

# Presentation **Abstracts** Day One April 22, 2025



Date: Tuesday, April 22, 2025

Time: 10:00 AM

Room: Columbia

Title: State-wide Needs Assessment for Autistic Children Across Four Therapy Types

Presenter: Claire McMahon, University of Missouri- Columbia

The objective of this study was to analyze the distribution of four distinct types of healthcare services supporting autistic children throughout the state of Missouri. We hypothesized a clear need for all 4 areas of healthcare investigated throughout Missouri, with concentrations in underserved rural areas and densely populated urban areas. This study examined the geographic distribution of Board-Certified Behavioral Analysts (BCBA), occupational therapists (OT), physical therapists (PT), and speech language pathologists (SLP), to children with a special education code for autism by their local school district, in the year 2020, throughout the state of Missouri. The count of each therapist by county was identified using the GeoAnalytics Summarize Within tool in ArcGIS Pro, then compared to the number of autistic children identified in the county, with the number of hours an autistic child was recommended to spend with each therapist. To meet recommendations, all counties needed at least 1 BCBA therapist, and SLP need was concentrated in urban areas. OTs were needed in the rural northern and southern regions of Missouri and PTs were needed in rural areas. There is a clear urban-rural divide dependent on the type of service. St. Louis, Kansas City, Columbia, and Springfield - state population centers - lack BCBAs and SLPs, yet have adequate PTs and OTs. While BCBA therapists are needed everywhere, they are most starkly needed in urban areas. Future research will investigate these spatial patterns with more advanced methods, such as the 2-Step Floating Catchment Method.



Date: Tuesday, April 22, 2025

Time: 10:00 AM

Room: Pines

Title: Assessing the Rason Special Economic Zone in the Post Covid-19 Period

Presenter: Torin Hovander, University of Missouri St Louis

According to the Bank of Korea, North Korea's economy contracted by 4.5% in 2020 due to pandemic prevention policies. (North Korea's Economy Shrinks 4.5% in 2020 amid Pandemic: BOK, Korea Times, June 30 2021) In the same period, North Korea "actively reoriented its trade priorities towards Russia". (Park and Cho pg. 1) North Korea's reorientation towards trade with Russia corresponds with increased economic activity in Rason.

This paper focuses on the Rason Special Economic Zone (Rason). The Kim Jong-un regime has tried to induce investment from China and Russia as a means of developing Rason into "Northeast Asia's logistics, transportation, and tourist hub". (Lim and Kim pg. 2)

This research utilizes geospatial tools to analyze economic activity in Rason. This research utilized two data points: night-light radiance and land usage. The data points included in this study covers the time between 2017 to 2023 and compared the spatial-temporal changes before and after Covid-19 lockdowns in 2020. This study detected changes in night-light radiance in 2017 compared to 2023. The land use/landcover change data utilized to analyze forest cover changes over the same period to test if the North Koreans used wood as a "low-cost or free source of fuel for household heating and cooking". (Chung, 38 North, December 31, 2020) Furthermore, deforestation is used to create new croplands during times of crises. (Seth, Association for Asian Studies, 2011)

The main finding of this research is that the Rason has not recovered from the 2020 Covid-19 lockdown. Night-light radiance is down 38.4% in 2023 compared to 2017. However, night-light radiance is up at the Sungri Petrochemical Complex in central Rason. This indicates that North Korea is increasing its refining capabilities at the Sungri Petrochemical Complex. Increased night-light radiance along key rail facilities2 along the Sungri line supports the argument that North Korea is getting energy from Russia via railways to be refined at the Sungri Petrochemical Complex. (Russia resumes oil exports to North Korea after long pause, Reuters, June 14th, 2023). Forest coverage increased by 4.64% from 2020 to 2023. This increase in forest coverage also supports the argument that North Korea is getting energy from Russia.



