher rates of violence in urban communities. San Francisco is a unique urban setting because of its relatively constant temperature. The present study examines the geographic relationships between on- and off-sale alcohol outlets, violent crime incidents, and residents’ perceptions of daytime and nighttime neighborhood safety in San Francisco. Point data for active on-sale beer, wine, and general liquor licenses (N=2,812) and off-sale beer/wine and general liquor licenses (N=796) for April 2017 in San Francisco were extracted using the California Department of Alcoholic Beverage Control’s License Query System. On-sale licenses authorize the sale of alcohol for consumption on the premises, and off-sale licenses authorize the sale of alcohol to be consumed off the premises. Point data for violent crime incidents (i.e. assaults, sex offenses [forcible and non-forcible], and robberies) between February 2017 and April 2017 were extracted from San Francisco police department incident reports (N=2,938). Valid and non-missing responses for

San Francisco residents' perceptions of daytime (N=1,075) and nighttime (N=1,032) safety at the zip code level were analyzed from the 2017 San Francisco City Survey, telephone and online survey conducted biannually in the spring on a random, representative sample of San Francisco residents.

Matteo Iudice – Ethnic Persistence

The project looks at the spatial distribution of ethnic groups in Ghana, using census data. Looking at the reported ethnicities of the members of each household, there are several cases of mixed ethnicity's couples with their children reporting a third, different ethnicity. Census data might help explaining, in part, this finding. I restrict my analysis to the spatial dimension, despite being constrained by the smallest geographical unit being district. I try to assess whether the households characterized above are uniformly distributed across districts or: (i) are mostly present in certain regions, (ii) within the regions, are mostly positioned around the borders. Finally, I compare the predominant ethnicity in the district with the ethnicity of the children belonging to these 'mixed ethnicity' households.

Augustine Kang – Food Deserts and Poor Dietary Intake in Black Women - A GIS Analysis of Dietary Intake Patterns of Black Women in Providence, RI and Boston, MA

Access to healthy foods is considered by activist groups to be a basic human right. Unfortunately, "food deserts" (defined by the USDA as at least 500 people or 33 percent of the census tract's population that reside more than one mile from a supermarket or large grocery store") continue to exist across vast geographic spaces in the United States. In addition, findings related to racial inequities in food accessibility are consistently emphasized as a major problem that requires targeted interventions to facilitate healthy eating and improve nutrition and health outcomes. The present study proposes to examine, using results from the SisterTalk Adhere lifestyle intervention, the spatial patterns of poor dietary intake in Black women (as measured by self-reported instruments such as the Food Frequency Questionnaire) as compared to USDA designated areas identified as food deserts, with the aim of identifying geographic areas of poor dietary behaviors within food deserts as these populations face more complex set of barriers for intervention efforts to address. GIS maps will be created to visualize the spatial patterns of poor dietary intake in Black women residing in the Providence and Boston metropolitan areas, overlaid onto USDA reported food desert areas. The results will inform future environmental modifications to improve eating behavior in the affected populations.

Masahiro Kubo – Economic Consequences of Cambodian Refugees

This project shows economic consequences of Cambodian refugees who arose at the time of the collapse of the communist Khmer Rouge regime (1975 - 1979) with some graphical analyses. We employ a complete set of the 1998 Census microdata and identify the returnees from Thailand. These analyses suggest that the returnees from Thailand, especially younger cohorts, attain higher educational outcomes, but experience worse labor outcome than stayers.

Ken Miura – Does Pollution Lead to Labor Reallocation?: Evidence from Japanese Metal Mines

This project studies the impact of water pollution from metal mines on employment shares in the neighboring regions in the context of Japan, 1920. Anecdotal evidence suggest that acid drainage especially from copper mines has significantly contaminated river water and topsoil, causing

reductions in agricultural productivity in the downstream villages. However, whether or not such externalities had any historical effect on local economy depends on the degree of market integration. If villages are characterized by a closed economy, the productivity shock to agricultural sector will slow down industrialization in these downstream areas. On the other hand, if local markets are connected so that agricultural commodities are tradable across different places, the negative effect of pollution on agricultural productivity will lead to the reallocation of labor force toward the manufacturing sector because of their relative increase in the comparative advantage. To explore this empirical question, this ongoing project compares the sector of employment between villages downstream of any mines and others, controlling for the total length of rivers. Preliminary results from the 1920 population census find that villages with a contaminated river had a larger share of industrial employment than control villages.

