# Troubled Worlds:
# A Course Syllabus about Information Work and the Anthropocene

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## INTRODUCTION TO THE COURSE SYLLABUS

As an analytic focus, the course title, "Troubled Worlds," embodies two approaches to a library and information science pedagogy of and around the era of human domination widely known as the "Anthropocene." On the one hand, it refers to the vast ecological, geopolitical, and material challenges mounted against the earth today. The phrase emblazons a commitment to interrogating the *trouble* faced by and within a diversity of its social *worlds*. On the other hand, with troubled worlds we point to the varied means by which we, as information scholars, might contend with and complicate those earthly challenges. The phrase then embodies a commitment to *troubling* the way society approaches world building.

This syllabus came out of a year-long seminar designed to think across the environmental dimensions of information technology, where the murky ethical waters of sourcing, circulation, maintenance, consumerism, and disposal bump up against experiments in community accountability, collective inquiry, and speculation. Coming both from departments tied to information work, we (Megan Finn and Daniela Rosner) first conceived of the seminar as a response to a growing complicity we felt within our own praxis of scholarship and instruction. As teachers of courses on design methods and information and data ethics, we hoped to give students the tools to examine and perhaps rework computing's place in the Anthropocene. We wanted to explore computing's long-

term effects and pose challenging questions that might lie outside the frame of conventional library and information studies inquiry.

To achieve this aim, and to challenge our ingrained pedagogical habits, we sought to convene a conversation that went beyond information studies and design engineering to reach into disciplines exploring radical perspectives on climate futures such as arts practice and humanistic approaches in media studies. Each week the group worked together to choose book excerpts and articles and put them in conversation with artistic interventions and experiments. We then read our own ideas, interests, and questions through each text or project, building varied conversations and reflections across the year. From within this undisciplined interdisciplinary conversation we developed a syllabus that seeks to enrich ongoing discussions on the Anthropocene and information work. Our objective is to extend the current dialogues on sustainability to consider, at least at the site of the classroom, the breaking up of hegemonic supply chains and at the same time, the breaking up of the naturalization of the cloud and its users (as predominately able-bodied, human) by considering the choices to support community-oriented making and repair as part of a system of value.

We have yet to teach this course in full, and yet our own experiments resemble the ones presented below. The curriculum thus serves as a provisional roadmap for more tailored derivatives. Instructors can use individual or a set of these modules for incorporating into their existing courses. For instance, instructors might want to introduce some of these concerns within the wider context of a survey or introductory course.

This compilation does not provide a comprehensive review of the literature on the environment within the information fields. Instead, it surfaces literature to promote experimental research, practice, and further investigation. The modules construct a provisional path through the related literature in a form that we hope may be continually adjusted, rearranged, and augmented. We include discussion questions for most modules, but we leave other learning activities, assessments, and evaluations to the author(s) of future versions.

The "Troubled Worlds" syllabus starts with pieces by Nathan Ensmenger and Anna Lowenhaupt Tsing. These writings motivated us to start *Troubled Worlds*, and we returned to them again and again throughout the year. We then move to a discussion of concerns most obviously germane to the work of most library and information science professionals: practices at the intersection of structuring information and computing (Module 2). Building on this attention, we interrogate materialities of information work such as computer infrastructures (Module 3), data centers (Module 4), and e-waste (Module 5). We then turn to humanistic approaches to thinking through the "Anthropocene" that helped attune our senses (Module 6). In our centering of humanistic approaches, we introduce poetic, artistic, and activist lenses that blur conventionally separate analytic and embodied approaches to analysis. Resource-intensive practices are deeply embedded in information work; we sought approaches that are radical and unsettling. We look to questions of disability justice in blended built and natural spaces

as well as the many different ways in which bodies respond to the toxic environments produced by information technologies (Module 7). We next investigate the newer design approaches to library and information research, specifically asking how design perspectives on digital information objects get inscribed in the Anthropocene (Module 8). Lastly, we consider paradigms of repair and making and analyze the different valences through which information researchers and professionals categorize and contextualize what is possible with them (Module 9). Throughout the course, we explore how infrastructures and objects raise awareness of the challenges facing our world, and how they may incorporate and reshape information for aesthetic ends.

## MODULE 1: INTRODUCTION TO THE COURSE

## Summary

This opening module aims to elicit conversation about the future of information institutions and information work in the Anthropocene.

