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FIELD REVIEW

Your Artificial Future is Repulsive: On Climate Change, Data Tech, and Artifice

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ABSTRACT

This field review traces the form and function of artifice at the intersections of data tech and climate change. The piece begins with a discussion of artifice and clarity-making, followed by an overview of the carbon-energy paradigm, artificial rain programs on Indigenous lands and waters, and data artifice in environmental regulatory policy. I emphasize the modalities of colonial and techno-imperial data control across scales and contexts that waylay the longstanding and world-saving work of the climate and environmental justice movements. And I invite the reader to get to know these movements and literatures and to share their own experiences with rejecting artificial futures.

Key Words: Artifice; Artificial Intelligence; Clarity-Making; Settler Colonialism; Environmental Racism; Data and Technology; Environmental Justice; Climate Futures; Planet Earth

“The World’s resources are SCARCE,”
her voice reverberates through the atmosphere.
“I Have *the* Analysis.”
You stare at the Great Innovator.
She stands confident backed by the strange authority of her casual-yet-expensive black leather coat.
Sweat glistens on her white, botoxed skin refracting
artificial light from her gilded podium and plagiarized artwork.
Behind her florescent screens flash, tall as skyscrapers.
Sleek and sexy images of the *FUTURE MACHINE* glow over an endless crowd of starry-eyed followers.
Swept up in a magnetic pull, you float closer to the glossy promises of the *FUTURE MACHINE*.
Your feet moving farther and farther away from the Earth.
Surrounding you in the clouds are fanatical experts, politicians, and nonprofit pundits clapping along to

Great Innovator's PR and tweeting out her brilliance.
"The *FUTURE MACHINE* has a conflict of interest," the Great Innovator mentions.
"*What Conflict of Interest?*" you wonder.
You turn to try and relocate the Earth.
Underneath you, you see networks of *FUTURE MACHINES* drilling, dumping, and extracting earth and water. You see massive fires and rivers choked dry.
You see people displaced from their homes and *FUTURE MACHINE*-funded militaries stealing living resources.
"*Nothing has changed*," your eyes widen, "*The FUTURE MACHINE is a LIE*."
You realize that you can't breathe.
Desperate for help, you turn back to the Great Innovator, but she is gone, her gilded podium now only an empty, crumpled box.
The crowd is vanished.
You suddenly feel the weight of your own body and gravity pulls you back to Earth. As the wind rushes past your face, you feel tears freezing on your cheeks.
Hours later you wake up crumpled over on the cold ground.
Your face feels hot with humiliation and throat swollen with regret. "*How could I have let the Great Innovator seduce me?*"
Through time, your discomfort turns into clarity, and you gain an understanding that it's okay to begin here with where you are at.
Welcome back to Earth!
Sinking your toes into the warm dirt, you remember the places you come from, your histories and your wisdom.
You begin to reckon with your complicity and to embrace your own power.
Natural golden light glimmers over the trees and people surrounding you,
illuminating their beauty and complexity.
You feel accountable to them, and to the Earth, and are ready to do the work.
The future you hope for finally feels possible—you lift your chin up towards the warm, soft glow of the horizon ahead.

art·i·fice | noun, verb, and anxious conditioning

Artifice is not always easy to see nor to describe. It is complex like an elaborate system or a fabricated universe. Artifice is stratified, webbed, and designed for rapid reproduction. Behind any environmental or climate technology, there are economic assumptions netted to epistemological commitments that reify cultural beliefs and social hierarchies. Artifice is also not clearly delineated—it blurs the lines between what is real and what is projected. Activists, writers, public intellectuals, and psychoanalysts have theorized and evidenced the ways hegemony, status quo culture, and gaslighting transmute the unthinkable into the unnoticeable, and galvanize cultural violence into structural banality (see, for example, Fanon 1963). Artifice is always present in this—it constitutes the status quo: the crafted spectacles, the media manipulations, the epistemes, the techne, the technologies, and innovations that aid in normalizing atrocities. Artifice persists even in its own critique (see Táíwò 2022; Katz 2020).

