

**“SPATIAL HISTORY LAB”**

**INSTRUCTORS CONTACT INFORMATION**

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Office Hours: TBD and by appointment  
Note: Students enrolling in this lab must also enroll in the 4-credit research seminar (GU4xxx)

**CATALOGUE DESCRIPTION** (Short)

Spatial History Lab for graduate and advanced undergraduate students. Students will learn theory and methods in spatial history while exploring key topics from the corequisite research seminar. This course will train students in the fundamentals of geographic information systems (GIS). Students will use skills learned in this lab to conduct a final research project in the corequisite research seminar. No previous experience necessary, but basic computer literacy highly recommended.

**COURSE DESCRIPTION** (Long)

Spatial History Lab, paired with the thematic research seminar (GU4xxx), trains students in geographic information systems (GIS) and challenges students to combine spatial thinking and analysis with historical thinking. Students will learn seminal principles of geography and spatial thinking, study and practice principles of cartographic design, and train in technical GIS skills to create their own spatial history project. Labs will connect with the weekly themes of the research seminar, providing students opportunities to reexamine topics through a spatial lens. Students will choose a final research project that aligns with the focus of the corequisite research seminar. The course is open to graduate students and advanced undergraduates. Students enrolling in the lab course (2 credits) must also enroll in the attached research seminar course (COURSE CODE) (4 credits).

**COURSE OBJECTIVES AND LEARNING OUTCOMES**

These objectives are designed to encourage students to approach problems with interdisciplinary methods and to consider historical and spatial thinking as relevant and applicable approaches to understanding problems of the past and present.

- Historical awareness: students will be introduced to the history of cartography and to the development of modern mapping through Geographical Information Systems (GIS). Students will develop an increased awareness of alternative and competing forms of mapping, both in historical and modern times.
- Spatial thinking: students will learn fundamentals of spatial theory through the lab assignments and will experiment with spatial approaches to historiographical questions.
- Multimodal Communication: through weekly labs and assignments, students will develop skills in written, visual, and oral communication

- Writing/ Mechanics: in writing assignments, students will be expected to use a scholarly-historical voice and to use The Chicago Manual of Style format for citations and bibliography.
- Argument and thesis: students will develop arguments through weekly lab assignments that connect with the weekly theme of the research seminar.
- Research and use of sources: students will be given opportunities to work with maps as primary sources and to create their own map that presents data that they have uncovered. Students will become familiar with the ways that maps can distort and advance political, social, and historical arguments.

## REQUIRED TEXTS AND MATERIALS

### BOOK (AVAILABLE ON CANVAS)

Monmonier, Mark S. *How to Lie with Maps*. 2nd ed. Chicago: University of Chicago Press, 1996. (also available through Interlibrary Loan)

### ARTICLES & CHAPTERS (POSTED ON CANVAS; ALSO AVAILABLE THROUGH JSTOR/LIBRARY ARTICLES)

Gregory, Ian. “‘A Map is Just a Bad Graph’: Why Spatial Statistics are Important in Historical GIS” in *Placing History: How Maps, Spatial Data, and GIS Are Changing Historical Scholarship*. Edited by Anne Kelly Knowles and Amy Hillier. 1st ed. Redlands, Calif.: ESRI Press, 2008.

Selections from Kimerling, A. Jon, Aileen Buckley, Phillip Muehrcke, and Juliana Muehrcke. *Map Use: Reading, Analysis, Interpretation*. 8th ed. Redlands, CA: Esri Press Academic, 2016.

Selections from Longley, Goodchild, Maguire, and Rhind. *Geographic Information Science and Systems*, Fourth Edition. Hoboken, N.J.: Wiley, 2015.

### RECOMMENDED READING | GENERAL

Bodenhamer, David J, John Corrigan, and Trevor M Harris. *The Spatial Humanities: GIS and the Future of Humanities Scholarship*. Bloomington: Indiana University Press, 2010.

Knowles, Anne Kelly, and Amy Hillier. *Placing History: How Maps, Spatial Data, and GIS Are Changing Historical Scholarship*. 1st ed. Redlands, Calif.: ESRI Press, 2008.

Knowles, Anne Kelly. *Past Time, Past Place: GIS for History*. Redlands, Calif: ESRI Press, 2002.

Slocum, Terry A., Robert B. McMaster, Fritz C. Kessler, and Hugh H. Howard. *Thematic Cartography and Geovisualization*. 3rd ed. Upper Saddle River, NJ: Pearson, 2009.

### ASSIGNMENTS

Methodological Blog posts – 10 blog posts in which students present their work and discuss the methodological choices. Students are encouraged to use blog posts to experiment with the new methods they have learned in the ArcGIS Pro tutorials and lab. Blog posts are due weekly. For more information on setting up a Columbia blog, visit <http://blogs.cuit.columbia.edu>.

