

Spatial Structures in the Social Sciences 2019 Winter GIS Institute

Final Presentation Program

January 18, 2019

John D. Rockefeller, Jr. Library
Patrick Ma Digital Scholarship Laboratory (DSL)

9:30 – 9:45 am	Welcome
9:45 – 10:30 am	Session I: GIS Applications in the Social Sciences I
10:30 – 11:00 am	Session II: Historical Geography
11:00 – 11:15 am	Session III: GIS and Climate
11:15 am – 12:15 pm	Session IV: GIS and Health I
12:15 – 1:30 pm	Lunch
1:30 – 2:30 pm	Session V: GIS Applications in the Social Sciences II
2:30 – 3:30 pm	Session VI: GIS and Health II
3:30 – 4:00 pm	Session VII: GIS and Economic Development
4:00 – 4:30 pm	Certificate Presentation & Closing Remarks
4:30 pm	Close of Conference

PARTICIPANTS

Mysia Anderson (Theater Arts and Performance Studies)

Jasmine Arnold (School of Public Health)

MHD Nour Audi (School of Public Health)

Amanda Ball (Sociology)

Aimee Bourassa (Political Science)

Yu-chi Chang (History)

Ana Lucia Espinosa Dice (Brown University)

Anna Makaretz (School of Public Health)

Divya Mehta (Office of Global Engagement)

Ogochukwu Nwanne (Alpert Medical School)

Matthew Scarpaci (Hassenfeld Child Health Innovation Institute)

Nana Akua Sekyi-Appiah (School of Public Health)

Yu-Cheng Shih (History)

Aditi Singh (Economics)

Nicole Sintetos (American Studies)

Julie Skarha (School of Public Health)

Bishnu Thapa (School of Public Health)

Lillian Tsay (History)

Rosa Xu (Earth, Environmental and Planetary Sciences)

Alexander Yarkin (Economics)

PROGRAM

SESSION I:

GIS APPLICATIONS IN THE SOCIAL SCIENCES I

Matthew Scarpaci, *An Exploration of Factors Associated with Chronic School Absenteeism Among Rhode Island 3rd Graders*

Aimee Bourassa, *Brokers and Mayors: The Distributive Politics of Policy Choice*

Yu-Cheng Shih, *The Geographical Distribution of Southeastern Migration in Taiwan since 2000*

SESSION II:

HISTORICAL GEOGRAPHY

Lillian Tsay, *Americanized Tokyo: A Geographic/Gender Analysis on the U.S. Military Spaces in Occupation Tokyo*

Nicole Sintetos, *Historical Geographies of Japanese American Incarceration: From Forced Removal to Resettlement, 1942-1947*

SESSION III:

GIS AND CLIMATE

Rosa Xu, *Spatial Association between Different Cloud Types and Precipitation in Asian Monsoon Regions*

SESSION IV:

GIS AND HEALTH I

MHD Nour Audi, *Establishing Syria Pre-conflict Spatial Access to Hospital Care*

Ana Lucia Espinosa Dice, *Clinic Switching Among People Living with HIV in Western Cape, South Africa: An Exploratory Spatial Analysis*

Jasmine Arnold, *Tobacco Availability and Model Policy Compliance in Rhode Island*

Nana Akua Sekyi-Appiah, *Human Settlements near Open Water Bodies and Malaria: Assessing the relationship between proximity of population clusters near open water bodies and incidence of malaria*

LUNCH BREAK, 12:15 – 1:30 PM

SESSION V:

GIS APPLICATIONS IN THE SOCIAL SCIENCES II

Mysia Anderson, *Spatializing Gun Violence: Space, Race, and Reproductive Justice*

Amanda Ball, *Aid Projects and Incidents of Violence in the DRC from 1999-2014*

Yu-chi Chang, *The Iron Votes: Military Housing Distribution and Voting Behaviors in Kaohsiung City, Taiwan*

Julie Skarha, *The Association between U.S. Prison Locations and Stationary Sources of Pollution*

SESSION VI:

GIS AND HEALTH II

Bishnu Thapa, *Exploring Geographic Differences in Health Status in New England*

Ogochukwu Nwanne, *The Impact of Neighborhood Factors on Infant Mortality in Rhode Island.*

