MS-GIST In Person
Master Projects 2020 Cohort
Friday May 1st – Livestream via Zoom

* There will be 5 minute breaks between each presentation to facilitate transitions in Zoom.

** Zoom links available on a per request basis. Contact: atgrogan@email.arizona.edu

Date/Time	Title	Person *
05/01/2020 6:00 – 6:20 pm	**Geospatial Assessment of Socio-Economic Determinants: A Population Health Analysis**	**Joshua Sutter**
05/01/2020 6:25 – 6:45 pm	**A Delicate Sound of Thunder: Building a Soundshed and Viewshed of the Late Bronze Age Eruption of Thera**	**Jim Wilcox**
05/01/2020 6:50 – 7:10 pm	**Wildlife in the City: The Effect of Corridors on Wildlife in Tucson, Arizona**	**Matthew Moore**
05/01/2020 7:15 – 7:35 pm	**Automating Accuracy Updates in an Electrical Grid**	**Carlos Parada**

Geospatial Assessment of Socio-Economic Determinants:
A Population Health Analysis

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Abstract:

Understanding demographic and socio-economic influences of a population is at the forefront of healthcare when servicing underserved populations. Social determinants of health reflect underlying conditions that influence a population's overall health status. El Rio Health is the largest federally qualified health center (FQHC) in Arizona, dedicated to serving the community by providing health care to populations in need. Geospatial techniques enable El Rio Health to uncover variations in social and economic issues regarding the Pima County population in Arizona. These variations are used to pin-point areas of Pima County that have the highest stress levels related to health (status). The purpose of this study is to determine areas (tracts) of Pima County that have the highest stress/need for additional health programs and discover what socio-economic determinants make up the characteristics of the El Rio Health patient population. Basic statistics using the U.S. Census Tiger files computed 21 social determinants of health within the community. Regression models are used to determine the most statistically significant socio-economic determinants that best explain the patient population. The Ordinary Least Squares (OLS) regression model was used to determine significance, while the Geographically Weighted Regression (GWR) model compliments OLS while predicting areas in most need of additional health programs. The results reveal 5 out of 21 social determinants were statistically significant (p-value ≤ 0.05) which best explain the patient population. "Opportunity Areas" were discovered where high stress/need values correlated, indicating places that El Rio Health can direct resources and provide care for these underserved and underrepresented populations.

A Delicate Sound of Thunder: Building a Soundshed and Viewshed of the Late Bronze Age Eruption of Thera

James Wilcox
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Abstract:

The Late Bronze Age eruption of Thera was an extraordinary event. Tephra from this eruption can be found as a horizon in archaeological sites across the region; being able to identify a firm date for the eruption would have a tremendous effect on Bronze Age chronologies for the civilizations of the eastern Mediterranean. Thera's eruption was more violent than the eruptions of Vesuvius (79 CE) or Krakatoa (1883 CE) and would have been similarly memorable. Despite being surrounded by literate cultures, no unequivocal records exist of the eruption. What is needed are more records, preferably from sources closer to Thera. This study has focused on using common Geographic Information System tools, combined with the locations of known contemporary urban areas, an estimate of the initial volume of the eruption, and an atmospheric sound attenuation calculator, to produce an interpolated soundshed of the eruption and a viewshed of the spectacular Ultra-Plinian eruption ash cloud. Since sound attenuation varies immensely by frequency, the soundshed has allowed an approximation of both the volume and the character of the eruption's sound at 38 settlements across the eastern Mediterranean. Additionally, this project has identified 19 Late Bronze Age urban centers that could have seen the eruption. This will provide archaeologists with not only locations where records of the eruption may be found, but some idea of what the inhabitants may have recorded of what they saw and heard on the day Thera erupted.

Wildlife in the City: The Effect of Corridors on Wildlife in Tucson, Arizona

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Abstract:

As the population of Tucson increases, the city encroaches upon the wilderness and its inhabitants, which leads to more human-wildlife interactions. Urban wildlife travel between suitable habitats in search of food and shelter, which can lead to a higher risk of injury and fatality. In this urban environment, terrestrial animals use wildlife corridors such as washes, parks, alleys, and undeveloped or empty parcels of land to travel. The purpose of this project is to determine if wildlife corridors reduce the negative interaction between humans and wildlife in the city of Tucson. The Tucson Wildlife Center provided the data on injured wildlife for the years 2018 and 2019. The city of Tucson and Pima County allow access to databases for wildlife corridor feature classes. Methods involve analysis of wildlife point density, nearest neighbor analysis, and layering fishnet grid centroids over interpolated surfaces for wildlife and corridor distance. Results indicate non-random clustering (p-value < 0.01) of terrestrial wildlife points with a higher concentration of sick and injured wildlife being found near corridors in East Tucson for both years. In contrast, clustering of wildlife farther from corridors changes locations between the two years. The average distance of wildlife to corridors was 153 feet in 2018 and 138 feet in 2019. The results of this study could be used for public education on urban integration of wildlife, to support wildlife rehabilitation centers, and aid in wildlife rescue planning.

Keywords:

City of Tucson, Wildlife Corridors, Urban Wildlife, Human-Wildlife Interactions

Automating Accuracy Updates in an Electrical Grid

Carlos Parada

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Abstract:

A system of records representing real world objects geographically will always have at least one important issue to deal with, accuracy. With the increasing connectivity between systems in organizations, along with advancing technologies the accuracy of location data is going to be increasingly important. Specifically in the electrical industry, safety is a top priority and making sure equipment is mapped correctly is essential to the safety of employees. In order to address the issue of accuracy this project incorporated current technologies and fieldwork to create a programmatic approach to updating the accuracy of poles in Tucson Electric Powers GIS. With GPS locations being tracked by another department's fieldwork, points of reference are now available which can be input into a process to automatically update locations in the main GIS. Ike data, python, and some scripts in ArcGIS make it possible to streamline the process. With the pole objects having connectivity to a number of different GIS objects a QA/QC procedure is essential to ensuring this process can provide quality results. Having this process in place for trial ensures that TEP can evaluate the value of GPS equipment for system accuracy and compare it to other technologies.

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