Research Paper – Details in research seminar syllabus (GU4xxx)

Methodological Presentation – 10-minute multimedia presentation of project methods. Students will present their project methods in the final class meetings.

## **GRADE POLICIES**

- 35% Participation (includes attendance and engagement)
- 15% GIS Milestone Quizzes (x2 pass/fail; must retake quiz until pass)
- 40% Assignments (includes blog posts, comments on peers' blogs)
- 10% Presentation (10-minute multimedia presentation on methods of final project)

All assignments must be completed to pass this class.

## **ABSENCE POLICIES**

Participation is crucial to succeeding in this class. Attending class is the first step to participating. If you are absent from class (excused or unexcused), contact me for alternative ways to participate in the lesson you missed.

## **FACULTY STATEMENT ON ACADEMIC INTEGRITY**

The intellectual venture in which we are all engaged requires of faculty and students alike the highest level of personal and academic integrity. As members of an academic community, each one of us bears the responsibility to participate in scholarly discourse and research in a manner characterized by intellectual honesty and scholarly integrity.

Scholarship, by its very nature, is an iterative process, with ideas and insights building one upon the other. Collaborative scholarship requires the study of other scholars' work, the free discussion of such work, and the explicit acknowledgement of those ideas in any work that inform our own. This exchange of ideas relies upon a mutual trust that sources, opinions, facts, and insights will be properly noted and carefully credited.

In practical terms, this means that, as students, you must be responsible for the full citations of others' ideas in all of your research papers and projects; you must be scrupulously honest when taking your examinations; you must always submit your own work and not that of another student, scholar, or internet agent.

Any breach of this intellectual responsibility is a breach of faith with the rest of our academic community. It undermines our shared intellectual culture, and it cannot be tolerated. Students failing to meet these responsibilities should anticipate being asked to leave Columbia.

The Columbia Center for New Media, Teaching, and Learning defines plagiarism and its consequences at Columbia University: [cnmtl.columbia.edu/projects/compass/discipline\\_humanities/documenting.html#plagiarism](http://cnmtl.columbia.edu/projects/compass/discipline_humanities/documenting.html#plagiarism)

## **GSAS STATEMENT ON ACADEMIC INTEGRITY**

Students should be aware that academic dishonesty (for example, plagiarism, cheating on an examination, or dishonesty in dealing with a faculty member or other University official) or the threat of violence or harassment are particularly serious offenses and will be dealt with severely under Dean's Discipline. Graduate students are expected to exhibit the high level of personal and academic integrity and honesty required of all members of an academic community as they engage in scholarly discourse and research. For further information, see the GSAS page on Academic Integrity and Responsible Conduct: <http://gsas.columbia.edu/academic-integrity>

## **DISABILITY SUPPORT SERVICES**

### *Columbia*

In order to receive disability-related academic accommodations, students must first be registered with Disability Services (DS). More information on the DS registration process is available online at [www.health.columbia.edu/ods](http://www.health.columbia.edu/ods). Faculty must be notified of registered students' accommodations before exam or other accommodations will be provided. Students who have (or think they may have) a disability are invited to contact Disability Services for a confidential discussion at (212) 854-2388 (Voice/TTY) or by email at [disability@columbia.edu](mailto:disability@columbia.edu).

### *Barnard*

If you are a student with a documented disability and require academic accommodations, you must visit the Office of Disability Services (ODS) for assistance. Students requesting eligible accommodations in their courses will need to first meet with an ODS staff member for an intake meeting. Once registered, students are required to visit ODS each semester to set up new accommodations and learn how to notify faculty. Accommodations are not retroactive, so it is best to register with ODS early each semester to access your accommodations. If you are registered with ODS, please see us to schedule a meeting outside of class in which you can bring us your faculty notification letter and we can discuss your accommodations for this course. Students are not eligible to use their accommodations in this course until they have met with us. ODS is located in Milbank Hall, Room 008.

## **SYLLABUS CHANGE POLICY**

This syllabus is an approximate guide for the course and is subject to change with advanced notice. The most up-to-date syllabus will be available on CourseWorks along with a change log.

## **CLASS SCHEDULE**

### **WEEK 1: INTRODUCTION**

#### Before Lab 1

- Review the syllabus

#### Lab 1: (Intro #1) More than a software: What is spatial history? Online Resources

- Bring to class questions about syllabus
- Introductory lecture on GIS and cartography
- Spatial thinking and cartography exercise

- Blog setup and online mapping platforms

After Class 1: Blog post (#1)

Blog post that includes short bio and reasons for taking this class. Draw a map or spatial graphic that shows your history in New York City (upload a picture of this hand-drawn map). Post both to your blog by Wednesday evening

**WEEK 2: THE RISE OF 19TH-CENTURY NEW YORK: AMERICA'S METROPOLIS?**

Before Lab 2

- Read *Map Use* "Introduction" (pg. 3-21)

Lab 2: (Intro #2) Spatial Thinking and Intro to ArcGIS Online

- Intro lecture on geography
- Intro to ArcGIS Online (AGO)

After Lab 2: Blog post (#2)

Blog post comparing population of US cities over time (e.g., "US Population 200 Years"). Can add other spatial layers of interest available through AGO as well.

