Spatial Structures in the Social Sciences
2022 Summer GIS Institute

Final Presentation Program
June 10, 2022

PSTC Seminar Room (Mencoff Hall 205)
68 Waterman Street, Providence RI 02912

9:30 – 10:00 am	Breakfast & **Opening Remarks**
10:00 – 11:30 am	**Session I:** GIS and Health
11:30am – 1:00 pm	**Lunch**
1:00 – 2:40 pm	**Session II:** GIS in Environment and Society
2:40 – 3:00 pm	Certificate Presentation & **Closing Remarks**

PARTICIPANTS

Jonathon Acosta (Sociology)

Justin Coleman (School of Public Health)

Calvin Lukas Kienbacher (Division of Biology and Medicine)

Murat Kirdar (Population Studies and Training Center)

Manuel Moscoso Rojas (Political Science)

Yaruska Ordinola (School of Public Health)

Bunmi Osias (School of Public Health)

Olivia Rozdolsky (Landscape Architecture, RISD)

Tiffany Wu (Swearer Center)

PROGRAM

SESSION I:

GIS AND HEALTH

[10:00am] Yaruska Ordinola, *A preliminary geospatial analysis linking manufacturing sites, social determinants of health, and potential health risks in RI*

[10:20am] Justin Coleman, *An Analysis of City Ward Park Access in Jackson, MS*

[10:40am] Bunmi Osias, *The Impact of Race on Sexual Health Access in Providence County, Rhode Island*

[11:00am] Calvin Lukas Kienbacher, *Clusters in Emergency Medical Service*

LUNCH BREAK, 11:30AM – 1:00 PM

SESSION II:

GIS IN ENVIRONMENT AND SOCIETY

[1:00pm] Jonathon Acosta, *Latinxs in Central Falls*

[1:20pm] Tiffany Wu, *The effects of light pollution on migratory avian populations in Rhode Island and Massachusetts*

[1:40pm] Manuel Moscoso Rojas, *Police Capacity Building in Conflict Settings*

[2:00pm] Murat Kirdar, *The Impact of "Village Institutes" on Schooling Outcomes in Turkey*

[2:20pm] Olivia Rozdolsky, *Agricultural Land Use Changes and Desertification Risk in Xorazm*

PRESENTATION ABSTRACTS

Jonathon Acosta – Latinxs in Central Falls
What is the formal political incorporation process of immigrants in an urban rustbelt community? This question is part of a broader community study of Central Falls, RI, a largely immigrant community located right next to the birthplace of the American Industrial Revolution. The community study asks why immigrants come to a scandal ridden, bankrupt, deindustrializing city in a cold and costly region of the US? What do they do (and do to that city) upon arrival? In this project I use maps to trace the distribution of the Latinx/Hispanic community in Central Falls across five decades. I use these maps to test the hypothesis that dispersed residential incorporation led to a delay in the formal political incorporation of Latinxs in the City relative to previous waves of migration. The maps are a first step at explaining the turnover in political power from European descended immigrants to Latinx immigrants.

Justin Coleman – An Analysis of City Ward Park Access in Jackson, MS
While numerous factors contribute to cardiovascular disease (CVD), one critical factor that has recently been reevaluated in CVD research is socioeconomic status through neighborhood equity. Jackson has 30 listed parks on its city website but still has the highest CVD proportions amongst the three largest tri-county cities of Jackson, Madison, and Pearl, Mississippi. The city of Jackson has a population of 168,778: Black (82.1%), White (16.1%), and other races/ethnicities (1.8%) (US Census Bureau, 2020). The city also is split into seven wards: Ward 1 has 25,309 citizens: Black (39.8%) and White (60.8%); Ward 2 has 24,590 citizens: Black (95.9%) and White (2.6%); Ward 3 has 24,065 citizens: Black (95.9%) and White (2.8%); Ward 4 has 25,691 citizens: Black (91.2%) and White (6.9%); Ward 5 has 24,445 citizens: Black (94.2%) and White (4.1%); Ward 6 has 24,491 citizens: Black (83.4%) and White (14.7%); Ward 7 has 24,923: Black (56.7%) and White (40.6%). The question lies: Is there an association between Ward park access and race?

Calvin Lukas Kienbacher – Clusters in Emergency Medical Service
Geospatial analysis of health data has been used for centuries to detect hot spots of diseases as it helps to properly allocate resources. We aim to detect and analyze spatial clusters of selected healthcare-related events (HRE), i.e., acute myocardial infarction, cardiac arrest, infectious diseases outbreaks, and drug-related problems in the setting of emergency medical service (EMS) over the last 4 years. Geographical cluster analysis of ambulance dispatches for HRE will be performed for the state of Rhode Island (United States). Data from the EMS setting will be derived from National Emergency Medical Services Information System (NEMSIS) compliant electronic Patient Care Reporting (ePCR) data through the ImageTrend Elite and biospatial platforms. A dispatch will be the unit of analysis. Hot and cold spots of HRE will be identified. Outcomes will be the HRE as measured by their incidences. Local and global Moran's I, Gi* statistics, emerging hotspot analysis, and local indicators of spatial association (LISA) will be computed. We hope to add knowledge to the role of geomapping in the detection of clusters of HRE. This might help to optimize the allocation of EMS and community (position of defibrillators, mobile integrated healthcare, community paramedicine) resources. Our models might also apply to other regions globally.

