11.205: Introduction to Spatial Analysis

Lecture
MW: 2:30-4:00 PM (EDT/EST)
https://mit.zoom.us/j/93900283738

Course Site
https://canvas.mit.edu/courses/3377

Lab
W: 4:30-6:30 PM (EDT/EST)
https://mit.zoom.us/j/98139425936

Th: 12:00-2:00 PM (EDT/EST)
https://mit.zoom.us/j/98139425936

All students attend one lab!

Course Description

Geographic Information Systems (GIS) are tools for managing data that represent the location of features (geographic coordinate data) and what they are like (attribute data); they also provide the ability to query, manipulate, and analyze those data. Put simply: a GIS permits planners to make maps that answer questions. GIS has become an important analytical tool for a variety of fields that study and shape cities: planning, architecture, engineering, public health, environmental science, economics, epidemiology, and business. As GIS has become more accessible, it has also become an important political instrument that allows communities, neighborhoods, and activists to graphically tell their story. This class will introduce the basics and offer a survey of what GIS makes possible.

Even as we learn to leverage spatial data to answer questions and tell stories, we will also be developing tools and frameworks to do so *reflexively*. Maps have been (and are) essential instruments for enacting racist urban policy, enabling colonial expansion, and justifying oppression; they have also been (and are) tools for resisting the same. Maps, map-makers and their institutions have positions and histories, and we will build this assumption into all of our mapping work.

Instructors

Catherine D'Ignazio
dignazio@mit.edu
She/her/hers.

Office Hours:
Mon 4:30-5:30pm & Fri 3:30-4:30pm
Sign up for office hours
Zoom 'office'

Eric Robsky Huntley
ehuntley@mit.edu
They/them/theirs.

Office Hours:
Thu 11:00am-12:00pm & Fri 9:00am-10:00am
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Lab Instructor

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She/her/hers.

Office Hours
Thu 2:00-4:00 pm
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Teaching Assistants

Angeles Martinez Cuba
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Mon 7:00-8:00pm & Tue 10:00-11:00am
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Matias Williams
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He/him/his.

Office Hours:
Wed 12:00pm-2:00pm
Zoom 'office'

Course Objectives

Introduction to Spatial Analysis (11.205) and GIS Workshop (11.520) are modular courses which together make up the Introduction to GIS series. **Introduction to Spatial Analysis (11.205)** is a required course for all MCP students, after which students will be able to...

- Work with Geographic Information Systems (GIS), using the free and open-source QGIS
- Reflect on and name forces of structural oppression, inequality and your own/your institution's positionality as they relate to your map-making practice
- Negotiate and critically employ spatial representations, data sources (local government data, census data), and geo-processing tools
- Employ spatial data visualization techniques and cartography

Assessment

Assignment	% of Total	Due
'Locating Ourselves' Exercise	5%	9/10
Exercise 1	15%	9/17

Exercise 2	15%	9/24
Exercise 3	15%	10/1
Problem Set 1	20%	10/8
Problem Set 2	30%	10/22

Late Policy

Turning in assignments promptly is important both for keeping current with the subject matter, which is cumulative, and to keep all students on a relatively level playing field. A late assignment will be accepted up until one week after the original due date for a loss of one letter grade (e.g., an A becomes an A-). After that point, late assignments will receive no credit and will not be accepted.

There will of course be situations where we are willing to bend these rules. These are regulatory ideals, not absolutes. We are human beings; you are human beings. Life happens. We will strive to respect you by taking your requests seriously if you similarly strive to not take advantage of our inclination to respect them. We're all in this weird boat together---let's be good to each other.

All assignments will be posted on the Canvas website.

Email

We will not always be able to respond to email right away. If we have not answered an email by the next time we see you in class please be sure to remind us in class. It is likely that we did not see your email yet. We will do our best to respond to your emails in 24-48 hours during the week. Instructors do not respond to emails on the weekends. The labor movement fought long and hard to secure your weekend! It is truly remarkable that we live in a world in which an email can travel to space and divebomb from the exosphere to our pockets in a matter of seconds; this does not imply that our response must be equally instantaneous!

