



West Lakes Division of the American Association of Geographers

2019 Annual Meeting | October 24 – 26, 2019

University of Northern Iowa | Cedar Falls, IA

Poster Abstracts (39 in a total)

| Presenter | Poster Title | Abstract |
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| Bailey, Sydney | Patterns of Tree Regeneration At Upper Treeline in the Sangre de Cristo Mountains | Changes in treeline are believed to be driven by temperature variability over timescales of decades to millennia. This association has permitted treeline to be used as a proxy in assessing past climatic patterns and extrapolating future predictions. In the Southern Rocky Mountain region, modern temperature trends (post-1945) in the Sangre de Cristo (SDC) range are dominated by sharp rises in minimum temperature during the growing season. Coincidentally, the onset of heat-induced drought stress is impacting trees throughout the mountain forest belt, though research is lacking across broad spatial scales at treeline. We used dendroecological techniques to sample seedlings at treeline to obtain annual resolution of establishment on contrasting north and south facing slopes in the SDC. We hypothesized that if patterns of tree regeneration are primarily driven by temperature, then we would expect seedling establishment to be more abundant on south-facing slopes. Alternatively, if heat-induced drought stress is important, we would expect seedling establishment to be more confined to north-facing slopes. Preliminary results show that seedlings on south-facing slopes (n = 66) are significantly taller and larger in diameter ($p < 0.05$) than their conspecifics on north-facing slopes (n=169), suggesting the importance of slope aspect in mediating the influence of climate at upper treeline. This indicates the possibility of moisture limitations at treeline and brings into question the future structure and extent of the upper forest border under a warmer and drier climate. |
| Beaver, Adam | Inclusionary Housing Without Inclusion | Inclusionary housing policies can be used to create affordable housing opportunities through requiring a percentage of new units in developments to be affordable, or by having developers pay a fee in-lieu to go into an affordable housing fund. Two unlikely places for affordable housing policies are the research focus: Lake Forest, and Highland Park, Illinois, which are two wealthy majority white north shore Chicago suburbs and each have inclusionary housing policies. Due to “rising property values” these policies state the need for inclusionary housing to “maintain” the diversity of their communities. The question forms: can Inclusionary Housing policies result in increased diversity in places that have a severe lack of diversity? Using Lake Forest and Highland Park as case studies and utilizing data obtained from each city as well as data from the U.S. Census bureau, it was found that the small numbers of affordable units created did not have a strong effect on the diversity of either city. |

| Presenter | Poster Title | Abstract |
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| Beseler, Brianna | Long-term Fire History from Bass Lake Northeastern Wisconsin | <p>While humans have caused major changes in the environment, fire history has predated us by millions of years. Fire is an important part of many forest ecosystems and by studying fire history this can allow for better understanding in how fire, vegetation and climate are linked together. Fire can drastically change the existing ecosystem so it is important to obtain records of fire history in order to gain insight into how forests respond to fire over a long period of time. Wisconsin's fire history is relatively small compared to various other parts of the world. In 1871 one of the deadliest wildfires in American history, the Peshtigo Fire, burned 1.2 million acres in Northeast Wisconsin. This project targets this catastrophic wildfire history of Wisconsin. Long records of fire can be obtained by examining charcoal accumulation in lake sediments. For this project we obtained a lake sediment core from Bass lake in Beaver, Wisconsin to reconstruct records of charcoal-based fire histories. It is crucial to know how old the sediments are when reconstructing, to do this we will construct an age versus depth model. An age versus depth model can be constructed using radiocarbon (C14) ages of material found in the lake sediment core.</p> |
| Bridgeman, Hesston | Militarized Landscapes in Gaming | <p>Video games and gaming have grown into a massive global industry, and are played by millions of people everyday around the world. The geographic literature has written surprisingly little about gaming, however, despite the rich potential to investigate geographic concepts. This poster will address this lack of scholarly attention, specifically by highlighting the geography of militarized landscapes in the popular video game franchise Call of Duty. Using content analyses, this poster will display the physical environment, technologies, human environment interactions, and the ethnic representation via game-play screenshots. These images can give us information on the content that players are exposed to, as well as an overview of the types of landscapes that our culture considers "militarized".</p> |
| Burke, Grant | Iowa National Hydrography Data GeoConflation | <p>Stream, waterbody, and edge of water datasets for Iowa have been mapped in recent years, supplanting National Hydrography Dataset (NHD) geometry that is out of date. The University of Northern Iowa Department of Geography GeoTREE Center is contracted by the Iowa Department of Natural Resources (DNR) to prepare these relatively new hydrography datasets for conflation into the NHD. The new statewide hydrography data has been compiled into a geodatabase and initial NHD attributes have been calculated such as Feature Codes and Types, and Flow Direction.</p> <p>The remaining pre-processing steps will be done individually for the hydrography features within each 10-digit Hydrologic Unit (HU10) watershed in Iowa. Subsets of features will be using the HUC10 watershed boundaries; then the subsets will be loaded into a NHD geodatabase template to ensure the schema will match that of the NHD. Then the HU10 geodatabase will go through a series of quality control tests to proper flow direction, enforcement of topology, and correction of pseudo-nodes. Before the local data can be conflated with the source NHD, a process to identify if streams are perennial, intermittent, and ephemeral must be determined and this investigation is currently being undertaken by the Iowa DNR.</p> |