Anna Makaretz, *TB Continued: An Exploratory Spatial Analysis of Reported Cases of Tuberculosis (TB) in New Mexico*

Aditi Singh, *Analyzing the effect of the Indira Gandhi Matritva Sahyog Yojana (IGMSY) on health outcomes*

SESSION VII:

GIS AND ECONOMIC DEVELOPMENT

Divya Mehta, *Mapping Climate Finance Recipient Countries*

Alexander Yarkin, *Long-run Economic Development through the lens of Ethnographic Georeferenced Data: Some Correlations*

PRESENTATION ABSTRACTS

Mysia Anderson – Spatializing Gun Violence: Space, Race, and Reproductive Justice

As instances of gun violence claim the lives of children in America, further inquiry into how violence is spatialized and racialized is increasingly urgent. Reproductive justice is a black feminist concept defined as the right to have children, to not have children, and to parent children in safe and sustainable communities without violence from the state and/or other actors. A threat to reproductive justice, gun violence is an expansive, complex issue that produces various responses, affects, stakes and traumas for the numerous communities that are impacted. Similarly to reproductive justice, gun violence is also a spatialized social issue. Imbued with compounding histories and precarious politics of race and class, investigating gun violence at the spatial level is vital to consider as we craft our responses. Taking space and place seriously, my presentation will illustrate gun violence at a spatial level in the cities of Parkland, Florida and Miami, Florida. Selecting one school from each city that has been impacted by gun violence as my case studies, I seek to analyze and visualize gun violence in relation to other spatialized social components. Utilizing buffer analysis, crime analysis, and U.S Census data, I seek to contribute to a conversation about the politics of space in gun violence movements.

Jasmine Arnold – Tobacco Availability and Model Policy Compliance in Rhode Island

Nearly half of US adolescents visit convenience stores at least once per week, and these stores are the primary retail environment for tobacco products, including both flavored and electronic cigarettes. Seven Rhode Island cities and towns have passed legislation limiting the sale of flavored tobacco and the use of tobacco coupons, as both of these retail strategies have been documented to encourage youth tobacco uptake and use. This project maps the location of tobacco retailers across Rhode Island and examines the proximity of these stores to schools. Within the seven cities and towns with tobacco legislation in place, this project also examines the policy violations documented over the past two years.

MHD Nour Audi – Establishing Syria Pre-conflict Spatial Access to Hospital Care

Access to hospital care in Syria has been heavily devastated by the ongoing conflict. Only 57 (51%) of total public hospitals are still functioning. It is imperative that any reconstruction strategy is guided by most communities in need by taking into consideration population density, travel distance and existing health infrastructure capacity. By using spatial access GIS methods, we could point to communities with the lowest access to hospital care.

This project tries to establish Syria pre-conflict spatial access to hospital care level. Also, exploring the disparity in hospital access levels among different communities and finding if there are any spatial trends in access inequality.

The project will use the ministry of health hospitals dataset which includes hospitals address and their number of beds combined with multiple open source GIS resources in order to produce a geocoded hospitals dataset. Then, using the two-step floating catchment area method to quantify spatial access to hospital care. I hope that this project would lay the foundation for further projects that track Syrian population spatial access to various healthcare resources during the conflict taking displacement, weaponization of healthcare, conflict lines and humanitarian interventions into consideration.

Amanda Ball – Aid Projects and Incidents of Violence in the DRC from 1999-2014

The research question for the larger project is, how does the protracted presence of humanitarian aid affect urban development in war-affected regions? This study is motivated by a perceived dearth of literature in sociology about the socio-spatial effects of humanitarian aid, particularly in the urban localities in which they operate. For the purposes of the GIS Institute, I show how aid in the Democratic Republic of the Congo (DRC) changed both in issue areas and distribution spatially over time. Using the DRC-AIMS Geocoded data set from AidData, I map development projects from 1999-2014. This provides a view of aid-related presence from the Second Congo War, through the establishment of the United Nations Organization Stabilization Mission in the Democratic Republic of the Congo (MONUSCO) in 2010, and the rise of the March 23 Movement (M23) in 2012 to demonstrate how aid was distributed spatially in the country as war-related violence shifted over time. This information is cross-referenced with information on incidents of violence and deaths in the DRC during the same time period from the Uppsala Conflict Data Program to assess if there is a relationship between political-violence and related deaths, and the type of aid present in the area.

