

January 10, 2021

## 11.S195/11.S954: Mapping as Making: Applied Map Design and Cartography Workshop

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- IAP 2021, MWF 3-5
- Class Held on Zoom<sup>1</sup>
- Office Hours: TuF, 9:30-11 Th, 4:30-6, booked on Calendly<sup>2</sup>

### Description

This workshop will introduce students to principles and practices of map design – what Europeans have called cartography - using both desktop and web-based graphic design and mapping tools. Through hands-on tutorials and case studies, students will be equipped to design compelling maps that tell powerful stories.

Maps are perhaps the most widely-used visual tools of activists, urban planners, and designers. Whether relaying the results of a GIS analysis, agitating for systemic change, providing the analytical basis for a plan, sharing the results of scientific inquiry, or actively gathering data as part of a participatory or crowd-sourced process, maps are ubiquitous. This ubiquity, however, makes us forget that maps are expected to do quite a lot of work – to capture and hold attention, to get us from place to place, to make arguments, to tell stories, to propose interventions. We will be learning to do each of these things better, and to do each of these things differently. Some GIS experience is preferred, though not required.

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<sup>1</sup><https://mit.zoom.us/j/98473097548?pwd=L0lveWdLYis0WFNlVFZTVEp4WTg3Zz09>

<sup>2</sup><https://calendly.com/robkyhuntley/office-hours/>



*Figure 1: Marie Tharp, cartographer and oceanographer, draws a physiographic diagram of the Indian ocean. Image from the Lamont-Doherty Earth Observatory. Reproduced in Hali Felt's Soundings: The story of the Remarkable Woman who Mapped the Ocean Floor (2012).*

### **How Will We be Learning?**

This course is very short—we only have five sessions, including the first! We will be covering content using a variable mixture of hands-on-tutorials and approachable lectures on mapping concepts.

### **Are There Prerequisites?**

No! Although, inevitably, some familiarity with GIS fundamentals (like those gained from successful completion DUSP's 11.205/11.520 sequence, for grads, or 11.188 for undergrads), will prove beneficial.

## Assessment and Assignments

This class will be graded, but it will be graded *leniently*—it is intended to be exploratory! Also note that, in accordance with MIT’s IAP grading policies for IAP 2021 (available at <https://registrar.mit.edu/covid-19/grading/iap-2021>) all Ds and Fs will be converted to D/NE and F/NEs.

### Assessment

Assignment	Weight
Participation	70%
Cartographic Experiment	30%

### *Cartographic Experiment*

- Due: Wednesday, January 27, 2021 by noon.

We will only have one assignment in this course—the assignment is to pursue one of the approaches outlined over the course of our time together and apply it to a geography that is of interest to you. However, I call this an ‘experiment’ for a reason! This is a loose, forgiving environment for you to try unconventional things. While there’s a great deal of value in learning (and adhering to) convention, there’s also much to be said for pushing against those conventions and seeing where breaking things might take you. As such, pursue unconventional mappings!

### Attendance Policy

As in life, much of your success in this class depends on showing up. I will be taking attendance, and it will be the largest component of your grade! That said, these continue to be extraordinary times—I recognize that there may be a variety of reasons for you to miss a class period. I will, in general, be recording class sessions so that folks can catch up asynchronously when necessary.

If you are unable to attend the regularly scheduled classes 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 me know as soon as possible - I’ll do my best to accommodate your situation.

## Lecture Recording

To accommodate folks who may have trouble joining class at the usual time, I will be recording class sessions and making them available. To ensure that everyone is as comfortable as possible, however, I intend to 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.

## Office Hours

You can find me from 9:30-11 on Tuesdays, 4:30-6 on Thursdays, and 9:30-11 on Fridays (all times are in US Eastern Time, UTC-5:00)). We're all suffering from Zoom fatigue to varying degrees, so make it pleasant/fun, whatever that means for you! Bring a cup of tea. Wear a funny hat. Pet an animal.

I find it very helpful if you book sessions in advance through my Calendly<sup>3</sup>, though this is not absolutely mandatory.

If the scheduled time does not work for you, we can make arrangements to meet at another time. However, please be conscientious! I set this time aside each week for office hours and I really do try to manage my time.

## Email

We have seen an explosion of platforms in use by educators for channeling class-related communication. I will be sticking to email because, honestly, Slack messages piling up gives me indigestion. If you want to chat amongst yourselves, I am happy to set up a Slack channel. But I will not be checking it.

I will not always be able to respond to email right away. If I have not answered an email by the next time we see you in class please be sure to remind me in class. I will do our best to respond to your emails in 24-48 hours during the week. I 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

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<sup>3</sup><https://calendly.com/robkyhuntley/office-hours/>

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!

