

LOCATING THE CLOUD

“New computational infrastructures build from, and on top of, existing material and physical infrastructures. On the one hand, this might seem counterintuitive because visions of data conjure images of ethereal and immaterial cyberspace. On the other hand, although data are intangible, data require storage and communication, which necessitates material and tangible infrastructures. These infrastructures bring rare-earth minerals, electricity infrastructures, laboring bodies, fiber optic cables, knowledge, code, water, and fossil fuel together in a disturbing whole”

---Anthony Levenda & Dillon Mahmoudi,
“Silicon Forest and Server Farms”

COURSE DESCRIPTION:¹

Inside the nondescript yet gargantuan data centers often located in global hinterlands are rows upon rows of machines emitting a faint if ever-present hum. These machines are servers, and the hyperscale data centers that house them are the physical nodes of the vast network of digital storage and computing known as “the Cloud.” This planetary network underlies everyday forms of digital connection and entertainment, from streaming a show or zooming into a class to liking a tweet or messaging a loved one. It also structures global flows of capital, labor, and commodities and advances long-standing forms of state violence, including surveillance, policing, and war.

The Cloud is designed to be omnipresent, providing access to digital networks everywhere and all of the time. But the boundlessness conjured by its name is aspirational. Indeed, the apparent immateriality of this digital network is grounded in a complex network of material infrastructures, and it has decidedly material implications both near and far from the physical sites of Cloud infrastructure. As Cloud infrastructures proliferate across the globe—a trend only accelerated by the pandemic-driven shift of more and more facets of everyday life into the digital realm—there is an urgent need to contend with the role of the Cloud in our lives and across the world. In this course, we will critically examine the cultural, economic, and ecological politics of the Cloud.

COURSE REQUIREMENTS:

In order to accomplish our objectives, the main outputs will consist of individual weekly responses and a collective group project. In centering our goal of creating a collaborative learning space in which to think through the complexities of the Cloud, the primary product will be the group project. There will also be a secondary, accompanying reflective essay that will be individual. Details of each are as follows:

¹ This syllabus was designed by Carrie Hamilton (PhD Student, Sociology) and Kellie Peterson (PhD Student, Sociology), as affiliates of the Science and Justice Training Program at UC Santa Cruz.

- **WEEKLY RESPONSES.** Each week before our meeting, participants should individually submit a brief **150–200 WORD** response reflecting on the theme and readings for the week and **1–3 QUESTIONS** for discussion.
- **LEAD DISCUSSANT.** Participants will sign up to serve as lead discussant for at least **ONE SESSION**. This may be shared with one to two other participants depending on course enrollment. The primary responsibility of the discussant role is to facilitate ongoing, generative discussion. The discussant should review the submitted weekly responses and select **2–3 QUESTIONS** to begin our discussion.
- **GROUP PROJECT.** The group project should showcase the knowledge participants have collectively gained from participating in this learning group. Groups will create a final project that clearly and cohesively engages **ONE OVERARCHING THEME** explored in this class. The project can take any form as long as it represents a tangible final product (i.e. a map, podcast, cooperative service learning project, etc.). The project must utilize **THREE (3) COURSE READINGS** and **TWO (2) ADDITIONAL READINGS OR SOURCES** at minimum. Groups will showcase their project during our final meeting.
- **FINAL PAPER.** To accompany the group project, each member will submit an individual reflective essay. The essay should be **1,000–2,500 WORDS** and should critically examine some dimension of the future role, impact, and issues posed by the Cloud and cloud computing technologies. The essay may draw upon the group project and associated theme but is not required to do so. In addition to the five sources cited for the group project, the essay should utilize an additional **TWO (2) SOURCES** at minimum. These can be either course readings or outside sources.

WHAT IS THE CLOUD?

WEEK 1: INTRODUCING THE CLOUD

READINGS:

Cha, Bonnie. 2015. "Too Embarrassed to Ask: What is 'The Cloud' and How Does it Work?" <https://www.vox.com/2015/4/30/11562024/too-embarrassed-to-ask-what-is-the-cloud-and-how-does-it-work>).

Holt, Jennifer and Patrick Vonderau. "Where the Internet Lives": Data Centers as Cloud Infrastructure." Pp. 71-93 in *Signal Traffic: Critical Studies of Media Infrastructures*, edited by Lisa Parks and Nicole Starosielski. Champaign, IL: University of Illinois Press.

WEEK 2: CLOUD INFRASTRUCTURE

READINGS:

Starosielski, Nicole. 2015. "Circuitous Routes: From Topology to Topography." Pp. 26-63 in *The Undersea Network*. Durham, NC: Duke University Press.

Dourish, Paul. 2015. "Protocols, Packets, and Proximity: The Materiality of Internet Routing." Pp. 183-204 in *Signal Traffic: Critical Studies of Media Infrastructures*, edited by Lisa Parks and Nicole Starosielski. Champaign, IL: University of Illinois Press.

Plantin, Jean-Christophe and Aswin Punathambekar. 2019. "Digital Media Infrastructures: Pipes, Platforms, and Politics." *Media, Culture & Society* 41(2): 163-174.

Hu, Tung-Hui. 2016. "The Shape of a Network." Pp. 1-35 in *A Prehistory of the Cloud* Cambridge, MA: MIT Press.

