

# GEOPHILLY



## GIS for Digital Humanities Part 1: GIS 101

# About Me

I'm a Geographer and Data Geek. I care about public access to civic data. I like talking about maps and data.

Education: Degree in Geography and Urban Spatial Analytics.

Work:

Current: Project Manager, Data Analytics at Azavea

Past: City of Philadelphia, Penn Museum

# About GeoPhilly

GeoPhilly unites developers, geographers, data geeks, open source enthusiasts, civic hackers, and map addicts in our shared love of maps and the facts they visualize and stories they tell.

333 Members

1-2 meetups per month including:

Workshops

Happy Hours

Film Screenings

Lightning Talks

Conferences

**GEOPHILLY**

# About this Series

This is a 3 part series on GIS for Digital Humanities.

**Part 1:** Introduction to GIS (a broad overview)

**Part 2:** Tutorial Night (we'll go through a basic GIS project, step by step)

**Part 3:** Project Night (you will bring your own project or work through a class project with minimal supervision)

# What you will get from this session?

- A hands-off Introduction to GIS concepts
- Familiarity with GIS data and tools
- A basic framework to get started with a project
- **Homework!**
  - Install QGIS
  - [Modules 1-7](#)
  - Create a Free CartoDb account and map something

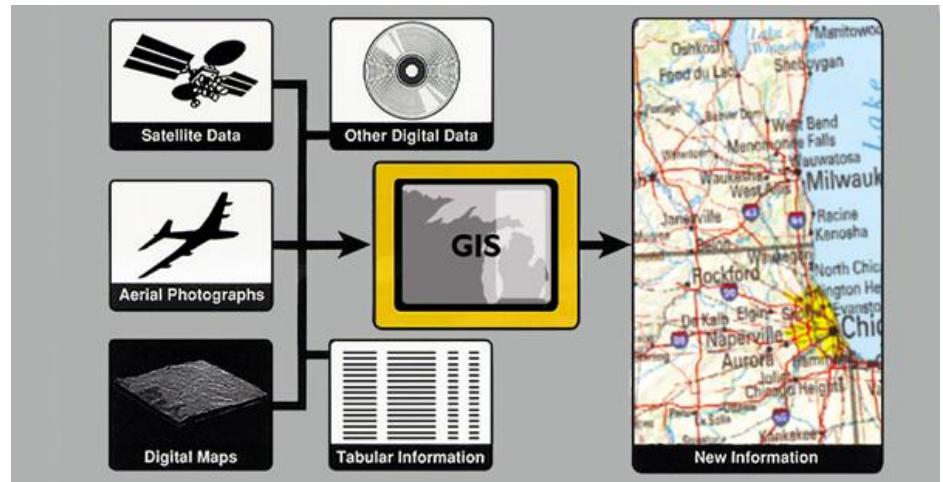
# Agenda

- **Introduction to GIS**
  - What is GIS?
  - Why and How is GIS used?
  - How GLAM uses GIS?
  - What is Spatial Data?
- **GIS Tools**
  - Downloading and Preparing Spatial Data
  - Geocoding Data
  - Desktop and Web Map Tools
- **Anatomy of a GIS Project**
  - GIS Projects: Step by Step
  - Engage Experts
- **Getting Started**
  - QGIS
    - Module 1-7
  - CartoDB

# What is a GIS?

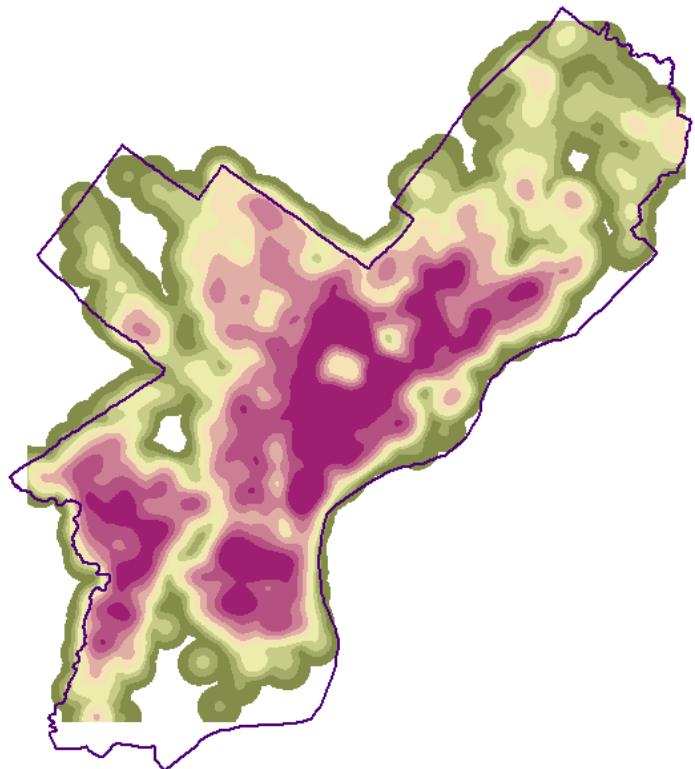
**Handout 1: GIS & Spatial Data 101** describes the basics of GIS and spatial data as well as the tools available to create print and web maps.

- **Geographic**
  - Data has a spatial location which can be located on a map
- **Information**
  - Data has additional information (street name, length, etc)
- **System**
  - Multiple components working together: Database, display, processing, etc.



