Posters

1. From T to Trees: Examining Park Access via the MBTA

YVES DE JESUS, Transitivo

Description: As Boston prepares to host the 2026 FIFA World Cup, millions of visitors from around world will rely on the MBTA to traverse the city. The ability of public transit to connect people to parks is essential for both recreation and daily life. This project evaluates transit-based park accessibility across the MBTA with open-source tools (OSMnx, GeoPandas) and visual maps. We generated 5-, 10-, and 15-minute walking isochrones from each MBTA station using OSMnx and pedestrian networks from OpenStreetMap. Isochrones are intersected with park boundaries to identify stations that provide green space access within each time band. Our study area spans the Boston urban core, capturing variation in park distribution and network connectivity. A preliminary study of the Green Line E branch showed mild transit-park connectivity. The full analysis will extend to all MBTA lines, showcasing a region-wide assessment of how well the system connects riders to green space.

2. Comparative Analysis of Above-Ground Biomass Estimation in Branford Salt Marshes: Evaluating Traditional Field Methods and UAS for Precision Assessment

Sonam Sah, University of New Haven

Description: Salt marshes are among the most productive ecosystems, offering services including carbon sequestration, shoreline stabilization, and biodiversity support. Salt marsh accessibility limits estimation of carbon and biomass. Above-ground biomass (AGB) is an indicator of carbon allocation and ecosystem vitality but constitutes a quarter of total biomass. Conventional field surveillance is laborious with small sample size and coverage. This research evaluates small Unmanned Aerial Systems(sUAS) as a scalable method to quantify AGB in Branford, Connecticut salt marshes, an estuary with rising sea level. A multi-year study uses 2024 and 2025 data, extended to 2026. AGB was spectrally validated via quadrats and oven-dried weight analysis. Orthomosaics from 2024 and 2025 are complete; additional

image collection planned for 2026. Dense point clouds created using Structure from Motion. Red-Edge and Near-Infrared bands calculate NDVI and NDRE, effective in dense Sporobolus alterniflorus canopies.

3. Conflict and Forced Displacement in Colombia: A Municipal-Level Econometric Analysis

Kaori Kimitsuka, Tufts University

Description: This study examines the spatial relationship between armed conflict and forced internal displacement at the municipal level in Colombia between 2018 and 2024. Colombia hosts one of the world's most severe internal displacement crises, yet national-level statistics obscure significant spatial heterogeneity across municipalities. Using georeferenced conflict event data (ACLED) and municipal-level displacement registry data (UARIV via Datos Abiertos Colombia), this project addresses four spatial research questions: which municipalities are the strongest sources of displacement; where conflict concentrates geographically; whether conflict intensity causally drives displacement rates; and how origin-destination flow patterns have shifted over time. The analytical approach combines choropleth mapping, panel fixed-effects econometrics with municipality-level fixed effects, and origin-destination flow mapping.

4. Enabling Connections between Communities, Campus, and the Commonwealth: The UMass GIS Hub

Forrest Bowlick, University of Massachusetts - Amherst

Description: The Regional GIS Hub at UMass - Amherst is a partnership between UMass - Amherst's Department of Earth, Geographic, and Climate Sciences in the College of Natural Sciences and Massachusetts' Bureau of Geographic Information (MassGIS), part of the Massachusetts Executive Office of Technology Services and Security (EOTSS). The Hub's goal is to support geospatial data and technology development and use throughout the region. Once operational, the Hub will assist local, state, and regional organizations—including regional planners, private businesses, and higher-education institutions—in using geospatial data and technology, and acquiring data, software, and consulting services. Students will conduct much of the work of the Hub, under the direction and close supervision of campus GIS faculty and research staff. This will provide real-world experience and training for the next generation of the geospatial workforce. This poster provides an update on the Hub's formation and operations.

5. Mapping Rural Healthcare Accessibility in Syunik Province, Armenia

Arev Kaligian, University of Massachusetts, Amherst

Description: Armenia, a former Soviet nation located in the Caucasus region, suffers from an underdeveloped primary healthcare system in which services are mainly located in regional hospitals.

This project analyzes driving times between villages and hospitals in the rural Syunik province to explore the limitations of the present facility distribution. I used satellite imagery to select a subset of houses in every village across Syunik, which I combined with a road network dataset created from open source data. I used ArcGIS Network Analysis to find the shortest route to hospitals and polyclinics and calculated both the driving distance and time based on road type characteristics and elevation. This project can help primary healthcare innovators evaluate weaknesses in current healthcare infrastructure which emphasizes expensive specialty care and fails to support rural regions facing additional challenges like poor road networks, mountainous conditions, and incursions from hostile neighbors.