Here, I invoke “repulsive” in two ways. First, as an invocation of disgust, vomit-rising-in-the-throat level of disgust. I believe that feeling genuinely repulsed by artificial histories and artificial futures is part of the work. Second, I am invoking a loose physics metaphor because all knowledge-making is in some way an engagement with space, time, and energy. There is a concept in physics called repulsive force. It describes the phenomena when two or more bodies—in no time—fly away from one another. Repulsion is a physical and metaphysical response to intrinsic energies (magnetic forces, electric charges, and the spiritual) that cannot occupy the same space at the same time. There is an instantaneous pushing away, a rejection.

Just like atomic particles, human beings are always charged, always in motion, always transforming and being transformed, always vibrating and emitting energy. The question is what energy are we (individually and collectively) charged with? What are we attracting and what do we repulse? Are we being pulled toward artificial relationships and artificial futures or are we working to be with each other and live with the Earth? Imagine collectively pushing away from artifice—a mass repulsion—because in our own minds, bodies, and souls, the artificial future is repulsive.[1]

Field reviews and fields themselves can be an artifice, too. Many academic and scientific fields operate as epistemic redlines, reifying the social power of the status quo and actively racializing, gendering, and excluding other traditions of thought. Fields can determine who can publish and who cannot, who has access to jobs and grants and who does not. In the current academic-nonprofit-industry complex, notably the critical tech and critical AI fields, there is a turn to publishing lists, declaring new fields, and creating new infrastructures of exclusion. An anxiety of achieving status and platform fuels this knowledge economy.

While headlines and platforms may express concern for planetary justice, many initiatives lack substantive power analysis and refuse to contend with imperialism and settler colonialism.

Currently, “just climate transition” and “environmental justice” and “water justice” are being rapidly co-opted by the critical tech and AI fields. While headlines and platforms may express concern for planetary justice, many initiatives lack substantive power analysis and refuse to contend with imperialism and settler colonialism. Consequently, ML-mediated equivalence studies and algorithmic audits are being advanced as solutions to vaguely defined environmental and climate problems. In this way, the critique industry is directly feeding the purported subject of its critique—the development and expansion of imperial technology and artificial intelligence. Climate justice is a matter of life and death and does not belong in the realm of abstraction and artifice, as data to be traded in an extractive knowledge economy. Given the current violent expansion of techno-imperialism and the real conditions of climate change, it is more important than ever to confront our means of knowledge production.

On May 30, 1975, Toni Morrison gave a speech at Portland State University in honor of Black studies. She spoke on racism, structures of knowledge production, the humanities, and the datafication of history.

She began with nearly 20 minutes of relaying genocidal and violent quotes from famous white men in US history. Summarizing these quotes, she said: “Accurate scholarship and free, dedicated artists would reveal a singularly important thing: that racism was and is not only a mark, a public mark, of ignorance; it was and is a monumental fraud. Racism was never, ever the issue. Profit and money always was. And all of those quotations from William Byrd to Benjamin Franklin to Andrew Jackson to the *New York Tribute,* the threat was always jobs, land, or money” (Morrison et al. 1975).

Toni Morrison’s speech is monumental for understanding the relationships between data and climate change—it identifies how science and social critique are webbed to the land and water grabs that undergird US empire. Speaking to Black artists and scholars, she additionally offers a two-pronged call for clarity-making in knowledge and data production:

1. The first job for the scholar, and particularly for the artist, is to destroy the source of that mindlessness, to focus on the hysteria and greed of those whose business it is to manipulate us and to keep us anonymous or peripheral to the events of this country.
2. The second responsibility of artists and scholars is to bear down on those generalities: the statistics and the charts and make them give up the life they’re hiding.

Toni Morrison was not advocating for an algorithmic audit on a genocidal war machine; she was advocating for a total rejection of these violent systems and a confrontation of their epistemological formations and haunted data. Today, 50 years later, critical race theory is being systematically undermined by the same powers that are rapidly consolidating wealth and expanding water and earth-guzzling tech systems under the amorphous label of artificial intelligence. This is not a coincidence.

Clarity-making, especially at the scale of data and analysis, has long been part of the climate and environmental justice movements. In the 1980s, several organizations formed to confront scientific and legal data in environmental policy. A crucial 1987 report conducted by the Commission for Racial Justice, *Toxic Wastes and Race in the United States*, evidenced the disproportionate exposure of “African Americans, Hispanic Americans, Asian Americans, Pacific Islanders, Native Americans and others to hazardous wastes in their communities” (Commission for Racial Justice 1987, ix). This was a landmark report that helped coin the term “environmental racism” and established a clear policy directive for prioritizing race in environmental transition.