## Description

The goal of this syllabus is to interrogate the material and socioeconomic processes that underpin our everyday information work. In particular, we examine the relationships developing between contemporary information practices and what problematically gets configured as "nature"—that messy world of non-human entanglements that often exists beyond the purview of innovation work, whether digital software development or industrial engineering. Much recent work on the environmental conditions of computing has sought to break down technology-nature dualisms in order to expose the implication of information technology in broader social and material ecologies. Library and information professionals and researchers are well poised to deepen this inquiry by presenting alternative nature-technology epistemologies grounded in longstanding analyses of information resources and their consumption.

In this introductory module, we selected a pair of readings that analyze the environmental consequences of information and technology fields, both past and present: Ensmenger's "Environmental History of the Internet" and Anna Tsing's "What's Left" (the first part of her celebrated three-part book on the globalized matsutake mushroom). The former text presents the many ways computing and environments are co-productive in historical context. It demonstrates how computing relies on older infrastructures, exploring its connections to the material world of energy, water, and waste. Through these material connections, Ensmenger argues that many peoples are enrolled in computing stories who are ordinarily overlooked. In contrast, Tsing's text embodies an attunement to what gets cast as salvage via breaks in hegemonic global supply chains. As Tsing describes, "commodities accelerate to market tempos only when earlier ties are severed" (Tsing 2015, 37). She shows how cutting local ties to international markets creates deepened ecological-economic relationships.

## Readings

Ensmenger, Nathan. "The Environmental History of Computing." *Technology and Culture* 59, no. 5 (2018): S7–S33.
Tsing, Anna Lowenhaupt. "'Part I: What's Left.'" In *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins*, 11–44. Princeton University Press, 2015.

## MODULE 2: STRUCTURING INFORMATION

## Summary

Imagine a non-exploitative episteme for information ontologies and recordkeeping institutions based on a more agential perception of the Earth.

## Description

Historically, colonialism and cataloging have been co-constitutive, entangled practices (Duarte and Belarde-Lewis 2015). To understand information ontologies, we must seek to understand how their epistemologies are entangled with the environment (Feinberg 2007). Re-conceiving ownership of information means attending to the dominant concepts of uniformity, resources, and identification.

This module examines the position of professional information practice so as to consider the environmental implications of an ethics of cataloging. Here we attempt to synthesize the fields of applied ontology and information retrieval systems with environmentalist concerns. This module asks participants to confront the imperialism of privileged ontologies by situating library, archives, and museum practices, and cataloging, classifying, and formal categorizing, in histories of colonial violence. In this intervention, we hope to further open space for decolonization research.

This decolonizing practice involves analyzing the technological structures that underpin that violence. In this thinking, the world exists as a continuum of resources available for incorporation into technology, through which surplus value can be produced. Information institutions can channel epistemic oppression through socio-technical acts of white supremacy or property-orientation, and the social norms shaping URI-based (Uniform Resource Identifiers, such as URLs, as static or fixed) linked data are predominantly naturalist and capitalist.

In considering fluidity in co-constituting of categories driven by self-identification (Adolpho 2019), this set of readings asks participants to consider how the ideologies of extractivism continue to influence the categories we create, connect, and preserve.

## Readings

Adolpho, Kalani. "Who Asked You?: Consent, Self-Determination, and the Report of the PCC Ad Hoc Task Group on Gender in Name Authority Records." In *Ethical Questions in Name Authority Control*, edited by Jane Sandberg. Sacramento, CA: Library Juice Press, 2019.

Duarte, Marisa Elena, and Miranda Belarde-Lewis. "Imagining: Creating Spaces for Indigenous Ontologies." *Cataloging & Classification Quarterly* 53, no. 5–6 (2015): 677–702.

Feinberg, Melanie. "Hidden Bias to Responsible Bias: An Approach to Information Systems Based on Haraway's Situated Knowledges." *Information Research* 12, no. 4 (2007): 12–4.

Jankowska, Maria J. "Environmental Programs and Green Practices: An American Library Association Timeline from 1989-2010." In *Greening Libraries*, 209:209–224. 224. Litwin Books in association with GSE Research, 2012.

Pendergrass, Keith L., Walker Sampson, Tim Walsh, and Laura Alagna. "Toward Environmentally Sustainable Digital Preservation." *The American Archivist* 82, no. 1 (2019): 165–206.

Tansey, Eira. "Archival Adaptation to Climate Change." *Sustainability: Science, Practice and Policy* 11, no. 2 (2015): 45–56.

Tadic, Linda. "The Environmental Impact of Digital Preservation." Presented at the Association of Moving Image Archivists conference, Portland, OR, November 2015. https://www.digitalbedrock.com/resources/.

## Discussion Questions

1. Intricate problems underlie numerous information preservation practices. For example, collecting documents (paper, digital media, etc.) has environmental effects, and at the same time, changing climates put continued preservation at risk. What conscious decisions are needed from catalogers and archivists in assessing material?