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| Carvalho de Castro, Paula | GIS and Remote Sensing in Multi-Purpose Cadastre: Applications for Land and Building Taxation in Brazil. | <p>The fiscal responsibility act in Brazil aims to ensure that government employees pay close attention to efficiency in the collection of real estate taxes. The IPTU (Land and Building Taxation) is one of the main sources of collection for a municipality and it is calculated based on a multi-purpose database (cadastre) held by the municipality. One of the most important features of the multi-purpose cadastre is the Generic Plant of Values (GPV). The GPV is understood as a map of homogeneous zones of real estate values that are created in order to serve as a foundation for the calculation of the IPTU. Each parcel in the multi-purpose cadastre overlaps a homogeneous zone in the GPV and therefore has a real estate value. The present paper takes a closer look at how spatial data is acquired, processed, stored and made available to the public on the process of calculating the Land and Building Taxation. Case studies of municipalities in Brazil were used in order to analyze how raster and vector data are collected, manipulated and combined with alphanumeric data to generate the GPV and later to calculate the IPTU. Remote sensing techniques and GIS were shown to be of significant aid when it comes to creating, maintaining and updating a multi-purpose cadastre and its products, such as the GPV and the IPTU. The study suggested that the use of remote sensing techniques and GIS play an essential role in making the collection of taxes more efficient and fair to taxpayers.</p> |
| Cheney, Wyatt | Modeling Nitrate and Sediment Yield of the UNI Campus using SWAT | <p>This project's goals were to create a land cover classification map and to simulate sediment and nitrate runoff of the University of Northern Iowa's Campus in Cedar Falls, Iowa. The campus size is approximately 3.63km². Hyperspectral imagery of Cedar Falls, including the campus, was collected in 2009 and this study simulates from 1994 through 2010. This project used ENVI image analysis software's Spectral Angle Mapper tool to create a land use/land cover map of campus from the hyperspectral imagery, along with ERDAS IMAGINE for accuracy assessment. The Soil and Water Assessment Tool (SWAT) was used for simulating sediment and nitrate runoff. To run SWAT digital elevation model (DEM), soils, and climatic data such as precipitation, wind, humidity, and solar were collected. After simulations, SWAT produced a database with simulated sediment yield and nitrate runoff among other water quality parameters. This helps users simulate the response of a watershed to climatic and land cover changes. The resulting land cover map yielded an accuracy of 76.33% and included Forest-Mixed, Kentucky Bluegrass, Urban-Institutional, and Urban-Transportation classes. After running the SWAT model, areas with Urban – Institutional land cover were found to have higher sediment yield than other areas of the campus. Sloped areas with Bluegrass land cover were identified to have higher nitrate runoff. However, these findings still need to be calibrated and validated with observed streamflow data to gauge the model's accuracy.</p> |

