# **Project Abstract:**

In attracting a large number of people through the use of transit in a fixed geographic space, transit can shape crime patterns in an urban environment. This project has advanced work in environmental criminology by analyzing the concentration of crimes in relation to the presence of transit in Milwaukee, WI; a geography that has yet to be explored in the existing literature. This research study has found that these crimes concentrate at an increased level relative to the uniform distribution of these events across the city.

Based on this finding, we address two additional questions at the meso- and micro-level of analysis to inform decision-making by law enforcement and transit administration. First, which Milwaukee districts experience the highest concentration of a.) transit stations and b.) crime? For this question, we will also report on geographical characteristics known to hold a relationship with the occurrence of crime. Second, which transit stations experience the highest concentration of a.) transit usage and b.) crime?

Having answered these questions, as a part of a prior research project, I will create an interactive website that reports on these findings. This webpage will serve as a resource for stakeholders in the city of Milwaukee.

# **Data Sources and Plan of Analysis:**

To answer these research questions, I acquired data provided by the Milwaukee Police Department, InfoGroup, and United States Census Bureau. The Milwaukee Police department provides officially reported crime data each year. Using this service, I extracted criminal offenses reported to the police in the year 2021. This data includes location coordinates for all events, allowing the research to examine the spatial distribution of these events across districts in Milwaukee. To examine the concentration of these events relative to transit, I acquired additional data from InfoGroup; a company that provides information on land use types (including transit station data) in the United States.

In measuring the concentration of crime and transit, I calculated location quotients. According to Groff and McCord (2012), location quotients are “ratios which compare the characteristics of a sub-areas to that of the larger, surrounding region” (Groff and McCord, 2012,9). Using this calculation, I examined the distribution of crime and transit stops in each district in relation to the city of Milwaukee, WI. Finally, I supplemented this analysis with the information provided by the US Census Bureau (2020) for each district in Milwaukee, WI. Specifically, in examining characteristics of Milwaukee districts that may hold a relationship with crime including population size, household income, and housing (% occupied or vacant).

# **Deliverables:**

In building one web page, I will deliver the following:

1. A narrative detailing the objectives and implications of the research project.
2. The creation of an interactive scatter plot that showcases the relationship between transit usage and the frequency of crime (see *example chart 1*)

Chart, scatter chart

Description automatically generated

**Station Usage**

**Reported Crime**

**Example Chart 1:** Relationship between Transit Usage and Reported Crime

* 1. This plot will be created using the performed micro-level analysis which examined data taken from InfoWorks and the Milwaukee Police Department.
  2. This plot will be interactive in that a tooltip will be created to allow the user to hover over each data point (transit stations; to be color-coded by district) to examine each station’s total usage and reported crime.
  3. A narrative detailing the main findings of this analysis will be provided.

1. The development of two choropleth maps (with corresponding narratives) that showcase the concentration of crime and transit cross districts in Milwaukee.
   1. Created in ArcGIS Pro, these maps will be embedded (see *example chart 2*):
      1. The first map will showcase the density of crime across districts.
      2. The second map will showcase the density of transit across districts.

Map

Description automatically generated

**Density of Transit Stops across Milwaukee, Wi**

**Example Chart 2:** Concentration of Transit Stops across Districts

1. The development of an interactive bar chart that presents the gathered data and calculated statistics for each district in Milwaukee (see example chart 3)

Chart, bar chart

Description automatically generated

**Count**

**Districts in Milwaukee, WI (N=18)**

**Variable 1**

**Variable 2**

**Variable 3**

**Variable 4**

**Example Chart 3:** Interactive Bar Chart showing Data for Milwaukee Districts

* 1. This table will report on the concentration of crime (location quotients), the number of transit stops, and measures taken by the US census bureau (2020).
  2. This data table will have an interactive legend and a tooltip that allows the user to hover over each bar and identify recorded values for each district.

# Diagram Description automatically generated**Website Layout:**

**Webpage:** Designed Site to be Hosted on bryce052.github.io