Aimee Bourassa – Brokers and Mayors: The Distributive Politics of Policy Choice

How does an incumbent government's organizational structure shape its menu of distributive strategies? Most models of distributive politics in developing countries portray a political machine targeting voters with particularistic benefits. Yet in practice, many politicians do not have access to such extended networks of partisan brokers; organizational capacity varies across parties and party systems as well as across time and space, even within a single city. I argue that this variation constrains politicians' policy portfolios, and in particular the returns from individual and collective policy instruments. To look at the distribution of different social benefits across space, I collected new, fine-grained data on FISM (Fund for Municipal Social Infrastructure) programs, social and political organization, electoral competition, and sociodemographic characteristics in Mérida, a regionally important city in the southern Mexican state of Yucatán. This presentation constitutes a first attempt to combine and map these data for further spatial analyses.

Yu-chi Chang – The Iron Votes: Military Housing Distribution and Voting Behaviors in Kaohsiung City, Taiwan

This project explores the spatial distribution of “military dependents' villages” (眷村 *juan cun*) in Kaohsiung City, Taiwan, and looks at the correlation between people's housing and voting behaviors in the 2018 Taiwanese local elections on November 24th. Military dependents' villages are products of migration from 1949 to 1960s. As Chiang Kai-shek's Nationalist Party (KMT) fled from Mainland China to Taiwan after losing the Civil War to the Communist Party in 1949, the government built these communities for military staff, soldiers and their family. Because of the strong connection between these “mainlanders” and the Nationalist Party, these villages are usually viewed as die-hard supporters of the Party—the so-called “iron votes” in Mandarin—in elections.

Drawing upon open GIS and voting data released by the Taiwanese government, this project focuses on the voting behavior of military dependents' villages and asks the following questions: What is the spatial distribution of military dependents' villages? How does the voting behavior of military dependents' villages differ from other districts? What can a map tell us about the election result in a different way?

Ana Lucia Espinosa Dice – Clinic Switching Among People Living with HIV in Western Cape, South Africa: An Exploratory Spatial Analysis

Improved enrollment and retention in HIV treatment is critical to achieving the Joint United Nations Programme on HIV/AIDS' 90-90-90 goals, a collection of ambitious treatment targets that aim to end the AIDS epidemic by 2030. Measuring retention in HIV care requires quantification of loss to follow-up. However, loss to follow-up estimates are limited and often complicated by the lack of capacity to monitor patients' movements across clinics and in and out of care. Quantifying clinic switching among people in HIV treatment will improve estimates of loss to follow-up and better inform how we choose to strengthen retention in care under the 90-90-90 framework. This project aims to quantify the spatial characteristics of clinic switching among a sample of 8,382 people living with HIV in Western Cape, South Africa. Specifically, this project will describe and quantify patterns of clustering, distance, time, and demographics with respect to clinic switching. This project utilizes a Provincial Health Data Centre dataset of electronic records of clinical, laboratory, pharmacy and viral status data from all Western Cape clinics. Unique patient identifiers permit consistent identification of each individual across visits and clinics within the province, while maintaining patient confidentiality.

Anna Makaretz – TB Continued: An Exploratory Spatial Analysis of Reported Cases of Tuberculosis (TB) in New Mexico

Tuberculosis (TB), an infectious disease caused by *Mycobacterium tuberculosis*, persists as one of the top ten causes of death worldwide and is the leading cause of death due to a single infectious agent. TB is a disease of poverty; globally, low- and middle-income countries carry the highest burden, yet even within the United States (US), those with fewer resources and limited access to health care are disproportionately affected. Because TB is relatively rare in the US today, TB often goes undiagnosed and untreated, precipitating further health concerns and increasing the risk of transmission.

The state of New Mexico (NM), located in the southwestern US, experiences a relatively low incidence of TB when compared with the rest of the nation (1.9 versus 2.9 cases per 100,000 people in 2016). However, the TB mortality rate among reported cases in NM between 2007-2017 (16.4%) was more than three times the national rate (5.0%). This discrepancy raises questions about the nature of the TB epidemic in NM as well as the accessibility of healthcare for those infected with TB in this largely rural state that is more impoverished than the national average.