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| Dietrich, James | Riverscape Mapping with an Open-Source Autonomous Surface Watercraft | <p>Most river system analyses use either intensive, small-area surveys, or extensive, low-resolution surveys. Recent research postulates that both high-resolution and river-extent information are necessary to understand fundamental questions of river processes, such as patterns of critical habitat, sediment links, and river instability. As part of a larger NSF-funded research project, we have developed an open-source, boat-based mapping approach to measure river geometry, sediment size patterns, hydraulic habitats, and riverbank erosion patterns. The catamaran design we have developed integrates off the shelf, lower-cost sensors including high-resolution RTK/PPK GPS, inertial measurement (IMU), side-scan sonar, single-beam sonar, temperature, and a multi-camera array for 3D mapping above and below water. The design is meant to be “garage build friendly”, utilizing a minimum number of common tools and basic construction techniques. The sensor package will be user-friendly enough for non-expert use, allowing the boat to be deployed for citizen-science based data collection by loaning it to groups like watershed councils or volunteer conservation organizations. This will allow data to be collected over larger areas in less time than would be possible by “expert” researchers. The boat designs and software are developed as an open-source project and all hardware and software will be made public as our testing and validation progress.</p> |
| Fox, Taylor | Transculturation in Little Havana, Miami | <p>In the 1960s, Miami rapidly transformed into a Cuban place with its core community setting up in what is now known as Little Havana. In the past few decades, this place has shifted from a predominantly Cuban enclave to a multiethnic Latin community which begs the question: Is the existing, Spanish-speaking, ethnic enclave built by Cubans inviting other Latin peoples to settle there as well, thus leading to a transcultural place? Using ethnographic interviews as well as participatory mapping to determine what all participants agree is Little Havana, initial findings show that the impact of dozens of new Spanish-speaking ethnic groups moving to the area has ignited a transcultural event; a development of a new culture amalgamating many group’s values. In my work, I will continue to analyze what impact this cultural shift is having on the community’s overall sense of place.</p> |
| Galvez, Annette | Disaster Capitalism: How Natural Disasters Displaced the Disenfranchised and Created Opportunity for Private Investors in the Cuauhtémoc delegation, Mexico City | <p>Natural disasters are often disregarded as unavoidable. However, there is a stark contrast when observing which people are able to overcome them and even thrive as a result of their occurrence and who has their livelihoods threatened. This analysis focuses on Cuauhtémoc delegation located the heart of Mexico City and the broad spectrum of people that have called it their home. Mexico City has experienced several catastrophes in its long history. This study focuses on the last 50 years, during which, Mexico City fell victim to two catastrophic earthquakes. These earthquakes devastated the city and its resources in a way that catalyzed social, economic and political change. The first earthquake hit in the 1980s when wealthy neighborhoods of the Cuauhtémoc delegation, were at the beginning stages of the departure of their wealthy residents. The neighborhoods within Cuauhtémoc delegation were and remains a prominent area but this wasn’t the case during a period in time. It is no coincidence that despite their flight during the two earthquakes, that people from a higher socio-economic background were able to return to neighborhoods, like Condensa, Roma, and Juarez after people with limited resources, were forced out of the rubble that remained by developers and politicians. In using the Cuauhtémoc delegation, over the course of 50 years, this study will highlight how the private investors were able to capitalize on natural disasters that devastate the lives and neighborhoods of the disenfranchised</p> |

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| Golosova, Elena | Community Integration of Refugees into the Local Communities in Iowa | Native residents and host countries that resettle refugees often express concern about newcomers in their communities. Some native people believe that refugees do not want to assimilate to the hosting culture; that is why will destroy the way of local life and drain the community resources. Emphasizing their reliance on public assistance, some media sources do not recognize refugees as active and productive members of the hosting society. This study examines the challenges and barriers refugees encounter in adapting to life successfully in their host community. Specifically, this analysis investigates the agency of refugees in their adaptation and community integration and their contribution to society. The study was drawn on four in-depth interviews with refugees who fled political, cultural, ethnic, and/or religious persecution in their home countries (Syria, South Sudan, Nigeria, and Russia) and resettled in the United States. |
| Grin, Petr | Opportunities for Utilizing Machine Learning Algorithms to Optimize Location Decisions for Chain Fast Food Restaurants | <p>Businesses use GIS (geomarketing methods) to maximize profit when searching for places to open new factories, shops, restaurants, or expand chain of cafes. The main approach of geomarketing is to calculate the optimal location based on socio-economic data, as well as on the criteria that are necessary for this type of business (suitability model).</p> <p>Traditionally the Maxent model, a type of an ecological niche model (ENM), helps to make a forecast regarding the distribution of different species of animals or plants in biological science. This machine learning algorithm uses data from points where the phenomenon in question has already been found and selects locations with similar characteristics. Thus, the location is not determined by the expert choice, based on the conditions and factors that are perceived as necessary or beneficial, but on the basis of the conditions known for those points in which these species of animals or plant. However, this model has already been used not only to predict the location of biological species, but also to predict and find potential distributions for human structures, such as wind turbines.</p> <p>This pilot study tests the opportunities of using Maxent for geomarketing applications, specifically determining the ‘best’ locations for fast food chain restaurants using Taco Bell locations in Iowa as an example. The results indicate that Maxent and ENM principles could be potentially useful for geomarketing applications. The resultant pilot model used a very limited number of variables, but was able to demonstrate in principle the utility of the method.</p> |
| Heick, Ethan | De-suburbanization of Cook County, Illinois Visualized Through Historical Highway Traffic Patterns | This project analyzes the ‘reverse urban sprawl’ that is occurring in Chicago, and its surrounding municipalities. My goal is to visualize this demographic change through maps highlighting annual Vehicle Miles Traveled (VMT) into the city. I used ArcGIS to create maps of total inbound vehicle miles traveled on Cook County’s major expressways in the years 1990, 2000, 2010, and 2014. This is a comparative study that correlates traffic flow and urban growth. After analysis, it is clear that the amount of vehicle miles traveled into Chicago is increasing year by year, and from every direction. I have concluded that people are once again migrating, but back into the city as opposed to the suburbs like we experienced half a century ago. |