**WEEK 3: URBAN MORPHOLOGY: STREETS, BLOCKS, DISTRICTS**

Before Lab 3

- Read "How to Fingerprint a City," <https://bigthink.com/strange-maps/how-to-fingerprint-a-city>
- Register your ArcGIS account (you will receive an email invitation from Esri)
- Read Chapter 2 "Elements of a Map" in *How to Lie with Maps* by Monmoner

Lab 3: (Intro #3) Working in ArcGIS Pro

- Intro to ArcGIS Pro (AGP): Creating a project, navigating the software, catalogue, etc.
- Bringing Data into AGP: Importing layers, downloading data, feature services, web layers, NHGIS, etc.
- Map Set#1: Mapping Morphological Change (overlying features)

After Lab 3: Blog post (#3)

Blog post expanding on maps created during lab

**WEEK 4: SURVEYING THE CITY 1: ADDRESSES, DIRECTORIES, CENSUSES, INSURANCE MAPS**

Before Lab 4

- Read Chapter 10 "Data Maps: Making Nonsense of the Census" in *How to Lie with Maps* (pg. 139-162)
- Review Chapter 4 "Georeferencing" in *Geographic Information Science & Systems* (pg. 77-98)
- Review ESRI Tutorial Learn the Basics in "[ArcGIS Pro quick-start tutorials](#)"
  - "[Introducing ArcGIS Pro](#)"
  - "[Create a project](#)"
  - "[Navigate maps and scenes](#)"
  - "[Add data to a project](#)"
  - "[Explore your data](#)"
- Complete ESRI Tutorial "[Get Started with ArcGIS Pro](#)"
  - Lesson 1 - "[Create a Map](#)" (mostly review)
  - Lesson 2 - "[Symbolize layers and edit features](#)" (some review, some new stuff)

[If you are interested, feel free to do some of the other lessons]

Lab 4: (Early Skills #1) Spatial Data

- Spatial Data Creation: Georeferencing, heads-up digitizing
- Map Set #2: Tracing the Built Environment (georeferencing, digitizing insurance maps)

After Lab 4: Blog post (#4)

- Complete tutorial "[Cartographic Creations in ArcGIS Pro](#)" (~2 hours). In the final section ("Print the Map" > step 2), choose "Export" rather than "Print" to save the map as an image file.
- Georeference a few Sanborn historical map sheets of lower Manhattan from the 1903-1919 atlas (available through the Columbia Library [website](#)). Compare the built environment in the georeferenced maps to the 1854 building footprints (source: Perris Atlas, digitizing by NYPL and NYPL Building Inspector). I've uploaded the building footprints as a layer package ("NYC\_Buildings1854") to our Group content page. You can access these in ArcGIS Pro through Catalogue Pane > Portal > Groups.
- Create a polished map (use skills learned from tutorial "[Cartographic Creations in ArcGIS Pro](#)"; include title, scale, legend, north arrow, source/author) and write up an explanation of the design choices you made to show changes in the NYC built environment from the 1850s to 1900s ; post to your blog by Wednesday evening

**WEEK 5: ECONOMIC GEOGRAPHY AND LAND USE**

Before Lab 5

- Review Chapter 8 "Data Collection" in *Geographic Information Science & Systems* (pg. 173-193)

Lab 5: (Early Skills #2) Tabular Data

- Tables: Tabular join, mapping by XY, geocoding, field calculator
- Map Set #3: Mapping Economic Activities (from directories, insurance maps, etc)

After Lab 5: Blog post (#5)

Tabular join HNYC data with other variables from NHGIS to investigate the economic geography of 19c NYC

**WEEK 6: SURVEYING THE CITY 2: THEMATIC MAPS OF HEALTH AND HOUSING**

Before Lab 6

- Read Chapter 4 "Blunders that Mislead" in *How to Lie with Maps* (pg. 43-57)
- Esri AGP Tutorial 2

Lab 6: (Early Skills #3) Thematic Mapping

- Thematic Mapping: Data classification, etc.

After Lab 6: Blog post (#6)

TBD

**WEEK 7: (UN)SANITARY ENVIRONMENTS: FOOD, WATER, WASTE**

Before Lab 7

- Read Chapter 11 "Color: Attraction and Detraction" in *How to Lie with Maps* (pg. 163-173)
- Read Chapter 6 "Map Design Basics" in *Map Use* by Kimerling et al. (pg. 120-148)

Lab 7: (Design Skills) Cartography and Design

- Thematic Mapping: Cartography
- Map Set #4: Mapping the Social Environment (tabular data for housing, disease environments, etc.)