There are a lot of ways to find help for this class: Discord, peer support and instructor/TA office hours are other good strategies to use. Please don't let an unanswered email hold you back.

On Mental Health…

Academic environments are taxing places. For reasons structural, institutional, financial, and interpersonal, they do not always lend themselves to what most reasonable people would think of as human flourishing. Your instructors went to graduate school. In fact, your instructors both went to graduate school twice. We also went to college. We are both intimately familiar with the toll that institutions of higher education can exact on our mental health and wellbeing.

We have two points here:

1. MIT offers a range of counseling and mental health resources for students. We would really encourage you to be proactive about taking advantage of them; and
2. Do not hesitate to let us know if you're struggling. It is not our intention to mine for the details of your private lives! It is only to let you know that we are sensitive to the distinctive difficulties of the environment we inhabit and that help is available.

Special Accommodations for Students with Disabilities

If you need disability-related accommodations, we encourage you to meet with us early in the semester. If you have not yet been approved for accommodations, please contact Student Disability Services at sds-all@mit.edu.

We look forward to working with you to assist you with your accommodations!

Diversity & Inclusion

MIT values an inclusive environment. We hope to foster a sense of community in this classroom and consider this classroom to be a place where you will be treated with respect. We welcome individuals of all backgrounds, beliefs, ethnicities, national origins, gender identities, sexual orientations, religious and political affiliations – and other visible and nonvisible differences. All members of this class are expected to contribute to a respectful, welcoming, and inclusive environment for every other member of the class. If this standard is not being upheld, please come speak with us immediately.

Indigenous Land Acknowledgement

> *"In exploring and writing about the imagined foundations of a society and a culture, we feel it necessary to acknowledge the very real foundation of our own. We therefore acknowledge the Indigenous Peoples as the traditional stewards of the land where this event is taking place, and the enduring relationship that exists between them and their traditional territories. The land that we are on today is the traditional unceded territory*

of the Wampanoag Nation. We acknowledge the painful history of genocide and forced removal from this territory, and we honor and respect the many diverse Indigenous people connected to this land on which we gather and perform from time immemorial."

– Developed and vetted by the MIT Indigenous Peoples Advocacy Committee (IPAC) in partnership with MIT's American Indian Science and Engineering Society (AISES) and other Native American MIT students.

Materials

Hard Drive

It is recommended (though not required) that you buy an external hard drive to store your coursework - for this class and beyond. While it's true that cloud backups are the more common way of working these days, it's always good practice to have your work backed up and stored locally as well.

If you want to go the cloud route, you can check out MIT's licenses for:

- `Dropbox`: Up to 500GB for students.
- `Google Drive:` A.k.a. GSuite for Education: Up to 2TB storage for students.

Just remember that you won't retain access to these services after you no longer have an account with MIT so you will need to migrate your files at that point.

Is there a book to buy?

No! All readings are uploaded to the course Canvas site. In fact, many, if not all, of the texts are available digitally to MIT affiliates through the libraries. Just remember this favor when you ask yourself how much of the reading to complete... 😉

Getting Help

There are many, many ways to get help for this class!

Class Discord Server

If you have a question, it is likely that at least one of your colleagues has had the very same question! We encourage you to make liberal use of the class Discord server to share resources, questions, and solutions with your teammates. Instructors and TAs will be closely watching for questions.

Office Hours

Each member of the teaching team will have their own office hours - because we have a large teaching team, this means that help will be available during a pretty astonishing proportion of the work week! **All office hours will be hosted in the given instructor or TA's Zoom room, unless otherwise noted.**

GIS+Data Lab

GIS is such an important part of planning research and practice that MIT's Rotch Library has its own large, skilled, and friendly research staff. They can help you find data and help with technical hurdles you encounter along the way. Reach out to gishelp@mit.edu.