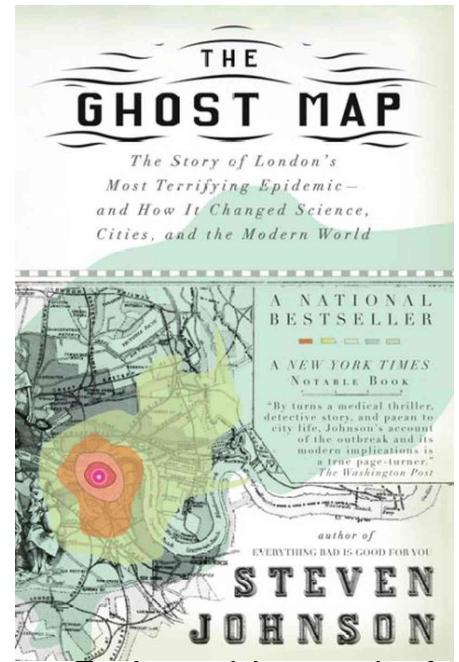
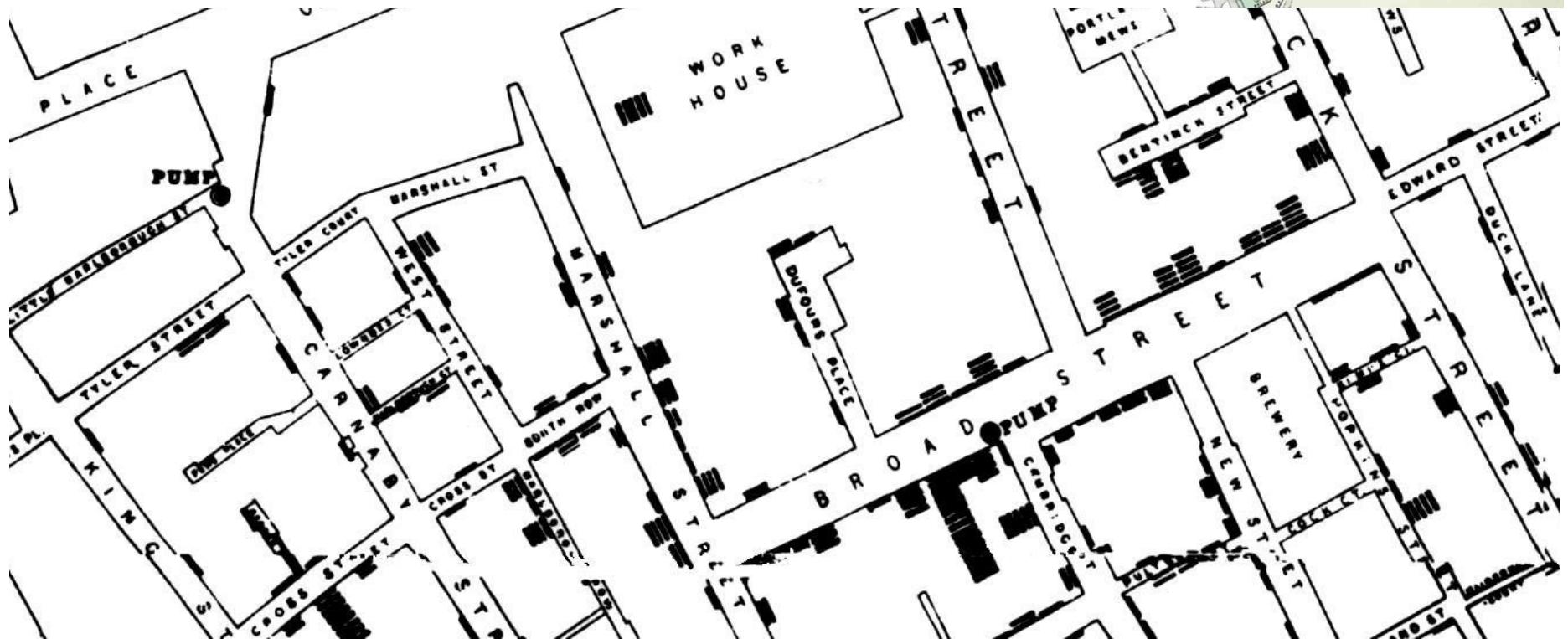
# Why use GIS to map your data?

- **Visualize** both complex and simple data
- **Tell a story** in a simple and compelling way
- **Find** hidden patterns in your data
- **Solve** problems



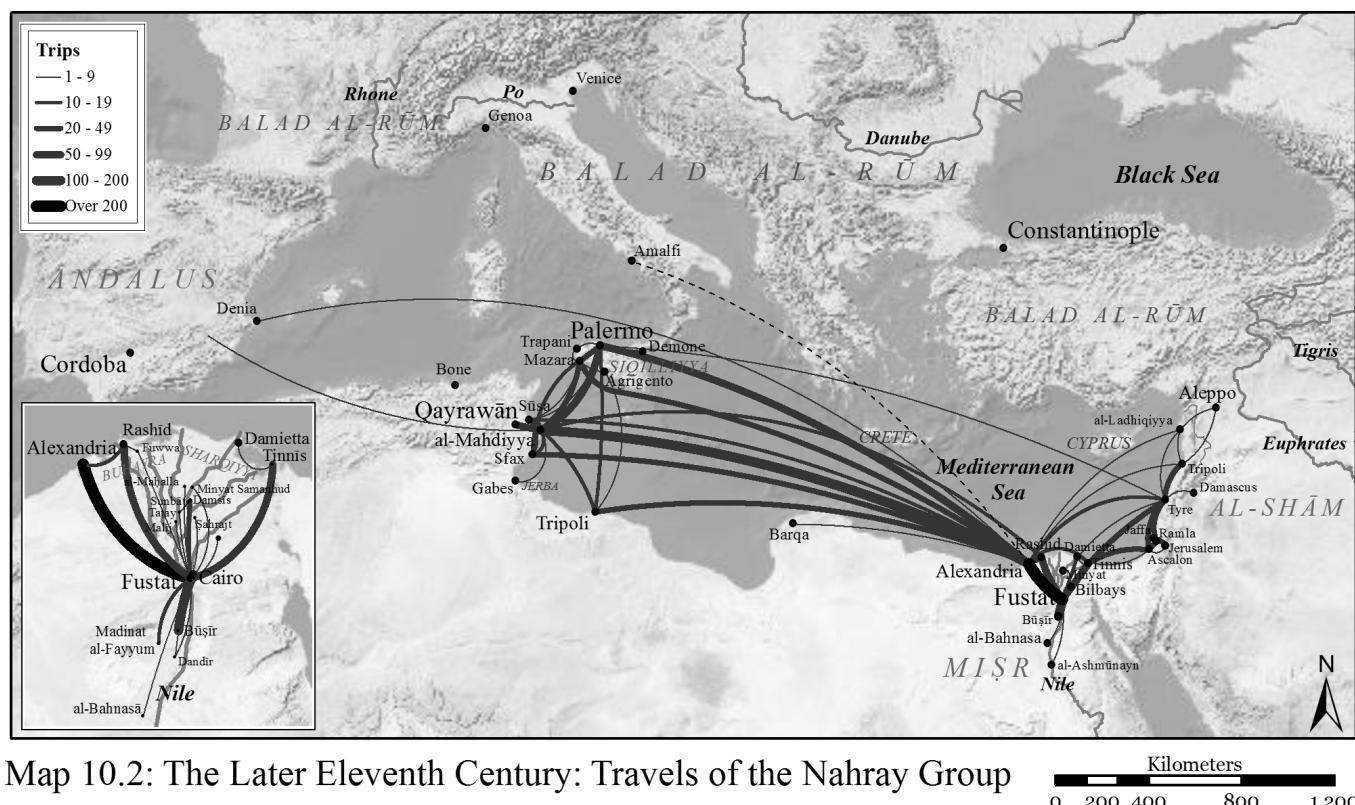
# GIS is used to solve problems.