Date: Tuesday, April 22, 2025

Time: 10:30 AM

Room: Columbia

**Title:** Accessibility of Level 1 Stroke Units for Rural Ischemia Patients in Missouri Within 4 Hours of Onset

#### Presenter: Alia Abu-Shanab, University of Missouri

In the United States, stroke is the fifth leading cause of death and a leading cause of long-term disability. Ischemic strokes, the more common type of stroke, can successfully be intervened upon with thrombolytic therapy administration (tPA), but only if administered within the first four hours from onset of symptoms. There are multiple risk factors that raise an individual's risk of having a stroke, including hypertension, diabetes, obesity, and hyperlipidemia. This combination of comorbidities is formally identified as Metabolic Syndrome (MetS) and has been increasingly associated with rural communities due to varying social determinants of health (SDOH). Research demonstrates that rural stroke patients experience higher mortality and incidence than urban patients, however, geographic methods have not been widely employed in understanding the spatial components of this healthcare issue. This project utilizes GIS to analyze and visualize the inequalities surrounding the ability of rural residents in Missouri to access to Level 1 stroke units within the critical four-hour time frame for tPA administration as well as the spatial-temporal mismatch between rural communities and Level 1 stroke facilities. The results from this research will contribute a geographic perspective that is presently missing from literature on ischemic stroke and its impacts on rural populations.



Date: Tuesday, April 22, 2025

Time: 10:30 AM

Room: Pines

Title: Geospatial Analysis to Assess Syndemic Health Affects

Presenter: Timothy L. Haithcoat, PhD, Institute for Data Science & Informatics

This research attempts to provide quantitative support for syndemic effects influencing COVID-19 Case Fatality Rate (CFR) within Missouri. The Geospatial Analytical Research Knowledgebase (GeoARK) was used to assemble a list of risk elements and areas. Missouri's risk assessment covered COVIDs impact as measured by CFR from March 4, 2020 – January 18, 2022. Examination for syndemic effects used single, 2-way, 3-way, and 4-way risk factor analysis. The most significant 2way syndemic results were found for health culture and socioeconomic factors (CFR=0.55%), and health culture and accessibility factors (CFR=0.53%). The most pronounced impact in the three-way analysis included health culture, socioeconomic, and accessibility factors (CFR=0.61%) found in 12 counties. The final four-way analysis including health culture, socioeconomic, accessibility, and susceptibility factors (CFR=0.58%) and was found in 11 counties. Results underscore the importance of including factors related to social systems and infrastructure to achieve better context for COVID CFR. The inclusion of geospatial distributions of health culture, socioeconomic, and accessibility measures can aid mitigation efforts. Syndemic processes are occurring within the health landscape. This approach is useful for directing the tailored cultural and educational interventions required to prepare for the next pandemic.



Date: Tuesday, April 22, 2025

Time: 11:00 AM

Room: Columbia

**Title:** Community mapping of the pediatric autism diagnosis to services journey: a power analysis for identifying systemic barriers to care in Columbia, MO

Presenter: Aída Rosalia Guhlincozzi, University of Missouri Geography

Pursuing an autism diagnosis for a child can be difficult for parents or guardians, due to a number of systemic barriers. These systemic barriers have only been examined primarily through a financial lens, but this project seeks to examine them through a geographic access lens at multiple scales, from state to local. To do this, this project surveyed family members of children who had received a diagnosis for autism in the past 5 years to identify difficulties with accessing diagnostic care for their children. This presentation summarizes the results of 30 surveys from parents and guardians from the Columbia, MO area. This presentation will discuss the key themes of the preliminary analysis of the survey, and identify next steps for community-engaged research with this project.



Date: Tuesday, April 22, 2025

Time: 11:00 AM

Room: Pines

**Title:** Integrating Machine Learning and Geospatial Analysis for Land Surface Temperature Reconstruction and Climate Impact Assessment on Forest Fire Dynamics in Alberta

Presenter: Hatef Dastour, MU Institute for Data Science & Informatics, University of Missouri

Accurate Land Surface Temperature (LST) data are essential for comprehending the interactions among climate variables, vegetation dynamics, and forest fire occurrences. This study introduces a machine learning framework employing CatBoost and XGBoost models to reconstruct LST across diverse land cover classes in Alberta, Canada. On the test dataset, the models demonstrated robust predictive performance: for LST-Day data, CatBoost and XGBoost achieved Median Absolute Errors (MedAE) of approximately 1.434 °C and 1.425 °C, respectively; for LST-Night data, MedAE values were around 1.186 °C for CatBoost and 1.176 °C for XGBoost.