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| Hickinbotham, Megan | Organic and Carbonate Content from a Lake Sediment Core, South Central Wisconsin | Material contained within a lake sediment core can provide information about a region's past environmental conditions and how they have fluctuated over time. A 9.5 meter sediment core was collected from Mud Lake, located in Jefferson County, Wisconsin, in June 2019 for the purpose of creating a full post-glacial climate record. The first step in studies of this nature is to analyze the sedimentary properties of the core. Therefore, the goal of this project is to determine changes in the organic and carbonate content of the core using sediment loss-on-ignition (LOI). Preliminary results of the top 4.5 m of the core indicate that organic content ranges from 8 to 33% and carbonate content between 31 and 42%. A chronology using radiocarbon-dated materials will help to determine the timing of these variations and allow the comparison of these LOI records with other paleo-environmental studies from the region. |
| Lott, Claire | Where have Spring and Fall Gone? Changes in Temperate Transition Season Days | Anecdotal evidence suggests that temperate transition season days are less numerous in recent years, with abrupt shifts directly from winter to summer or summer to winter becoming more common. In this work we examine this change for St. Louis using two temperature-derived metrics. Evidence suggests that temperate transition season days are changing in two ways. First, the number of temperate transition season days are decreasing; secondly, these days are becoming more common in spring and decreasing modestly in fall. Diurnal shifts in apparent temperature show that the overnight period is warming more rapidly than the daytime, which may partially explain the seasonal shifts. Future work will expand this work to additional locations and using other thermal comfort indices. |
| Kaemmerer, James | Visualizing A Catastrophic Climate Event: Mongolia's 2009-2010 Dzud | Incorporating MODIS imagery, change detection techniques, and zonal statistics mapping, this poster focuses on the Mongolian dzud of 2009-2010, which has been recorded as one of Mongolia's most devastating. A dzud [зуд] is generally characterized by a long dry summer (which limits the growth and availability of grassland to be grazed by livestock), followed by a cold snowy winter (during which higher-than-average snowfall and colder-than-average temperatures further restrict access to food for the already undernourished livestock). This natural hazard can result in mass livestock die-offs, affecting the livelihoods of herders across the country. |
| Kannarr, Seth | Geography of Color Preference in the United States | Nearly every person has a favorite color, and is proud of their preference. The question that seeks to be answered: is there a spatial correlation between one's state of origin and one's favorite color? Does the environment or local culture play an influence on the color one chooses to be their favorite? Or, is there no statistical difference for favorite color and place of origin and it is entirely subjective to the individual? Here, we explore the results of a mass-media survey of color preference across the United States. |
| Klocke, Greg | 360 Images for Google StreetView | This project will show 360 images that were taken in state parks, prairies, campus, etc. These images are published or will be published to Google StreetView for the public to see. |