2. Based on your readings, discuss efforts to "green" archival practices (Janowska 2012, Tansey 2015). What are the potentials and pitfalls of new metadata workflows? Particularly consider efforts of information communities to re-shape narratives around their practices in response to climate change.

3. Data Refuge (https://www.datarefugestories.org/), a community-based collaborative project, spreads awareness as well as organizes the preservation of environmental data. Tadic (2016) estimates that archivists are facing 400,000,000 hours of audiovisual media (such as videotape, containing toxins) to digitize. Digitalization will generate 29.2 exabytes of data (for scale, current global IP traffic is 1400 exabytes). Is this a case for, as in Pendergrass et al. (2018), collecting less?

MODULE 3: MATERIALIZING INTERNET ENERGY CONSUMPTION

## Summary

Developing an awareness of the environmental impacts of computing infrastructures and network ecosystems.

## Description

In everyday information work, we rarely take a moment to consider the vast and varied resources our data infrastructures consume, even as we perform the most basic computational task. The work of most library, archive, and information professionals relies on networked computing resources, and so an interrogation of relations between information practices and the Anthropocene must include a discussion of how these resources are inscribed in the world. Across disciplines, information professionals are concerned with the implementation and optimization of systems, but the downstream effects and externalities of that work are often given mere lip service even as venues such as the LIMITS of Computing conference (computingwithinlimits.org) seek to make these connections. This is especially true in software engineering, a kind of work which supports other information practices by building infrastructure. In media studies, the multiple ways in which the environment is participating in media are described by Walker and Starosielski (2016)—for example, media can include film of the environment, but also all of the ways in which media infrastructures are imbricated in the environment. Here we seek to make similar links with internet computing applications. In software engineering the symbolic abstractions that happen across different levels of the software stack serve to distance a computer user or programmer from the impact they have on material reality—especially when it comes to energy consumption.

Concern for computational resources and algorithmic execution speed have been formalized as optimization metrics within the discipline of computer science, but why not directly deal with energy consumption as well? To address this question, we might examine Julie Cohn's (2017) article, "Data, Power, and Conservation," which historicizes the infrastructural growth of the US electrical grid. As economies of scale enable energy to be distributed and more widely used, there is a strange moment where awareness of a resource's availability increases demand for it. This produces a feedback effect, driving down energy costs further and increasing consumption. By analogy, we might examine this equilibrium within the computer system itself—as computers get more powerful, we expect faster results delivered to the user, perhaps at the expense of resource usage (memory, CPU cycles, GPU cycles, or disk space consumed). Computers are more efficient but demand more energy.

Since writing software enables other users to perform complex tasks with simplicity, we must also consider the compounding effects software tools instantiate

when in the hands of hundreds of millions (or even billions) of users. The energy consumption of googling something is multiplied over all of the searches done in a given day. But part of the reason energy estimation is such a thorny problem relates to interdependency and individuation within computer systems. It is hard to look at the energy consumption of one computer or mobile device without decoupling it from the interconnected technologies that make it possible to perform a task—for example, the sheer number of different component parts in information retrieval is challenging to comprehend. You can't google something unless Google has first indexed the information, storing it in their data centers. The collection of articles in this module shares some conceptual frameworks for considering energy consumption across different parts of information infrastructure. With Zakarya et al. (2017)'s work, we can scale ideas from Cohn up further and look at energy use across the datacenter. Aslan et al (2018) give us tools for estimating the energy that web activity might consume and van Bussel et al. (2015) models how such questions might shape digital preservation.

## Readings

Aslan, Joshua, Kieren Mayers, Jonathan G. Koomey, and Chris France. "Electricity Intensity of Internet Data Transmission: Untangling the Estimates." *Journal of Industrial Ecology* 22, no. 4 (2018): 785–798.

Bussel, Geert-Jan van, Nikki Smit, and John van de Pas. "Digital Archiving, Green IT and Environment. Deleting Data to Manage Critical Effects of the Data Deluge." *Electronic Journal of Information Systems Evaluation* 18, no. 2 (2015): 187.

Cohn, Julie. "Data, Power, and Conservation: The Early Turn to Information Technologies to Manage Energy Resources." *Information & Culture* 52, no. 3 (2017): 334–361.

Walker, Janet and Nicole Starosielski. "Introduction: Sustainable Media." In *Sustainable Media: Critical Approaches to Media and Environment*, edited by Nicole Starosielski and Janet Walker, 1–19. New York, NY: Routledge, 2016.