- 1850's London Physician, **John Snow**, mapped Cholera outbreaks to determine the source of the outbreak: a contaminated water pump.



# How GLAM uses GIS?

- Mapping Collections
- Spatially Linking Records
- Creating Easy Data Discovery by the Public
- Visualizing Connections
- Reach new audiences.
- and More!

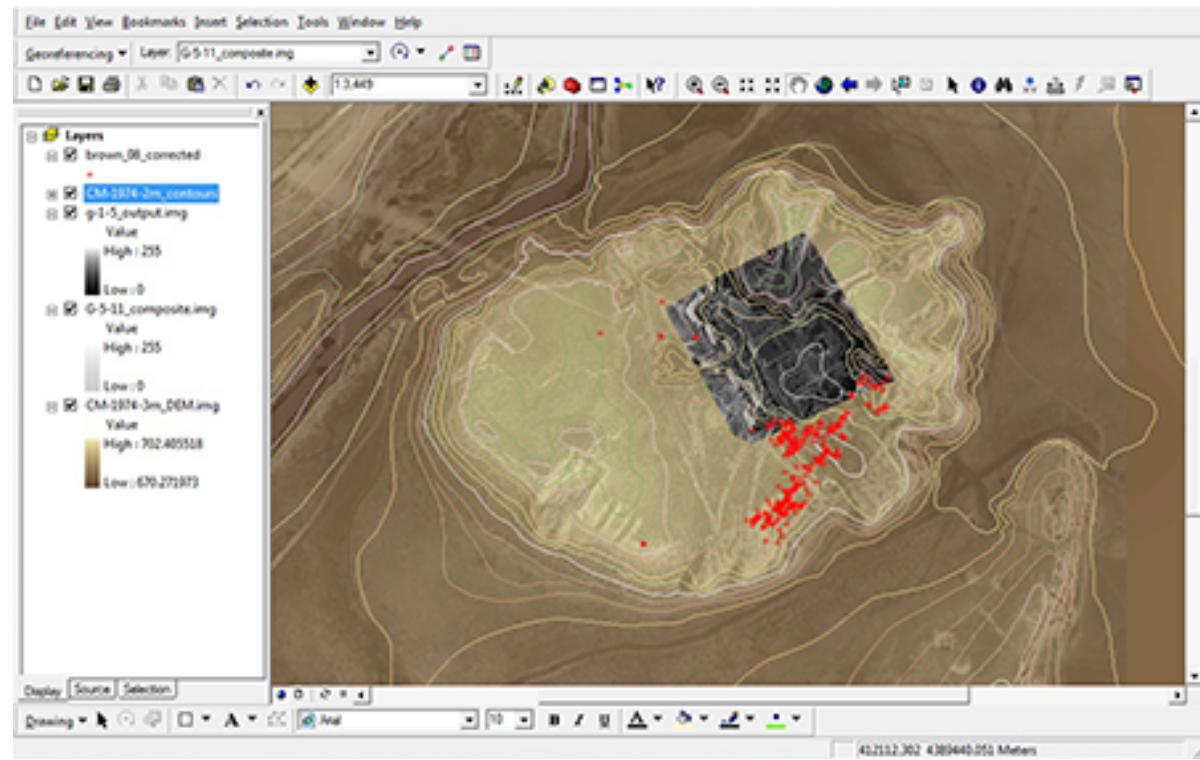


# Museums are using GIS.

## Digital Gordion Mapping Project

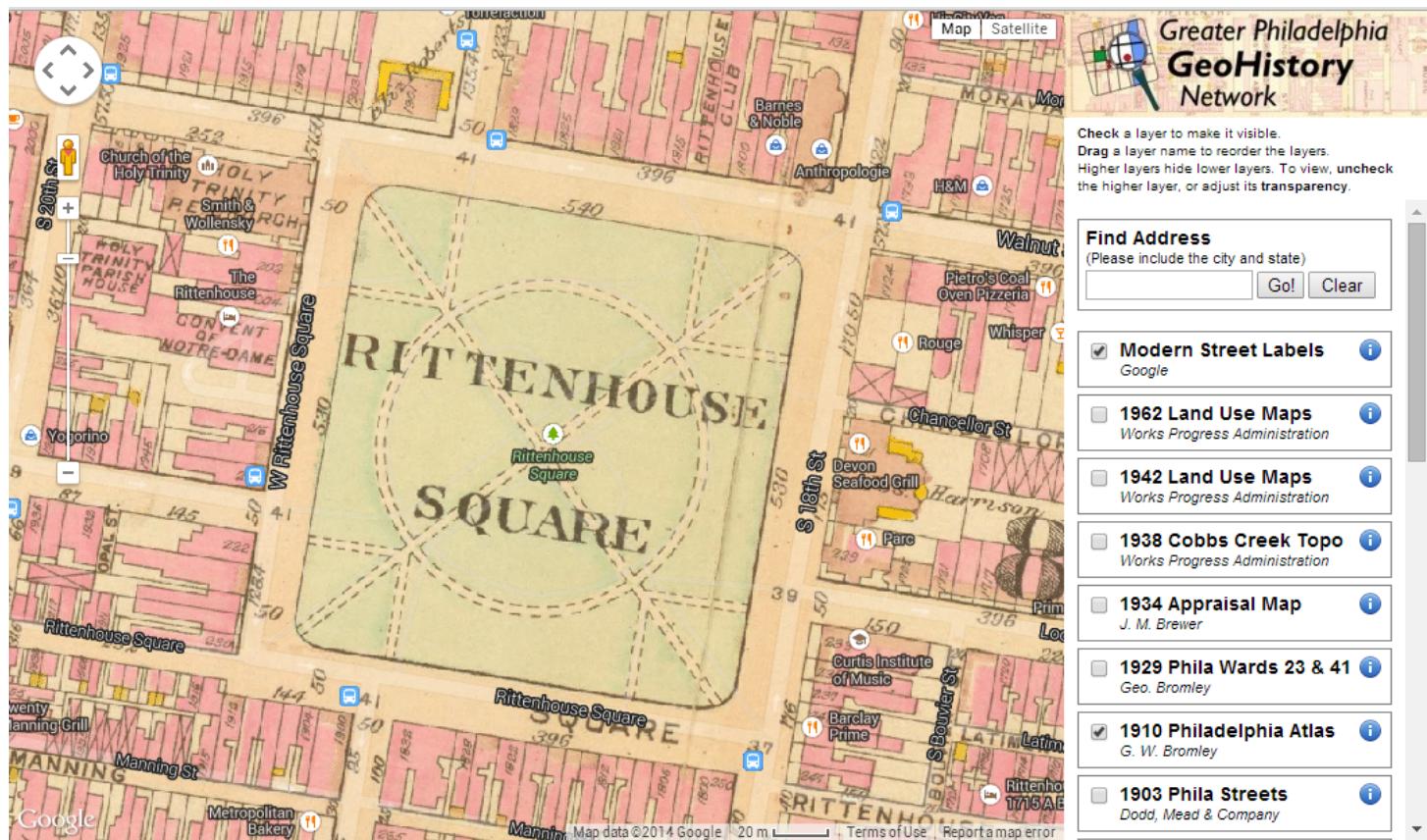
- Georeferencing excavation maps based on aerial imagery (balloon maps) from 1940-present.