WEEK 3: FIELD TRIP

DATA CENTER TOUR

WHAT MAKES THE CLOUD?

WEEK 4: CLOUD ECOLOGIES

READINGS:

Crawford, Kate. 2021. "Earth" Pp. 23-51 in *The Atlas of AI: Power, Politics, and the Planetary Costs of Artificial Intelligence*. New Haven, CT: Yale University Press.

Gonzalez, Steven. 2022. "The Cloud is Material: On the Environmental Impacts of Computation and Data Storage." *MIT Case Studies in Social and Ethical Responsibilities of Computing* Winter.

Hogan, M  l. 2018a. "Big Data Ecologies." *Ephemera* 18(3): 631-657.

Siddik, Md Abu Bakar, Arman Shehabi, and Landon Marston. 2021. "The Environmental Footprint of Data Centers in the United States." *Environmental Research Letters*, 16 (6):064017.

WEEK 5: CLOUD WORK

READINGS:

Ensmenger, Nathan. 2021. "The Cloud is a Factory." Pp. 29-49 in *Your Computer is on Fire*. Edited by Thomas S. Mullaney, Benjamin Peters, Mar Hicks and Kavita Philip. Cambridge, MA: MIT Press.

Crawford, Kate. 2021. "Labor" Pp. 53-8 in *The Atlas of AI: Power, Politics, and the Planetary Costs of Artificial Intelligence*. New Haven, CT: Yale University Press.

Hogan, Mél. 2018b. "Data is Airborne; Data is Inborne: The Labor of the Body in Technoecologies." *First Monday* 23(3-5).

Qui, Jack Linchuan, Melissa Gregg, and Kate Crawford. 2014. "Circuits of Labour: A Labour Theory of the iPhone Era." *tripleC: Communication, Capitalism, Critique* 12(4).

WEEK 6: CLOUD GEOGRAPHIES

EXPLORE:

[Locating the Cloud map](#). This map shows the approximate location and workforce size of US hyperscale data centers owned by Google and Meta.

READINGS:

Burrell, Jenna. 2020. "On Half-Built Assemblages: Waiting for a Data Center in Prineville, Oregon." *Engaging Science, Technology, and Society* 6: 283-305.

Jaeger, Paul, Jimmy Lin, Justin Grimes, & Shannon Simmons. 2009. "Where is the Cloud? Geography, Economics, Environment, and Jurisdiction in Cloud Computing." *First Monday* 14(5).

Vonderau, Asta. 2018. "Storing Data, Infrastructuring the Air: Thermocultures of the Cloud." *Culture Machine*, 18:1-12.

Levenda, Anthony M. and Dillon Mahmoudi. 2019. "Silicon Forest and Server Farms: The (Urban) Nature of Digital Capitalism in the Pacific Northwest." *Culture Machine*, 18: 1-14.

WHAT DOES THE CLOUD "DO"?

WEEK 7: THE CLOUD & POWER

READINGS:

Amoore, Louise. 2020. "The Cloud Chambers: Condensed Data and Correlative Reason." Pp. 29-55 in *Cloud Ethics: Algorithms and the Attributes of Ourselves and Others*. Duke University Press.

Hu, Tung-Hui. 2016. "Data Centers and Data Bunkers." Pp. 79-110 in *A Prehistory of the Cloud*. Cambridge, MA: MIT Press.

Hu, Tung-Hui. 2016. "Seeing the Cloud of Data." Pp. 111-144 in *A Prehistory of the Cloud*. Cambridge, MA: MIT Press.

Crawford, Kate. 2021. "State" Pp. 23-51 in *The Atlas of AI: Power, Politics, and the Planetary Costs of Artificial Intelligence*. New Haven, CT: Yale University Press.

WEEK 8: (RE)IMAGINING THE CLOUD

READINGS:

Larkin, Brian. 2013. "The Poetics and Politics of Infrastructure." *Annual Review of Anthropology* 42: 327-343.

Gillespie, Tarleton. 2010. "The Politics of 'Platforms.'" *New Media and Society* 12(3): 347-364.

Starosielski, Nicole. 2015. "Short-circuiting Discursive Infrastructure: From Connection to Transmission." Pp. 64-93 in *The Undersea Network*. Durham, NC: Duke University Press.

Crawford, Kate and Vladan Joler. 2018. "Anatomy of an AI System: The Amazon Echo as an anatomical map of human labor, data and planetary resources." <https://anatomyof.ai/>

WEEK 9: NEBULOUS FUTURES

READINGS:

Edwards, Paul N. 2021. "Platforms are Infrastructures on Fire." Pp. 313-336 in *Your Computer is on Fire*, edited by Thomas S. Mulaney, Benjamin Peters, Mar Hicks and Kavita Philip. Cambridge, MA: MIT Press.

Hogan, Mél and Tamara Shepherd. 2015. "Information Ownership and Materiality in an Age of Big Data Surveillance." *Journal of Information Policy* 5: 6-31.

Amoore, Louise. 2020. "The Unattributable Strategies for a Cloud Ethics" Pp. 154-172 in *Cloud Ethics: Algorithms and the Attributes of Ourselves and Others*. Durham, NC: Duke University Press.

WEEK 10: *FINAL PROJECT DUE*

FINAL PRESENTATIONS & COURSE REFLECTIONS