Beyond LST reconstruction, the study examines the relationships between climatic variables—LST, precipitation, and relative humidity—and forest fire occurrences across Alberta's natural subregions. The analysis reveals that elevated LST, combined with decreased precipitation and relative humidity, correlates with increased forest fire activity and subsequent vegetation changes, particularly in the Central Mixedwood, Dry Mixedwood, and Montane subregions. These findings align with observed warming and drying trends in these areas, suggesting that climate-induced alterations may amplify fire regimes and influence vegetation composition. Such shifts have significant implications for biodiversity, ecosystem services, and carbon sequestration.

The integration of machine learning techniques with geospatial analysis offers a comprehensive approach to LST reconstruction and climate impact assessment on forest fire dynamics. This methodology provides valuable insights for the Geographic Information Systems (GIS) community, enhancing the understanding of climate-fire-vegetation interactions. The findings are instrumental for developing adaptive forest management strategies aimed at mitigating the adverse effects of climate change on fire regimes and vegetation dynamics in Alberta's diverse landscapes.



Date: Tuesday, April 22, 2025

Time: 11:30 AM

Room: Columbia

Title: Community GIS and the Missouri Autism Projects

Presenter: Rachel Riley, University of Missouri - Columbia

Community geography is an area of research focusing on bringing together researchers, community members, and stakeholders to support societal action towards addressing community issues. (Guhlincozzi, 2022). The Missouri Autism Projects is an initiative of the Missouri Department of Mental Health that aims to provide services and resources, such as behavior management training, language therapy, caregiver training, and advocacy training, to autistic individuals and their families (Missouri Department of Mental Health, n.d.). As such, the initiative serves as an example of a statewide effort to increase regionalized access to resources that can enhance an autistic individual's daily life and provide additional support to their families and caregivers. In particular, the Missouri Autism Projects arose out of requests for improved access to services among rural communities in the state, addressing relevant themes pertaining to health equity. To request any of these services, it is necessary to contact one of the five regional offices based on county of residence. To this end, the Missouri Department of Mental Health directs viewers to a series of regional maps to help them identify the appropriate office to contact. In this way, the Missouri Autism Projects is an initiative that relies on accurate spatial information presented in a legible and accessible format to connect individuals and families to resources they need for the improvement of their wellbeing. From a community geography standpoint, all Missouri residents would benefit from the collaboration between professionals in departments such as the Department of Mental Health and GIS professionals and input from affected community members. Such an integration would both ensure accuracy and assistance in accessing services and increase awareness of issues impacting residents throughout the state and call attention to the importance of garnering necessary support. This presentation shares two simple mapping examples taken up by the Critical and Community Geographies Lab at the University of Missouri and how they will support more integrated efforts to improve access to care with accurate geographic mapping efforts.



Date: Tuesday, April 22, 2025

Time: 11:30 AM

Room: Pines

Title: Trends in GIS Roundtable

Presenter: Tim Bixler, Missouri Dept. of Conservation

Geographic Information Systems (GIS) continues to evolve, and with the growth comes both opportunities and challenges. This session will be a collaborative discussion among GIS peers regarding recent trends in GIS.



Date: Tuesday, April 22, 2025

Time: 1:00 PM

Room: Columbia

**Title:** Community Geography and the Black Experience in Columbia, Missouri: Housing, Transportation, and Displacement

#### Presenter: Rikki Ascani, University of Missouri

Urban renewal and transportation infrastructure projects have historically led to the displacement and marginalization of Black communities across the United States. While these effects have been well-documented in major cities, there is a significant gap in research on how these processes have shaped the Black community in Columbia, Missouri. This project utilizes community geography praxis to examine the intersection of place, institutional racism, and forced displacement under the guise of urban renewal and increased connectivity. By employing historical mapping and conducting interviews with Black Columbia residents, this research uncovers how housing and transportation development policies have systematically impacted the community. The co-production of knowledge with local Black residents aligns with community geography's goal of amplifying historically marginalized voices and shedding light on societal injustices. Additionally, this work contributes first-hand historical knowledge to existing research on housing and transportation, offering a deeper understanding of how these policies have shaped Black life in Columbia. Through this research, I aim to challenge dominant narratives of progress and infrastructure development by centering the lived experiences of those most affected.



