# Geospatial Analysis in R

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In this presentation:

- Anatomy of spatial data

- Reading in spatial data

- Spatial data wrangling with dplyr

- Data visualizations with ggplot2

Components of spatial data

- Features: point, line, area, volume

- Supports: each feature is of certain size and shape and has specific spatial orientation

- Attributes: observations or measured values associated with features (i.e. racial composition of counties, salinity of rivers)

Spatial data basics
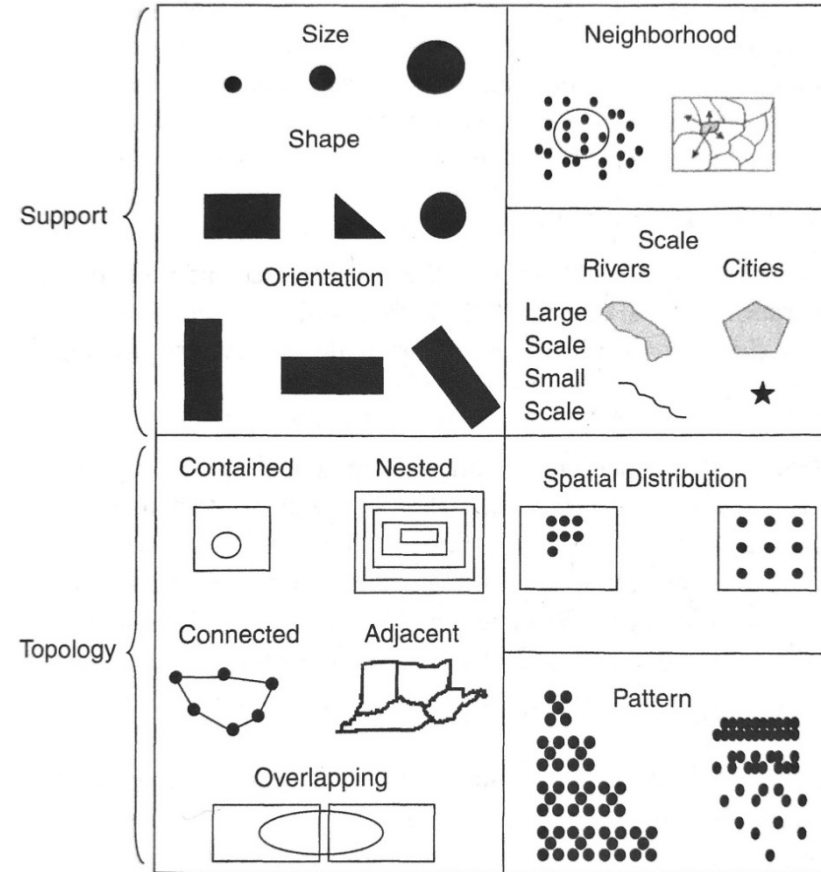
Important aspects of spatial data. [Modified from Clarke (2001).]

Vector and Raster GIS

- Vector data: locations are stored as points/lines/areas

- Raster data: locations are stored as pixels

- Different computational storage burden and primary GIS operations

- R packages:
  - **sf** for vectors
  - **raster** for grids

- We will mainly explore the **sf** package today.

Coordinate reference system

- A place on the earth is specified by a latitude and longitude or X-Y coordinates

- Projected vs. unprojected CRS

- Vector and raster spatial data was created based on a specific CRS

- Metadata should contain information about CRS

Links:

- Census API: https://api.census.gov/data/key_signup.html

- Google API: https://developers.google.com/maps/documentation/geocoding/get-api-key

- New York State GIS dataset: http://gis.ny.gov/gisdata/inventories/details.cfm?DSID=927

Now…time to get spatial with R!

More Spatial Resources

- Textbooks available in 'Spatial Statistics Resources' folder in our research share drive

- Geocomputation with R: https://geocompr.robinlovelace.net/

- Datacamp courses! ☺

- Visual Variables: https://www.axismaps.com/guide/general/visual-variables/