Representatives of the Indigenous Environmental Network attend an environmental protest outside White House in 2011. Photo credit: Shadia Fayne Wood & Tar Sands Action/Flickr.

Since their early 1990s founding, the Indigenous Environmental Network, Climate Justice Alliance, and the Just Transition Alliance have identified and confronted the catastrophic consequences of false climate solutions.[2] Federal regulatory policies have since corroded this substantive justice work through data manipulations and data erasure. Despite this, the climate justice and Indigenous environmental justice movements have continued to slow down and stop many deadly innovations, technologies, and markets (Hitchcock Auciello 2019; UNPFIP Network 2022). The NAACP and many other organizations have worked over decades to demystify the violent nonsense of carbon markets, carbon trade, and carbon pricing schemes (see Patterson et al. 2021).

Critics of artifice wield clarity; they cut through obscurity and draw clear delineations. Geographers Ruth Wilson Gilmore and Mike Davis have mapped out the material geographies of obfuscated systems of inequity and violence in climate change (see Wilson Gilmore 2022; Davis 1998; Davis 2020). Ruha Benjamin advocates for *Viral Justice* rather than living in someone else's imagination. In *Dear Science* Katherine McKittrick embraces the materialities of anticolonial thought and black studies (not reduced to scientific racism) by writing and studying "stories about algorithms, lists, science, footnotes (references, citations), plantations, consciousness, grooves and beats, poetry, geography, methodology, and theory." In *Dark Matters,* Simone Browne watches the watchers and further challenges anti-black surveillance technology and its imposition of norms by "talking back" (Browne 2015).

Colonial temporal and spatial manipulations (the core artifice of history-making) are reified in the data,

technologies, and epistemological frameworks used to track and archive climate change. Confronting this, Indigenous philosopher Kyle Whyte teaches how colonial descriptions of the "climate crisis" (what he terms crisis epistemology) assert a false construct of linear time that is irreconcilable with relations of kinship and sustainable life (Whyte 2020a; Whyte 2020b; Whyte 2019).

There are many clarity-makers leading change in environmental science and environmental policy. The Red Nations' *Indigenous Action to Save Our Earth* states, "The best forms of environmental policy come from the bottom up, and momentous change only happens with the might of a peoples' movement behind it" (2021, 27). The Indigenous Data Sovereignty movements continue to protect the ability for Indigenous people to control their own data and are generating sustainable meaning for data everywhere (Rainie et al. 2019). EDAction & Civic Laboratory for Environmental Action Research (CLEAR) have evidenced how pollution is colonialism and they are establishing anticolonial research methods and praxis for university science (2017). The Environmental Data & Governance Initiative (EDGI) puts data to question in federal and national environmental policies. By confronting the material realties of the scientific establishment including lithium mining and water extraction, the Center for Interdisciplinary Environmental Justice (CIEJ) works in solidarity with Planet Earth (see also Benally 2014).

Innovators of artifice…aim to eviscerate indeterminacy and control the future.

Drawing clear delineations and clarifying our terms does not mean complexity and contradiction fall away nor that the world should be organized into binaries. To the contrary, indeterminacy has long been part of liberatory movements and imagination as the liminal spaces between real and speculative yield possibilities for new worlds (see King, Navarro, and Smith 2020). For this reason, indeterminacy in climate change can be cherished. Innovators of artifice, to the contrary, aim to eviscerate indeterminacy and control the future. As I wrote in "Designing Certainty"(Dryer 2019), the history of algorithmic resource control is an anxious program of trying to eviscerate uncertainty, rather than to embrace the beauty of vulnerability in precarity and the possibilities of life that it yields (e.g., see Precarity Lab 2020).