Date: Tuesday, April 22, 2025

Time: 1:00 PM

Room: Pines

Title: Learning with GIS: Strategies for a World Regional Geography Classroom

Presenter: Tara Vansell, Lindenwood University

This presentation shares how GIS can be used to enhance spatial thinking in a World Regional Geography classroom by adapting GeoInquiries for undergraduate learners and using Story Maps to deliver immersive experiences using virtual reality. The goal of this talk is to emphasize how to use GIS tools for engaged learning, not about teaching the "clicks" of GIS. If you are just beginning your GIS educator journey or you have been navigating the World Regional Geography space for some time, please let me share with you my lessons learned and student responses to these activities.



Date: Tuesday, April 22, 2025

Time: 1:30 PM

Room: Columbia

Title: Landscape phenology and forest songbird dynamics across the Central Hardwoods

Presenter: Benjamin Tjepkes, University of Missouri

Many forest communities across the central hardwoods ecoregion of the United States are experiencing shifts from oak dominance to later successional species after anthropogenic alternations to historical disturbance regimes. This transition, amidst unprecedented climatic variability, casts uncertainty on the future of resident and migratory forest passerines that depend on this region for access to high-quality breeding habitat. Land surface phenology, the timing of annual growth cycles measured from remote sensing platforms, offers a potential proxy for forest ecosystem response to changing bioclimatic conditions that can be used for landscape-based wildlife conservation planning. This research explores how regional forest phenology patterns relate to demographic trends in avian communities across the Central Hardwoods Bird Conservation Region under anthropogenic climate change to assess the utility of phenology-informed models in predicting wildlife habitat suitability at regional scales. We used 40 years of Landsat multispectral imagery to model spatially explicit estimates of phenological transition dates based on gap-filled Enhanced Vegetation Index (EVI) values and gridded climate data to represent the temporal progression of seasonal passerine habitat. These climate-mediated phenological metrics will serve as inputs for hierarchical Bayesian avian community models using relative abundance trends from North American Breeding Bird Survey (BBS) point counts within the region. We will then be projecting any bird-phenology relationships through the year 2100, using a range of future climate (CMIP6) scenarios. This work extends existing bird research in the central hardwoods to better understand indirect climatic drivers of forest phenology and how these patterns relate to diachronic bird abundance trends. The findings of this research will offer insights for conservation initiatives focused on preserving avian diversity by implementing resilient forest management practices informed by climate-based spatial prioritization at landscape scales.



Date: Tuesday, April 22, 2025

Time: 1:30 PM

Room: Pines

Title: Importance of data mapping in local organizations

Presenter: Victor Mercade Gonzalez, Lindenwood and Missouri Botanical Garden

As one of the nation's oldest botanical gardens, the Missouri Botanical Garden was founded in 1859 as a center for research and science education in the St. Louis metro area. The Missouri's Botanical Garden strives for the protection, conservation, and research of plants and their ecosystems aiming to inspire and educate St. Louis residents. The Missouri Botanical Garden supports many educational programs that guide the public on the way to living sustainable lives supporting their communities. Many of these educational programs rely on ArcGIS web apps.

With the retirement of web app builder, the focus of my internship has been to renovate the web apps and maps used for the control and identification of plants in the different plant beds. These maps were used as inspiration and transferred from web apps and instant apps to the new ArcGIS Experience builder to provide new, efficient maps and apps that can be used by the horticulture team to better achieve the goal of the Garden. In addition, a set of areas in the Garden were mapped using cartography to display the planting beds and irrigation to allow the horticulture team to use day to day visual representations and localized notes on the current projects. Emphasizing that the use of ArcGIS provides a multitude of data and helps visualize it in an efficient way that aids the horticulture team in taking care of the Garden in the best way possible.



