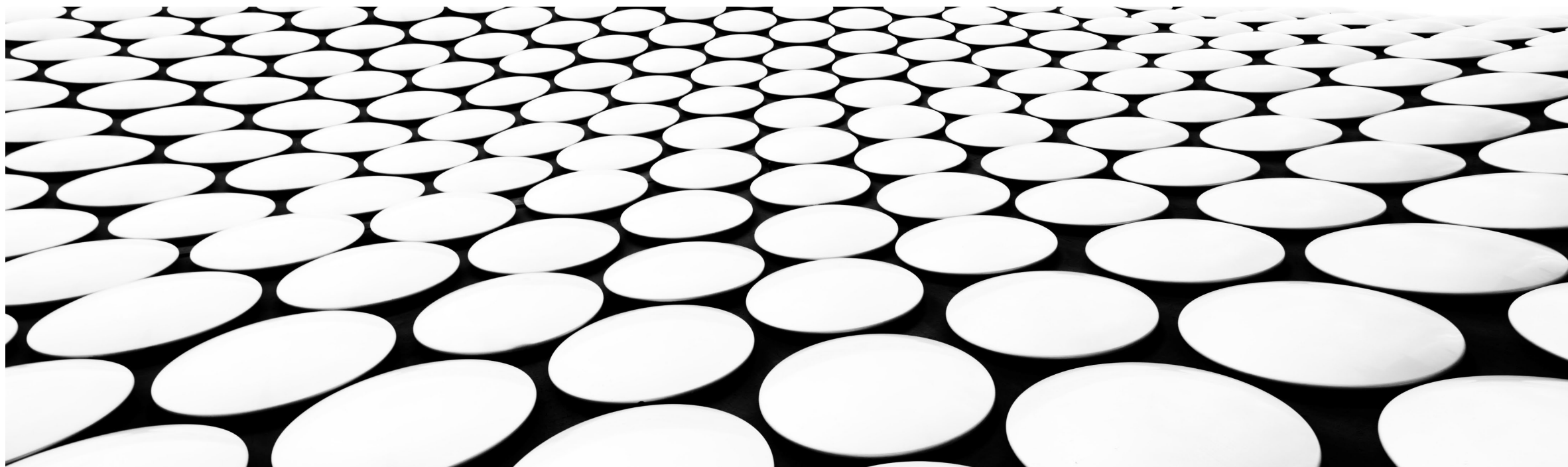


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# Spatiotemporal Analysis of School Shootings in the United States

KEVIN BLAIR



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# Overview of Presentation

- Introduction
- Research Question
- Summary of Literature Review
- Proposed Methodology
  - Data and Maps
  - Methods
- Technology
- Timeline
- Acknowledgements & Sources
- Questions

# Introduction

- From 2013 to 2020, over eight hundred shootings have taken place on school campuses. (Gunfire on School Grounds in the United States | Everytown Research & Policy, n.d.)
- These acts of violence have taken place across the country and resulted in hundreds being killed and even more being wounded.
- Much research has been done on the topic of school shootings from both a demographics and psychological perspective. Less has been written about the spatial and temporal components of this topic.
- Challenge - A key component will be understanding how to define a school shooting. Any firearm discharge on school grounds? Only involving students? Negligent discharge by security/ police officer?



<https://www.newyorker.com/podcast/the-new-yorker-radio-hour/malcolm-gladwell-on-school-shootings-and-the-return-of-paul-schrader>



<https://www.denverpost.com/2018/02/24/school-shootings-and-the-voices-of-students-and-teachers/>

# Research Question

- I plan to center my research on an exploratory analysis of the distribution of school shootings on the county level. I hope to center my research on this topic around the following questions:
  - Are School shootings more likely to happen on a specific day of the week, time of the year? How has the pattern of school shootings changed over time, from year to year?
  - Are school shootings more likely to happen in large cities or small? Is there a geographic tendency of school shootings? Are school shootings located in rural or urban areas?
  - What demographic variables may increase likelihood of school shootings? Does the criminology of violence match the demographics of school shootings?