As Anna Tsing wrote in *The Mushroom at the End of the World*:

> Precarity is the condition of being vulnerable to others. Unpredictable encounters transform us; we are not in control, even of ourselves. Unable to rely on a stable structure of community, we are thrown into shifting assemblages, which remake us as well as our others. We can't rely on the status quo; everything is in flux, including our ability to survive. Thinking through precarity changes social analysis. A precarious world is a world without teleology. Indeterminacy, the unplanned nature of time, is frightening, but thinking through precarity makes it evident that indeterminacy also makes life possible. (Tsing 2015, 20)

Embracing indeterminacy as a philosophy of life-making can liberate it from its imperial military history. When I was 19, my confrontations with artifice first turned to indeterminacy in physics. I wanted to

understand relativity theory and I wrote two dissertations on structures of space and time in quantum mechanics. I have spent my academic career since working to articulate the historical interplays between data, anxiety, and uncertainty. Significantly, at the turn of the twentieth century, there had been a "crisis" in physics regarding irreconcilable explanations of the datafication of light. Theoretical physicist Albert Einstein was obsessed with mathematical artifice, an anxiety from which he theorized the energy-mass equivalence, the principal physics equation behind nuclear energy and nuclear bombs (e.g., Einstein, Podolsky, and Rosen 1935).

Due largely to its military funding, much of the physics literature on mathematical artifice over the past century fails to account for the violence and darkness behind light manipulations. It fails to address how the twentieth-century crisis of European superiority was used to justify mass murder and transfigure a geopolitical system into competing uranium and fossil-fuel dependent military empires.

In 1951, at the start of the US proxy wars, Hannah Arendt writes, in the *Origins of Totalitarianism* (1951), that the mass production of genocidal infrastructures—gas chambers, guillotines, and mass graves—are not inexplicable nor sudden. They are deeply material. She argues that the Holocaust can be clearly explained by race and bureaucracy (the latter she defines as a principle of foreign domination) and that claiming incomprehensibility is a denial of complicity in this history. Arendt spent decades of her life grappling with her own Zionism. The Zionist movement predates the establishment of the Third Reich by half a century. Both movements are settler colonial, and both depend on the techno-imperial apparatus of race science. The Nazis modeled race science after the United States, a settler colonial project that fails to contend with and stop its perpetuation of genocide and slavery (see Zimmerman 2010).

As historian Rashid Khalidi (2020) describes in *The Hundred Years' War on Palestine*,the Zionist movement is a particular colonial project, not identical to the United States and not distinctive either. The 1948 ethnic cleansing of Palestine was only possible following the demographic mass of settlers and their establishment of a military apparatus. Khalidi writes "The expulsion then of over half the Arab population of the country, first by Zionist militias and then by the Israeli army, completed the military and political triumph of Zionism" (2020, 13). The current Israeli and US genocidal war on Gaza is understood in parallel with the 1948 Nakba and it is an amplification of military power and apartheid technology. Since October 2023, the IOF and US have dropped tens-of-thousands of bombs and continued their experimentation with white phosphorous, predictive surveillance technologies, and AI-development (Goodfriend 2023; Parrish 2019).

Many are tracking greenhouse gas (GHG) data on the climate impact of the current aggression on Gaza. In only six months, the United States and Israeli military have released over 250,000 tonnages of CO_2 emissions, emission estimates greater than the annual emissions of 20 individual countries and territories (e.g., Ali 2024).These emissions costs are nearing four percent on the global register—yet how do we translate this data into justice for Palestine and for the world? In March of 2024, the United States began building a port for direct access to Gaza's offshore oil reserves. This is part of the rampant land and water grabs occurring throughout Palestine and clear evidence of how, as Toni Morrison said, land and money are always at work. What is the purpose of GHG data and energy measures, without demanding the dissolution of military technologies and colonial occupations everywhere?

A Brief Annotation on Carbon and Energy

The role of artifice in climate data production and analysis relates to the historical formations of energy and carbon. Both carbon and energy have enlightenment origins and they both took distinctive material form during the era of industrialization. Since this time, the overextraction of fossil fuel materials has caused a global climate crisis. The Global North's pursuit of more and more energy and carbon materials, and of more and more energy and carbon data, is both the cause of climate change and, in our current geopolitical system, the purported solution to climate change. I see artifice in the multiple ways this hegemonic absurdity is maintained: through resource control, data manipulations, narrative craft, and technological growth and innovations.