This project utilizes verified cases of TB in NM reported to the Centers for Disease Control and Prevention (CDC) between 2007 and 2017 (n=521), which records patient residence at the zip code level. Using geospatial methods, this analysis seeks to (1) assess the spatial distribution of TB cases across the state, stratified by age, race, country of origin, clinical attributes, and mortality, and to (2) explore the relationship between the residential zip codes of TB cases and their proximity to health care facilities. Ultimately, the goal of this project is to provide greater insight into the current landscape of TB care in NM that can be leveraged by the NM Department of Health to improve access to care across the state.

Divya Mehta – Mapping Climate Finance Recipient Countries

In the following project, I hope to use data primarily available through the Asian Development Bank to map recipient countries of climate finance, particularly differentiating between projects receiving adaptation funding and mitigation funding. This mapping is part of a larger project aiming to map recipient countries of climate financing from all sources (beyond public financing from DFIs such as the Asian Development Bank), particularly differentiating between adaptation and climate funding to analyze lending patterns, predominantly trying to make a statement about what types of projects are being prioritized based on geographical vulnerabilities of these geographical entities. The analysis is on a country scale given the limited existence of data for smaller units, and poses an obvious limitation to the study, wherein smaller units within countries may face vulnerabilities of differing extents due to different reasons, i.e. a coastal city may be more flood prone, while the island nation may be more vulnerable to sea-level rise. However, the purpose of the project is less concerned with the nature of vulnerability, and more with sources of climate funding, and for the purpose of this institute, focusing particularly on one source of public financing.

Ogochukwu Nwanne – The Impact of Neighborhood Factors on Infant Mortality in Rhode Island.

Aim: To study the neighborhood disparities in infant mortalities in Rhode Island and its correlation with sociodemographic factors

Background: Despite being leading in health care in the world. The United states faces challenges with medical advances translating to optimized health care delivery to its citizens. Infants mortality is one of the health indices used to determine the overall health of a society. Infant mortality rates remain higher in the US than in other advanced countries and there is significant variation in these rates across US states and socioeconomic cadres.

Method: For this study, the Rhode Island sociodemographic data will be obtained from the United States 2010 census data available on www.RIGIS.org. This data which is available at the census block group level, will be aggregated into municipal towns. Infant mortality data will be obtained from the Rhode Island Kids count fact book which has infant mortality data for each RI city/town. The spatial distribution of the neighborhood characteristic of interest (income, ethnic minority concentration) and of infant mortality in the State will be visualized using choropleth maps. Spatial Correlation between Infant mortality rate and neighborhood characteristics within the state will be assessed using Moran's 'I' statistics. Data analysis will be done using Arc Map and GeoDa.

Conclusion: Health disparities continue to be a public health problem in the US. Studying neighborhood disparities in important health indices such as infant mortality rate will assist policy makers to proffer and implement community targeted solutions to the barriers of achieving optimization of health care delivery and wellbeing of the people.

Matthew Scarpaci – An Exploration of Factors Associated with Chronic School Absenteeism Among Rhode Island 3rd Graders

Chronic school absenteeism (defined as school absence $\geq 10\%$ of days during a school year) is a documented risk factor of childhood illiteracy rates in developed countries. This project works to investigate factors involved in increased levels of school absenteeism as part of evaluating 3rd grade literacy in Rhode Island. This project posits that school absenteeism comes from three broad sources: family issues and dysfunction, logistical difficulties in getting to school, and chronic illness. Using 3rd grade absenteeism data from the Rhode Island Department of Education, the goal is to map patterns of absenteeism from 2015-2017 in the State of Rhode Island to identify areas of greatest concern. Then this project will examine different factors which may be associated with increased risk of absenteeism among Rhode Island children. First, air pollution levels supplied by the US Environmental Protection Agency will be used as an indicator of chronic illness such as asthma. Secondly, by assessing distance from households to schools of enrollment, I aim to determine whether there is a pattern between higher levels of absenteeism and a child's difficulty in getting to school. Finally, by looking at 5-year estimates on housing density from the American Community Survey, I will assess whether there is a correlation between neighborhood crowding and population density and higher absenteeism levels. Maps of the three potential indicators will be constructed and compared. Regression models that can account for spatial factors will be developed and discussed.

