

MS-GIST Online

Master Projects 2018 Cohort

Thursday April 18<sup>th</sup> - 25<sup>th</sup>, 2019 – Livestream: <https://arizona.zoom.us/j/2161752699>

Date/Time	Title	Person
4/18/2019 10 – 10:30 am	<a href="#"><u>Amenity Accessibility-based Gentrification and the Effect on Crime in London</u></a>	Hannah Hook
4/23/2019 10:30 - 11 am	<a href="#"><u>Predictive Power of Interstate Migration Determinates in the United States</u></a>	Sarah Welch
4/24/2019 10:30 - 11 am	<a href="#"><u>Developing Local and Global Regression Models for the Particulate Matter Concentration, based on Climatic Indicators during Major Dust Storms</u></a>	Amin Mohebbi
4/24/2019 3:30 - 4 pm	<a href="#"><u>Density Analysis of Wildfires in Southern California</u></a>	Joseph Howe-Hamilton
4/25/2019 11:30 am - 12 pm	<a href="#"><u>Using Geospatial Analysis to Measure Accessibility and Understand Food Access Beyond Proximity to Grocery Stores to Reach the SNAP-Ed Eligible Population in Pima County, AZ.</u></a>	Gabriela Barrilas-Longoria
4/25/2019 1:00 - 1 pm	<a href="#"><u>Arizona Tribal Clinics and Emergency Preparedness</u></a>	Mackenna Herr

**Title:** Amenity Accessibility-based Gentrification and the Effect on Crime in London

**Author:** Hannah Hook, hannahhook@email.arizona.edu

**Keywords:** gentrification, crime, amenity accessibility, socioeconomic geography, urban environment

**Abstract:** The social implications of gentrification are widely disputed. People within different demographics view gentrification controversially because they are affected by it in vastly different ways. From a policy standpoint, gentrification is often viewed positively because there are many economic benefits that occur which increase tax revenue. However, the people that are already residing in these areas often find themselves displaced with their access to employment, child care, and other social necessities disrupted. The relationship between gentrification and crime can be used as a measure to assess the quality of life of urban inhabitants. Therefore, this study will determine whether the rates of different types of crime are significantly affected by the increase in gentrification in areas of Greater London during the time period of 2008 to 2018. The measure of gentrification used is the annual influx within MSA-level geography of food-service industry establishments, as gentrification can be associated with increased amenities and the use of expendable income. Conventional census measures to indicate gentrification will also be used to create a gentrification score. Type and frequency of crime in these areas will be analyzed in a multivariate model to assess the significance of change in crime. For every percentage of increase in the gentrification score, total crime decreased by 54% ( $p=.001$ ), largely due to a decrease of 36% in theft ( $p=.001$ ). This research suggests that an increase in gentrification, as measured by access to amenities, in Greater London will indicate a decrease in crime rates.

### **Title: Predictive Power of Interstate Migration Determinates in the United States**

**Author:** Sarah Welch, Sarahqwelch@email.arizona.edu

**Keywords:** interstate migration, predictive power, migration determinates, congressional reapportionment

**Abstract:** Migration is a critical factor that has the ability to change lives and influence political change. People within the United States may move based on location characteristics related to weather, government regulation, improved quality of life, the economy, housing market, and education. Though the factors that hold the most predictive power may vary geographically and across demographics, the factors that impact the overall interstate migration have the ability to tell an extrapolative story. The purpose of this Master's Project is to investigate which determinates most attract new residents, and to explain the increases in net migration being seen in several US states. The study area includes the fifty states as well as Washington, DC, with the focus being the states experiencing a net increase in migration. In order to determine the predictive power that state attributes hold, their values are compared to net interstate migration values provided by American Community Survey 1-year estimates program, between 2010 and 2017. Three attributes were chosen to represent migration determinates that a person may consider before migrating. Geographic information system tools were used for each attribute and state to display determinates as maps, check for spatial autocorrelation, assign weights

accordingly, and determine the best fit regression model. Further analysis will show which determinant has the most predictive influence on migration; while the final cartographic products will illustrate the impending migration increase and decrease by state, to serve as an exploratory insight on the upcoming congressional reapportionment following the 2020 census

**Title: Developing Local and Global Regression Models for the Particulate Matter Concentration, based on Climatic Indicators during Major Dust Storms**

**Author:** Amin Mohebbi, amohebbi@email.arizona.edu

**Keywords:** Particulate Matter, Dust Storm, Weather Research and Forecasting, Ordinary Least Square, Geographically Weighted Regression

**Abstract:** Health problems from particulate matter are classified as those caused by particles having a diameter less than ten micrometers (PM10) or coarser that target the lower respiratory system and those caused by PM2.5 or finer that target the gas-exchange region of the lung. Arizona residents have been dealing with the suspended particulate matter caused health issues for a long time due to Arizona's arid climate. The state of Arizona is vulnerable to dust storms especially in the monsoon season because of the anomalies in wind direction and magnitude. In this study, a high-resolution Weather Research and Forecasting (WRF) model coupled with a chemistry module (WRF-Chem) is developed to simulate the particulate matter as well as the climatic parameters for the state of Arizona. A WRF is a mesoscale numerical weather prediction system with a software architecture allowing for parallel computation. Subsequently, Ordinary Least Square (OLS) and Geographically Weighted Regression (GWR) techniques are utilized to develop predictive models based on the climatic factors that impact the formation and dispersion of the particulate matter during dust storms. Terrain height, temperature, wind speed and vegetation fraction were designated as the most significant variables whereas base state and perturbation pressures, planetary boundary layer height and soil moisture were adopted as supplementary variables. The correlation coefficient for OLS and GWR models peaked at 0.92 and 0.97, respectively. These models are vital to state agencies and provide a better understanding of the current distribution of the particulate matter and can be used to forecast future trends.