# Summary of Literature Review

- I have decided to focus my literature review in the same way I will conduct my analysis. I have sectioned off the literature review to 3 distinct sections.
  - Temporal Analysis - Nonparametric spatiotemporal analysis of violent crime. A case study in the Rio de Janeiro metropolitan area by Fuentes-Santos, W. González-Manteiga, J.P. Zubelli <https://doi.org/10.1016/j.spasta.2020.100431>
  - Spatial Distribution - The Spatial and Social Patterning of Property and Violent Crime in Toronto Neighbourhoods: A Spatial-Quantitative Approach by Lu Wang , Gabby Lee, and Ian Williams <https://www.mdpi.com/2220-9964/8/1/51>
  - Spatial Analysis -Statistical Analysis of Spatial Crime Data by Wim Bernasco, Henk Elffers [https://link.springer.com/chapter/10.1007/978-0-387-77650-7\\_33](https://link.springer.com/chapter/10.1007/978-0-387-77650-7_33)
  - Risk Factors in School Shootings by Stephanie Verlinden, Michel Hersen, and Jay Thomas <https://www.sciencedirect.com/science/article/pii/S0272735899000550>

# Proposed Methodology – Data and Maps

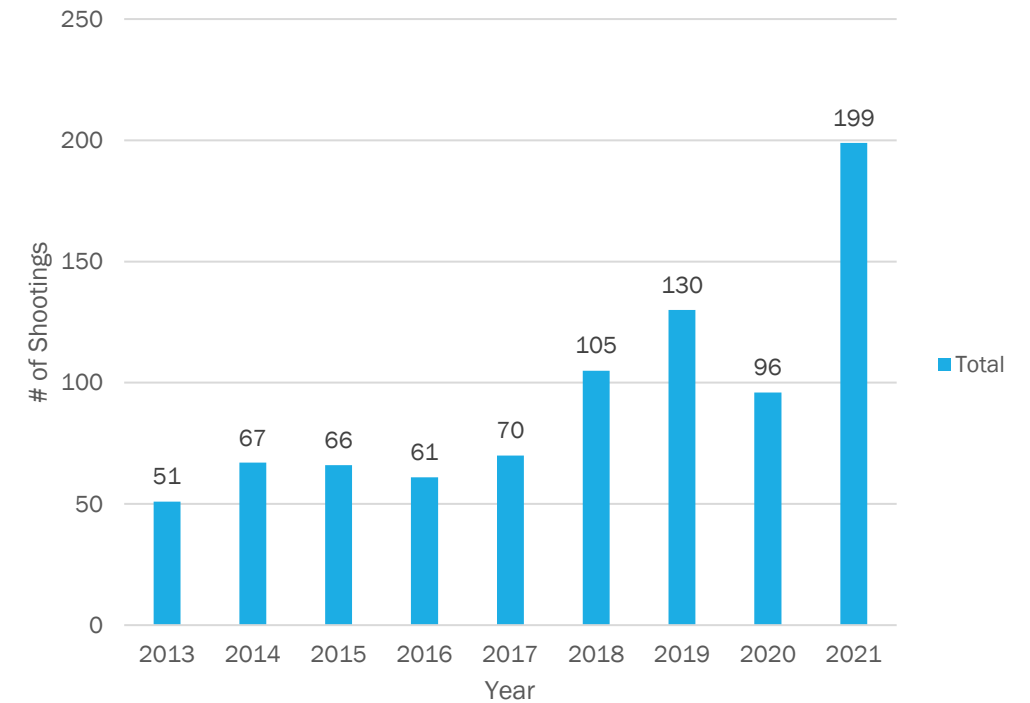
Chart showing the top 10 states for school shootings

Top 10 States	# of School Shootings 2013-2020
TX	73
GA	58
NC	51
FL	49
CA	48
OH	37
TN	32
PA	31
AL	27
LA	27