<http://sites.museum.upenn.edu/gordion/archaeology/mapping>



# Archives are using GIS

[Philly GeoHistory](#): These maps lived in drawers, now they live online and are easily searchable.



# Archives are using GIS

[PhillyHistory](#): Liberating 97,000 historic photos, identifying their geographic location and generating revenue.

313-315 Chestnut Street

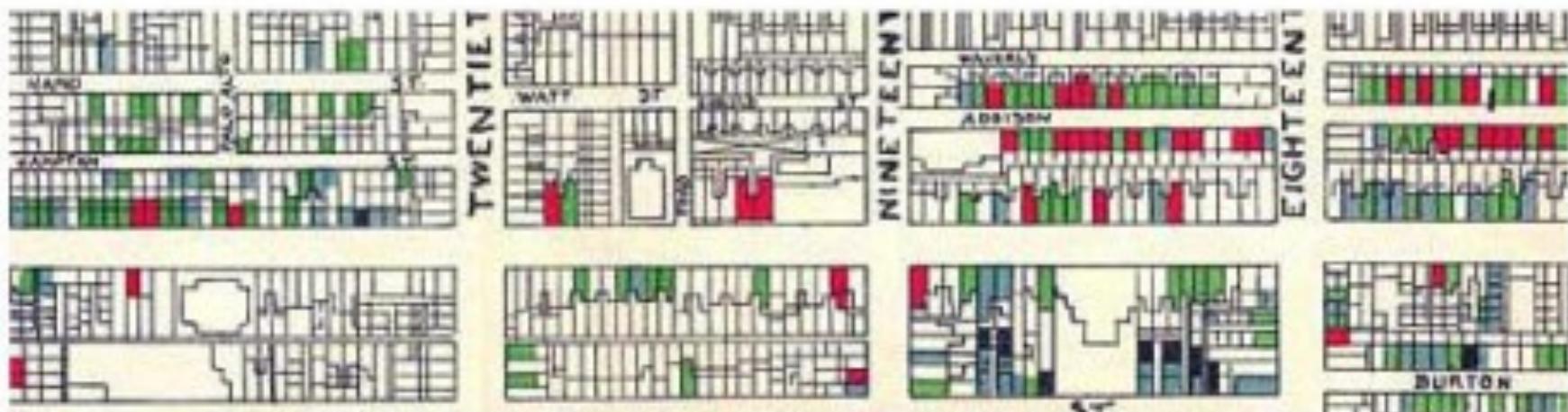
The screenshot shows a historical black and white photograph of a large, multi-story building with classical architectural details, identified as the First National Bank. The photo is displayed on a website interface with various interactive elements. At the top, there are buttons for 'PURCHASE', 'LICENSE', 'ADD TO FAVORITES', 'COMMENTS', and navigation arrows. To the right are social sharing options for Twitter, Facebook, Email, Google+, and Pinterest. Below the photo, a map of Philadelphia highlights the location of the bank at the corner of Chestnut and Front Streets. A green star marks the exact location. The map also shows surrounding landmarks like Independence Hall and the National Historical Park. A legend for 'NEARBY RESULTS' is visible, along with a link to 'OPEN IN GOOGLE EARTH'. Below the map, a table provides detailed information about the photo:

Title	313-315 Chestnut Street
Description	313-315 Chestnut Street. First National Bank on Corner
Address	313 Chestnut St
Date	1/24/1952
Photographers	Bender, Charles J
Collection	DOR Archives

# Historians are using GIS.

## The Ward: Race and Class in Du Bois' Seventh Ward

Ward: Digitization of WEB Du Bois historical social work Survey Maps. Now searchable by name, property and theme.



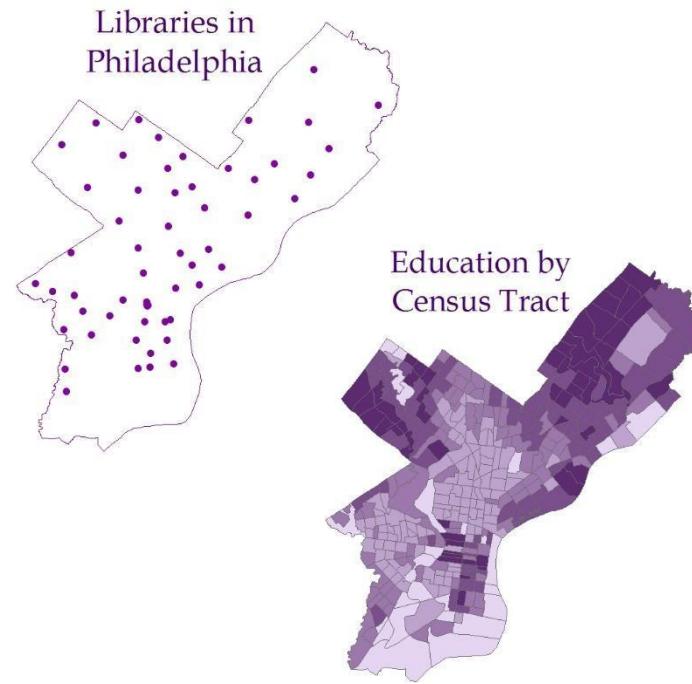
# What is Spatial Data?