Nana Akua Sekyi-Appiah – Human Settlements near Open Water Bodies and Malaria: Assessing the relationship between proximity of population clusters near open water bodies and incidence of malaria

Malaria remains a deadly disease with a disproportionately high incidence occurring in most of the African region due to this part of the world having very conducive climatic conditions for mosquito breeding, as compared to the rest of the world. Given that mosquitoes exclusively breed in aquatic habitats, some previous research studies have indicated a possible association between the distribution of water bodies and recorded malaria cases. To explore this relationship further, I will be utilizing spatial analysis tools to investigate any possible correlation between proximity of clusters of human settlements to water bodies and reported cases of malaria in Ghana, West Africa. Estimating a spatial association between these two variables will be particularly helpful in understanding the nature of malaria re-emergence in different parts of the world, as well as providing insight into developing robust strategies to combat malaria.

Yu-Cheng Shih – The Geographical Distribution of Southeastern Migration in Taiwan since 2000

This project aims to understand the features and influences of Southeastern migration in Taiwan. Since 2000, more than eighty percent of migrants in Taiwan came from Southeast Asia including Indonesia, Thailand, Philippines, and Vietnam. Also, in total more than one-fifth growing population since 2010 were from these areas. Accordingly, exploring the geographical distribution of these migrants will benefit to understand the changing pattern of demography, which throws new lights on rethinking the composition of society in Taiwan under the neoliberalist trend.

Based on the data released by Taiwanese government by 2018, this research focus on three dimensions. First, it traces back the historical changes of Taiwanese population from Southeast

Asia since 2000. Second, this work explores the geographical disparity of these migrants, showing the differences between urban, suburban, and rural areas. Besides, this study will also address in the outcome of the last election in 2018 to see whether and to what extent these aspects perform a correlation.

Aditi Singh - Analyzing the effect of the Indira Gandhi Matritva Sahyog Yojana (IGMSY) on health outcomes

IGMSY is a conditional maternity benefit scheme launched in 52 districts in India in 2010. It is aimed at improving the health and nutrition status of pregnant and lactating women by providing partial compensation for the wage loss experienced during pregnancy. I examine the effectiveness of this pilot by employing a difference-in-difference strategy, by comparing districts in which the scheme was launched to similar ones in the same state that did not get the scheme. I further use spatial analysis to determine which areas needed the scheme the most, and if there's any relation between the scheme's effectiveness and the location of the district in which it was implemented.

Nicole Sintetos – Historical Geographies of Japanese American Incarceration: From Forced Removal to Resettlement, 1942-1947

Within the archive of Japanese-American Incarceration in World War II, the majority of physical material hovers around the operation of the U.S.-based internment camps between 1942 and 1946. This project hopes to extend the temporal scope of the archive through a broad analysis of the large-scale displacement and eventual resettlement of Japanese Americans that occurred prior to and following World War II. The War Relocation Authority's Final Accountability Rosters for each of the ten camps provides invaluable data on the names, ages, origin addresses, and resettlement addresses for the over 110,000 Japanese American internees. Such data is ripe for spatial analysis and offers an array of rich questions: namely, how did the incarceration of Japanese Americans impact previously established ethnic enclaves along the West Coast, and how can categories of citizenship, race, and labor be mapped onto resettlement patterns in the post-war period? This analysis asserts that the methodical dispersal of Japanese Americans following their departure from camp was not separate from the government project of internment—rather, it was merely another manifestation of the government's end goal to isolate peoples of Japanese ancestry.

Julie Skarha – The Association between U.S. Prison Locations and Stationary Sources of Pollution

The US has the largest incarceration rate in the world. Previous research on the health of incarcerated peoples indicates they have higher rates of communicable and non-communicable disease compared to non-incarcerated populations. There is extensive literature linking exposure to environmental pollutants with related adverse health outcomes. Yet there has been limited research on how these pollutants may also be shaping the health of this population. The decision on where to locate a prison and stationary sources of pollution is not made randomly but rather is shaped by power. Due to the systematic removal of rights from people who are incarcerated, this population may be particularly vulnerable to stationary sources of pollution locating near their living space. The purpose of this study was to determine whether there is an association between

the location of prisons and stationary sources of pollution such as power plants, landfills, airports, and more.