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| Klundt, Delaney | Can I GrowIt!?: Examining USDA Plant Hardiness Zones and Their Relevance through a Mobile Gardening Application | Plant Hardiness zones have been used as a tool to indicate which plants will survive and grow under certain climate conditions. From advanced horticulturists to novice gardeners, plant hardiness zones and maps of them have had a major emphasis in discussions surrounding plants. A main reference has been the USDA Hardiness Zone Map that relies solely on temperature to predict where certain plants will grow. This research attempts to further investigate claims that the USDA Hardiness Zone Map may no longer be relevant due to climate change and the impacts of it. By using data from a mobile app containing plant inventory uploaded by a community of over 850,000 gardeners, botanical gardens, and garden centers; this research examines possible trends of plants that are growing outside of their designated USDA hardiness zone due to climatic change. Additionally, the research promotes a discussion about the future use of geospatial technologies and demonstrates the possibility of utilizing a mobile gardening application's data to track the impacts of climate change and other trends. |
| Kolasa, Magda | Combatting Transit Deserts: Adaptive Reuse of the Chicago Parks and Boulevard System | 438,490 residents of Cook County live in transit deserts, concentrated primarily on the Westside and Southside. This study focuses on the hypothetical implementation of a new streetcar system along the existing Chicago Parks and Boulevards, along with a Boulevard revitalization plan. This idea mainly seeks to remedy a portion of the issues that arise due to a lack of transportation in transit deserts by bridging the Last Mile gap that commuters often face and focusing on equitable development. This study will consist of three components concentrating on A. the history and evolution of the Parks and Boulevard System and old Surface Lines System in Chicago B. the comparative logistics of a new streetcar system between Chicago and Istanbul, its tram system awarded "Best Practice" in providing for transportation demand in 2005, and C. an adaptive reuse of the Parks and Boulevard system in Chicago. The concluding ideas of this project are an attempt to envision the hypothetical introduction of a new streetcar system on the streets of Chicago, and ways in which to approach transit development without displacement. |
| Kremer, Noah | Web Mapping for Northeast Iowa Food Bank | Project done by the GeoTREE for the Northeast Iowa Food Bank to use web mapping to show the spatial distributions of people that these food banks accommodate. |
| Laingen, Christopher | Rural Depopulation in Southwestern Minnesota | Twenty years ago, as an undergraduate geography student at South Dakota State University, I mapped abandoned farms in four townships in Watonwan County, Minnesota. Using aerial photography and ground truthing I compared the status of farms – lived in, abandoned, or demolished – with their status in 1950. In November of 2018 I revisited my study area and updated what I had first mapped in 1999. This poster will report what has changed over the past twenty years regarding the status of farms and farmland ownership. Local-scale patterns and trends will then be used to discuss regional- and national-scale trends in rural population change and U.S. agricultural land-use and production. |

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| Larson, Molly | Geography of Mental Health | <p>Across the state of Wisconsin, there are huge disparities in disease and mortality associated with mental health. What accounts for this disparity? How does this relate to the overall state of mental health in Wisconsin? Based on a search of abstracts of recent AAG annual meetings, geographical attention to mental health does not seem to match current mental health issues facing our society. After searching the literature, we researched different factors that could be contributing to mental health such as access to health care, the location and number of treatment centers in the state, the number of licensed therapists in each county, and the amount of funding each Wisconsin university receives from the state government for mental health care. Overall, we discovered a huge disparity in mental health resources between rural and urban counties. In general, counties with fewer mental health resources had more alcohol-related deaths and suicides in 2017. Mental health, particularly anxiety and depression, has become an epidemic; luckily, it's a treatable one. With more research like ours and funding to improve services, reformed mental health across the state of Wisconsin and the country is attainable.</p> |
| Lewicki, Roxanna | Women's Homelessness: A Geospatial Analysis of Risk Factors That Women Face in the City | <p>The Homeless Management Information System states that as of October 2019 there have been 9,459 homeless people identified in Chicago, 39% of them being women. This percentage has been rising each month due to a variety of challenges that women face in the city. Homeless women are often invisible in the urban landscape as a result of the lack of female specific services, which leads them to seek shelter through couch surfing, "doubling up," and occupying abandoned buildings. This project uses geographic information systems to map out three risk factors as indicators of women's homelessness: female poverty, female headed households, and housing instability. Further, using these indicators, it examines areas in which women are at a high risk of homelessness, and determines whether shelters that service women and their needs are located in these areas. Consequently, project results indicate that most areas lack an adequate amount of shelters to service the women in communities who are expected to use them the most. These results can also suggest which areas could benefit from more service centers and programs aimed to prevent female homelessness.</p> |
| Liu, Ziqi | What Factors Influenced Teen Birth in Illinois? | <p>Adolescent pregnancy has always been a problem around the world. Giving birth at a young age can lead to emotional, social, and financial problems for the parents, children and their families. In 2009, approximately 410,000 births occurred among teens aged 15--19 years (CDC). For the state of Illinois, the average teen birth rate was 9.6% (IDPH, 2009). This study aims to investigate the relationships between teen pregnancy rates and some socioeconomic factors. It is important to understand which socioeconomic factors are associated with this issue, thus, leading to better and more effective policies and ways to alleviate teen pregnancy.</p> |