Lab computers: In addition to helping with data and methods, the GIS + Data Lab has quite a few computers that you can use from the comfort of your own home using remote desktop technology. This is very helpful if you find yourself needing more computing 'oomph' than your laptop can provide.

The Documentation

It's never a bad idea to read the manual! Learning how to read technical documentation is its own special skill to build, and once you master it you can do anything. QGIS documentation is here: https://docs.qgis.org/3.10/en/docs/index.html

Stack Overflow

A well-known, community-driven, tech help forum, Stack Overflow has become the go-to venue for tech help - which includes GIS!

Attendance Policy

As in life, much of your success in this class depends on showing up. We will be taking attendance in lectures and labs. (Students are required to go to one lab per week). That said, this is an extraordinary semester and we recognize that there may be a variety of reasons for you to miss a lecture or lab session. We are recording the class lectures so that people can catch up asynchronously when necessary. **If you need to take advantage of the asynchronous option, please drop the teaching team an email to explain your absence.** We value being in regular contact with you and understanding what challenges might prevent you from attending.

If you are unable to attend the regularly scheduled lectures and labs for an extended period of time (due to, say, a 12-hour time difference between yourself and the east coast of the United States), let us know as soon as possible - we'll do our best to accommodate your situation.

Lecture Recording

To accommodate folks who may have trouble joining class at the usual time, we will be recording the lecture portion of the course and making it available. We will not be recording lab sessions. To ensure that everyone is as comfortable as possible, however, we will prioritize student and instructor privacy. In practice this means a few things:

1. The recordings will not be made publicly available; access will be limited to members of the class.
2. Any student can ask for us to pause the recording at any time, no questions asked.
3. Students are not required to have their camera on during class time.

Abbreviated Schedule

Date	Week	Due	Assigned
8/31	**Week 0:** Locating Ourselves *Class starts Wednesday.*	🥳*Nothing!*🥳	Exercise 0
9/7	**Week 1:** Mapping *Labor Day, no class Monday.*	Exercise 0	Exercise 1
9/14	**Week 2:** What is Special About Spatial?	Exercise 1	Exercise 2
9/21	**Week 3:** Map Projections	Exercise 2	Exercise 3
9/28	**Week 4:** "What Gets Counted Counts" *Eric gone Monday, Yom Kippur.*	Exercise 3	Problem Set 1
10/5	**Week 5:** Thinking by Mapping: Spatial Analysis	Problem Set 1	Problem Set 2
10/12	**Week 6:** Geocoding	🥳*Nothing!*🥳	🥳*Nothing!*🥳

	Indigenous Peoples' Day - Monday schedule on Tuesday		
10/19	**Week 7:** 11.520 begins...	Problem Set 2	*(If in 11.520...)* Exercise A Project Paragraphs

Schedule

Week 0 | Locating Ourselves

`August 31 - September 4`

- Class starts **Wednesday, September 2**.
- What is GIS?
- What do power, feminism, Indigenous thought, and Black studies have to do with mapping?

Due

🥳 Nothing! 🥳

Assigned

Exercise 0: Locating Ourselves, due Thursday, September 10 at 11:59PM EDT.

Readings

- Paul A. Longley, Michael F. Goodchild, David Maguire, David W. Rhind, *Geographical Information Systems and Science*. Fifth Edition, "Chapter 1: Geographic Information: Science, Systems, and Society." pp. 1-32.
- Catherine D'Ignazio & Lauren F. Klein. Data Feminism, "Chapter 1: the Power Chapter." pp. 21 - 49.
- "Colonialism." Amber Murray, 2020. In: Kobayashi, A. (Ed.), International Encyclopedia of Human Geography, 2nd edition. vol. 10, Elsevier, pp. 315-326.
- Harley, John Brian. "The Map as Biography: Thoughts on Ordnance Survey Map, Six-Inch Sheet Devonshire CIX, SE, Newton Abbot." *The Map Collector* 41 (1987): 18–20.