Marcel Peruffo – Road Tolling and Economic Development

The ultimate goal of this project is to study the impacts of extensive road privatizations that occurred in Brazil in the last 23 years. Starting in 1995, the Federal government initiated a program that consists of transferring, via a procurement process, the responsibility of highway maintenance to private third parties. These long-term (usually more than 20 years) contracts stipulate that these firms can charge tolls from road users.

For this week, I simply collect data on the contemporaneous entire Brazilian highway network and on simple, municipal-level economic aggregates (output per industry). I then identify the roads that are privatized at this point in time (The ultimate goal is to identify, in every year, which stretches were privatized. That unfortunately will have to wait for the next time. Even so, I believe that it would just be a straightforward (though laborious) extension of what is done here.). To address the issue that privatization is not occurring at random, I undertake an instrumental variable approach. Specifically, I construct straight lines between major cities in the country at the beginning of the privatization period - the underlying assumption here is that the probability of tolling correlate with distance to these lines, and that a municipality lying on these lines is “randomly” more likely to be crossed by a toll highway.

Diego Ramos Toro – Pollution and Cohesion

Why are we experiencing a global failure in tackling climate change? Why have some nations made significant progress in the matter while other have not? As a part of an ongoing investigation, I am interested in unveiling the link between carbon emissions and social cohesion at a subnational level in Europe. Following Ashraf and Galor (2013)*, cohesion can be constructed using migratory distance from Addis Abbaba, Ethiopia. I intend to geographically divide Europe into squares of 100KM times 100KM, which will then allow me to retrieve measures of average intensity of nightlights for each of these squares coupled with x-y coordinates for their centroids. This will be a first step that on a later instance I will mimic not only with nightlights, but with satellite estimates of CO₂, ruggedness, elevation, soil suitability for agriculture, average temperature and population densities. I will then be able to use the x-y coordinates, combined with the information above for each fictitious square, in systematically assessing the subnational relation between cohesion and carbon emissions.

*Ashraf, Q. and Galor, O. (2013). “The Out of Africa Hypothesis, Human Genetic Diversity and Comparative Development”, *American Economic Review*, 103(1), 1-46.

Marie Schenk – Youth Voter Turnout and High School Characteristics in US Cities

What causes citizens to vote? In the United States, voting is a highly prized civic right, and yet turnout rates, especially in non-presidential elections, is quite low. The voting population tends to be older, wealthier, and better educated than the population as a whole. Political scientists have written influential, occasionally expansive, works devoted entirely to explaining and predicting the actions of American voters. Education consistently ranks as one of the top predictors of a potential voter's likelihood of turning out on election day. However, most studies using education as a variable treat it as a "black box," measuring only the years of education someone experienced without examining the content or quality of that education. This project links youth turnout rates with high school characteristics. Do students who feel more efficacious in the classroom also feel more efficacious in the political system? In this project, I present evidence showing that how a person is educated, not just how many years of education they received, influences their likelihood of turning out to vote. I focus my analysis on young adults (age 18-24) as the impact of their high school education should be especially strong. Schools are an important neighborhood characteristic, so this analysis will benefit greatly from a spatial component.

Lauren Schlichting – Risk Factors for Preterm Birth in Rhode Island

In 2015, 8.5% of births in Rhode Island were preterm, occurring before the 37th week of gestation. Preterm birth is a major determinant of infant morbidity and mortality and these infants are at higher risk than full-term infants for a number of adverse health outcomes including respiratory, neurodevelopmental, immunological, and vision problems. The specific cause of preterm birth is unknown, however, a number of potential risk factors have been suggested, including maternal exposure to air pollution, maternal diet, and access to prenatal care. In the present analysis, location of three types of businesses whose presence or absence in a community may impact rates of preterm birth will be examined. The location of toxic chemical release facilities, food markets, and OB/GYN practices in Rhode Island will be geocoded and mapped and comparisons will be made between towns with varying percentages of preterm births.