Bishnu Thapa – Exploring Geographic Differences in Health Status in New England

Using county level data from New Hampshire, Vermont, Maine, Massachusetts, Connecticut, and Rhode Island, we seek to understand geographic variation in the relationship between health status and socio-economic drivers. Health status is a self-reported measure based on the perception of whether it is poor, fair or good. It is often used as a proxy for assessing quality of life and is also believed to be a strong predictor of healthcare cost/spending, future disability, and mortality, among others. While the existence of geographic variation in healthcare spending in the US is well established, variation in health status across geographic units is not as well studied. We use county level data (obtained from <http://www.countyhealthrankings.org/>) based on the Behavioral Risk Factor Surveillance System Survey (BRFSS) to understand the spatial relationship between health status and its potential drivers (including health insurance coverage, access to primary care, income inequality, unemployment, family type, and housing status). We use a combination of exploratory and statistical techniques (including Geographically Weighted Regression) to study the relationship.

Lillian Tsay – Americanized Tokyo: A Geographic/Gender Analysis on the U.S. Military Spaces in Occupation Tokyo

After Japan's surrender in the Second World War, General MacArthur arrived Japan in August, 1945 with his Allied Forces to reconstruct the devastated country. Approximately 430, 000 American officials and their dependents had resided in Tokyo, the city that was burnt to the ground during the war, and their presence had profound influence on the city's later developments. Using the archival maps made by the U.S. Military as the main source, in this project I aim to address how the American Occupation influenced the landscapes of the city with a particular focus on the power relations in urban space in terms of gender -- "a primary way of signifying relationships of power" (Scott, 1986:42). In the early years of the Occupation, in fear of mass rape of Japanese women by American soldiers, the authorities established the RAA (Recreation and Amusement Association), namely the military brothels designated for the Americans. Meanwhile, the military dependents, mainly the wives of the soldiers, were also present in Tokyo. With the assistance of GIS tools, I will focus on the geographical intimacies between the military buildings, dependent housings, and RAA brothels on how these spaces had formulated the spatial power relations in the American Occupation period, and moreover how these "Americanized" urban sites have developed in the later years.

Rosa Xu – Spatial Association between Different Cloud Types and Precipitation in Asian Monsoon Regions

East Asian monsoon region and South Asian monsoon region are two of the most typical monsoon areas of the world with significant change in precipitation during different seasons. We can separate the annual change into 4 periods. Pre-monsoon period (March, April and May), Monsoon Period (June, July and August), Post-Monsoon Period (September, October and November), and Winter Period (December, January and February). Clouds and precipitation are closely related. However, different clouds will have different contribution to the precipitation possibility. In my project, I will classify clouds into three types: high clouds, low clouds and

deep convection clouds according to their water concentration and altitude. I will locate the distribution of these three kinds of clouds in those two areas during different monsoon periods, and try to identify each kind of clouds' contribution to precipitation due to time and location.

In my project, I will use satellite cloud sat data from 2007 to 2010 to calculate the different kinds of clouds. I will use the Tropical Rainfall Measuring Mission data to get the strength of precipitation. My spatial analysis will compare using the Ordinary Least Square (OLS) regression and Geographically Weighted Regression (GWR) to find out each kind of cloud's contribution to precipitation. My result is going to tell what kind of cloud is going to dominate the monsoon area during different monsoon periods, and how their location is related to the strength and location of precipitation.

Alexander Yarkin – Long-run Economic Development through the lens of Ethnographic Georeferenced Data: Some Correlations

In this research, I explore historical roots of several key determinants of economic growth. I employ three sources of worldwide ethnographic data (Ethnographic Atlas, Standard Cross-Cultural Sample, and Binford (2001) foragers data), matched with bio-geographical characteristics at the pixel level (G-Econ, FAO, Galor and Ozak's (2016) CSI), country-level data, and social survey data, in order to determine the role of historical, deep-rooted factors behind contemporary economic development. In particular, I explore the role of historical disease environment and ecological diversity in the formation of the attitudes towards outgroup members, and the role of historical modes of production (agriculture vs hunting, types of crops, etc.) shaping ethnic-level and contemporary intergenerational mobility patterns. At this stage of research, I analyze and summarize raster data at the level of ethnic group regions and perform regression analysis at the level of ethnic groups. Further, I attempt to aggregate ethnic and raster data to the level of contemporary national borders to check if pre-colonial ethnic characteristics have a persistent effect till nowadays.