Week 1 | Mapping

`September 7 - September 11`

- **Labor Day!** No class Monday.
- Map Design and Cartographic Standards
- Case Study: Power and Positionality in Mapping

Due

Exercise 0: Thursday, September 10 at 11:59PM EDT.

Assigned

Exercise 1: Due Thursday, September 17 by 11:59PM EDT.

Readings

- Paul Bolstad. *GIS fundamentals: A first text on geographic information systems*. Sixth edition. 2020. "Chapter 2: Data Models." **only pp. 27- 50**
- Paul A. Longley, Michael F. Goodchild, David Maguire, David W. Rhind, *Geographical Information Systems and Science*. Fifth Edition, "Chapter 11: Cartography and Map Production." pp. 237-265

Case Study: Power and Positionality in Black Geographies

- Catherine D'Ignazio & Lauren F. Klein. *Data Feminism*, Chapter 2: Collect, Analyze, Imagine, Teach. 2020. pp. 49-73, focus on the comparison of two maps pp. 49-59
- Adam Bledsoe, Willie J Wright, LaToya Eaves, *Black Geographies,* International Encyclopedia of Human Geography, 2nd edition, pp. 347-350. 2020.
- Laura Kurgan, *Close-Up at a Distance, Mapping Technology and Politics*, (Chapter 9 Million Dollar Blocks), 187-204.
- Read the BlackSpace Manifesto ('20 DUSP alum Kenyatta McLean is a co-founder).

Optional Reading about Mapping, Cities & Power

- Bosse, Amber J, "Map Anyway" Presented as part of *Atlas in a Day*.
- Denis Cosgrove, "Carto-City," *Geography and Vision: Seeing and Representing the World*, Chapter 10. 2008.

- Sarah Williams, "Big Data for Cities is Not New", *Data Action: Using Data for Public Good*, Chapter 1. 2020.
- More on the DGEI: Gwendolyn C. Warren, Cindi Katz, and Nik Heynen. “Myths, Cults, Memories, and Revisions in Radical Geographic History: Revisiting the Detroit Geographical Expedition and Institute 59.” In *Spatial Histories of Radical Geography: North America and Beyond*, pp. 59-87.

Week 2 | What is Special about Spatial?

`September 14 - September 18`

- Relational Databases
- Spatial data types and formats
- Vector vs. Raster
- Data Classification and Normalization
- Topology
- **Monday:** Visit from Shiri Pasternak of the Yellowhead Institute.

Due

Exercise 1: Thursday, September 17 at 11:59PM EDT.

Assigned

Exercise 2: Due Thursday, September 24 by 11:59PM EDT.

Readings

- Paul Bolstad. *GIS fundamentals: A first text on geographic information systems*. Sixth edition. 2020. "Chapter 2: Data Models." **pp. 50-75 only**

Case Study: Land Back

- Yellowhead Institute. “Land Back: A Yellowhead Institute Red Paper”, October 2019. **Read sections 1-3, pp. 15-45**. https://redpaper.yellowheadinstitute.org/wp-content/uploads/2019/10/red-paper-report-final.pdf

- Pearce, Margaret, and Renee Louis. "Mapping Indigenous Depth of Place." *American Indian Culture and Research Journal* 32, no. 3 (2008): 107–26. https://doi.org/10.17953/aicr.32.3.n7g22w816486567j.