**Spatial Data:** Data that defines a geographic location or boundary

## Examples

- Tabular Data
  - Databases & Spreadsheets
- Points on a map
  - Client Locations
- Boundary Data (Polygons)
  - Population by Census Tract
- Raster Data (Images and Grids)
  - Satellite imagery, temperature, density

10 Dr. and Mrs. Ge	241 S. 6th Street Apt #1101	Philadelphia	PA	19106
11 Mrs. Susan Ker	929 Lawnton Te	Glenolden	PA	19036
12 Mrs. Nancy Mei	638 Fitzwater St	Philadelphia	PA	19147
13 Mrs. Margaret S	31 Eagle Rd	Phoenixville	PA	19460
14 Ms. Deborah Sc	1252 Charleston	Cherry Hill	NJ	08034
15 Ms. Kathy Dunn	806 Pine Street	Philadelphia	PA	19107



# Downloading Spatial Data: Open Data

## **OpenDataPhilly**

Provides searchable catalog of open spatial data for Philadelphia available for access and download.



# Spatial Data Preparation: Cleanliness

## Clean Data (properly formatted)

ID	FirstName	LastName	Address_1	Address_2	City	State	Zip	Phone	Email
1	Nikki	Bleggi	2515 Panama St		Philadelphia	PA	19103	215-227-1372	nikki@bleggi.com
2	Steve	Sivia	1061 Bridge St		Philadelphia	PA	19124	215-227-5562	steve@sivia.com
3	Nelson	Smith	800 Spruce St	2A	Philadelphia	PA	19107	215-236-7117	nelson@rudnic.com
4	Sybil	Quare	3001 Market St		Philadelphia	PA	19104	215-244-7049	sybil@quaresma.com
5	Modesto	Shelvin	1831 Pemberton St	Rear	Philadelphia	PA	19146	215-245-1893	modesto@shel.com
6	Adam	Moun	1614 N Felton St		Philadelphia	PA	19151	215-245-2856	adam@moun.com
7	Donnell	Sibilia	3034 Fairfield St		Philadelphia	PA	19136	215-245-4825	donnell@sibilia.com
8	Bethany	Bearup	734 N Judson St		Philadelphia	PA	19130	215-245-7889	bethany@bearup.com
9	Iva	Harpold	2831 S Warnock St		Philadelphia	PA	19148	215-256-0199	iva@harpold.com

## Dirty Data (poorly formatted)

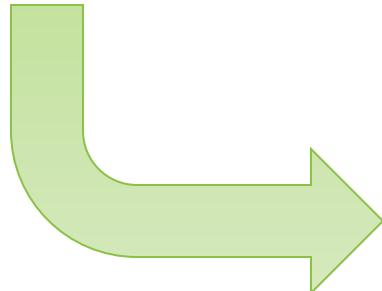
FirstName	LastName	Address	Phone	Email
Nikki	Bleggi	Panama St Philly PA	215-227-1372	nikki@bleggi.com
Steve A. Silvia	Jr.	1061-1065 Bridge St Philadelphia Penna 19124	215-227-5562	steve@sivia.com
Nelson	Smith	800 Spruce St Apartment 2A Philadelphia 19107	not given	nelson@rudnic.com
Mrs. Sybil	Quare	30?? Market St Philadelphia PA 19104	215-244-7049	sybil@quaresma.com
Modesto	Shelvin	Missing	215-245-1893	modesto@shel.com
Adam	Moun	1614 N Felton St Philadelphia PA 19151	missing	adam@moun.com
Donnell and Jeff	Sibilia	3034 Fairfield St Phila. Pennsylvania 19136	215-245-4825	donnell@sibilia.com
Bethany (Beth)	Bearup	734 N Judson Street Philadelphia PA 215-256-3930	215-245-7889	bethany@bearup.com
Iva Harpold	(esquire)	2831 N/S Warnock St Phila PA 19148	215-256-0199	iva@harpold.com

# Convert a Spreadsheet to a Map

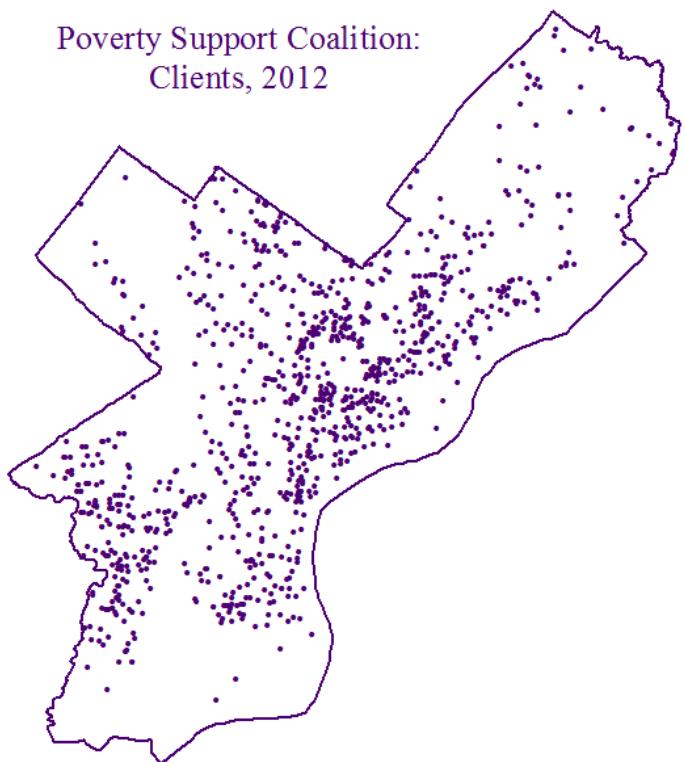
ID	First	Last	Address	Add_2	City	State	Zip	Phone
1	Nikki	Bleggi	2515 Panama St		PHILADELPHIA	PA	19103	215-227-1372
2	Steve	Sivia	1061 Bridge St		PHILADELPHIA	PA	19124	215-227-5562
3	Nelson	Rudnick	800 Spruce St 2nd		PHILADELPHIA	PA	19107	215-236-7117
4	Sybil	Quares	3001 Market St		PHILADELPHIA	PA	19104	215-244-7049
5	Modest	Shelvin	1831 Pemberton St	Apt 1	PHILADELPHIA	PA	19146	215-245-1893
6	Adam	Moun	1614 N Felton St		PHILADELPHIA	PA	19151	215-245-2856
7	Donnell	Sibilia	3034 Fairfield St		PHILADELPHIA	PA	19136	215-245-4825
8	Bethany	Bearup	734 N JUDSON St	F1 3	PHILADELPHIA	PA	19130	215-245-7889
9	Iva	Harpold	2831 S Warnock St		PHILADELPHIA	PA	19148	215-256-0199
10	Elsa	Hailston	1617 J F Kennedy		PHILADELPHIA	PA	19103	215-257-4758
11	Carmen	Rohan	1901 Walnut St	Apt A	PHILADELPHIA	PA	19103	215-289-6754
12	Francis	Kingore	717 S Columbus		PHILADELPHIA	PA	19147	215-322-6663
13	Christe	Kennau	100 West Ave		PHILADELPHIA	PA	19046	215-331-2098
14	Angel	Checa	235 Bainbridge St		PHILADELPHIA	PA	19147	215-332-8110
15	Saundr	Trochhi	2434 Brown St	Rear	PHILADELPHIA	PA	19130	215-336-7023
16	Addie	Aspri	407 Gaskill St		PHILADELPHIA	PA	19147	215-348-8084