Zakarya, Muhammad, and Lee Gillam. "Energy Efficient Computing, Clusters, Grids and Clouds: A Taxonomy and Survey." *Sustainable Computing: Informatics and Systems* 14 (2017): 13–33.

## Discussion Questions

1. As we map a computer system in order to better understand the power it consumes, we might want to start by focusing on the affordances it provides to users. Which technologies and resources are essential for us to perform basic computing tasks (for example, writing an essay or analyzing a spreadsheet)? Which seem ancillary to this process? Is it advisable or possible to describe computing activities in terms of energy?

2. Should we include the supply chain or acquisition of materials (like rare earth metals) in the process of estimating energy consumption of ICT systems? Why or why not?

3. From a systems design perspective, consider the different structural forces that reify the notion that the internet (or other computational technologies) is immaterial. How might we use training in design, pedagogical techniques, or other practices to address this discursive claim?

## MODULE 4: DATA CENTERS

## Summary

Examining how data centers work as sites of massive resource consumption integral to the cloud in ways that also restructure relationships between places and peoples.

## Description

Now that we have discussed the multiple ways in which the web is material, let's examine resource consumption of data centers. The readings outline how data centers use water, energy, and other resources and produce heat. Data centers can be small and exist in the corners of office buildings or they can be massive buildings that occupy vast plains. Often described as covering multiple "football fields," the newest innovations in data centers are "hyperscale." Within data centers are computers that store and serve data.

Data centers are a key element of what is sometimes labeled "the cloud." "The cloud has become so naturalized in everyday life that we tend to look right through it, seeing it uncritically, if we see it at all," wrote Tung-Hui Hu in *The Prehistory of the Cloud* (2015, XII). How can we "see" the cloud? In Silvio Lorusso's (2013) "Data Centers Grand Tour," the viewer is shown images of data centers, and those data centers are the physical sites from where the image is being "served." Lorusso seeks to underscore to viewers that data is stored somewhere.

While data centers allow massive amounts of data to be stored remotely, people also might want to access this data immediately. Thus, data centers are often co-located with significant networking infrastructure or placed near consumers to ensure speedy delivery of bits. So, Netflix's Content Delivery Network relies on Amazon's AWS cloud services, which are distributed around the globe, to ensure that there are "local" copies of movies that people want to watch. Resources such as datacentermap.com illuminate what data centers are where and what is either in the same building or nearby.

As Greenpeace reports in "Clicking Green," data centers can consume energy that is renewable and not renewable. Greenpeace describes some companies such as Amazon as consumers of "dirty" coal energy while other companies are working towards consuming "renewable" energy. Yet, as many authors have noted, this does not mean that the overall energy consumption by data centers has decreased, or that data centers should be understood purely in terms of energy consumption.

Data centers have a number of impacts on the peoples near whom they are located, including using great volumes of energy, space, and water. Readings by Hogan (2015), Levanda and Mahmoudi (2019), and Johnson (2019) offer perspectives on data centers in Utah, the Pacific Northwest and Iceland, and how those data centers refigure relations between urban and rural, implicate water resources in national security, and

marginalize places within imperial regimes. Velkova (2016) explores ways in which the byproducts of data centers are reconfigured.

## Readings

Edwards, Paul N. "Knowledge Infrastructures for the Anthropocene." *The Anthropocene Review* 4, no. 1 (2017): 34–43.

Greenpeace, "Clicking Clean." 2017. https://www.greenpeace.org/usa/global-warming/click-clean/.

Hogan, Mél. "Data Flows and Water Woes: The Utah Data Center." *Big Data & Society* 2, no. 2 (2015): 2053951715592429.

Johnson, Alix. "Data Centers as Infrastructural In-Betweens: Expanding Connections and Enduring Marginalities in Iceland." *American Ethnologist* 46, no. 1 (2019): 75–88.

Levenda, Anthony M., and Dillon Mahmoudi. "Silicon Forest and Server Farms: The (Urban) Nature of Digital Capitalism in the Pacific Northwest." *UMBC Geography and Environmental Systems Department Collection*, 2019.

Lorusso, Silvio. 2013. *Data Centers Grand Tour: (this data belongs here)*. Exhibit at e-Permanent. https://silviolorusso.com/work/data-centers-grand-tour/.

Low Power Magazine. 2018. "How to Build a Low-tech Website?" https://solar.lowtechmagazine.com/2018/09/how-to-build-a-lowtech-website.html

Velkova, Julia. "Data That Warms: Waste Heat, Infrastructural Convergence and the Computation Traffic Commodity." *Big Data & Society* 3, no. 2 (2016): 2053951716684144.