Optional Reading

- Aronoff, Kate, Alyssa Battistoni, Daniel Aldana Cohen, and Thea Riofrancos. *A Planet to Win: Why We Need a Green New Deal*. New York, NY: Verso, 2019. "From Brine to Batteries," pp. 146-153.
- Cronon, William. *Changes in the Land: Indians* [sic]*, Colonists, and the Ecology of New England*. New York, NY: Hill and Wang, 1983. "Chapter 4: Bounding the Land," pp. 54-81.
- Kuyek, Joan. *Unearthing Justice: How to Protect Your Community from the Mining Industry*. Toronto, ON: Between the Lines, 2019.
- Lee, Robert, Tristan Ahtone, Margaret Pearce, Kalen Goodluck, Geoff McGhee, Cody Leff, Katherine Lampher, and Taryn Salinas. "Land-Grab Universities: How the United States funded land-grant universities with expropriated Indigenous land." *High Country News*, April 2020. https://www.landgrabu.org/.
- Palmer, Mark, and Robert Rundstrom. "GIS, Internal Colonialism, and the U.S. Bureau of Indian Affairs." *Annals of the Association of American Geographers* 103, no. 5 (2013): 1142–59. https://doi.org/10.1080/00045608.2012.720233.
- Rose-Redwood, Reuben. "With Numbers in Place: Security, Territory, and the Production of Calculable Space." *Annals of the Association of American Geographers* 102, no. 2 (2012): 295–319.
- Scott, James C. *Seeing like a State: How Certain Schemes to Improve the Human Condition Have Failed*. New Haven, CT: Yale University Press, 2008. "Land Tenure: Local Practice and Fiscal Shorthand." pp. 33-52.
- And for the statistically inclined, we should point out that spatial data has its own set of statistical idiosyncrasies as well (the topic of Eric's class in the spring): O'Sullivan, David, and David J. Unwin. "The Pitfalls and Potential of Spatial Data." In *Geographic Information Analysis*, 33–54. Hoboken, NJ: John Wiley & Sons, 2010. https://doi.org/10.1002/9780470549094.ch2.

Week 3 | Map Projections

`September 21 - September 25`

- Projections
- Datums
- Reference Systems
- State Plane Coordinate and UTM

- Peters projection, Buckminster Fuller, Mercator

Due

Exercise 2: Thursday, September 24 at 11:59PM EDT.

Assigned

Exercise 3: Due Thursday, October 1 by 11:59PM EDT.

Readings

- Paul Bolstad, GIS Fundamentals, Chapter 3, "Geodesy, Datums, Projections, and Coordinate Systems." XanEdu, 6th Edition, 2020, p. 87-136

Case Study | Counter-Mercators

- Selections from Lilla LoCurto and Bill Outcault. 2000. Selfportrait.map. University of Washington Press.
    - Also, their website... https://www.locurto-outcault.com/selfportrait-map-2000-new
- Selections from Arno Peters, 1983, *The New Cartography*.
- Crampton, Jeremy. "Cartography's Defining Moment: The Peters Projection Controversy, 1974-1990." *Cartographica* 31, no. 4 (1994): 16–32.
- 'Cartographers for Social Equality' clip from *The West Wing*, Season 2, Episode 16. "Somebody's Going to Emergency, Somebody's Going to Jail."
- Thompson, K., & Emerson, B. (1969). 'Universal Antipode Projection.' *Antipode*, 1(1), 16–16. https://doi.org/10.1111/j.1467-8330.1969.tb00387.x
- "Life Presents R. Buckminster Fuller's Dymaxion World." *LIFE*, March 1, 1943.
    - Fuller, R. Buckminster. *Cartography.* United States Patent Office 2,393,676, filed February 25, 1944, and issued January 29, 1946.

Resources

- Epsg.io
- Kai's Block, Comparing map projections: http://bl.ocks.org/syntagmatic/ba569633d51ebec6ec6e
- Mike Bostock, "Projection Transitions" https://observablehq.com/@d3/projection-transitions

Week 4 | “What Gets Counted Counts”: The U.S. Census and Gerrymandering

`September 28 - October 2`

- Eric gone Monday, Yom Kippur.
- History of Census/American Community Survey
- Census Geography
- Calculating New Variables and Making New Table Fields
- Census Variables
- Estimation Methods
- **Monday:** Visit from Meredith Gamble, City of Somerville Complete Count Coordinator.
- **Wednesday:** Visit from Heather Rosenfeld, Metric Geometry and Gerrymandering Group.

Due

Exercise 3: Thursday, October 1 at 11:59PM EDT.

Assigned

Problem Set 1: Due Thursday, October 8 by 11:59PM EDT.