### **Land Acknowledgment**

Mapping has been (and continues to be) instrumental in the dispossession of indigenous folks from their land by colonists. As such, it would seem particularly important to include language in this syllabus recognizing that the land on which MIT sits (and on which many, if not all, of the places we're Zooming in from sit) is unceded.

“MIT acknowledges Indigenous Peoples as the traditional stewards of the land, and the enduring relationship that exists between them and their traditional territories. The land on which we sit is the traditional unceded territory of the Wampanoag Nation. We acknowledge the painful history of genocide and forced occupation of their territory, and we honor and respect the many diverse indigenous people connected to this land on which we gather from time immemorial.”—Developed by the MIT Indigenous Peoples Advocacy Committee (IPAC) in part with MIT’s American Indian Science and Engineering Society (AISES), Native American Student Association (NASA) and other Indigenous MIT students/alumni.

### **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. I went to graduate school. In fact, I went to graduate school twice. I also went to college. Without dwelling on the issue, I will say that I am intimately familiar with the toll that institutions of higher education can exact on our mental health and wellbeing. I also know that many of you just experienced substantial displacements in your personal, academic and professional lives. This suggests that we should all do our best to form a little mutual aid community—do not hesitate to reach out to me.

Additionally, the COVID crisis has not meant the end of MIT formal support for student wellbeing. The institute continues to offer a range of counseling and mental health resources<sup>4</sup> for students. There is also the new coaching program that the institute has created in light of the pandemic. I would really encourage you to be proactive

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<sup>4</sup><https://medical.mit.edu/services/mental-health-counseling>

about taking advantage of these things. Also, as I said above, do not hesitate to let me know if you're struggling. It is not my intention to mine for the details of your private lives! It is only to let you know that I am sensitive to the distinctive difficulties of the environment we inhabit and that help is available.

## Schedule

Session 1: Monday, January 11 | Overview

Session 2: Wednesday, January 13 | Projections to Make a Point

### Starting Points

- Sarah Battersby. 2017. "Map Projections." In *The Geographic Information Science & Technology Body of Knowledge*, edited by John P. Wilson. 2nd Quarter 2017 Edition. DOI: 10.22224/gistbok/2017.2.7
- *The West Wing*. 2001. "Somebody's Going to Emergency, Somebody's Going to Jail." Directed by Jessica Yu. Written by Paul Redford and Aaron Sorkin. 28 February.
  - As of January 2020, the relevant segments are extracted at <https://www.youtube.com/watch?v=AMfXVWFBvVo>.

### Additional References

- Paul Bolstad. 2019. "Geodesy, Datums, Projections, and Coordinate Systems." In *GIS Fundamentals*, p. 87-115. 6th Edition. Ann Arbor, MI: XanEdu.
  - Okay, so first thing's first—if you want more technical details on projections and coordinate reference systems, look no further than this excellent chapter in Paul Bolstad's very useful reference text. The segment most applicable to common projection-related GIS processes starts on page 116.
- Agnes Denes. (1976) 2019. "Isometric Systems in Isotropic Space—Map Projections." In *Absolutes and Intermediaries*, p. 186-208. New York, NY: The Shed.
  - A, by turns, beautiful and absurd exploration of map projections as systems of abstraction by a renowned landscape artist.

- Crampton, Jeremy. 1994. “Cartography’s Defining Moment: The Peters Projection Controversy, 1974-1990.” *Cartographica* 31 (4): 16–32.
  - One of the classic reference points for teaching projection as a political act is the controversy surrounding Arno Peters’s equal area projection, particularly within the community of professional cartographers. Crampton’s account of the controversy is classic.
- Lilla LoCurto and William Outcault. 1999. *selfportrait.map*. Seattle, WA: University of Washington Press.
  - A slightly grotesque experiment with map projections as applied to bodies—there’s something about the way that the projections apparently tear and stretch the artist’s skin that makes the distortion involved in map projections feel very visceral.
- Susan Schulten. 1998. “Richard Edes Harrison and the Challenge to American Cartography.” *Imago Mundi* 50: 174-188.
  - For more on this, see Daniel Immerwahr. 2019. “The Map that Remade an Empire”<sup>5</sup>. *Mother Jones*. December, which is itself an adapted excerpt from Daniel Immerwahr. 2019. *How to Hide an Empire: A History of the Greater United States*. New York, NY: Farrar, Straus, and Giroux.