## Discussion Questions

1. From Levanda and Mahmoudi: "What inequities are arising in the uneven development of data infrastructures within and beyond cities? How might we extend analyses of data centers and data infrastructures to understand the relationship between computing and socio-natural change? And how might these [data center] mappings elucidate new areas for contestation and resistance? What are the possibilities for more sustainable and equitable alternatives in digital economies?"
2. Are Low Power Magazine's websites an alternative to data centers? Why or why not?
3. After interrogating the extractive logics which underpin data centers, Edwards (2107) reminds readers that the storage and use of data also allows

people to comprehend climate change. The important use of computing resources by climate scientists potentially raises important questions: What are the "right" uses of computing resources? When is the use of computing resources justifiable from the perspective of resource consumption? When is it wasteful? Can traditional appraisal techniques from archival practice guide us forward? What could a decolonized approach to data management look like?

## MODULE 5: RUBBISH-REPAIR, CONSUMPTION-CARE

## Summary

Mapping technological supply chains and what gets thrown away, repurposed, consumed, and cared for within/alongside them.

## Description

The circulation of electronic waste is complex. Simple narratives imagine electronic rubbish as foisted upon poor countries by wealthier ones. Yet, as repair studies scholars point out, such narratives misunderstand the contingent and interconnected nature of consumption practices. Global circulations of electronics are multi-dimensional (Lepawsky 2015) and the repair practices (Houston 2017) that undergird them illustrate the importance of community knowledge and access around computational devices. They reveal how diagnosis, repairability, and breakdown remain emergent but constrained by waste economies (Burrell 2012). People learn to fix, adapt, and maintain what they already have—upgrading software, replacing broken parts, and restoring functionality, often in ways that reflect their varied material conditions and resistances (Chin 2016, 12). Innovative libraries host repair cafes which encourage people to maintain and repair their property rather than send it to the dump (Cottrell 2017). Rubbish and repair have ramifications for how information scholars and professionals understand their roles in ongoing processes of electronics consumption and care (Pérez-Bustos 2017). As Jennifer Gabrys (2016, 33) reminds, "Information technologies contribute to the very proliferation they attempt to manage."

This module works to identify a process of reconciling the geopolitical realities of repair with everyday practice. Features of disassembly, reconstruction, and maintenance operate as a necessary means of engineering know-how, illuminating the forms of care ethics that become integral to innovation labor (Jackson 2014, Pérez-Bustos 2017). Reflecting on contemporary information practices, we examine repair competencies as evolving forms of librarianship that take the into account the wider socioeconomic conditions of erosion, error and decay.

## Readings

Burrell, Jenna. "Chapter 7: The Import of Secondhand Computers and the Dilemma of e-Waste." In *Invisible Users: Youth in the Internet Cafés of Urban Ghana*, 159-182. Cambridge, MA: MIT Press, 2012.

Chin, Elizabeth. *My Life with Things: The Consumer Diaries*. Durham, NC: University Press, 2016.

Cottrell, Megan. "Libraries and the Art of Everything Maintenance." *American Libraries Magazine*. https://americanlibrariesmagazine.org/2017/09/01/libraries-everything-maintenance-repair-cafe/ (accessed 01/04/2020).

Gabrys, Jennifer. "Silicon Elephants: The Transformative Materiality of Microchips." In *Digital Rubbish: A Natural History of Electronics*, 20–44. Ann Arbor, MI: University of Michigan Press, 2011.

Houston, Lara. "The Timeliness of Repair," *continent* 6, 1 (2017): 51-55. http://www.continentcontinent.cc/index.php/continent/article/view/280.

Jackson, Steven J. "Rethinking Repair." In *Media Technologies: Essays on Communication, Materiality, and Society*, edited by Tarleton Gillespie, Pablo J. Boczkowski, and Kirsten A. Foot, 221–240. Cambridge, MA: MIT Press, 2013.

Lepawsky, Josh, and Charles Mather. "From Beginnings and Endings to Boundaries and Edges: Rethinking Circulation and Exchange through Electronic Waste." *Area* 43, no. 3 (2011): 242–249.

Pérez-Bustos, Tania. "Thinking with Care." *Revue d'anthropologie Des Connaissances* 11, no. 1 (2017): a–u.

## Discussion Questions

1. How do dominant narratives of computing's material footprint compare with first-hand accounts? Any resonances, contrasts, or tensions?
2. Who currently holds responsibility for acts of repair around information and computing resources? How might that responsibility change with new right-to-repair legislation or sourcing/waste regulation?
3. What stands out as central to cultivating a care ethics around information and computing ecosystems?
4. What can libraries do to encourage sustainable decision-making, not just in terms of information access structures, but programming and outreach, such as organizing "repair cafes" (Cottrell 2017)?