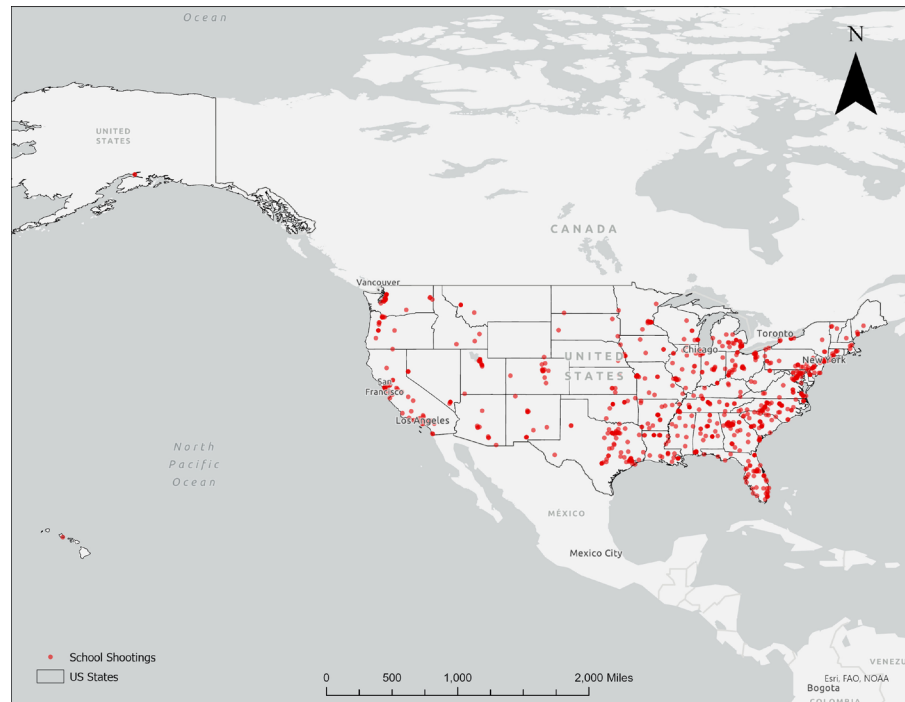
Census.gov

# of School Shootings by Year

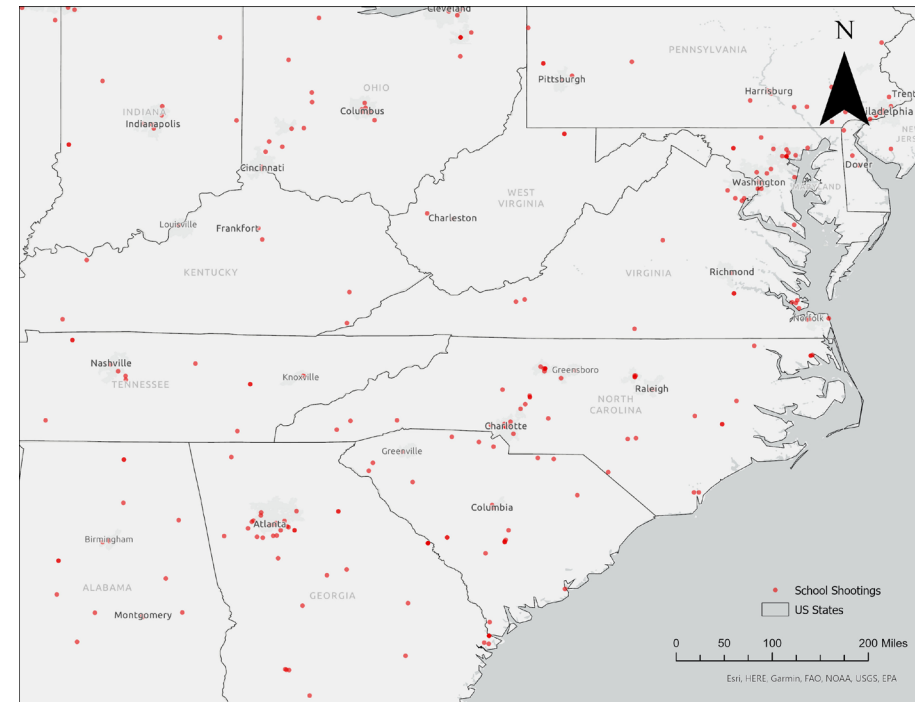


# Proposed Methodology – Data and Maps

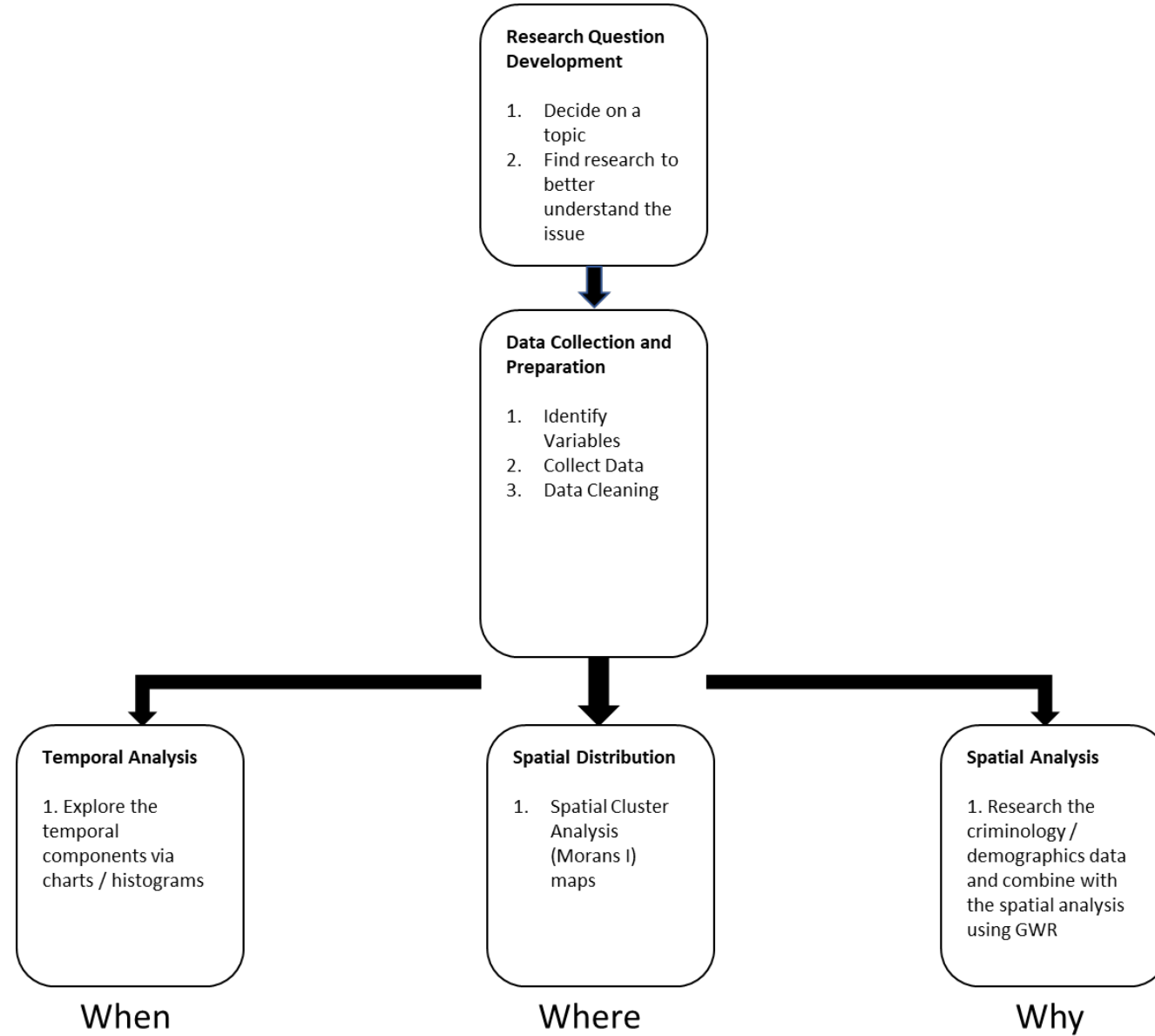
Map of the United States showing the school shootings from 2013 – 2020



Map of the Eastern United States showing the school shootings from 2013 – 2020



# Proposed Methodology - Method





## Proposed Methodology - Method

- Geographically Weighted Regression (GWR) evaluates a local model of the variable or process you are trying to understand or predict by fitting a regression equation to every feature in the dataset. GWR constructs these separate equations by incorporating the dependent and explanatory variables of the features falling within the neighborhood of each target feature. (ESRI - <https://pro.arcgis.com/en/pro-app/2.8/tool-reference/spatial-statistics/how-geographicallyweightedregression-works.htm>)
- Local Moran's I will be used to discover hot spots and cold spots in the data, as well as spatial outliers. ([https://geodacenter.github.io/workbook/6a\\_local\\_auto/lab6a.html](https://geodacenter.github.io/workbook/6a_local_auto/lab6a.html))

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## Technology



ArcGIS Pro



# Timeline

- March 11, 2022 – Peer review presentation
- April 1, 2022 – Data Preparation
- May 1, 2022 – Temporal Analysis / Spatial Distribution
- May 11, 2022 – Summer classes start (GEOG486)
- July 20, 2022 – Summer classes end
- August 1, 2022 – Spatial Analysis
- August 8, 2022 - Begin complying final project
- August 17, 2022 – Fall 1 classes begin (GEOG596b)
- October 26, 2022 – Fall 1 classes end (GEOG596b)
- ??? - Final Presentation

# Acknowledgements & Sources

- Gunfire on School Grounds in the United States | Everytown Research & Policy. (n.d.). Everytown Research & Policy. Retrieved February 24, 2022, from <https://everytownresearch.org/maps/gunfire-on-school-grounds/>
- Temporal Analysis - Nonparametric spatiotemporal analysis of violent crime. A case study in the Rio de Janeiro metropolitan area by Fuentes-Santos, W. González-Manteiga, J.P. Zubelli  
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- Risk Factors in School Shootings by Stephanie Verlinden, Michel Hersen, and Jay Thomas  
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# Questions?