6. Beyond the Storm: The lasting impact of Hurricane Katrina on Housing Equity in New Orleans

Dankweli Mwaka, Dartmouth College

Description: While the catastrophic devastation of Hurricane Katrina is well-documented, previous studies have often lacked a granular, long-term analysis of how the disaster specifically exacerbated systemic housing inequities. Addressing this gap, this study examines how Hurricane Katrina intensified the housing crisis in Louisiana. Using income, rent, and homeownership data from the 2000 and 2010 decennial census, we applied affordability indexes derived from metrics developed by the U.S. Department of Housing and Urban Development at the census tract level to assess changes in the housing market. We then contextualize this crisis by focusing on New Orleans to analyze the racial disparities that correlate with disaster impacts using levee flood exposure levels. By focusing on how race and socioeconomic status shaped disaster exposure and post-disaster housing outcomes, this study examines the uneven spatial impacts of Hurricane Katrina on housing equity in New Orleans.

7. From Endangered to Vulnerable

Steavi Swinson, Beta Group, Inc.

Description: Over the years, the expansion of the human population, improved infrastructure, and increased agricultural activity have made living and migration difficult for pandas. Human development has led directly to their decline; forest fragmentation and the reduction of continuous forest habitats have triggered significant losses of biodiversity, causing pandas to be labeled as endangered. Fortunately, despite substantial habitat loss over the past century, concerted conservation efforts and panda diplomacy have stabilized and even increased panda populations, resulting in their reclassification to vulnerable status.

8. Lidar and Geomorphological Evidence of Pre-Colonial Mariculture in the Westbrook Marsh, CT.

Alexander Angulo, Salem State University

Description: This study examines geomorphological and LiDAR evidence of pre-colonial hydraulic engineering in Westbrook Marsh, Connecticut. High-resolution topo-bathymetric LiDAR, multispectral imagery, and RGB orthomosaics from UCONN, CT DEEP, and NOAA reveal channel networks inconsistent with modern mosquito-control ditching. Instead, features display symmetry, converging flow paths, and ecological zoning suited for brackish aquaculture. Spatial patterns align with Indigenous mariculture practices, including fish weirs and shellfish zones. Vegetation indicators, such as Spartina alterniflora and wild rice, suggest salinity regulation through engineered flow. Terrain modeling identifies anomalies like post-hole depressions and geometric channels. Comparisons with WPA-era ditching indicate modern modification of earlier systems. Historical records support Indigenous water management, suggesting a hydrological palimpsest and the need for archaeological validation and preservation.

9. Mapping the Post-Pandemic Housing Affordability Crisis in the Adirondack Park: A GIS Analysis

Arianna Roeder-Fabos, St. Lawrence University

Description: Housing costs in the Adirondacks, the largest protected area in the lower 48 and a major tourism destination, have skyrocketed since the Covid-19 pandemic, making it increasingly difficult for local residents to afford rent amid an influx of short-term rental properties and Airbnbs, which were bought up during the pandemic. Census housing data were used in ArcGIS Pro to determine how rent prices have increased in the Adirondacks by comparing pre- and post-pandemic data to quantify the increase. It was found that rent prices had significantly increased, with residents paying an average of over 45% of their income for housing post-pandemic, forcing locals to live farther away from employment centers, lengthening commute times, and straining local infrastructure. These findings highlight the need for more targeted housing and land use policies that limit short-term rental properties to better support the needs of the local population.

10. Patterns in emergent and epifauna distributions in the Central Basin.

FAITH CHEPCHIRCHIR, University of New Haven

Description: Benthic communities in Long Island Sound's Central Basin are changing, with recent shifts in dominant seafloor taxa suggesting broad ecological changes. Through the Long Island Sound Seafloor Habitat Mapping Initiative (LISSHMI), a ~280km^2 area of the seafloor was surveyed via video and still image transects using the USGS SEABOSS platform. Georeferenced images were analyzed to identify organisms and quantify their percent cover. The composition and spatial distributions of benthic organisms were characterized in the context of the sedimentary and physical seafloor environment. Atlantic slipper snails (Crepidula fornicata) were densely aggregated in fine sediment habitats near New Haven Harbor, reflecting recent shifts in epifaunal taxa. These results support LISSHMI's goals of characterizing seafloor environments and developing map products to guide decision-making for more sustainable management of the Sound.

11. Predictive habitat suitability modelling for beavers using remote sensing and machine learning

Caitlin Rogers, University of Connecticut

Description: Beavers (Castor canadensis) are a keystone species in forested wetlands, providing important ecosystem services and contributing to climate change mitigation. Although beavers were previously extirpated from Connecticut, populations have rebounded since the early 1900s, leading to an increase in flooded wetlands. However, information on the distribution of beaver sites and the factors influencing habitation remains limited.