## MODULE 6: WRITING TROUBLED WORLDS - ECOPOETICS IN THE ANTHROPOCENE

## Summary

Exploring how imaginative literature has long raised awareness of troubled worlds, whether imagined, far away or hidden in plain sight, and offered alternatives, both cautionary and hopeful.

## Description

Almost from the beginning, literature has addressed the natural landscape and the human place within it. If the Romantics and Transcendentalists saw nature as a place of repose and spiritual renewal, the realist industrial novels of the nineteenth century and the Progressive era raised awareness of the life of factory workers and the environmental and public health problems caused by industrialization. Similar concerns about the machine can be seen today in climate fiction (cli-fi), in postcolonial novels about the costs of resource extraction, and in films like Godard's Alphaville or Kubrick's 2001.

How relevant are older works to today's concerns? Some scholars argue for seeing the Romantic nature poets as precursors to "green movement poets" directly influenced by the modern environmental movement (Whitlark 2017) or insist that poets can no longer conceive of nature as "rustic retreat" but instead must see it "a pressing political question, a question of survival" (Parini, as quoted in "Poetry and the Environment"). However, many scholars see a rupture between traditional environmental literature and a newer ecopoetics.

This module presents several recent definitions and discussions of ecopoetics and interrogates their usefulness for information professionals concerned about the environmental impacts of computing. They offer ecopoetics as a broad multidisciplinary perspective drawing on critical theory (especially poetics and poethetics [Silva 2014]), but also science and environmental writing. For M. Jimmie Killingsworth (2005), from the perspective of writing studies and technical communication, ecopoetics is less about specific poems and more about the intersections between place, language, and mind. He explains, "Ecopoetics tries to say what happens to the things and places of the earth—the mockingbird and the bluebonnet, the forest and the meadow—when we represent them in language [...]—and in turn what happens to human thinking and behavior in the process" (367). He argues against leaving environmental writing to the experts and for "ecocomposition," or the realization that every text arises within an environment.

Recent scholarly works focus on ecopoetics through close readings of recent American poetry. The essays in Angela Hume and Gillian Osborne's edited collection address "a diversity of field-writing practices" (2018, 5) and trace four few categories: the apocalyptic, embodiment, environmental justice, and critiques of sustainability. Hume's

contribution to the volume explores waste and wasting in Claudia Rankine's poetry. Margaret Ronda's (2018) *Remainders* considers the value of a belated cultural form like poetry in an era of natural devastation, placing poets like Lorine Niedecker and Gwendolyn Brooks in dialogue in order to explore uneven development and environmental racism. One could also consider ecopoetics a postcolonial turn in the environmental humanities, which calls our attention to environmentalisms outside North America and Europe. Drawing on Rob Nixon's conception of "slow violence" (2011), this scholarship looks at texts like African fiction about colonialist and neocolonialist resource extraction (Caminero-Santangelo, 2015; Iheka, 2017). Enlarging this historical register, such ecopoetics forge new analytic ground in Silvia Wynter's concept of replanting and Dionne Brand's concern for maroonage. Their geopoetics help us reimagine the excess of colonial grammars.

## Readings

Brand, Dionne. "Maps." *e-flux* 105 (December 2019)*.* https://www.e-flux.com/journal/105/302980/maps/.

Caminero-Santangelo, Byron. "Witnessing the Nature of Violence: Resource Extraction and Political Ecologies in the Contemporary African Novel." In *Global Ecologies and the Environmental Humanities.* Routledge, 2015.

Hume, Angela and Gillian Osborne, eds. *Ecopoetics: Essays in the Field*. Iowa City, IA: University of Iowa Press, 2018.

Iheka, Cajetan. *Naturalizing Africa: Ecological Violence, Agency, and Postcolonial Resistance in African Literature.* Cambridge University Press, 2017.

Killingsworth, M. Jimmie. "From Environmental Rhetoric to Ecocomposition and Ecopoetics: Finding a Place for Professional Communication." *Technical Communication Quarterly* 14, no. 4 (2005): 359–373.

Nixon, Rob. "Slow Violence." The Chronicle Review. *The Chronicle of Higher Education*, June 26, 2011. https://www.chronicle.com/article/Slow-Violence/127968.

Ronda, Margaret. *Remainders: American Poetry at Nature's End*. Stanford University Press, 2018.

Silva, Denise F.  "Toward a Black Feminist Poethics." *The Black Scholar* 44 (2014), no. 2: 81–97.