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| Musedinovic, Tea | Mapping Hyperspectral Signatures for Urban Materials using Spectral Angle Mapper | <p>Intensive growth of the urban environment and its impact on the ecologic system require precise mapping of urban materials for various applications. Airborne hyperspectral remote sensing data is characterized by high spatial and spectral information that can enable the automated collection of various urban materials, which has been challenging for multispectral remote sensing.</p> <p>This project aims to present the ability of classification algorithm (Spectral Angle Mapper) to identify the wide range of different urban build-up surfaces using very high-resolution Headwall hyperspectral image of the city of Cedar Falls, Iowa. Field measurements were carried out with the ASD FieldSpec 3 spectrometer with a spectral range of 350nm to 2500nm. ENVI, Parge, and ArcMap Desktop were utilized to process the hyperspectral image of the study area. The overall classification accuracy was 63.2%. Further study will use a spectral library to improve image classification. Inclusion of the thermal band and different classification methods could also be considered.</p> |
| Nelson, James | A Critical Analysis of Minneapolis's 2040 Plan | <p>Minneapolis, Minnesota is a city on the rise, but it is also a city divided. Amongst other social, demographic, and economic divisions, its many neighborhoods all share their own restrictions in terms of zoning. With a set amount of single family homes, Minneapolis is soon set to reach carrying capacity unless something is done. The 2040 plan, introduced in 2018, plans to bring provisions for a growing city. This project will analyze the impact of zoning changes and creation of affordable housing throughout the city of Minneapolis and regardless of neighborhood as laid out by the city's 2040 plan. It will also explore how these proposed changes will impact or facilitate demographic or social and economic shifts. This project also looks at whether or not this plan is all inclusive in terms of creating adequate provisions for all residents in Minneapolis and looking at who might be left out or who might be benefitting from this plan.</p> |
| Nunez, Natalie | Spatiotemporal Analysis of Supraglacial Streams on the Greenland Ice Sheet from 2009-2017 using Remote Sensing | <p>Anthropogenic disturbance and global warming are currently enhancing the influx of freshwater into the oceans from melting glaciers and ice sheets. The Greenland Ice Sheet has experienced accelerated surface melt which is expected to reduce North Atlantic Deep Water formation and Atlantic thermohaline circulation. More than half of the Greenland ice sheet total mass loss is due to meltwater runoff produced on the surface by supraglacial lakes, streams, and rivers. The objectives of this study are to map changes in supraglacial drainage systems that develop in the Southwest region on the Greenland Ice Sheet and estimate meltwater runoff from this region for the 2009-2017 melt seasons. To evaluate the response of the Greenland ice sheet, change detection analysis will first be conducted on several very high-resolution WorldView (WV) satellite images to map seasonal and annual changes of supraglacial streams. A modified normalized difference water index (NDWI) and object-oriented classification will be used over all WV images in which area changes will be compared to assess surface changes on the GrIS. Finally, meltwater discharge will be estimated using the Regional Atmosphere Model (MAR). This research will improve the understanding of the GrIS response and development, as well as provide reliable estimates to the effects of rising temperatures on the Greenland Ice Sheet.</p> |

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| Pajtash, Wyatt | Redistricting Geographies and Techniques | <p>Redistricting plans in every state across the United States are drawn up every decade and are all guided by the same foundation of criteria from the U.S. Constitution. These benchmarks include that districts should be compact, contiguous, of equally population and racially fair. The act of redistricting is given over for each state to handle as they please. The lack of uniformity in state laws and processes allows for individual states leadership to manipulate districts unfairly for political gain across voting lines. This process known as Gerrymandering, leads to groups being underrepresented and elections losing their competitiveness. The United States Supreme Court has chosen against creating national uniformity in this process (<i>Rucho v. Common Cause</i>), leaving states to continue with their varied approaches at creating and distributing districts. Each state has different ways of going about redistricting, from independent commissions to state legislatures. This study examines the three states of Arizona, Iowa, and Wisconsin, to understand the different redistricting techniques that states use in order to manage how their state and congressional district maps are being redrawn. In particular, the study looks to investigate the competitiveness of congressional elections in these three states based off their different standards.</p> |
| Pitney, Sophie | Climate Sensitivity in the Transitional Forest: A <i>Betula</i> Gradient Study | <p>The forecasted impacts of climate change in the Eastern U.S. are highly variable, including shifts in species composition, significant dieback and mortality, or little to no change. This uncertainty is especially prominent at the Harvard Forest in New England, which is located in the tension zone where two major forest types meet. Three <i>Betula</i> species—<i>papyrifera</i> and <i>alleghaniensis</i> prominent in the north, and <i>lenta</i> prominent in the south—coexist in the Transitional Forest. This provides a unique opportunity to study climate sensitivity within one genus. In this study, I used dendroecology and PRISM climate data to investigate two different landscapes (flat and mesic/slope and dry) in order to understand how these species are responding to climate and competition. Trees from different canopy positions ranged in age from 60 to 140 years. While cross-dating, all three species exhibited missing and false rings, which made dating problematic. <i>Betula</i> species have highly individualistic responses to climate. I found that <i>B. papyrifera</i> in the flat, mesic site is negatively correlated with summer temperatures minimums, while in the dry, slope site is positively correlated with march precipitation. <i>B. lenta</i> on the slope site is negatively correlated with June temperature maximums, and <i>B. alleghaniensis</i> on the mesic site is positively correlated with summer PDSI (Palmer Drought Severity Index). Gaining a deeper understanding of <i>Betula</i> species' climate sensitivity will improve predictions about the future challenges experienced by the New England forests due to climate change.</p> |