The pursuit of energy, which has driven fossil fuel dependency and contoured the geopolitical order of the last two centuries, emerged from the exhaust and fumes of nineteenth-century British imperialism. In *The Birth of Energy: Fossil Fuels, Thermodynamics, and the Politics of Work*, Cara New Daggett (2019) contextualizes the paradigm of energy itself as a product of the Industrial Revolution that coincided with the steam engine. Energy is not a neutral social and economic category—hegemonic powers revere energy as a civilization building, resource consuming, emblem of white imperial power.[3] Energy continues to dominate our social and political forms, especially data and technology. In *Digital Energetics*, Anne Pasek, Cindy Kaiying Lin, Zane Griffin Talley Cooper, and Jordan B. Kinder (2023) analyze how data and energy have jointly modulated the character of the materiality and labor of digital systems in a warming world.

While fossil fuels are the main culprit, the energy paradigm consumes more resources than coal and oil. The current tech-imperialist geopolitical order feeds on lithium, hydrogen, cobalt, copper, silicon (Burrington, forthcoming), and water ("Mining of Cobalt" 2023). These violently sourced resources fuel Silicon Valley, AI, ICT, and our individual smartphones. Mainstream climate transition policies refuse to abandon energy growth models as rare-earth and water intensive tech programs, including electric vehicles and carbon capture, dominate transition agendas.[4]

Energy and carbon are inseparable. Carbon is a prolific chemical element found in the material world. In many literary and social descriptions, it is an element synonymous with life itself. Across cultural depictions, carbon is cited as *the* element—it is the matter and the form, the blueprint, the original, the referent to carbon copies.[5] Carbon is revered in these ways because carbon makes up most earthly things and earthly beings; it is an element abundant in the human body as well as in every living plant and animal. Carbon is omnipresent and yet impossible to hold still. It is tractable (in material, data, and other representational forms) and yet carbon remains fundamentally indeterminate.

For as much as carbon is an element of life, it is also a source of death. Energy development and extractive mining produces carbon offsets. The word carbon derives from the Latin *carbo*, meaning charcoal and coal. Carbon is the main active component in fossil fuels typically weighing at 85 percent carbon (O'Connor et al. 2000). Carbon is both unstable and indestructible; it transmutes into myriad solid, gaseous, and sometimes liquid states. Carbon transmutations, whether naturally occurring or human-forced, generate derivatives, wastes, and byproducts that become permanent features of the environments they are released in. There is no carbon manipulation without a corresponding environmental change. Carbon transmutations release toxic carbon gasses—carbon monoxide and carbon dioxide (CO_2)—into the atmosphere.

Nineteenth-century British imperialists established long-lasting conceptions of coal, charcoal, and soot as abundant sources of life and history.

Racist beliefs and violent technological forms, which undergird energy dependency, also reinforce historical visions of carbon empire. Nineteenth-century British imperialists established long-lasting conceptions of coal, charcoal, and soot as abundant sources of life and history. The British empire theorized historical time itself from carbon-rich beginnings. They classified historical epochs into stratified layers of carbon and coal material in detailed drama, describing, for example, the "abundant and luxuriant […] plants of the Carboniferous age" (see Greene 1889). These stories seeded the US empire's conception of a carbon-rich Pennsylvanian land in its early formation, which sparked its dependency on anthracite coal (Jones 2010). Histories of carbon artifice are more than cultural memory, they have shaped material geopolitical formations and destroyed living Earth.

In *Carbon Sovereignty: Coal, Development, and Energy Transition in the Navajo Nation*, Diné geographer

Andrew Curley (2023) relocates energy in the places and with the people that sacrifice for it. Curley details the political and cultural questions around coal in Navajo Nation.

> What I found were the raw experiences that contributed to the social phenomena we call colonialism and capitalism. It isn't enough to use these words to describe what I witnessed or the experiences of people on the ground. What this renewal entailed was contested meaning and high political stakes. The renewal was about continued work for people at the mine and plant. It was about substantial revenues for the tribe and the future of life on the planet. (Curley 2023, 9)

Colonialism and capitalism are resource intensive. Ecocide and genocide are functions and not accidents of these social systems. Colonial-led fossil fuel consumption has generated vast amounts of methane and carbon dioxide. These gasses have transfigured the chemical makeups of water, soil, and air; they have permanently altered life on planet Earth. In science and policy, these are called GHG emissions. Significantly, the Global North has produced most of the climate change causing agents, through energy extraction, and the violence of this extraction is disproportionately experienced by the Global South. This looks like terraformed and depleted lands, poisoned and overallocated waters, forced labor, food shortages, starvation, displacement, slow violence, and intergenerational health disparities. Meanwhile, the Global North controls the GHG counts, the carbon calculus, the data-driven governing apparatus (e.g., the Intergovernmental Panel on Climate Change), and policy mechanisms that promise justice and accountability.