Whitlark, James. "Green Movement Poets." In *Salem Press Encyclopedia of Literature*. Pasadena, CA: Salem Press, 2017.

Wynter, Sylvia. N.d. "Black Metamorphosis: New Natives in a New World." Institute of the Black World Records, MG 502, Box 1. Schomburg Center for Research in Black Culture.

## Discussion Questions

1. Literature's primary function is not generally considered to be the transmission of information; as William Carlos Williams wrote in "Asphodel," "it is difficult/ to get the news from poems." Yet Williams also famously continues that "men die miserably every day/ for lack/ of what is found there." How could literature most effectively convey the realities of coding, data centers, e-waste, etc.?

2. Several of the essays in Hume and Osborne's *Ecopoetics* collection quote Frederick Buell's suggestion that we "abandon apocalypse for a sadder realism" (22). What have been the limitations of apocalyptic rhetoric in writing about environmental crisis? Do you think Buell's suggestion might lead to a more effective politics? Why or why not?

3. Although a number of writers have argued that the traditional categories of pastoral and wild nature are now obsolete, Ronda suggests that revolutionary poets like Gary Snyder or Diane di Prima might be more productively understood in relation to pastoral. Are the "good green place" and the wilderness now extinct? If so, might they still be useful as fictions or rhetorical strategies?

4. Killingsworth (2005) proposes to have students make a film, drawing, poem, or story that imagines what happens when someone plugs a laptop or a cell phone charger into a socket. Discuss what you imagine happening as a result of connecting a device.

## MODULE 7: PLACING DISABILITY

## Summary

Interrogating intersections between disability justice and the blending of natural/built environments

## Description

Library and information professionals are concerned with ensuring that all peoples can access information and other media. As noted in prior modules, this area of study involves complex and budding fields. We consider this module from the perspective of access to resources (environmental, human-built, or a combination) for all bodies, disability in relation to perceptions of the environment, and toxicity in relation to notions of disability.

Since the 1960s, activists have led the disability justice movement in the United States as a civil rights issue. In the late 1990s, proponents adopted Universal Design methodologies to insert disability justice into the design of built environments (Hamraie 2017). They applied Universal Design to integrate the needs of people with disabilities into modern conceptions of public design thinking (Williamson 2019). Thus, most critical work in disability justice has related disabled experiences with built environments, not natural environments. As previous modules emphasized significant blending between built and natural environments due to the materiality of library and information work, we seek ways to place disability within such complex situations.

The two dominant disability paradigms are the medical and social models (Shakespeare 2017). The social model focuses on contextual and systemic factors that interact with disabled experiences. Traditional disability paradigms take on new questions when juxtaposed with blended environments that are neither wholly built nor wholly natural. How can disability justice movements achieve important and necessary civil rights goals in light of these complicating factors?

The anthology *Disability Studies and the Environmental Humanities* (Ray, Sibara, and Alaimo 2017) examines "ways in which toxic environments engender chronic illness and disability or how environmental illnesses disrupt dominant paradigms for scrutinizing 'disability'" (Ray and Sibara 2017, 3). We increase this tension by highlighting computing industry contributions to environmental toxicity that remake and challenge conceptions of disability. For example, Lécuyer (2017) analyzes labor and toxicity in Silicon Valley semiconductor fabrication plants in the 1980s. Fortun (2004) explains how, in the wake of the Bhopal disaster, disability becomes a one-dimensional object to invoke pity and spark change. Fraught environmental realities challenge the value that justice movements assign to disabled experiences. Valerie Ann Johnson distills this conflict: "What is not seen is the implicit assumption that we want healthy environments so that we do not end up damaged (i.e., disabled)" (Johnson 2017, 77). Tensions arise when people's disabilities

entangle materiality and metaphor across their varied experiences (e.g., as hereditary, acquired, temporary, contextual), and when quality of life is driven by privilege and accessibility (or lack thereof). As Sami Schalk explains, "disability metaphors therefore allow us to explore the historical and material connections between disability and other social systems of privilege and oppression."

## Readings

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Discussion Questions
1. In what ways might Universal Design methodologies have unforeseen negative effects on natural environments? Who could be involved in remediating these effects and how?
2. What actions can environmental justice activists consider in order to account for situations of toxicity that lead to "preventable" disabling or illness?
3. How can we leverage the valuable work of disability justice to challenge the assignment of "damaged" identities to people?
4. What are "correct" ways to use resource-intensive infrastructure to support people with disabilities?

