

Spatial Structures in the Social Sciences 2024 Winter GIS Institute

Final Presentation Program

January 19, 2024

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

10:30 – 11:00 am	Brunch & Opening Remarks
11:00 am – 12:00 pm	Session I: GIS and Health
12:00 – 1:00 pm	Lunch
1:00 – 2:20 pm	Session II: GIS in Environment and Society
2:20 – 2:40 pm	Session III: Historical GIS
2:40 – 2:50 pm	Certificate Presentation & Closing Remarks

PARTICIPANTS

Gonzalo Aguirre (Anthropology)

Sarah Bell (Joukowsky Institute of Archaeology and the Ancient World)

Laird Gallagher (Sociology)

Lauryn Orsillo (Department of Dermatology | Warren Alpert Medical School)

Alejandra Irene Cueto Piazza (Sociology)

Siddharth Swaminathan (Watson Institute for International and Public Affairs)

Megan Tran (Division of Biology and Medicine)

Hunter Tsao (Department of Dermatology | Warren Alpert Medical School)

PROGRAM

SESSION I:

GIS AND HEALTH

[11:00am] Lauryn Orsillo, *Analysis of indoor tanning facilities and their geographic relationship to post-secondary education institutions in New England*

[11:20am] Megan Tran, *An Analysis of U.S. State Legislative Tanning Bed Policies and Indoor Tanning Availability*

[11:40am] Hunter Tsao, *Health disparities associated with the geographic distribution of board-certified Mohs surgeons in the US*

LUNCH BREAK, 12:00 PM – 1:00 PM

SESSION II:

GIS IN ENVIRONMENT AND SOCIETY

[1:00pm] Laird Gallagher, *Environmental Justice Implications of Current and Proposed U.S. Carbon Dioxide Pipeline Networks*

[1:20pm] Alejandra Irene Cueto Piazza, *The Power of Classification: The Role of Social Movements in State Knowledge Production in Argentina*

[1:40pm] Siddharth Swaminathan, *Social Segregation in India's Cities*

[2:00pm] Gonzalo Agiurre, *The distribution of salmon farming in northern Patagonia: first insights into the impact of extractive industries on indigenous territories*

SESSION III:

HISTORICAL GIS

[2:20pm] Sarah Bell, *Memories of Unity, Memories of Power: Regional Differences in Post-Abandonment Visitation to Bronze Age Sites of Memory in Early Iron Age Crete*

PRESENTATION ABSTRACTS

Gonzalo Aguirre – The distribution of salmon farming in northern Patagonia: first insights into the impact of extractive industries on indigenous territories

In the last 20 years, the salmon industry has grown aggressively between the Reloncavi Sound and Diego Ramirez Island - an area known as Chilean Patagonia. Currently, Patagonia is highly valued for the beauty of its pristine landscapes and the resources it contains. On the one hand, conservation groups have promoted the protection of these territories; on the other hand, national and international stakeholders have set their sights on Patagonia as an ideal space to develop extractive industries, such as fishing, or activities considered sustainable, such as ecotourism. These actors dispute the territory while ignoring the indigenous communities and Chilean settlers who have inhabited these territories for generations, in some cases for centuries, reproducing the history of dispossession and genocide that characterized the colonization of southern Chile, and Patagonia in particular, between the nineteenth and twentieth centuries. My project focuses on the distribution of salmon industry activities in Northern Patagonia, Los Lagos, Chile. Using databases of Chilean government agencies, analyzed and visualized using ArcGIS Pro, my objectives are, first, to identify points of contact and friction between the stakeholders that currently shape Patagonia (industries, conservation, local communities); second, to observe whether the effects of salmon farming are unevenly distributed among territories and populations. Preliminary results of my project show that there is a high concentration of extractive activities on the edges of protected areas and around territories of indigenous communities.