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| Ringling, Alex | African Muslim Refugees in a Small City: Negotiating Identity & Belonging | <p>This research explores the experiences of African Muslim refugees from Somalia, Eritrea, and Sudan in the small MidWestern city of Columbia, Missouri. African Muslim refugees resettled in the United States are located at an intersection of multiple marginalized identities: African/black, Muslim, refugees. Literature addressing this intersection focuses on Somalis in the large, diverse city of Minneapolis, however, resettlement sites and new immigrant gateway cities in the US have been increasingly shifting to small and medium-sized cities, where African Muslim refugees are more likely to be a small minority. Redistribution to smaller metropolitan areas may benefit refugees through characteristics such as more affordable housing, less spatial distance to traverse, and lower crime rates. Conversely, small cities often lack access to services and resources compared larger urban areas such as public transportation, English language services, low-wage job markets, and similar ethnic communities. Focusing on the case of Columbia, Missouri, where less than 100 African Muslim refugees currently reside, this research questions how this population negotiates identity, belonging, and racialization in the contemporary U.S. At a time of rising anti-refugee, anti-black, and anti-Muslim rhetoric and policies, the lived experiences of African Muslim refugees in small cities are valuable to understand.</p> |
| Salinas, Maritza | Unveiling Shadows: How to Optimize Shadow Detection in HSI through Combination of LiDAR and Histogram Thresholding | <p>From “multi-” to “hyper-” spectral, remote sensing capacities have improved tremendously in how we measure Earth’s unique signatures. Unfortunately, shadow detection and correction remain an issue in most hyperspectral images, especially those with high spatial resolution. Shadows result when direct sun light is obstructed and the spectral reflectance values for pixels in those regions decrease. Many successful approaches exist to correct this blue skew to shorter wavelengths, but it can be daunting to truly assess which approach to employ since each require different levels of priori knowledge. This research attempts to generate and cross-validate shadow masks using popular GIS software; ENVI 5.5 and ArcMap Desktop 10.6.1. The goal is to create a tailored method for regions that have access to existing Light Detection and Ranging (LiDAR) data for their study area. The procedure focuses on incorporating two popular methods, histogram thresholding on a linear band algorithm and a model-based method built from LiDAR. The results include an overall evaluation of shadow range characteristics on the histogram from the newly combined image and an accuracy assessment of these two methods.</p> |