## MODULE 8: MORE-THAN-HUMAN DESIGN METHODS

## Summary

Exploring methods for investigating the impacts of computing infrastructures on more-than-human stakeholders, exposing the co-creation of futures with non-human partners.

## Description

Information technology scholars and design practitioners increasingly use design work to reckon with computing's contribution to climate change. Some scholars have confronted the limitations (and outright violences) carried forward by design methods that center humans and marginalize other entities and ecologies (see Light et al. 2017). Other scholars expose the ways design methods cast non-human entities as inert matter or resources to exploit rather than beings with their own experiences, contexts, needs, and desires (see Liu et al. 2018). Interrogating capitalism's (and in turn, computing's) accelerating demands on more-than-human worlds may require library and information scholars and practitioners to adopt methods (Bennett et al. 2017; Nardi and Ekiba 2018) that support relationship, reciprocity, and co-creation of futures with the more-than-human (Bonhomme 2019).

This module responds to this provocation by considering the range of methods made possible with more-than-human partners. Participatory Design (PD) methods represent a set of practices rooted in the Scandinavian workplace democracy movement and predicated on the belief that the very people implicated in, and living out designed futures should be able to participate in their creation. The PD approaches described by Bastian (2019) and Light, Powell and Shklovski (2017) value the unique knowledges that individuals and communities possess about their own experiences, contexts, needs, and desires; these approaches are often used in work that aims to address inequities by centering marginalized human communities in research and design practices. We then ground and rework these methods vis-a-vis Kim Tallbear (2011) and Robin Wall Kimmerer's (2013) perspectives on processes of indigenous knowledge production, partnership, and world-making to explore wider design philosophies and methods developed in solidarity with stakeholders, both human and otherwise.

## Readings

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Nardi, Bonnie and Hamid Ekiba, "Chapter 5: Developing a Political Economy Perspective for Sustainable HCI." In *Digital Technology and Sustainability: Engaging the Paradox*, edited by Mike Hazas and Lisa Nathan. New York, NY: Routledge, 2018.

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## Discussion Questions

1. How might we understand and engage with concepts of participation, agency, power, and reciprocity beyond human experiences (and definitions)? Where might these concepts or definitions break down?
2. How might you approach co-designing with more-than-human partners/ stakeholders/actors? What could collaboration look like for different beings and across different scales and lifetimes? How might more-than-human beings communicate?

# MODULE 9: MAKING WASTE, ENCOUNTERING MARGINAL MATERIALS

## Summary

Investigating the creation of enduring information imaginaries by "making" with waste

## Description

Over the past decade information scholars and professionals have begun to chart an expanding role for libraries in their communities (Wong and Partridge 2016). Moving from content collection and curation towards creative material practice, and from technology distribution to production, they have developed spaces for "making" and other dedicated practices of collaborative creative production to provide a home for the people, equipment, and expertise needed to support new forms of entrepreneurship (Willett 2016, Irani 2019). These efforts seek to scaffold new forms of community building and material understanding alongside the education of entrepreneurial makers—ultimately tying information practice to commercial interests (Turner 2016; Seyram Avle et al. 2017).

This module draws attention to how creative practices like prototyping produce not only things, but also enduring social arrangements. Although pundits and scholars have celebrated such practices as useful for supporting hands-on learning and technology innovation, other scholars point to their limitations and pitfalls (DiSalvo et al. 2010; Silberman et al. 2014). Seyram Avle and colleagues (2017) point out that making activities may reproduce values like novelty and invention over enduring collective and structural intervention. They show how uncritically adopting such values can obscure the longer-term inheritances and stakes of creative production practices. Kristin Dew and Daniela Rosner (2019) and Cindy Kohtala (2016) likewise show how making gets associated with ecologically damaging ways of working that depend on abundant, labelled, and controllable materials. Together this scholarship exhibits how the make-and-dispose approach can also reify the dominance of Western, settler colonial, and masculinized notions of technology practice.

## Readings

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Willett, Rebekah. "Making, Makers, and Makerspaces: A Discourse Analysis of Professional Journal Articles and Blog Posts about Makerspaces in Public Libraries." *The Library Quarterly* 86, no. 3 (2016): 313–329.

Wong, Anne, & Helen Partridge.  "Making as Learning: Makerspaces in Universities." *Australian Academic & Research Libraries* 47, no. 3 (2016): 143–159.

## Discussion Questions

1. What remnants of making might we deem too small or impractical to reuse? Why and according to whom?
2. How do current information and production practices and institutions push against making with leftovers?
3. How might we resituate remnants of making as usable materials again? What infrastructures are necessary for this?
4. In what ways could making with waste challenge dominant logics of abundance, extractivism, and innovation?