Spatial Structures in the Social Sciences
2022 Winter GIS Institute

Final Presentation Program
January 14, 2022

[Digital Scholarship Lab (DSL)](#)
John D. Rockefeller, Jr. Library | Room 137
10 Prospect Street, Providence RI 02912

9:30 – 10:00 am	**Welcome Breakfast**
10:00 – 11:00 am	**Session I:** GIS Applications in the Social Sciences I
11:00 am – 12:00 pm	**Session II:** GIS Applications in the Social Sciences II & Humanities
12:00 – 12:15 pm	**Closing Remarks** & **Certificate Presentation**

PARTICIPANTS

Danielle Edwards (Annenberg Institute)

Joe LaBriola (Population Studies and Training Center)

Regina Noto (History of Art and Architecture)

Emily Rauscher (Sociology | Population Studies and Training Center)

Monica Whitham (Spatial Structures in the Social Sciences | Sociology)

Jiayue Zhang (Economics)

PROGRAM

SESSION I:

GIS APPLICATIONS IN THE SOCIAL SCIENCES I

[10:00am] Monica Whitham, *A Spatial Analysis of Community Improvement 311 Calls in Boston*

[10:20am] Danielle Edwards, *The Spatial Distribution of Teacher Shortages in Tennessee*

[10:40am] Jiayue Zhang, *Behavioral Change in Climate Risk Perception: Evidence from RI Housing Market*

SESSION II:

GIS APPLICATIONS IN THE SOCIAL SCIENCES II & HUMANITIES

[11:00am] Emily Rauscher, *Hidden Money: School-Supporting Non-Profit Tax Records and Educational Inequality*

[11:20am] Joe LaBriola, *The Spread of Residential Growth Controls in California, 1970-1992*

[11:40am] Regina Noto, *Reredos Recontextualized: How did artistic inspiration move in medieval England?*

PRESENTATION ABSTRACTS

Danielle Edwards – The Spatial Distribution of Teacher Shortages in Tennessee
Although the popular narrative that there is a national, widespread teacher shortage permeates media coverage, prior research suggests that the existence and severity of teacher staffing challenges vary by district, locale, and subject. Using novel school-level teacher vacancy data from Tennessee, we quantify the extent to which teacher shortages are localized. We use geospatial hot spot analysis to determine whether schools with vacancies are spatially dispersed throughout Tennessee or clustered in particular regions. Preliminary findings show that schools with and without vacancies are clustered in different areas of the state suggesting that teacher shortages are concentrated in certain geographies. Patterns vary by grade level. Future iterations of this work will describe whether clusters with high and low levels of teacher vacancies are characterized by varying levels of demand for teachers as well as the available teacher supply in the region.

Joe LaBriola – The Spread of Residential Growth Controls in California, 1970-1992
The rapid increase in house prices over recent decades reflects in large part that demand for housing has greatly outstripped supply in many metropolitan areas. One of the main causes of this mismatch between supply and demand is that many local governments have instituted various regulations designed to control residential growth. However, we lack clear evidence on which sociodemographic factors predict the adoption of local residential growth controls, and on how these controls have spread over space and time. I begin to answer these questions using a panel dataset containing information on the existence of various land use regulations in California cities and counties from 1970-1992, which I link to shapefiles for GIS analysis. I plan to generate maps in ArcGIS Pro that show how residential growth controls maps on to various city-level sociodemographic characteristics. Additionally, I plan to use spatial analysis tools to examine whether there is evidence of spatial clustering in the adoption of residential growth controls, and whether this clustering has changed over time.