Date: Tuesday, April 22, 2025

Time: 2:00 PM

Room: Pines

Title: A Conservation GIS Internship at the Saint Louis Zoo

Presenter: Lauren Roberts, Lindenwood University

Urbanization is an ever-increasing process seen as we expand as humans, indirectly leading to a major impact on amphibians and other species. When comparing previously known amphibian environments to the current day, a noticeable disappearance of species can be observed. In Missouri, as Saint Louis expands, alterations have been made to the surrounding creeks and rivers to meet the needs of residents. As a result, the shift in which species have been able to adapt and those that could not is evident.

As part of the St. Louis Zoo's conservation efforts in the greater Saint Louis area, the primary focus of my internship was based creating Choropleth, Range, and Heat maps that displayed locational data of three different frog species native to the area. These species include Spring Peepers (Psuedacris crucifer), Boreal Chorus Frogs (Pseudacris maculata), and Cricket Frogs (Acris blanchardi). The work completed for this was in support of the Spring Peeper Program to aid the global decrease in frog species. The project and maps created were designed to show the decline of these three species previously found in the STL Metro Area, with a goal of identifying and protecting the remaining populations.



Date: Tuesday, April 22, 2025

Time: 3:00 PM

Room: Columbia

**Title:** After Redlining: A GIS and Social Work Analysis of Environmental and Health Issues in Stockton's Redlined Neighborhoods

#### Presenter: Olivia (Livi) Sourivong, WashU Graduate Social Work student

This project will highlight the impacts of historic redlining practices in Stockton, California, and focus on the environmental and public health risks that impact the Lao community. Using GIS spatial analysis, this project will examine the relationship between redlined neighborhoods and their access to green spaces, tree cover, and air quality. I will use the Home Owners' Loan Corporation (HOLC)graded maps, demographic data on Lao people from the American Community Survey (ACS), and other environmental and public health data from the U.S. Forest Service and CDC Places to help capture the effects of systemic problem that shape ecosystems and health outcomes in Stockton. Lao and other Southeast Asian refugee communities that reside in Stockton are often burdened by these challenges because of their historical settlement in redlined areas, which typically face limited green infrastructure, poor air quality, and high asthma rates. By identifying these complex issues and the intersections between historic redlining, environmental justice, and public health, I hope to provide insight into how these challenges impact marginalized communities. As a social worker, I am particularly interested in leveraging my social work skills to address maco-level issues while also incorporating community engagement. I am a firm believer in shaping solutions based on what communities themselves identify as their needs and respond with empathy and understanding. When our solutions are community-centered, we build public trust-which is critical for ecosystems and communities to heal from the traumatic legacies of past urban planning and policies. The research questions I will explore in this project are: How does the history of redlining in Stockton relate to green space availability and air quality? How are Lao people in Stockton affected by these issues?



Date: Tuesday, April 22, 2025

Time: 3:00 PM

Room: Pines

Title: Exploring Community Through GIS: Afterschool Lessons in Geospatial Thinking

Presenter: Zach Stafford, Donald Danforth Plant Science Center/ JJK FAN

This program highlights the development and implementation of geospatial lesson plans designed to engage students in East St. Louis through Jackie Joyner-Kersee afterschool programming. These lessons introduced students to GIS concepts, aerial spectral imagery analysis, and community mapping, fostering both technical skills and a deeper understanding of their local environment. This presentation examines the impact of these activities, showcasing student-created story maps and their reflections on how geospatial tools can address real-world challenges in their community.



Date: Tuesday, April 22, 2025

Time: 3:30 PM

Room: Columbia

Title: The PreGISP Program

Presenter: Tony Spicci, GIS Certification Institute

The GIS Certification Institute (GISCI) uses a rigorous exam, a portfolio covering at least four years of work experience, and signing of a Code of Ethics declaration to certify candidates as GIS Professionals (GISP). It is the only such certification for GIS professionals besides the state licensure procedure for surveying engineers.