Murat Kirdar – The Impact of "Village Institutes" on Schooling Outcomes in Turkey
In this project, I plan to estimate the long-term impacts of a schooling program using both GIS tools via ArcGIS and statistical analysis via Stata. Turkey constructed 21 boarding schools in the 1930s and 40s that aimed at brining up teachers for rural children from rural children. First, I will calculate the distance of each Turkish county to the nearest school, using the GIS tools. For this purpose, I will first use a map of Turkey at the county level obtained from GADS and prepare a spreadsheet of the 21 schools containing their coordinates. In this step, I will project the map of Turkey in coordinates to a map in meters. Merging these two layers, I will measure the distance of the centroid of each country to the nearest school (using the near tool from Proximity toolbar). In the second part of the project, I will combine these distances with the 2000 Census of Turkey (which includes information on the county of birth). Using the Census, I will examine how the educational attainment of various cohorts of individuals are correlated with the distance to school measure I calculated via GIS.

Manuel Moscoso Rojas – Police Capacity Building in Conflict Settings
Why do governments in conflict settings allocate security to some places and not others within their borders? To answer this question, I explore the case of Colombia, where the state has intended to build an uneven police security apparatus in rural areas over the last three decades. Using the previous three Colombian censuses (1993, 2005, and 2018) and the location of each police station in rural areas, I visualize and compare the socioeconomic and geographical characteristics of populated centers with and without a police station. I focus on two Colombian regions -Antioquia and Valle del Cauca – where the government has built police stations in 133 of the 1,066 populated centers of those departments. The government faces an electoral and security dilemma when deciding where to provide protection in those places.

Yaruska Ordinola – A preliminary geospatial analysis linking manufacturing sites, social determinants of health, and potential health risks in RI
This project will utilize manufacturing site data across the state of Rhode Island from the years 1953-2012, collected originally from printed and then digitized manufacturing directories. This analysis will mainly focus on two prominent types of industries that have been historically important in RI, and whether they can be linked to (1) environmental exposures (2) increased health risks. Based on where these manufacturing sites are located, and potential environmental exposures (chlorinated solvents), the question I seek to answer is: are there indicators of increased health risk outcomes near these identified sites in RI? and do they differ across communities in RI? The data utilized in this project will include HEZ data by the CDC to identify vulnerable populations, and CDC data from the American Community Survey.

Bunmi Osias – The Impact of Race on Sexual Health Access in Providence County, Rhode Island
Sexual health is an important health promotion concept that can be indicative of population health as a whole. Nationally, racial and ethnic minority populations are known to have higher rates of STIs, but there is not much literature on the analysis of sexual healthcare access at the state or national level. This project aims to determine the access to sexual healthcare in Providence county neighborhoods through a sociodemographic analysis focused on race and

ethnicity. Through using census data to determine the 2020 census and publically available data, we will determine areas in Rhode Island that are within 5 miles of a sexual health clinic through performing a location allocation analysis in ArcGIS. There will also be an analysis of the types of services available (STI testing, HIV testing, birth control prescription, and abortion access) and if there is any correlation between the racial makeup of the catchment area and the services that are provided. Through dissecting the impact of race on sexual health outcomes one can determine what policies can be implemented to help underserved populations have equitable access to sexual health resources.

Olivia Rozdolsky – Agricultural Land Use Changes and Desertification Risk in Xorazm
Under the Russian Empire, water management systems in Uzbekistan were centralized; and control shifted from local agents—farmers and mirabs—to Russian engineers. Similarly, in the early Soviet period, water management boundaries were delineated by state line, rather than by watershed. The resulting policies and infrastructure development contributed to water scarcity and desertification—most infamous being the desiccation of the Aral sea. Desertification continues to be a growing issue in the region, compounded by continued intensive cotton cropping, transboundary water resource management challenges and climate change. Using MODIS data, I will visualize the relationship between land use changes and evapotranspiration in order to understand where agricultural lands are potentially at risk of desertification.

Tiffany Wu – The effects of light pollution on migratory avian populations in Rhode Island and Massachusetts
Artificial light from increased urbanization and human settlement has negatively impacted millions of birds each year. When light pollution replaces natural darkness, birds can alter established routes, change their feeding behaviors, and become dangerously disoriented, leading to collisions with buildings. Excess artificial light is not an isolated problem for avian species — nocturnal migrators like geese and songbirds, as well as seabirds like shearwaters, are all at risk. The United Nations Environmental Programme (UNEP) and the Convention on Migratory Species (CMS) has spotlighted the importance of the issue through this year's 2022 World Migratory Bird Day. Just as clean air and water are crucial for ecological conservation, so are clearly distinguishable light / dark travel corridors when it comes to safe passage for migrators. Using Cornell eBird population counts and estimated ranges, U.S. Census Bureau tracts, and spatial light pollution data from the German Research Centre for Geosciences, this analysis will gauge which species may be at greatest risk and what solutions presently exist in Southern New England.