### Session 3: Friday, January 15 | Terrain and Surfaces

#### Starting Points

- Patrick Kennelly. 2017. “Terrain Representation.” In *The Geographic Information Science & Technology Body of Knowledge*, edited by John P. Wilson. 4th Quarter 2017 Edition. <https://doi.org/10.22224/gistbok/2017.4.9>.
- Patrick McHaffie. 2000. “Surfaces: Tacit Knowledge, Formal Language, and Metaphor at the Harvard Lab for Computer Graphics and Spatial Analysis.” *International Journal of Geographical Information Science* 14 (8): 755–73. <https://doi.org/10.1080/136588100750022778>.

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<sup>5</sup><https://www.motherjones.com/media/2019/12/the-map-that-remade-an-empire/>

### *Additional References*

- Garrett Dash Nelson. 2019. “Mosaic and Tapestry: Metaphors as Geographical Concept Generators.” *Progress in Human Geography* 43 (5): 853–70. <https://doi.org/10.1177/0309132518788951>.
  - Nelson is interested, here, in how our ‘spatial ontologies’ lead us to think about the world—this is fancy language for “what do the concepts we have allow us to consider ‘real?’” Surfaces have long been of interest to both physical scientists and social sciences, with approaches flying freely back and forth between the two, often through cartographic visualizations. This has implications for how we’re able to imagine the world!
- Eduard Imhof. *Cartographic Relief Presentation*. Redlands, CA: Esri Press.
  - The stone-cold classic of terrain representation, by a Swiss cartographer. Dusty, sure, but Imhof’s cartography is rather stunning.
- Paul Bolstad. 2019. “Terrain Analysis.” In *GIS Fundamentals*, p. 485-520. Sixth Edition. Ann Arbor, MI: XanEdu.
  - Useful, and relatively exhaustive technical reference.

No Class on Monday, January 18

Session 4: Wednesday, January 20 | Flows + Networks

### *Starting Points*

- Steiner, E. 2019. “Flow Maps.” In *The Geographic Information Science & Technology Body of Knowledge*, edited by John P. Wilson. 2nd Quarter 2017 Edition. DOI: 10.22224/gistbok/2019.4.10.

### *Additional Resources*

- Laura Kurgan. 2013. “Million-Dollar Blocks.” In *Close Up at a Distance: Mapping, Technology, and Politics*, p. 187-204. New York, NY: Zone Books.
  - The flow maps used here make a rather compelling argument about the manner in which prisons produce extraordinary costs and distances between imprisoned folks and their communities. See also Sarah Williams.

2020. “Share It! Communicating Data Insights.” In *Data Action: Using Data for Public Good*, p.157-186. Cambridge, MA: The MIT Press.

- Sergio Peçanha and Tim Wallace. 2015. “The Flight of Refugees Around the Globe.” *The New York Times*, June 20.
  - A very classic use of flow maps—to show the movement and flow of migrants and refugees.
- Garrett Dash Nelson and Alasdair Rae. “An Economic Geography of the United States: From Commutes to Megaregions.” *PLoS ONE* 11 (11): e0166083. <https://doi.org/10.1371/journal.pone.0166083>.
  - A sophisticated contemporary application of network science to the idea of the ‘region’—they use commuter flows to analyze the economic inter- and intra-dependency of places, producing some rather stunning cartography along the way.

#### Session 5: Friday, January 22 | Mapping Cities

##### *Starting Points*

- Jill Desimini and Charles Waldheim. 2016. “Land Classification.” In *Cartographic Grounds: Projecting the Landscape Imaginary*, p. 112-135. New York, NY: Princeton Architectural Press.
- Jill Desimini and Charles Waldheim. 2016. “Figure-Ground.” In *Cartographic Grounds: Projecting the Landscape Imaginary*, p. 136-155. New York, NY: Princeton Architectural Press.
- Nelson, Garrett Dash. 2017. “Making the Single City: The Constitutive Landscape and the Struggle for ‘Greater Boston,’ 1891–1911.” *Landscape Research* 42 (3): 243–55. <https://doi.org/10.1080/01426397.2016.1267130>.

##### *Additional Resources*

- Sarah Williams. 2020. “Big Data for Cities is Not New.” In *Data Action: Using Data for Public Good*. Cambridge, MA: The MIT Press.
  - An accessible history of the use of data in urban governance, many instances of which are primarily cartographic.

- Denis Cosgrove. 2008. "Carto-City." In *Geography & Vision*, p. 169-182. New York, NY: I.B. Taurus & Co.
  - Another episodic history of urban cartography.
- Urban Theory Lab–GSD. 2014. "Visualizing an Urbanized Planet - Materials." In *Implosions/Explosions: Towards a Study of Planetary Urbanization*, p. 460-475. Berlin, Germany: Jovis.
  - This piece is fascinating—it's an exploration of attempts to map 'the urban,' and a set of propositions about how doing so has led to constrained understandings of processes of urbanization.