This research uses multimodal remote sensing, ArcGIS Pro, and machine learning to develop a predictive habitat suitability model for beavers across Connecticut. The model highlights key environmental and anthropogenic variables while the resulting map identifies areas with a high likelihood of future presence and classifies active sites. Improved understanding of beaver distribution can support more effective wildlife management and reduce human conflict.

12. Spatial Analysis of Elderly Populations, Nursing Homes, and Hospitals in New Hampshire

Hyun Joong Kim, Plymouth State University

Description: As New Hampshire's population continues to age, understanding the spatial distribution of nursing home services is increasingly important. This study conducts a spatial analysis of elderly populations aged 65 and over, 75 and over, and 85 and over, alongside nursing homes and hospitals at the census tract level. Census tract centroids are used to represent the elderly population demand. Using various GIS tools and kernel density analysis, the study examines spatial patterns of the elderly population and facility concentrations to identify potential mismatches. Results suggest that some rural areas with higher concentrations of older adults may have limited access to nearby facilities. Future research will further examine accessibility, service types, and hospital linkages to provide a more comprehensive understanding of long-term care planning in New Hampshire.

13. Using Earth Observations to Quantify Methane Concentrations Produced by Landfills in New Hampshire

Sadie Lockwood, Oregon State University

Description: Methane is a potent greenhouse gas contributing to climate change and posing public health risks at high concentrations. In New Hampshire, municipal solid waste landfills are among the largest methane sources, according to the Environmental Protection Agency Greenhouse Gas Inventory (2019). In partnership with the New Hampshire Department of Environmental Services Air Resources Division, a NASA DEVELOP Program team evaluated the use of Earth observations to enhance methane monitoring at landfill sites. Using Sentinel-5P TROPOMI, ISS EMIT, and EPA data, methane was analyzed

through monthly trends, high-resolution plume detection, and reported emissions. Results identified temporal patterns and a positive anomaly over a southern New Hampshire landfill. Findings demonstrate that remote sensing can complement emissions inventories by revealing spatial and temporal methane patterns, supporting hotspot detection and informing future monitoring and regulatory efforts.

14. Optimizing the Digital Interface of Connecticut's Coastal Access Guide {digital visualization}

Adelaine McCloe, Connecticut Department of Energy and Environmental Protection

Description: The Connecticut Department of Energy and Environmental Protection (CT DEEP) would like to do a digital visual presentation on the GIS overhaul of the CT Coastal Public Access Guide, which was one of the earliest online guides of its kind (digitized in 2004), and served as a template for other states' development of their own online access guides. In recent years, the way we store and present the data has become cumbersome and now faces further challenges with the deprecation of Microsoft Access, through which we house almost 900 public access records, making an update not only desirable, but necessary. The updated guide will integrate new GIS features that enable the public to interact with shoreline data in new ways, including utilizing new site filters to identify beach fees, mapping public transportation routes to sites, tracking site popularity and capacity, and viewing available accessibility amenities. The mobile-friendly interface will provide multilingual accessibility as well.

15. Spatial Analysis of Methane in Henan, China: The Silent Accomplice

Jorge Santiago Rodriguez, Salem State University

Description: This research focused on analyzing methane concentration levels over the region of Henan, China. Data from the Sentinel 5P satellite was combined with point data for common methane sources such as coal mines, wastewater treatment facilities, and smokestacks to analyze what emitters had the highest concentrations of atmospheric methane. While methane itself is not a direct harm to human respiratory health, there are pollutants like nitrous oxide, sulfuric oxides, particulate matter, and tropospheric ozone which are tied to methane. This study provides valuable insights for human health as it demonstrates how methane sources can highlight high levels of air pollution in a region.

16. A 20 year NDVI time series analysis using BFAST to identify logging in the Allagash Wilderness Waterway, Maine

Jacqui Parker, Salem State University

Description: The Allagash Wilderness Waterway is a system of rivers, lakes, and streams in Northern Maine. There are buffer zones around the lakes and rivers that restrict logging to protect habitat. Previous research showed that the waters of the Allagash system have experienced warming in past years, a concern is that the warming is in part caused by excess logging, and potentially logging within these

buffer zones. To examine the logging in the region, this research uses Landsat 5, 8 and 9 imagery to create a NDVI time series from 2004 - 2024. The BFAST method is used to identify breaks of NDVI in the region, focusing on 4 main areas of interest where water temperatures were identified as rising. Areas of logging are identified using BFAST and are compared with the buffers to find any points of overlap where potential illegal logging has occurred in the last 20 years. There are a few identifiable points of logging within or close to the buffers of the Allagash River, as well as a few areas along the tributary streams. Both the Allagash and these streams with logging had experienced warming temperatures in previous research and monitoring. Future research could consider how new enforcement of buffers may help the health of the Allagash Wilderness Waterway as well as adding buffers to the tributary streams.