| Presenter | Poster Title | Abstract |
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| Shukla, Tanya | Three-dimensional Flow Structure at Three Confluences with Different Planform Configurations at High Flow Stages | The combining of flows from separate tributaries at confluences results in complex hydrodynamic conditions that, in turn, play an important role in confluence morphodynamics. The complexity of hydrodynamic conditions is characterized by highly three-dimensional patterns of fluid motion controlled mainly by the confluence planform (junction angle and degree of symmetry) and the momentum ratio of the incoming flows. Despite abundant previous work, understanding of 3D flow structure at confluences remains poorly constrained, preventing the development of a universal conceptual model. The purpose of this study is to analyze the 3D flow structure at three confluences with different planform configurations at relatively high stages. Previous work at these confluences has examined flow structure at low stages that were not capable of mobilizing bed material, and thus did not directly influence morphodynamics. Measurements of three-dimensional velocities were obtained along several cross-sections at each confluence using a Sontek M9 acoustic Doppler current profiler and were analyzed using the Velocity Mapping Toolbox (VMT) (Parsons et al., 2013). The structure of depth-averaged and cross-sectional downstream velocities reveals the presence of a stagnation zone near the upstream junction corner, the size of which depends upon the momentum ratio. The 3D velocity measurements indicate that flow patterns for these high flows do not necessarily conform to patterns documented during low flows. This study contributes to the understanding of confluence hydrodynamics and changes in these hydrodynamics with changes in flow stage. |
| Sklar, Alyssa | Urbanization and the Utility of Remote Sensing: A Case Study of Barcelona, Spain | This work investigates remote sensing techniques of the urban environment in Barcelona, Spain using a series of satellite imagery from 1990 – 2019 to evaluate the utility of urban remote sensing. An exploration of biophysical indicators, such as land surface temperature and normalized difference vegetation index, is applied to show the process of urbanization. The ability or inability to accurately analyze urban growth with remote sensing techniques is investigated. Additionally, socioeconomic factors are applied to look at the relationship of areas with a less built-up environment and more green space to consider the impacts of urbanization. |
| Sloan, Chelsey | Collection & Initial Description of Sediment Core from Mud Lake in Jefferson County, WI | Lake sediment cores are one of several proxies used by climate scientists to help reconstruct climate history for a specific region. Reconstructing past climates can aid in identifying climatic patterns for a region that humans can use to prepare for and adapt to these future changes in climate. The long-term goal of this project is to develop a paleoclimate record that will provide insight into patterns of floods and droughts across the Upper Midwest since the last glacial period. In June 2019, a 9.5 m sediment core was collected from Mud Lake using Bolivia and Livingston piston corers. An Initial Core Description (ICD) was completed at the LacCore facility at the University of Minnesota – Twin Cities where various analyses were done on the sediment core including acoustic wave velocity, color spectrophotometry, density, electrical resistivity, and magnetic susceptibility. Details about the core collection process, will be presented, as will the ICD data, and preliminary findings. |

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| Ubben, Isaac | Creating 3D Building Models of UNI's Campus | In this project, we use ArcGIS Pro to create 3D vector models of buildings on UNI's campus, and then add these features into an interactive web mapping application. |
| Ward, John | Piracy and Preservation: The Geography of Underground Music Sharing on the World Wide Web | In the past decade, the internet has dramatically changed many aspects of modern society, yet the geography of cyberspace is a subject that needs more research. This research examines one aspect of these changes: the underground collection and dissemination of digital music recordings on the World Wide Web (WWW) with a focus on historic preservation. Through the utilization of Internet Protocol (IP) addresses and Geographic Information Systems (GIS) technologies, this research sheds light on the global geographic distribution of underground music sharing activities on the internet, and identifies significant historical archives of music recordings that are widely accessible and provide important collections of music culture. |
| Young, Ruth | Land Use and Fire in Chiang Mai, Thailand | Between the months of February and May 2019, I experienced Chiang Mai's worst recorded air pollution. The air pollution was made up mostly of PM 2.5 particles, a majority of which came from burning agricultural land in Thailand and its bordering countries. This research uses GIS and remote sensing to explore the relationship between fire and the recent change in land use from small scale to large scale agricultural production. Currently, the resource-rich landscape of Northern Thailand is being utilized to grow crops such as sugar cane, rice, cereals, and rubber, on a larger scale than ever before. Crops such as sugar cane are providing sustenance for people, not just in Thailand, but across the world. As a result, more land must be cleared every dry season with fire being the cheapest means of doing so. While burning swaths of land may have been an effective farming technique on a small scale, large scale burning comes with a myriad of health-related, ecological, and political consequences. |
| Zhang, Yiyi | A Conceptual Agent-Based Model of Farming Households' Adaptation to Winter Storms | It is acknowledged that the climate vulnerability varies on small scales including community level and household level due to the climate process, environmental realities and human behavioral variability that is determined by various factors including adaptive capacity. Despite agent-based model being widely used to model household climate change adaptation, an explicit standard mechanism for simulating the interactions between rural households and external changes in response to a specific storm event is still limited. Following the standard protocol Overview, Design concepts, and Details (ODD), a conceptual agent-based model (ABM) is developed in an attempt to address this gap of assessing vulnerability at small scales where regional and household datasets are available. This model is presented with a case that explores how human-environment-climate interactions lead to the household storm losses under the most simplified scenarios. Although it may not fit all cases, this proposed model is a promising step to establish a transferable architecture for agent-based assessment for rural vulnerability and climate adaptation. |