Readings

- MacDonald, Heather and Alan Peters. *Urban Policy and the Census.* Redlands, CA: Esri Press. 2011. “Chapter 1: Introduction to the US Census” and “Chapter 2: Mapping Continuous Measures: The ACS.” pp. 1-17, 26-32
- *Data Feminism,* Chapter 4, “What Gets Counted Counts.” https://data-feminism.mitpress.mit.edu/pub/h1w0nbqp , pp. 97-124
- Winlow, Heather. “Mapping, Race and Ethnicity.” In *International Encyclopedia of Human Geography*, 309–21. Elsevier, 2020. https://linkinghub.elsevier.com/retrieve/pii/B9780081022955105712.

Case Study: 2020 Census and Gerrymandering

- Jill Lepore. 2020. “Will This Year’s Census Be the Last?” *The New Yorker*, March 23, pp. 11-17.
- CUNY Mapping Service. Hard to Count Map. https://www.censushardtocountmaps2020.us/

- Wines, Michael. "As Census Count Resumes, Doubts About Accuracy Continue to Grow." The New York Times, August 24, 2020. https://www.nytimes.com/2020/08/24/us/census-bureau.html.
- Bernstein, Mira, and Moon Duchin. "A Formula Goes to Court: Partisan Gerrymandering and the Efficiency Gap." *Notices of the American Mathematical Society* 64, no. 09 (2017): 1020–24. https://doi.org/10.1090/noti1573.
    - Skim the math! You can also see Duchin speak about this work here.
- MGGG's Districtr

Optional Reading

- Neil Freeman's @everytract
    - Commentary by Miller, Daegan. "Earthward: Landscape Photography in the Satellite Age." Places Journal, July 28, 2020.
- Brown, Michael, and Larry Knopp. "Places or Polygons? Governmentality, Scale, and the Census in the *Gay and Lesbian Atlas*." *Population, Space and Place* 12, no. 4 (2006): 223–42. https://doi.org/10.1002/psp.410.
- Bowker, Geoffrey C., and Susan Leigh Star. *Sorting Things out: Classification and Its Consequences*. Cambridge: The MIT Press, 2000.
- Coverage of problems facing the 2020 Census in Boston: Dooling, Shannon. "The Race To Be Counted: Why Some Mass. Advocates Fear A Woefully Inaccurate 2020 Census." WBUR. August 19, 2020. https://www.wbur.org/news/2020/08/19/census-count-immigrants-people-of-color-nonprofit-efforts.
- Duchin, Moon, and Bridget Eileen Tenner. "Discrete Geometry for Electoral Geography." ArXiv:1808.05860 [Physics], August 15, 2018. http://arxiv.org/abs/1808.05860.
- Hannah, Matthew G. *Dark Territory in the Information Age: Learning from the West German Census Controversies of the 1980s*. Bulington, VT: Ashgate Publishing, 2010.
- MacDonald, Heather and Alan Peters. *Urban Policy and the Census.* Redlands, CA: Esri Press. 2011. "Chapter 3: Interpretation and Communication." 1-32. 31
- Mark Monmonier, *How to Lie with Maps*, University of Chicago Press, 2nd Edition, 1996, Chapter 10: "Data Maps: Making Nonsense of the Census."
- Nobles, Melissa. 2000. *Shades of Citizenship: Race and the Census in Modern Politics*. Stanford, CA: Stanford University Press.

Week 5 | Thinking by Mapping: Spatial Analysis

`October 5 - October 9`

- Concepts of Spatial Analysis
- Geoprocessing Tools (Buffer, Clip, Dissolve, Update, Union, etc)
- **Monday:** Visit from Black Girls M.A.P.P.
- **Wednesday:** Visit from Tim Reardon of the Metropolitan Area Planning Council (MAPC)

Due

Problem Set 1: Due Thursday, October 8 by 11:59PM EDT.

Assigned

Problem Set 2: Due Thursday, October 22 by 11:59PM EDT.