There is, at this point, no standardized exam for graduates of GIS (Geographic Information Science) programs in the United States. The American Association of Geographers (AAG), the University Consortium for Geographic Information Science (UCGIS), and the GISCI got together to develop a pre-GISP exam that puts students graduating from GIS programs onto the path towards GISP certification as an important step towards career readiness. This initiative is of interest to academic GIS programs because it provides a nationally accepted form of external assessment. It serves students as a stepping stone towards professional acknowledgment and it helps GISCI to create a pipeline to increase the pool of GISPs.

This session will acquaint audience members with the development of an exam blueprint, a body of knowledge that educators can teach to regardless of their disciplinary background, being assured of the relevance of the material to future employers. During this session, we will discuss the respective knowledge areas and the administration of the exam that GISCI will roll out in Spring of 2025.



Date: Tuesday, April 22, 2025

Time: 3:30 PM

Room: Pines

Title: Understanding Tiger Habitat Suitability in Urban Spaces of Bhopal using GIS techniques

Presenter: Anam Ahsan, University of Missouri

Anam Ahsan, D. Psrivastava, Shehkar Kolipaka, Michael Byrne

The survival of tigers in human-dominated landscapes as urbanisation increases necessitates a sophisticated comprehension of habitat suitability in fragmented habitats. The urban regions of Bhopal, a city with a lot of greenery and close proximity to protected areas, are evaluated for tiger habitat compatibility in this study. Through a comprehensive strategy that integrates remote sensing, camera trap surveys, GIS-based habitat modelling, and ground sign surveys, we assess the main determinants of tiger presence, such as habitat connectivity, anthropogenic pressure, prey availability, and land use and land cover (LULC). We employ habitat suitability modeling and and graph analysis to identify high-probability tiger habitats and assess the impact of urban expansion on their movement corridors. Our study results indicate the presence of 19 suitable habitat patches across the landscape that are crucial for tiger survival and movement. Among these, some are highly connected, facilitating easier dispersal and movement, while others, despite their potential as suitable habitats, lack connectivity. This highlights the need for targeted conservation efforts to enhance habitat corridors and connectivity, ensuring long-term tiger persistence in the region. The study further explores the role of urban green spaces, water bodies, and human settlements in shaping tiger movement and habitat use. Findings from this research provide critical insights for conservation planning and urban biodiversity management, emphasizing the need for habitat connectivity, conflict mitigation strategies, and sustainable urban planning to support tiger persistence in Bhopal's rapidly changing landscape. These insights will aid in developing science-based strategies for coexistence and long-term conservation of tigers in urban environments.



Date: Tuesday, April 22, 2025

Time: 4:00 PM

Room: Columbia

Title: Charting New Horizons: Empowering Tomorrow's Geospatial Leaders

Presenter: Katilin Belk, Allstate Consultants LLC

Young geospatial leaders are emerging into an industry shaped by the dedication and collaboration of current and past geospatial professionals. As these emerging leaders enter the workforce with fresh perspectives, it becomes increasingly vital to establish best practices that foster personal and professional growth while upholding the foundational principles in which the industry has thrived. By creating an inclusive environment for sharing knowledge or experiences and a space to honor skills through mentorship and collaboration, we can effectively empower young leaders to play a pivotal role in shaping the future trajectory of geospatial technology. This approach enriches the industry's collective knowledge base with continued innovation.



Date: Tuesday, April 22, 2025

Time: 4:00 PM

Room: Pines

Title: GIS Education and Interships Roundtable

Presenter: Tara Vansell, Lindenwood University

This special interest group is open to those in academia and industry looking to connect in order to mentor the next generation of geospatial professionals. This group is looking to discuss industry skillset needs, placing students in meaningful internship experiences, the need for more hybrid and remote internship opportunities, how academic instructors/advisors can support industry mentors, how AI is being used in the office - what students should be learning, best practices for technology and data sharing collaborations.