Sarah Bell – Memories of Unity, Memories of Power: Regional Differences in Post-Abandonment Visitation to Bronze Age Sites of Memory in Early Iron Age Crete

The period that marks the end of the Bronze Age and the beginning of the Iron Age was one of widespread social collapse throughout the Mediterranean world. The pronounced schism between what had come before and what would come after is widely held by archaeologists to have created a crisis of legitimacy in the Greek sociopolitical world—one which appeared to require connections to ancestral or even mythical pasts to overcome. The period following these ruptures was marked by episodes of visitation to abandoned Bronze Age monumental sites, where it is believed that a rising elite were seeking to legitimate their claims to authority through the creation and maintenance of material connections to their “glorious ancestors”. While this phenomenon has been most thoroughly studied on the Greek mainland, the island of Crete yields evidence for similar acts of post-abandonment visitation to Bronze Age sites of memory. Here, however, monumental sites were not the only targets. Remote upland subsistence settlements, established in the wake of the 1200 BCE collapse and inhabited, most often, for no more than a century, also show evidence of post-abandonment memory practice. Despite differences in spatial focus, in the material qualities of the deposits, and in the relative cost of these visits in terms of labor and emotional investment, all of these episodes have traditionally been interpreted in the same way—as a means of legitimizing elite authority. Spatially mapping these deposits and their characteristics shows marked regional differences in post-abandonment practice, however, suggesting that regional social groups had different motivations, means, and methods for accessing the past through abandoned sites. Through mapping the spatial focus of these post-abandonment deposits, their distribution, and the ways in which their contents differed, this project aims to create a more nuanced understanding of these practices.

Laird Gallagher – Environmental Justice Implications of Current and Proposed U.S. Carbon Dioxide Pipeline Networks

There is broad scientific and policy consensus that keeping average global temperatures from overshooting the Paris Climate Agreement goal of “well below” 2C above pre-industrial levels will require the massive scaling up of carbon capture, transport, and storage (CCS) technologies. But while researchers estimate that by 2030 roughly 1 gigaton of CO₂ must be captured and stored each year to meet the Paris goal and reach net zero emissions by 2050, just 45 megatons of CO₂ were captured in 2022. The scale-up of CCS in the US, jumpstarted by over \$12 billion in direct federal funding in 2021, will involve the buildout of a vast CO₂ pipeline network spanning the entire country, and yet there has been little research into the environmental justice implications of CO₂ pipelines. This project investigates the relationship between environmental burden, cumulative impact, and CO₂ pipeline infrastructure. It focuses on two networks: the Denbury CO₂ pipeline network in Louisiana, Texas, and Mississippi, and the proposed Summit network in Iowa, Nebraska, Minnesota, and the Dakotas. Using pipeline route data together with data from the U.S. Census Bureau, Environmental Protection Agency, and Centers for Disease Control and Prevention, the study explores whether overburdened communities are and will be disproportionately impacted by CCS infrastructure.

Lauryn Orsillo – Analysis of indoor tanning facilities and their geographic relationship to post-secondary education institutions in New England

While the use of indoor tanning beds has been decreasing, the majority of their users continue to be white females 18-25 years old. Given that these users are college age, the quantity and proximity of indoor tanning facilities to post-secondary education institutions should be evaluated as their availability may influence use. This project aims to determine the average number of tanning facilities within close proximity to post-secondary education institutions in the New England region. Through utilizing Data Axels business database and the National Center for Education Statistics we will be able to locate all indoor tanning facilities and post-secondary education institutions in New England. With this data we can create a map of the distribution of post-secondary education institutions and the indoor tanning facilities located within a 2-mile buffer. The average number of tanning facilities within these buffers can then be calculated, providing insight into the possible availability of indoor tanning facilities to college-aged individuals in the New England region.

Alejandra Irene Cueto Piazza – The Power of Classification: The Role of Social Movements in State Knowledge Production in Argentina

States count populations as accurately as possible to design and enforce public policies. However, state bureaucracies struggle to identify and count territories that are hard to “see,” such as informal settlements. How do states identify and measure populations and territories that are hard to “see” and measure? This question is part of a broader research project on the effects of knowledge production between the state and a social movement in policies designed for informal settlements. In my research, I identify that to measure these territories and populations, states produce data with nonstate actors (i.e., social movements and NGOs, among others). I investigate this process by examining the case of the National Registry of Informal Settlements in Argentina, in which a social movement (UTEP) and the national government collaborated to produce data about informal settlements in 2017. I use ArcGIS to compare data collected by the state with a social movement with census data. Specifically, I look at changes in how the national state captures the cartography of informal settlements in the national census before and after the collaboration with a social movement.