Readings

- Paul Bolstad. *GIS fundamentals: A first text on geographic information systems*. Sixth edition. 2020. "Chapter 9: Basic Spatial Analysis." pp. 373-415
- Schlossberg, Marc, "GIS, the US Census and Neighborhood Scale Analysis". Planning, Practice & Research, vol. 18, No. 2-3, pp.213-217, May-August, 2003

Case Study: Recent Briefs from the Metropolitan Area Planning Council

- Racial Disparities in the Proximity to Vehicle Air Pollution in the MAPC Region
- The COVID-19 Layoff Housing Gap
- Crowded In and Priced Out: Why It's so Hard to Find a Family-Sized Unit in Greater Boston
- Climate Vulnerability in Greater Boston

Optional Reading about applications of spatial analysis to various domains

- Kremer, Peleg, and Tracy L. DeLiberty. "Local food practices and growing potential: Mapping the case of Philadelphia." *Applied Geography* 31.4 (2011): 1252-1261.
- Frank, Lawrence, Mark Bradley, Sarah Kavage, James Chapman, and T. Keith Lawton. "Urban form, travel time, and cost relationships with tour complexity and mode choice." *Transportation* 35, no. 1 (2008): 37-54.

Week 6 | Geocoding

`October 12 - October 16`

- **Indigenous Peoples' Day:** Monday's class held on Tuesday.

- Geocoding
- Terminology
- Common Errors and Problems
- **Wednesday:** Visit from Margaret Pearce.

Due

🥳 Nothing! 🥳 (Work on Problem Set 2!)

Assigned

🥳 Nothing! 🥳

Readings

- Paul A. Longley, Michael F. Goodchild, David Maguire, David W. Rhind, *Geographical Information Systems and Science*. Fourth Edition, "Chapter 4: Georeferencing". **pp. 77 - 88 and 95 - 98 only**
- Video - Diana Shkolnikov, Befriending a Geocoder, State of the Map Conference, 2016 http://stateofthemap.us/2016/befriending-a-geocoder/

Case Study: Postcolonialism, Geocoding & "Development" - what3words, Makani

- "Postcolonialism." Vives, L., Mohabir, N., 2020. In: Kobayashi, A. (Ed.), International Encyclopedia of Human Geography, 2nd edition. vol. 10, Elsevier, pp. 289–295.
- The techno-heroic story:
    - "Addressing Brazil's favelas | what3words." https://www.youtube.com/watch?v=7PMtqGDUahE.
    - "Take a trip to the Olympics with what3words and RioGo." What3words: https://what3words.com/partner/riogo/
    - This one is just offensive: Marshall, Aarian. 2014. "Google and Microsoft are Putting Rio's Favelas on the Map." *CityLab* September 26.
- The critical take: Maral Sotoudehnia. "Toponymic checksum or flotsam?: Recalculating Dubai's grid with Makani,"the smartest map in the world"." In *The Political life of Urban Streetscapes*, pp. 290-308. Routledge, 2017.

Optional Reading to Understand what's going on "behind the scenes" in Geocoding:

- Jiang, Wen, and Emmanuel Stefanakis. "What3Words geocoding extensions." *Journal of Geovisualization and Spatial Analysis* 2, no. 1 (2018): 7.
- Paul A. Zandbergen, *Influence of street reference data on geocoding quality,* Geocarto International, Vol. 26, No. 1, February 2011, 35–47
- Lee, Kangjae, Alexis Richard C. Claridades, and Jiyeong Lee. "Improving a Street-Based Geocoding Algorithm Using Machine Learning Techniques." *Applied Sciences* 10, no. 16 (2020): 5628.

Optional Reading - Creative Applications of Geocoding:

- Currid, Elizabeth and Sarah Williams, "The Geography of Buzz: art, culture and the social milieu in Los Angeles and New York", *Journal of Economic Geography*, (July, 2009) pg 1-29

GIS Workshop (11.520) Starts October 19, 2020!