**Solution:**

Geocoding!



Poverty Support Coalition:  
Clients, 2012



# Geocode

Google

340 n 12th

Get directions My places

A 340 N 12th St Philadelphia, PA 19107

Directions Search nearby more ▾

At this address:

- Bryan Hanes Studio
- Counterpole Records Entertainment Inc
- Coyopa Productions Inc
- Elder Health Inc Pa
- Free People Photo Studio
- G & D Garment Corporation
- Inspiritech
- Internet Order LLC
- Menzfit
- Pennsylvania General Store
- Stroll
- Suretybondcom
- T & Q Fashion Inc
- Wolf Building

Map data ©2013 Google, Sanborn - Edit in Google Map Maker Report a problem

Address information



Point on a map

# Downloading Spatial Data

**What spatial data is needed to support this project?**

- Download Philadelphia Park Data from OpenDataPhilly

**Demo!**

# Map Making Tools

## Desktop

- Pros:

- More functionality
- Easy export to PDF

- Cons:

- Steeper Learning Curve
- Not suitable for web mapping
- Can be expensive



## Web

- Pros:

- Easier to use
- Simple to make and share a web map

- Cons:

- Price depends on usage (Software as a Service Model)
- Limitations on use (File size, number of geocodes, page visits, privacy)



# Desktop Map Making Tools

## Proprietary Software

Esri's ArcGIS Desktop



\$250 for nonprofits or \$100 for Home Use License

## Free Open Source Software

QGIS

Open source software with free training manuals  
and community support



# Web Map Making Tools

- CartoDB (\$29 per month but generous free tier)
- ArcGIS Online (\$2500 per year, personal free tier)
- MapBox (good for making basemaps)



# Web Map Making Tools

**Tutorial: Database to Map**  
describes the technical steps  
needed to turn a spreadsheet  
of data into a quick and free  
interactive web map.

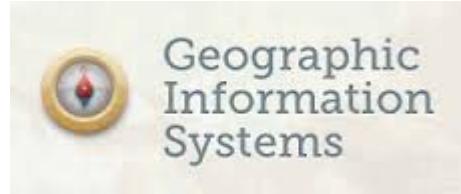
## Demo!

Using CartoDB to quickly visualize & share spatial data.

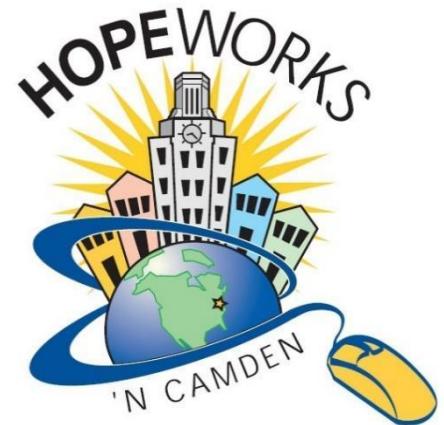
- Philadelphia Parks

# Experts and Guides can help!

- GIS Stack Exchange
- Interns
- Civic Hackers
- Professional Consultants
- Probono Services



AZAVEA  
**SUMMER** *of* **MAPS**



See **Handout 2** for  
Geospatial Project  
Case studies and  
steps for approaching  
a new project!

# 6 Steps of a GIS Project

1. Collect your Data
2. Geocode your Data
3. Formulate a Spatial Question
4. Assemble Additional Data
5. Analyze Data
6. Publish your Map

# 1. Collect your Data

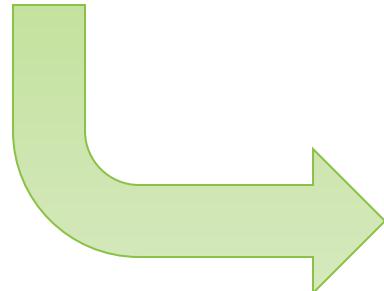
- **Sustainable data collection processes from the Start**
  - Use forms with drop downs and multiple choice, not free form text
  - Accurately record address and other location information
- **Prepare your internal Data**
  - **Clean** your data
  - **Maintain** data in a spreadsheet (*not a word file or PDF*)
  - Assign a **Unique ID** to all Records
  - When naming fields, avoid special characters & starting with a number
  - Create new **field for each address element** (Street name, City, State, Zip)
  - Save as **CSV, Tab Delimited** or **Excel** file
  - Store Zip Codes fields as Text (08755)

