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title: "Chi Zhang's GIS Work"

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Welcome! This is my personal collaboration of GIS work based on the R script.

# [GIS WORK 01](https://needcola.github.io/index13.html)

- I began to be familiar with R and Rstudio: what the basic logic is, and how to use it.

- I can create a brief personal website using R and Github, that everyone visits it online easily.

- Make a good start on Geographic Information Science!

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In the \*\*GIS WORK 01\*\*, I worked with COVID-19 data in US, monitoring California's daily new cases, plotting 4 interesting states' changes of cases, and evaluating the pandemic trending on space and time. Here is the link of workflow.

# [COVID-19 Data Wrangling](https://needcola.github.io/geog-13-labs/lab-02.html)

- I was familiar with Rstudio gradually from practices, for instance, analyzing raw data with packages and plotting, combination of raw data, and extracting the variables from raw data.

- In the COVID-19 data wrangling, I started to realize the relationship among data. Data will be influenced by other variables, chronologically and spatially.

- The structure of the code is important too. Well-structured code is easier to debug and present.

Here is my highlight in the project:

![](img/geo13-lab02highlight.png)

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In the \*\*lab03\*\*, I figured out the geographic relationship between US cities and borders of national, states, and near countries. Then I evaluated the 100-mile Border Zone described in [ACLU article](https://www.aclu.org/other/constitution-100-mile-border-zone).

# [Distances and the Border Zone](https://needcola.github.io/geog-13-labs/lab-03.html)

- I learned how to build sf objects from R packages and CSVs, using computer to program the projection which studied in the Geog w12.

- In the project, I understand the calculation of distance between geographic objects, such as point, line string and area.

- And I can plot clear map with distance data by ggplot.

Here is my highlight in the project:

![](img/geo13-lab03highlight.png)

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In the \*\*lab04\*\*, I started to analyze the geographic points in the polygon, with the functions defined by myself. With the raw data of dams in the United States, I tried to find the relationship between the dam distribution and geographic information.

# [Tesselations, Point-in-Polygon](https://needcola.github.io/geog-13-labs/lab-04.html)

- I understand how the tessellation works. Each tessellation has its own advantages and disadvantages, and different attributes.

- I analyze the dams data in the United States with the voronoi tessellation, defining the numbers of dam in each tiles. With the distribution of different types, I demonstrate the possible reasons of the distribution.

- And the leaflet map also be drawn, showing in largest and high\_hazard dam in each state with Mississippi River System.

Here is my highlight in the project:

![](img/geo13-lab04highlight.png)

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In the \*\*lab05\*\*, we learned to use raster layers to analyze the continuous data, a case of flooding in Palo, Iowa. We used the raster pacakge and raster data knowledge to create flood images using multiband Landsat Imagery, thresholding and classification methods.

# [Raster and Remote Sensing](https://needcola.github.io/geog-13-labs/lab-05.html)

- First time I deal with the continuous data with raster data model, and map algebra to analyze elevation, precipitation, and climate.

- In the case of Palo, I use kmean-rasters compared with Landsat band calculating the flooding cells shared by each layers.

- And I extracted a specific location captured by the drone from layers to define its value in the raster data.

Here is my highlight in the project:

![](img/geo13-lab05highlight.png)

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In the \*\*lab06\*\*, terrain analysis is managed by R coding. We chose Mission Creek's flood event in 2017 as object, estimating the number of buildings impacted. In the project, I completed the whole analysis from collecting data to the assessment of impacts.

# [Flood Risk in Mission Creek: Past, Present, Future](https://needcola.github.io/geog-13-labs/lab-06.html)

- I use OSM data to collect building centroids and the stream linestring.

- with the whitebox, I create hillshade raster of Santa Barbara area and HAND raster for flooding cell values.

- The correcting of elevation is important in the data, which will impact the precision of analysis.

- In the final step, I overlay all raster layers into one, indicating the impacted buildings when the creek flooded.

- I also create a gif for Mission Creek's flood inundation map library from 0 to 20 foot.

Here is my highlight in the project: