Spatial Structures in the Social Sciences
2023 Summer GIS Institute

Final Presentation Program
June 16, 2023

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

9:30 – 10:00 am	Breakfast & **Opening Remarks**
10:00 – 11:40 am	**Session I:** GIS and Health
11:40am – 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

Jen Ansley (Landscape Architecture, RISD)

William Bannister (School of Public Health)

Grace Berg (Center for Environmental Studies)

Daniel Cabral (Political Science)

Margaret Murphy (Center for the Study of Race and Ethnicity in America)

Tania Sawaya (School of Public Health)

Shreenidhi Sharma (School of Public Health)

Jessie Trudeau (Political Science)

Alex VanHelene (Lifespan)

Samer Wahood (Division of Biology & Medicine)

PROGRAM

SESSION I:

GIS AND HEALTH

[10:00am] Samer Wahood, *Health disparities associated with the geographic distribution of board-certified Mohs surgeons in the US*

[10:20am] Shreenidhi Sharma, *Access to Obstetric Providers in Rhode Island across Census Tracts*

[10:40am] Alex VanHelene, *Cancer Patient Travel Distance to Clinical Trial Sites: How Geography Creates Healthcare Inequities*

[11:00am] Tania Sawaya, *Spatial Analysis of Medicare Spending and Quality of Care across States and Counties*

[11:20am] William Bannister, *A Preliminary Analysis of Students Experiencing Homelessness and Distribution of Resources in New York City*

LUNCH BREAK, 11:40AM – 1:00 PM

SESSION II:

GIS IN ENVIRONMENT AND SOCIETY

[1:00pm] Grace Berg, *Local environment and source proximity classifications for a neighborhood-scale air monitoring network in Providence, RI*

[1:20pm] Daniel Cabral, *Slavery and Political Development in Post-Abolition Brazil*

[1:40pm] Jen Ansley, *New York City's Municipal Wasteshed: A Leaky System*

[2:00pm] Jessie Trudeau, *Voting in Rio de Janeiro's Informal Settlements*

[2:20pm] Margaret Murphy, *Environmental Justice in Rhode Island Communities*

PRESENTATION ABSTRACTS

Jen Ansley – New York City's Municipal Wasteshed: A Leaky System
This study of New York's municipal waste shed is the beginning of a longer project that is interested in how discard is spatialized within and beyond urban environments to maintain "waste management" as a system of power that supports the global reproduction, accumulation, and uneven distribution of capital. For the purposes of the institute, I begin with a look at how municipal solid waste landfills are spatially distributed across the United States (with the understanding that the U.S. also exports a significant amount of waste to the Global South) before zooming into the NYC's primary "wasteshed"—which extends from Upstate New York to Virginia— taking a particularly close look at Seneca Meadows Landfill and its local impacts.

William Bannister – A Preliminary Analysis of Students Experiencing Homelessness and Distribution of Resources in New York City
Students experiencing homelessness are at higher risks for chronic absenteeism, dropping out of school, and other determinants of social and health well-being. This project aims to use geospatial analysis to better understand the population of students experiencing homelessness in school districts in New York City. In doing so, this project will also compare accessibility and utilization of emergency shelter resources to students in these districts. In order to do this, data from the Institute for Children, Poverty & Homelessness for the 2015-2016 and 2016-2017 school years will be assessed.

Grace Berg – Local environment and source proximity classifications for a neighborhood-scale air monitoring network in Providence, RI
Primary and secondary air pollutants can vary on an intra-urban scale. The Breathe Providence community-scale air monitoring network seeks to better characterize pollution dynamics at the neighborhood level in Providence, RI. Ultimately, through this project we hope to support Providence's environmental justice, community health, and greenhouse gas reduction goals. The monitoring network currently consists of 22 air monitors distributed across 19 neighborhoods of the city. Despite being confined to a small geographic area, monitoring sites vary in their proximities to potential local sources or influences, such as industry, urban heat islands, and major roadways. In this GIS project, my goals are to build a classification system that allows for the evaluation and 'coding' of each monitoring site in several parameter categories. This system will inform network-wide analyses by allowing for the filtering of sites by classification, which could have implications for source attribution by emission sector. In this work I also evaluate how representative this monitoring network is of the study area as a whole.

Daniel Cabral – Slavery and Political Development in Post-Abolition Brazil
This research project undertakes an exploration of two guiding and still evolving questions: the first primarily concerns the influence of slaveholding elites in the creation or reinvention of coercive institutions in post-abolition Brazil; the second considers the potential positive impacts of formal recognition of collective land ownership to *comunidades quilombolas* communities of descendants of runaway black slaves. I will present a historical overview, telling the story of Brazil's unique participation in the transatlantic slave trade. Then, I will discuss the lessons that such inquiries might provide to our understanding of post-abolition politics in slave societies and the efforts that elites put forward to preserve their political and economic power at the expense of the inclusion of free blacks. Leveraging historical data, I will focus primarily on the creation or adaptation of coercive

institutions - formal police forces and criminal justice system or informal private militias - to thwart claims of political inclusion or wealth redistribution. The second idea aims at understanding the consequences of granting legal recognition in present-day Brazil of collective land ownership to ethnic communities (*quilombos)* linked to past episodes of slave resistance. By leveraging historical records and contemporary census data and weaving these elements together, this project aims to provide a clear understanding of Brazil's post-abolition landscape, offering substantial contributions to scholarly work on the social and political ramifications of Atlantic slavery in the Americas and the Caribbean.