# 2. Geocode your Data

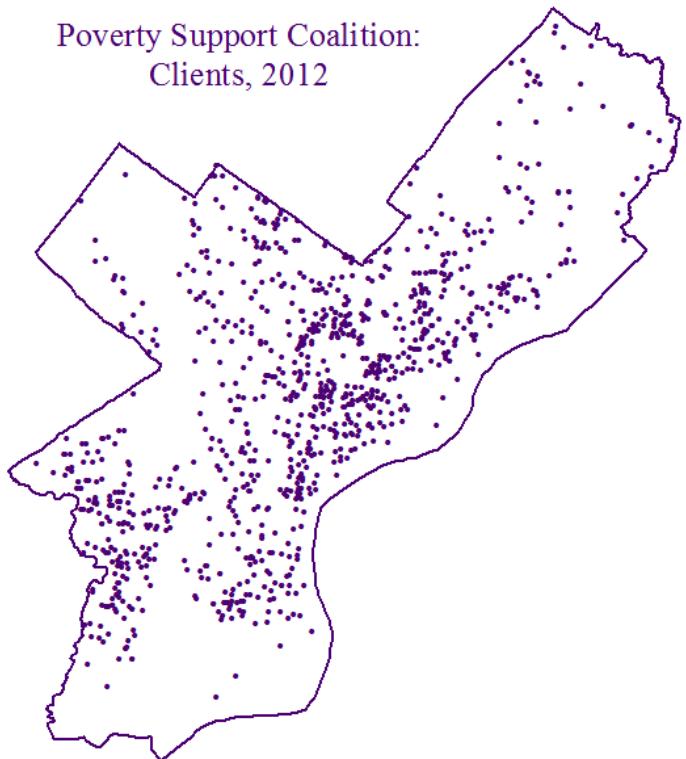
ID	First	Last	Address	Add_2	City	State	Zip	Phone
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6	Adam	Moun	1614 N Felton St		PHILADELPHIA	PA	19151	215-245-2856
7	Donnell	Sibilia	3034 Fairfield St		PHILADELPHIA	PA	19136	215-245-4825
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16	Addie	Aspri	407 Gaskill St		PHILADELPHIA	PA	19147	215-348-8084

**Solution:**

Geocoding!



Poverty Support Coalition:  
Clients, 2012



# 3. Formulate a Spatial Question

- **Formulate a Spatial Question**
  - How many of our manuscripts originated from Athens, Greece?
  - Where are our excavation sites located?
  - Where were our Archive's photos taken?
- **When framing your question, approach the problem geographically**
  - Be Specific & Concise
- **Keep in mind: data must exist in order to answer these questions**
  - Known geographic locations of artifacts or historic geographic boundaries.

# 4. Assemble Additional Data

## 2010 Decennial Census

- Population survey data

## TIGER/Line Files:

- Boundary Files



- **Federal**

- Data.gov
- Geodata.gov

- **State**

- data.CA.gov
- Pennsylvania Spatial Data Access (PASDA)

- **Local**

- NYC Data Mine
- Open Data Philly
- London Datastore

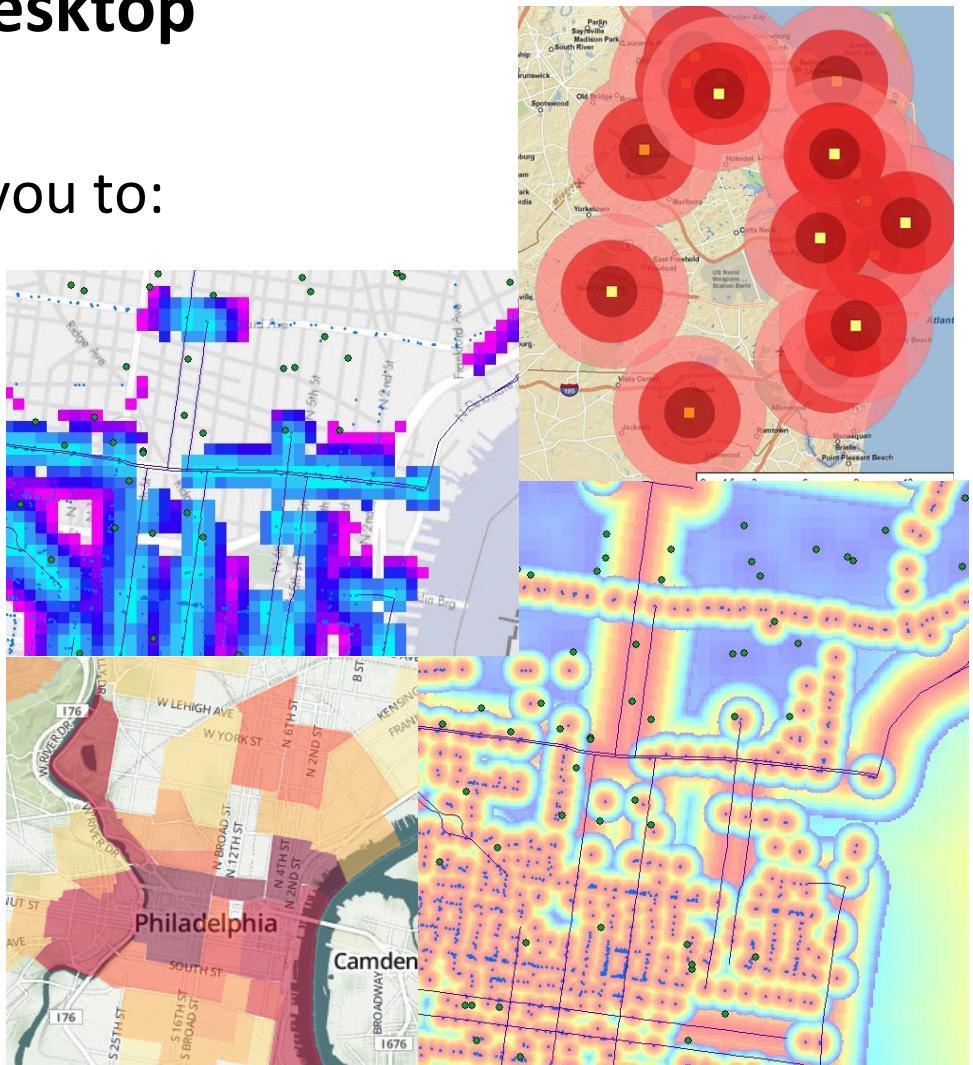


# 5. Analyze Data (optional)

Analyze your data using desktop GIS software

Geoprocessing tools allow you to:

