Gun Reform and Overall Violence Project Proposal

- **Problem Statement Formation:**
  How did changing state laws regarding gun reform impact overall violence? What causal inference can be deduced from gun reform and violence? Since different states at different time periods changed their gun laws in a similar manner, a designed difference-in-difference quasi-experiment can be conducted to infer causality.

- **Context:**
  Between 2000 and 2010, 21 states expanded the castle-doctrine statute to a new law called “Stand Your Ground”. Previously, lethal violence by a civilian was only allowed within their own home. In public, the duty to retreat was placed on the parties that felt threatened. With the Stand Your Ground law, civilians were allowed to use lethal violence if they felt threatened and they were also protected from civil suits as well. From an economic perspective, this lowers the cost of committing a homicide. In the case of the true positive (using lethal violence to avoid one’s own death), the homicide rate would remain the same. Instead of the victim dying, the perpetrator would die. In the case of the false positive (using lethal violence when no death would have occurred), the homicide rate would increase. There is also a third possibility: deterrence. With an increased risk to the criminal, violent crime could decrease because the cost of commiting the crime had increased.

- **Criteria for Success:**
  The causal inference analysis will conclude if the studied gun reform was the cause of increased homicides, the cause of decreased homicides, or if the gun reform maintained previous homicide rates. By designing a multi-tiered difference-in-difference analysis, all known and unknown confounding factors will be removed so that actual causality can be inferred from only the change in gun laws. This analysis will be completed within one month.

- **Scope of Solution Space:**
  Within the 50 states of the United States, there are currently 25 states that have Stand Your Ground laws, 8 states that have traditional Castle Doctrine laws, and 17 states that have explicit Duty to Retreat laws. The adoption of Stand Your Ground laws did not occur at one time period but with a staggered adoption rate, which allows for a complex difference-in-differences quasi-experimental design for analysis.

- **Constraints:**
  There are several known issues when expanding the classic difference-in-difference design to multiple time periods and multiple treatment cases. The Twoway Fixed Effects with Differential Timing will be initially used and reviewed but the Bacon decomposition and Sant'Anna's Difference-in-Difference with Multiple Time Periods will also be used. Finally, the merits of Synthetic Difference-in-Difference will also be explored in an effort to avoid having to compare yet-to-be-treated states with already-been-treated states, which violates the non-transitory assumption of controls and treatment effects.

- **Stakeholders:**
  Policymakers, gun reform advocates, and general citizens are all affected by gun laws and homicide rates.

- **Data Sources:**
  This analysis can be conducted using Bayesian Causal Inference with the beta-version of CausalPy and PyMC v4. The dataset with changes in gun laws and a time series of violence is in this dataset:
  https://github.com/scunning1975/mixtape/blob/master/castle.dta
  Additional data resources will be explored as necessary.

The deliverables for this project will be the raw code to develop this analysis, a completed analysis, a project report, and a slide deck.