After Lab 7: Blog post (#7)

Digitize building footprints (and optionally, other features) using your georeferenced Sanborn map from last week. Add new fields to your feature class, and record building use, number of stories (height), and/or other information of interest in the attribute table (Sanborn map legend: <http://sanborn.umi.com/HelpFiles/bwkey.pdf?CCSI=2041n> (Links to an external site.)). Use your

new feature class to create a thematic map. Compare this with a thematic map of the 1854 building footprints. Post to your blog by Wednesday evening.

## WEEK 8: A MOSAIC OF IMMIGRANT NEIGHBORHOODS 1, 1850-1880

### Before Lab 8

- Review Chapter 13 “Spatial Data Analysis” in Geographic Information Science & Systems (pg. 290-318)
  - Analysis Based on Location (pg. 295)
  - Spatial Joins (pg. 299)
  - Point-in-Polygon Operation (pg. 300)
  - Polygon Overlay (pg. 301)
  - Buffering (pg. 306)

### Lab 8: (Advanced Skills #1) Geoprocessing

- Geoprocessing: Spatial Joins, Buffers, Clipping
- Map Set #5: Mapping Class and Gender (with “Mapping Historical NYC” data)

### After Lab 8: Blog post (#8)

- Use one of the analytical techniques (e.g., buffer, clip, nearest neighbor, KD) we discussed in class to analyze your data and formulate an argument
- For this week's blog post (#8), please create a series of maps that visualize the density of residents living in Brooklyn in 1880 (Boerum Hill area — the georeferenced Sanborn sheet from the new map package "SpatialAnalysisLab\_new"). Among these, include a thematic map that visualizes people per building (digitize building footprints on a block or two, then spatial join), another that visualizes (i.e., thematic map) people per building square foot (calculate geometry of building feature class), and a third that shows a kernel density estimate of the population. I've cleaned up the Census feature class a little bit ("Brooklyn\_Census1880\_sample") — the points should now be within the historical building footprints (that you will digitize; practice creating your own feature class if you'd like). Let me know if you have questions/concerns/comments. This assignment should take ~2 hours or less. Get in touch if it is taking longer.

Other guides:

- Guide to Geoprocessing (e.g., buffering, summarize within):  
<https://pro.arcgis.com/en/pro-app/get-started/use-geoprocessing-tools.htm>
- Guide to calculating geometry (this must be done in a new field - Double data type).  
<https://support.esri.com/en/technical-article/000016157>

## WEEK 9: A MOSAIC OF IMMIGRANT NEIGHBORHOODS 2, 1880-1910

### Before Lab 9

- GIS Review Session

### Lab 9: GIS Milestone Quiz

### After Lab 9: Blog post (#9)

Redo GIS quiz and post to blog

## WEEK 10: THE GEOGRAPHY OF RACIAL SEGREGATION

### Before Lab 10

- Esri AGP Spatial Analysis Tutorial



- Gregory, Ian. “A Map is Just a Bad Graph’: Why Spatial Statistics are Important in Historical GIS” in *Placing History: How Maps, Spatial Data, and GIS Are Changing Historical Scholarship*. Edited by Anne Kelly Knowles and Amy Hillier. 1st ed. Redlands, Calif.: ESRI Press, 2008.
- Review Chapter 13 “Spatial Data Analysis” in *Geographic Information Science & Systems* (pg. 290-318)
  - Analysis Based on Distance (pg. 304)
  - Measuring Distance and Length (pg. 304)
  - Cluster Detection (pg. 308)

Lab 10: (*Advanced Skills #3*) *Measures of Spatial Distributions*

- Spatial Analysis 1: Avg. nearest neighbor, near analysis, high-low clustering
- Map Set #6: Mapping Immigrant Neighborhoods (with “Mapping Historical NYC” data)

After Lab 10: Blog post (#10)

TBD

## **WEEK 11: RESEARCH PROJECTS**

Before Lab 11

- Review Chapter 13 “Spatial Data Analysis” in *Geographic Information Science & Systems* (pg. 290-318)
  - Dependence at a Distance (pg. 309)
  - Density Estimation (pg. 310)
  - Spatial Interpolation (pg. 313)

Lab 11: (*Advanced Skills #3*) *Density and Interpolation*

- Spatial Analysis 2: Kernel density, interpolation
- Map Set #7: Mapping Racial Segregation (with “Mapping Historical NYC” data)

After Lab 11: Blog post (#11, bonus)

TBD

## **WEEK 12-14: RESEARCH PAPER CONSULTATIONS / PAPER PRESENTATIONS**