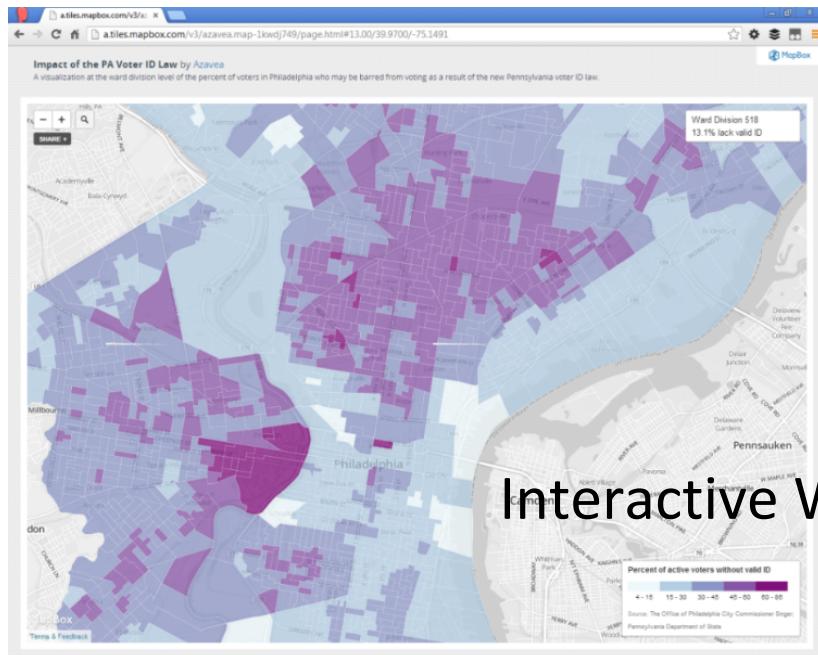
- Buffer
- Clip
- Merge
- Spatial Join
- Query
- Overlay
- Symbolize



# 6. Publish your Map

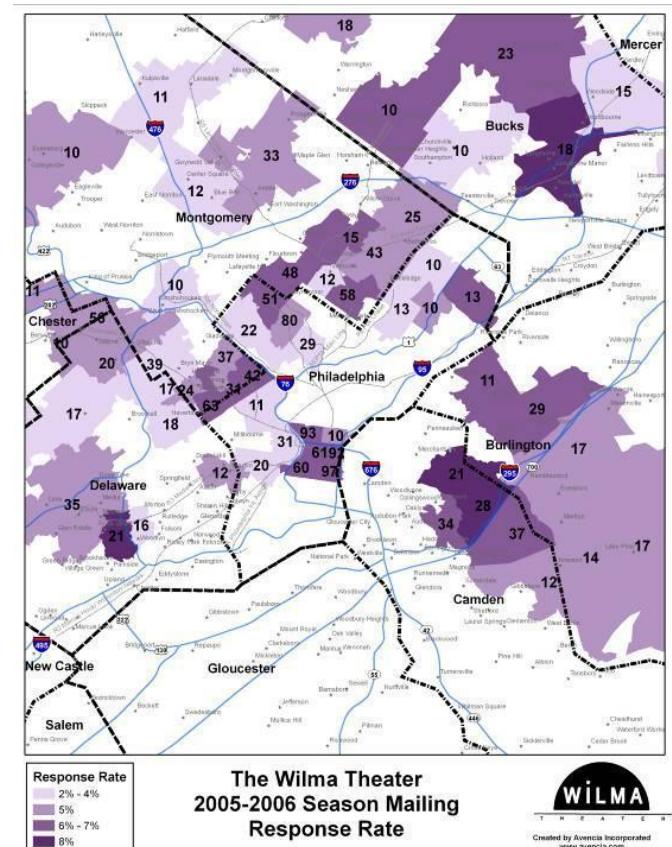
- Publish your maps in various formats

- Print Maps
- Web Maps
- Spreadsheets with data calculations



Interactive Web Map

- Print PDF Map



# Homework:

- Download and Install QGIS (<http://www.qgis.org/en/site/>)
- Complete Modules 1-7 in QGIS ([http://docs.qgis.org/2.2/en/docs/training\\_manual/index.html](http://docs.qgis.org/2.2/en/docs/training_manual/index.html))
- Create a Free CartoDB account and make a map
  - Download a shapefile from OpenDataPhilly
  - Use the **tutorial** to create an account, add data and share a map with CartoDb

To learn more about upcoming GeoPhilly events

Visit our Meetup page: **geophilly.com**

# Learn More:

- **Handouts:**

- **Handout 1: GIS & Spatial Data 101**

- This document describes the basics of GIS and spatial data as well as the tools available to create print and web maps.

- **Handout 2: Approaching Geospatial Projects**

- This document describes 3 case studies featuring complex geospatial questions and lists the steps used to approach a new project.

- **Tutorial: Database to Map**

- This tutorial describes the technical steps needed to turn a spreadsheet of data into a quick and free interactive web map.

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# Additional Resources:

## More Spatial History Projects

[Dabbling in History: Digital History Course 2014](#)

## Historic Data Available Online for Download

National Register of Historic Places <http://www.nps.gov/nr/research/>

## The Spatial History Project (Stanford)

Visualization of historical data in time and space illuminates patterns of movement and transformation in the past. <http://www.stanford.edu/group/spatialhistory/cgi-bin/site/index.php>

PhilaPlace – <http://www.philaplace.org>  
PhillyHistory.org – <http://www.phillyhistory.org>  
Greater Philadelphia GeoHistory Network – <http://www.philageohistory.org/geohistory/>  
New York Public Library MapWarper – <http://maps.nypl.org/warper/>  
Visualizing Emancipation – <http://dsl.richmond.edu/emancipation/>  
HyperCities – <http://hypercities.com/>  
The Spatial History Project, Stanford University – <http://www.stanford.edu/group/spatialhistory>  
Cleveland Historical – <http://clevelandhistorical.org/>  
Mapping DuBois – <http://www.mappingdubois.org/>  
Gilded Age Plains City – <http://gildedage.unl.edu/>  
Spatial Humanities – <http://spatial.scholarslab.org/>  
Google Map Engine Lite – <https://support.google.com/mapsengineelite/answer/3024396>  
Neatline – <http://neatline.org/>  
Google Earth – <http://earth.google.com/>  
Crowdmap – <https://crowdmap.com/>  
Social Explorer – <http://www.socialexplorer.com/>  
CartoDB – <http://cartodb.com/>  
MapStory – <http://mapstory.org/>  
GeoCommons – <http://geocommons.com/>  
MapBox - <https://www.mapbox.com/>

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