Regina Noto – Reredos Recontextualized: How did artistic inspiration move in medieval England?
A wall-type reredos is a particularly English style of medieval church decoration. It is a screen or partition behind a church's main altar which features multiple sculptural niches. There are only seven wall-type reredoses that still exist in England from the medieval period. In order from earliest construction to latest, the reredoses are in: Christchurch Priory, New College Oxford, All Soul's College Oxford, St. Alban's Cathedral, Milton Abbey, Winchester Cathedral, and Southwark Cathedral. The question that I hope to answer using GIS, is: How did certain reredoses turn out to be similar in style, similar in numbers of niches, and similar in the number of filled niches, rather than others? Was it due to the date of construction, proximity to other reredoses, or when the reredoses were restored? From this tracing of similarities, I hope to learn how artistic inspiration moved from one reredos to another in medieval England.

Emily Rauscher – Hidden Money: School-Supporting Non-Profit Tax Records and Educational Inequality
Not one low-income community in the U.S. has student test scores at grade level. Unequal child outcomes persist despite larger benefits of school funding among low-income students and 5 decades of school finance reforms in nearly every state. One explanation for persistent inequality despite more equal funding could be money from school-supporting non-profits, including parent-teacher associations (PTAs), parent-teacher organizations (PTOs), booster clubs, alumni associations, and school foundations, whose mission is to support the local schools. Non-profit funds are a hidden source of inequality because they do not appear in district budgets, but can cover expenses that free district funds for instructional spending. Research documents the rise of school-supporting non-profit organizations and revenues through 2010, but little is known about how unequally non-profit funds are distributed. I use millions of non-profit tax return records from the Internal Revenue Service linked to district-level data on finances, student composition, achievement, and attainment from the National Center for Education Statistics and the Stanford Education Data Archive, to examine how much non-profit funds differ across districts by student income. Preliminary evidence indicates that funds from school-supporting non-profits are even more unequally distributed than local revenue. But the amount of non-profit funds is trivial compared to district budgets and weakly related to student achievement. Hidden funds from school-supporting non-profits cannot explain persistent inequality despite more equal funding.

Monica Whitham – A Spatial Analysis of Community Improvement 311 Calls in Boston
The 311 system is a citizen hotline for reporting non-emergency local issues, such as graffiti, potholes, or broken streetlights. For this project, I will be analyzing 311 calls focused on community improvement as a form of productive exchange. Social exchange theorists define productive exchange as a highly collaborative form of social exchange that involves pooling resources and sharing the collective benefits. Through productive exchange collaboration, individuals are able to produce a pooled benefit that is greater or less costly than what could have been produced alone, and the benefits are collectively shared. Recent research suggests that many 311 callers are motivated by a prosocial desire to improve their communities, suggesting certain types of 311 calls that are focused on community improvement, such as reporting a broken streetlight or pothole, may be likely to spatially co-occur with other community-oriented productive exchange projects, such as community gardens. I will test this hypothesis using data from 311 calls in Boston to analyze the spatial associations between community-improvement focused 311 calls and community gardens.

Jiayue Zhang – Behavioral Change in Climate Risk Perception: Evidence from RI Housing Market
One implication of climate change risk is the increased probability of extreme weather events. The housing market is particularly suitable to study market perception of climate change risk given its exposure to extreme weather and its very long tenor. However, empirical evidence has shown nearly muted response to climate-related shocks in the housing market broadly, and somewhat negative response at a finer scale. This project aims to rationalize the under-reaction to climate risk from housing market as a result of homeowners' inattention to the underlying climate change risks, and empirically estimate the changes in inattention from near-miss areas before and after extreme weather events (e.g. hurricanes). For the empirical work, I gathered predicted paths of hurricanes that hit Rhode Island in 2020-2021 and obtained the near-miss

region by clipping away the overlapping area with the actual paths. Residents in the near-miss region are only exposed to the probability of being hit by a hurricane, but are not exposed to the actual risk. Therefore, any price drops observed would be reflecting people's belief about increased hurricane risk, instead of the actual drop in amenity values. By comparing the housing transactions in the near-miss region before and after a hurricane as well as at different scales, I document the near-miss pricing pattern of coastal properties in Rhode Island.