

# 13th Annual Student Research Symposium



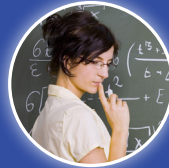
# SRS

STUDENT RESEARCH SYMPOSIUM

Conrad Prebys  
Aztec Student Union

**February 28 and  
February 29, 2020**

Friday, 8 am - 6 pm  
Saturday, 8 am - noon



**A Showcase of Student  
Discovery and Innovation**

Celebrating the achievements of SDSU student  
research, scholarship and creative activity



SAN DIEGO STATE  
UNIVERSITY

(U) = Undergraduate; (M) = Masters; (D) = Doctoral

## Session B-16

Poster Behavioral & Social Sciences 8

Friday, February 28, 2020, 10:45 am

Location: Montezuma Hall

**284 10:45 am TT**

Associations between Temperature Variables and Heat-Related Deaths in the Contiguous United States

**Jessica Embury, Geography/Geographic Information Science (U)**

Hyperthermia caused by exposure to high temperatures results in hundreds of deaths annually in the United States. Individual susceptibility to heat-related death or illness is determined by both environmental and socioeconomic factors. Community based interventions, such as the provision of air-conditioned spaces, can prevent heat-related deaths in at-risk populations. This study examined the relationship between heat-related deaths reported by county and two temperature variables: extreme maximum temperature and percentage of days above 90°F. Additionally, this study identified outlier counties as targets for future demographic analysis and assessment of need for heat-related social programming.

Data from 1999-2016 for the study area of the contiguous United States was collected from the Centers for Disease Control and Prevention (CDC) and the National Oceanic and Atmospheric Administration (NOAA). Temperature values at the county level were determined through the aggregation of data from stations within each county. The occurrence of heat-related death was expressed using crude death rates. Python scripting was used to automate the collection and preparation of data for both visual and statistical analysis. Data visualization was completed in ArcGIS Pro and R scripting was used to analyze variable relationships with both simple linear correlation and geographically weighted regression techniques.

The results of this study revealed that percentage of days above 90°F is more closely related to crude death rate than the extreme maximum temperature. This finding is supported by both the linear correlation and geographically weighted regression analyses. The study identified several possible outlier counties with unexpectedly high crude death rates, such as Onondaga County, NY and La Paz County, AZ. These findings provide guidance for further analysis of heat-related deaths and the eventual study of the effects of established social programs.

**285 10:45 am UU**

Vegetation regrowth in a post-wildfire riparian environment using field-based observations and citizen science

**Madeline Haggood, Geography (U)**

Wildfires can bring new opportunities for vegetation, providing a nitrogen rich environment for plants. The fire severity can impact the physical and chemical structure of soil and water storage, which are key factors in vegetation regrowth. Opportunistic plant species, usually invasive or non-native species, may thrive after fire, taking nutrients and light needed by native plants. Invasive vegetation such as *Arundo Donax* are also highly flammable and can increase the fire fuel loads. Understanding vegetation processes and feedbacks after fire is essential for predicting and managing post-fire recovery. The goal of this project was to monitor and analyze the transformation of an urban riparian zone after it had been damaged by a fire. A riparian area is the land that is located near a river or stream and is important for maintaining a healthy waterway. Monitoring locations were selected along a transect in the burned riparian zone. Locations of ash and decaying vegetation were noted as key features that might influence regrowth. Frequent (biweekly) vegetation surveys provided an opportunity to note resprout patterns and canopy cover. Citizen science was also employed to augment field observations. The public was encouraged to help monitor the site by sending digital photos, contributing to a continuous database for monitoring changes in vegetation. Through frequent vegetation monitoring, observations of the types and patterns of vegetation that flourish after an event such as a fire can take place. While fires can significantly alter a community, education and outreach activities can help to bring the community together and increase our understanding of post-fire processes. The community may want to understand the beauty the fire can hold, is this site the future for native plant species to flourish in the wake of decaying flora?