**Title: Density Analysis of Wildfires in Southern California**

**Author:** Joseph M.A. Howe-Hamilton, jmahh95@email.arizona.edu

**Keywords:** Southern California, wildfire, density analysis, wildfire management, Los Angeles County

**Abstract:** The geographic region of Southern California is comprised of 10 counties which are prone to wildfires. These counties are vulnerable to wildfires because climatic conditions and vegetation type. A lack of rainfall combined with plants with a waxy coating is perfect fuel to start a wildfire. With increasing urbanization and populations, wildfire management becomes more than just one dealing with safety and welfare, it becomes an ethical dilemma about wildlife

management practices. The past thirty years (1987-2017) of recorded wildfires will be analyzed to provide information on the risk to the population in the area. The purpose of this Master's Project is to determine the frequency and severity of wildfires in Southern California. An overlay of maps, each displaying different data, will provide an analysis of which county is at the highest risk. The number of wildfire events, size of the population, and concentration of fires will depict the severity of these fires. Geographic Information Systems Technology will be used to analyze and map the wildfires. Viewing their extent and frequency will determine how dangerous these fires are to the people of Southern California. Density analysis along with other tools provided by ESRI and other mapping software will be utilized in this research project. Results of this research project conclude that the county of Los Angeles has the highest exposure to wildfires. Los Angeles County also accounts for the highest concentration of wildfires along with being the largest population. According to my findings, Los Angeles County needs more attention to manage wildfires properly.

**Title: Using Geospatial Analysis to Measure Accessibility and Understand Food Access Beyond Proximity to Grocery Stores to Reach the SNAP-Ed Eligible Population in Pima County, AZ.**

**Author:** Gabriela Barillas-Longoria, [gabibl@email.arizona.edu](mailto:gabibl@email.arizona.edu)

**Keywords:** accessibility, food access, Network Analyst, built environment, farmers' markets, public health

**Abstract:** Accessibility is a standard performance measure in the transportation planning field, however it is not commonly used in the public health field to address issues such as food access and limited access to transportation. The U.S. Department of Agriculture's Supplemental Nutrition Assistance Program-Education (SNAP-Ed) provides innovative, evidence-based nutrition education and policy, systems, and environmental level obesity prevention interventions. This project aims to expand on the current program planning approach that uses U.S. Census poverty level demographics to guide interventions by providing a visual depiction of where individuals who receive SNAP benefits live and the characteristics of the surrounding built environment. Using demographic datasets from various local, state, and federal agencies such as the USDA's Food Access data, an overlay analysis was used to guide suitable areas for program interventions. This study proposes a GIS-based method to identify target areas with high rates of eligible populations to measure reach by mapping clients and targeted areas, farmers' markets and other sites in Pima county for multi-level interventions. For food access, the results show service areas using ArcGIS Network Analyst based on a multi-modal network dataset. The project assessed the geographic distribution of farmer's markets that accept SNAP benefits in relation to high-SNAP areas, and within specific driving and walking times, indicating opportunities to strategically expand incentive programming to markets that have the highest percentage of SNAP households within service areas. A GIS-based method to program planning allows the SNAP-Ed program to model how to use demographic data and a network analysis to serve the SNAP-Ed eligible target population.

**Title: Arizona Tribal Clinics and Emergency Preparedness**

**Author:** Mackenna R. Herr, [mmaddox2@email.arizona.edu](mailto:mmaddox2@email.arizona.edu)

**Keywords:** tribal clinics, emergency preparedness, GIS, Arizona, EMS, health

**Abstract:** The purpose of preparing Arizona's tribal clinics for emergencies and disasters is to strategically plan a unified vision and establish a mutual framework for emergency response programs to effectively and efficiently implement ambulances to crisis areas. By complying with cultural practices, traditional views, and State/Federal guidelines, emergency response times can be mitigated to match the national average of 15 minutes and 9 seconds. The purpose of this Master's project is to deploy geographic data and maps to help better plan, coordinate, and mobilize information for tribal clinics and emergency response programs for the general population of Arizona's tribal areas. Geographic information systems (GIS) data was gathered from variety of sources and studied using Esri's ArcMap. Utilizing selection of features, visual tactics, and accessibility methods, a comprehensive GIS of emergency medical services available to the 22 federally recognized tribal reservations and their nearby health clinics was established. The results concluded that of the 677 emergency medical service stations located in Arizona, 43 (6.4%) were located on reservation lands, as well as 27 health clinics. Overall, cost distance analysis determined the link between tribal communities and health services is effective for emergency response. Comparatively, the northwest region of the state has no tribal emergency medical services available which is a notable gap in coverage. The findings provide a well-researched and evidence based visual aid in support of the continued education of tribal leaders and policy makers for emergency preparedness in Arizona's tribal communities.