Siddharth Swaminathan – Social Segregation in India’s Cities

As India rapidly urbanizes, two questions of interest to social scientists emerge: (a) do Indian cities exhibit identity (mainly caste, class and religion) based residential segregation? and (b) to what extent does the provision of basic services and infrastructure such as water, electricity and sanitation follow similar patterns of uneven distribution? I use primary geo-coded household level survey data from 2 Indian cities (Chennai and Ahmedabad, approximately 3000 households in each city) that includes variables relating to basic services and infrastructure (access, supply, and quality related to water, electricity, and sanitation provision) as well as social identity (caste, class, and religious identity) and political behavior (voting, political, and civic participation) - in order to examine the above questions spatially. While this is primarily a descriptive study, my initial expectations are that Indian cities are likely to exhibit identity based spatial segregation - and that the more marginalized caste and religious identities tend to cluster - in generally what tend to be low income neighborhoods. The distribution of basic services and infrastructure is also expected to follow a similar spatial pattern in which marginalized caste and community households are characterized by lower levels of infrastructure and service provision, and high (or low) infrastructure neighborhoods exhibit cluster. Since basic service and infrastructure provision, and planning are responsibilities of the urban local level government, answers to these questions have significant implications not only for the quality of local democracy but the equitable growth of cities and citizenship in India as well.

Megan Tran – An Analysis of U.S. State Legislative Tanning Bed Policies and Indoor Tanning Availability

Indoor tanning is associated with an elevated risk of skin cancers. In response, various U.S. states have implemented legislative measures to regulate or outright ban the use of tanning beds. Understanding the nuances of these legislative approaches and their potential impact on the prevalence of tanning beds within states is crucial for informing public health initiatives and policy decisions. This study undertakes an analysis to explore the relationship between tanning bed bans and the density of tanning beds across U.S. states. To conduct this analysis, I collected and examined state-specific legislation related to tanning bed usage. Each state was categorized into the following groups: ban under 21 years old, ban under 18 years old, ban under 17 years old, ban under 16 years old, soft ban comprising access restrictions for minors, and no ban. Tanning bed business data was collected from Wharton Data Services Data Axle’s database. ArcGIS Pro was utilized to visualize the distribution of tanning bed services and tanning legislations by state. We performed an ANOVA test to determine if the tanning bed per capita for each group was significant. Our findings reveal diverse legislative approaches across U.S. states, with variations in the scope and strictness of tanning bed bans. However, ANOVA test revealed that there was no significant difference in tanning bed per capita in each tanning bed legislation group ($p=0.40$). These results emphasize the importance of continuous evaluation and refinement of legislative approaches to address public health concerns associated with indoor tanning. While legislative measures exist to mitigate the risks of skin cancers linked to tanning bed use, their impact on the actual availability of tanning beds appears limited in this analysis.

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

Melanoma is the most lethal skin cancer given its propensity to metastasize. Previous studies have shown that lower socioeconomic status (SES) is associated with a lower 5-year survival rate and worse prognosis, though higher SES correlates with higher incidence. This suggests that the mortality disparity observed with lower SES could be due, in part, to reduced access to melanoma treatments. One specialized form of skin cancer surgery, i.e., Mohs micrographic surgery (MMS), has been routinely deployed for non-melanoma skin cancers, including basal cell and squamous cell carcinoma. However, MMS is also used for early melanomas that are potentially curable. Little is known about the geospatial relationship between melanoma incidence/mortality and SES. One could argue that better access to a more integrated cancer system, which includes Mohs surgeons, could diminish the disparity observed between outcome and SES. In order to determine if the number of Mohs surgeons is correlated with melanoma count and SES factors, we will map the location of board-certified Mohs surgeons at a county-by-county level along with the average count of melanoma and population-based socioeconomic data (median household income, percent less than high school education, percent greater than high school education) across all counties in the entire contiguous United States. Through this analysis, we aim to uncover previously undescribed relationships between MMS, SES, and melanoma count, and generate a heat map of medical need to address health disparities. These efforts may lead to targeted interventions, ensuring the optimum outcome for patients with melanoma and reducing inequalities.