Navajo Generating Station, Navajo Nation, AZ. Photo credit: Wolfgang Moroder/Wikimedia Commons.

Carbon data and technologies function as part of greater social and economic artifice regarding a historical preoccupation with carbon materials that dates back centuries. Our current carbon calculus informs a broad suite of carbon-related technologies, including carbon capture technologies—that skirt contending with centuries of carbon injustice by promising to absorb carbon emissions back into rock (see Patterson et al. 2021). These technologies are automations and mechanizations of the deeper capitalist and colonial impulse to extract profit from carbon material. The Global North's grasp for energy control continues to function through settler colonialism and technological imperialism. Yet many choose to pursue future promises of carbon domination in an ill-defined crisis instead of seeking to understand their complicity in these systems. For this reason, artificial ambitions of net zero dominate the white liberal imagination.

The pursuit of carbon data and technology further relates to empiricist histories of science that neglect any power analysis of climate change's colonial history. Climate scientist Paul Crutzen popularized the "Anthropocene era" as a historical epoch of planetary carbon extraction. He describes it as "the rapid expansion of mankind in numbers and per capita exploitation of Earth's resources" (Crutzen 2002). This definition has since been revised to show that the Anthropocene is actually a dominant white, European scientific explanation of historical change (or in Nick Mirzoeff's term: the White Supremacy Scene [(2018; Yusoff 2019]) that reduces the climate crisis to vaguely defined anthropogenic activity tracked and archived in carbon data and information (Baldwin and Erickson 2020). Consequently, this fixation on carbon information feeds the obscure promises of "carbon neutrality" and "net zero" (Lin, Dryer, and Rodgers 2023)—data-driven benchmarks and greenwashed banners flown over centuries-old systems of carbon extraction and broken earth.[6]

Energy and carbon are governing orders that seek to control the past, present, and future through colonial and imperial datafication and archives. Activist and literary scholar Amrah Salomón describes the colonial processes that shape anthropogenic activity and the significance of graphite, the crystalline form of carbon, "from which written word, colonial archives come from." She specifies: "Under colonial invasion, Indigenous peoples became subjects of colonial archival records—written documents, photographs, films, maps, and all kinds of collections of ephemeral and material objects, of even our very bodies—produced by the needs, curiosities, and imaginations of the colonial gaze to document and contain us as so many forms of carbon and graphite" (2022, 237).

Through kaleidoscopic lenses of race and power, scholars have responded to the Anthropocene framework by identifying real, contextually rooted histories, including the plantationocene, the capitaloscene, and the chthulucene. These contexts clarify the historical and present-day linkages between climate change and colonialism, slavery, labor exploitation, militarism, and systemic racisms (Haraway 2015; Tuana 2019; Groner 2021). This literature has fostered deeper engagement with the contextual historical forces behind climate change, and by breaking from the Anthropocene's teleology, they show how other futures become possible (McKittrick 2013). Resiliency, repair, reparations, and justice are features of this work.

Energy consumption cannot really be reduced to carbon counts; it is entwined with living histories of imperialism, colonialism, and militarism.

Given the dual nature of carbon as both the element of life and the source of death, the carbon world is often described as "being out of balance" and, in Amitav Ghosh's terminology, "greatly deranged" (2016). Energy consumption cannot really be reduced to carbon counts; it is entwined with living histories of imperialism, colonialism, and militarism. Archiving contextless carbon information does not address the imbalance of the Global North's egregious GHG emissions and carbon waste as it disproportionately affects the Global South, Indigenous land and water, and urban and rural environments plagued by stratified histories of toxic colonialism and environmental racism.

There is a carbon imbalance between who profits from the digging, burning, and dumping, and who is denied a future because of it. Those in positions of privilege benefit and profit from the death of those who are not. Achille Mbembe's terms necropolitics and necrocapitalism are descriptions of how those in privileged positions profit and thrive off toxic colonialism, systemic racisms, labor exploitation, and genocide (2002). The base fact is that the Global North's carbon pursuits are enacted through its slow violence on the Global South. And yet, in data-driven policy initiatives, such as the Kyoto Protocol and the IPCC, all peoples and geographic contexts have historically been held equally culpable in the Anthropocene's data counts. The recent policy artifice of "loss and damages" claims to amend the imbalance of culpability-to-accountability measures at international meeting spaces such as the 2022 COP27, where despite the loss-and-damages fanfare, oil lobbyists sitting in innovation tents greatly outnumbered climate justice advocates who were corralled outside (Dryer, Brito-Millán, and Salomón 2022).