Margaret Murphy – Environmental Justice in Rhode Island Communities
Using data from Rhode Island state agencies and the United States Census data, this project examines the impacts of environmental variables on low-income and communities of color in the State of Rhode Island. Many researchers have documented a correlation between negative environmental or climate impacts and historically marginalized communities. In this research, I take a closer look at Rhode Island as a case study. In this research, two environmental variables are investigated: the location of brownfield sites and heat severity in urban areas. This data is presented in relation to the data on income and race provided by the Census and American Community Survey. These maps are meant to depict and help viewers to understand who and what areas are the most impacted by environmental change and pollution.

Tania Sawaya – Spatial Analysis of Medicare Spending and Quality of Care across States and Counties
"The U.S. spends so much on health care yet doesn't make proportional returns." This is a narrative that has fueled much of the health services and policy research of the past decades. However, the field has also reached a point where the big picture questions have been asked, and nuance is now needed to identify pockets of inefficiencies in the U.S. health system.
The Centers for Medicare and Medicaid (CMS) are the biggest public providers of care in the U.S. and with it, some of its biggest spenders. In 2021, CMS released a unique dataset with quality of care and spending measures going down all the way to the county level. In this project, we leverage GIS to visualize, for the first time in what we can reasonably infer is the history of the field, quality of care and spending of all counties across the nation. We use this to run analyses of clusters and significance across quality and spending measures, identifying not only clusters of good and worse quality care, but also spending per user, and the relationship between the spatial clustering pattern of both using mono and bivariate LISA analyses. This will help us bring light to the decades-long debate in health services research: Does higher spending relate to higher quality of care? The true answer is probably not singular. Spatial analysis will bring nuance to the discussion in showing how the answer might vary across regions, states, and county neighborhoods.

Shreenidhi Sharma – Access to Obstetric Providers in Rhode Island across Census Tracts
Access to timely and quality prenatal care is imperative for positive maternal and neonatal health outcomes. Some factors that are important to consider when thinking about access to prenatal care include looking at the spread of OB clinics throughout the state of Rhode Island. Due to data acquisition issues and learning more about the capabilities of ArcGIS through the first week of the institute, my updated aim for the S4 project is to determine the accessibility of OB clinics in Rhode Island. I plan on geocoding OB clinics in RI then conducting a series of network analysis to determine travel time to OB clinics, and service paired orders analysis. Finally, I also want to use

population centers to apply the two-step floating catchment area method to determine OB clinics' service capabilities to weigh whether there are enough OB clinic resources for the population and understand overall OB access availability in Rhode Island. In doing this project, I could support the data team at the Hassenfeld institute in examining health disparities such as access to OB clinics for children and families in Rhode Island and how those disparities may differ across census tracts.

Jessie Trudeau – Voting in Rio de Janeiro's Informal Settlements
This project maps the polling stations in Rio de Janeiro, Brazil, and calculates voting patterns for residents of informal settlements, favelas. It draws from several original data sources, including electoral returns, spatial data on favela boundaries, and socioeconomic and crime statistics of the underlying populations.

Alex VanHelene – Cancer Patient Travel Distance to Clinical Trial Sites: How Geography Creates Healthcare Inequities
The center for Clinical Cancer Informatics and Data Science (CCIDS) tackles interdisciplinary research topics that merge clinical research and the social sciences in the context of cancer care. One area of interest is analysis of the social network of cancer clinical trialists. Previous work by Li et al. (http://www.ncbi.nlm.nih.gov/pmc/articles/pmc7568560/) discovered that a relatively small number of prominent oncology clinical researchers have the most connections with other researchers and publish the highest impact papers. Social network analyses investigating co-authorship in clinical trial publications indicate that high density collaboration networks form around these prominent clinical trialists. This prior work did not take geography or affiliation into account. We hypothesize that clinical trials will be hosted disproportionately in close proximity to senior researchers' home institutions. Additionally, we speculate that this geographic bias in clinical trial sites will create healthcare inequities.

Our main data source is the NCI-funded HemOnc knowledgebase, which has a large list of curated clinical trials; the study sites associated with >3000 of those studies were retrieved from the ClinicalTrials.gov database. While ClinicalTrials.gov contains free text descriptions of the country and city where study sites are located, geographical data sets such as Open Street Maps combined with GIS tools facilitate a more granular investigation into how the accessibility of clinical trials varies by geographic region. The accessibility of clinical trials in New England was visualized by marking the location of each study site and estimating 30-minute, 1-hour, and 2-hour catchment areas by vehicular transport, revealing trial "deserts" and "oases". The number of people inhabiting each catchment area was calculated using 2020 decennial census data. Broadly speaking, analyzing the geographic distribution of clinical trial sites can identify patient populations that lack access to cutting edge cancer treatments.

Samer Wahood – Health disparities associated with the geographic distribution of board-certified Mohs surgeons in the US

Mohs micrographic surgery (MMS) is the most effective method for removing skin cancers such as melanoma, basal cell carcinoma, and squamous cell carcinoma with a high cure rate and minimal scarring. Mohs surgeons are specialized dermatologists trained in treating all types of skin cancer. Not all dermatologists who practice MMS are fellowship-trained and board-certified by the American College of Mohs Surgery. Previous studies have demonstrated the geographic distribution

of dermatologists who practice MMS across the United States and compared the socioeconomic and demographic characteristics of counties with and without dermatologists who practice MMS, yet none have employed geospatial analysis techniques. Here we map the distribution of practice locations of board-certified Mohs surgeons across counties in the contiguous United States. We will explore the relationship between the geographical distribution of Mohs micrographic surgeons in the United States and income in areas at high risk for melanoma. We aim to uncover trends and patterns that may inform targeted interventions to address health disparities in access to skin cancer treatment, ultimately improving patient outcomes and reducing inequalities.