Rebecca Thorsness – Travel Distance for Hemodialysis: An Exploratory Analysis

People with end stage renal disease (ESRD) experience high rates of morbidity and mortality, and the burden of ESRD disproportionately falls on minority and low-income communities. ESRD patients generally require dialysis three times per week at specialized facilities until kidney transplant or termination of dialysis. This project explores travel distance to hemodialysis facilities for patients in urban and rural regions of a western state in the United States, and (potentially) determines whether patients go to their nearest facility. If this analysis is not feasible, a secondary objective is to generally explore whether hemodialysis facilities are located in areas with higher need, to the extent that need is clustered geographically, and whether neighborhood characteristics such as income and race are related to the presence of hemodialysis facilities. This analysis will use the Renal Management and Information System (REMIS) data from 2009 to 2015, which includes information about patients newly beginning dialysis in the United States, including their residential address as well as neighborhood information from the American Community Survey and Census. This analysis will focus on a single state (potentially Colorado) with both urban and rural regions. This work is part of a bigger project looking at the relationship between insurance coverage at the start of dialysis and outcomes including death.

While insurance coverage is one component of access to care, geographic considerations are another. I hope that this small project discovers whether it is feasible and interesting to ultimately explore the relationship between distance to dialysis facility and health outcomes.

Shunsuke Tsuda – Interlinked Market and Non-Market Transactions across Amazonian Communities

Market transaction and non-market transaction like risk sharing, both of which are critically important among rural households in developing economies, have been separately studied in the economics literature. We examine how rural agricultural households adopt market transaction (food crop trading) and non-market transaction (risk sharing in the form of seed sharing) across communities. We develop a theory of household joint decisions of trading and risk sharing to characterize their substitutability and complementarity and derive factors determining household decisions. We empirically test theoretical hypotheses using our original community census undertaken in four major river sub-basins in the Peruvian Amazon (n=919 communities), where market access is strongly constrained among remote communities. We examine how 1) four possible community-level transaction regimes – (i) autarky (subsistence); (ii) across-community risk sharing only; (iii) across-community trading only; (iv) both risk sharing and trading – , 2) the prevalence of risk sharing/trading across communities, and 3) the household-level and communities-level inequalities are determined by community location, geographical transaction cost (market access), income diversification from trading (market development), community wealth (land and resource endowment), risk (vulnerability to flood), and social transaction costs (communication infrastructure and ethnicity). The evolution of rural communities and markets, and implications for rural development are discussed.

Richard Vachula – Calibrating Paleofire Proxies with Spatial Analysis

Fire history reconstructions are the best means of assessing the abnormality of modern burning and predicting fire regime responses to climate change. Charcoal particles preserved in lake sediment records and metrics derived from variations in their accumulation are widely employed paleoecological proxies of fire. However, despite their ubiquitous use, the spatial scales of charcoal particle dispersal remain a topic of debate in the literature. Here I present a proxy calibration study assessing the spatial mobility of three size classes of macroscopic charcoal. Using an ideally situated case study in the Sierra Nevada of California, I compare down-core variations in charcoal accumulation rate (CHAR) with a historical record of area burned in order to delineate the spatial scales for which CHAR variations are representative of area burned.

Ieva Zumbyte – Spatial Disparities in Women’s Empowerment in Bangladesh

Gender equality matters in its own right but it is also an instrument for development and greater population well-being. Yet, gender equality and women’s empowerment continues to be a critical issue in many parts of the world, including Bangladesh. Bangladesh ranks 115 out of 187 countries on the Gender Inequality Index, developed by United Nations Development Program. In other international gender-related indicators (e.g. WEF’s Global Gender Gap Index) Bangladesh also falls within the bottom half of countries exhibiting worst rankings. Even though Bangladesh has made great progress towards women’s empowerment during the last several decades, serious gaps remain. Women and girls are at risk of violence at home and are curtailed in their mobility by concerns of insecurity in public. In terms of their participation in decision-making, they have a weak voice both in the home and outside. The aim of this project is to

investigate the spatial inequality in women's empowerment in Bangladesh and understand whether community-level factors can be associated with greater or lesser female empowerment levels. The project uses Demographic and Health Survey for Bangladesh 2014 which includes GPS coordinates for 600 clusters of observations. The sample focuses on ever-married women aged 15-49. The main dependent variables of interest are women's empowerment measured by women's control over their own earnings and two summary indicators: an index of the number of household decisions (0-4) in which the woman participates and an index of the number of reasons (0-5) the woman accepts as justifying wife beating. These measures of empowerment are then analyzed in relation to community-level infrastructure indicators and their variation across space, including access to market, health facilities, availability of electricity and water sources. Multivariate regressions are used to estimate the correlations between community-level indicators and women's empowerment. Models that can account for potential spatial effects are discussed.