Finally, carbon manipulations are baked into data, algorithms, and the epistemological frameworks that inform climate policy and climate action. Throughout the late twentieth century, climate-change denialism led to evidentiary manipulations detailed by Naomi Oreskes and Eric Conway (2011). Sociologists have coined the term SCAMs, or scientific certainty argumentation methods, to identify data manipulations for desired policy outcomes that benefit entities like big tobacco and big oil (Freudenburg, Grambling, and Davidson 2008). This relates to the science of agnotology regarding culturally induced ignorance or doubt. The IPCC is the dominant data, evidence, and policy response to the climate change, and it lacks a theory of change that addresses colonialism and capitalism at the root of its subject.[7]

Artificial Rain: "It Only Rains Over White Men"

Occupation of the skies is a core mechanism of capitalism and colonialism. For instance, artificial rain (or cloud seeding) is a century-old tech program that hinges on false promises of man-made rain through military intervention of the skies.[8] Artificial rain programs first expanded in the 1920s and 1930s, as physicists experimented with silver iodide to induce precipitation in laboratory cloud chambers. By the 1940s, allied militaries began to literally bomb clouds to try and make them rain. In efforts to extend these programs over public and Indigenous lands, governments and private tech interests promised

watered agricultural lands as a “public good” outcome of military surplus tech. Over the past century, this ambition to control precipitation, as a function of dominating the skies, has continued to grow, and is currently ballooning as a quick-fix solution to conditions of drought and scarcity exacerbated by climate change (e.g., Lewis 2021; Benson 2022).

In the 1940s and 1950s, the US Southwest experienced a drought and private capitalists working in military surplus manipulated the crisis to grow a “cloud seeding” enterprise. They designated the US “arid West” a laboratory for artificial rain experimentation and data collection. In collusion were private capital rainmakers, government entities in water management, and the US military. Water municipalities, including the Arizona Water Management Board, made unilateral decisions to seed this technological enterprise with public and municipal resources, and without consulting water-use communities, local farm unions, nor Native American councils. In addition to taking municipal funding, private capital “rainmakers” solicited funds from local communities to seed their programs. For example, in 1952, a private Arizona company called the Precipitation Control Company collected annual planning resources from local farm unions and Navajo Tribal Council, by promising them artificial rain to alleviate drought conditions for the next year (Donovan 2014; Dryer 2019).

In 1953, Navajo Tribal Council rejected a second season of cloud seeding after it was already evident that the experiments were fraudulent and deleterious to the environment. The council expressed, “It only rains over white men.” From years prior, Diné representatives were skeptical of the programs and visited the New Mexico School of Mines—now the New Mexico Institute of Mining and Technology— “for information on the white man’s artificial rain-making methods” (“Indians Seek Data” 1950). Since the 1940s, Hopi and Diné people characterized weather modification programs as a settler colonial program and an extension of the deadly processes of coal and uranium mining currently destroying their lands (see Powell 2018).

Aircraft belonging to the Weather Modification Company in the 1960s. Photo credit: Bill Larkins/Flicker.

Significantly, cloud seeding is an aerial agricultural initiative as well as a big data project. Throughout the late twentieth century, university and military statisticians were eager yet unable to quantify and prove the efficacy of cloud-seeding experiments (Dryer 2019). By the early 1960s, statistical data analysts were in widespread consensus that there was no correlative evidence showing silver iodide interventions made any significant precipitation changes in clouds (see Dryer 2019). Yet, because of the abundance of precipitation data created and archived for the programs, and the profitable outcomes for those repurposing military surplus, the programs continued.[9] In many cases, the need for more and more data justified continued land and air experimentation.

Governments and tech entities have failed to broadcast the fact that cloud seeding, and weather modification programs more generally, are empirically and quantitatively proven to be artificial promises. This is in large part because weather modification research continues to feed the advancement of predictive analytics and algorithmic decisions systems specifically because of the abundance of data available for experimentation (e.g., Pham et al. 2020). Unsurprisingly, AI development is currently ballooning these data-intensive environmental programs (e.g., Dennehy 2022). This data is not made in the clouds; it is extracted from the Earth.

Artificial rain programs are large-scale data programs designed to control ground resources through physical intervention and occupation of the skies. Cloud seeding is a well-funded military-tech response to climate change, a promise to control an experimental framework and a future that can never exist. For decades, these programs have been rejected by Native American governments, farm workers, and local water-use communities who understood weather control to be profitable for white people, destructive to sacred lands and waters, and an artificial-future-chasing ambition. Even after a century of failed experimental results, and deleterious consequences to local communities and environments, the global enterprise continues to expand under promises of an artificial future.

"The Burden of Proof": Environmental Racism, Data Artifice, and the EIS

After the 1964 Civil Rights Act, environmental justice leaders worked to integrate civil rights laws, and local community scientific and social scientific findings, into the growing consciousness of US environmentalism (see Cole 1994; Yang 2002; Colopy 1994). The environmental justice (EJ) and Indigenous environmental justice (IEJ) movements coalesced just as their empirical findings became more widely recognized in federal environmental policy.[10] Throughout this time, evidence of environmental racism and toxic colonialism mounted. The realities of racialized urban environments, poisoned water systems, appropriated and destroyed Indigenous land and water, and drastically different living conditions for low-income populations could no longer be ignored—the evidence was clear.

Yet, dominant data-driven environmental policy systems have ignored, erased, and manipulated this

evidence in the name of environmental justice. This is a sinister and widely employed tactic in environmental policy: the demand for and disavowal of evidence of things that are more than evident.[11] In his reflections on environmental policy since the 1970s, environmental justice leader Robert D. Bullard (1994) wrote that environmental racism "places the *burden of proof* on the victims rather than the perpetrators." The burden of proof is an artifice at work in environmental and climate policy. It requires that those living under conditions of environmental racism and toxic colonialism do tireless work to prove the realities of environmental racism and toxic colonialism.

Indigenous protesters at the 2014 People's Climate March. Photo credit: Joe Brusky/ Flickr.

Much of the work of the EJ and IEJ movements has been to evidence these realties through legal, scientific, medical, and statistical interventions in hopes of enacting transformative and justice-centered policy change. Scholar and historian Sylvia Hood Washington (2017) argues that environmental racism is a better policy term than environmental justice to reflect the real conditions and stratified histories of places of inequality, as evidenced in her comprehensive study of environmental racism in Chicago. Bullard's resonant definition of environmental racism details its multiscalar complexity:

> Environmental racism reinforces the stratification of *people* (by race, ethnicity, status and power), *place* (in central cities, suburbs, rural areas, unincorporated areas or Native American reservations) and *work* (in that office workers, for example, are afforded greater protections than farm workers). (Bullard 2004, iii)

Environmental racism functions across all scales of environmental decision-making from urban planning

to legal and regulatory apparatus. It is encoded into the seemingly banal systems of data and analysis that operate across these domains.

In the 1970s, environmental policy went through a process of datafication. A product of this shift was the environmental impact statement (EIS). EIS were first mandated by the Nixon administration's 1969/1970 National Environmental Policy Act (NEPA), which additionally formed the Environmental Protection Agency (EPA) (National Environmental Policy Act of 1969; Environmental Protection Agency 2015). However, this legislative overhaul did not prioritize civil rights nor environmental justice needs in their constitution. For example, the Office of Environmental Justice (OEJ) would not be created until 1992, two decades after the EPA's founding.

Throughout the 1970s, environmentalist attitudes saturated legal and policy work. Backed by NEPA, federal and state agencies wrote directives to purportedly help humans coexist with the environment. The Reagan administration would later push back against the popularizing prerogative, undercutting environmental policy and civil rights (Hamblin 2015). One indicator of this backlash is in the erasure of EJ and IEJ data, including texts like *Toxic Wastes and Race in the United States,* which have disappeared from mainstream environmental policy in Washington (Commission for Racial Justice 1987; see also Bullard 1993a; Bullard 1993b; Bullard 1994; Stiffler 2006).

Despite the political changes, the 1970s and 1980s mark a definitive turning point to data-driven environmental policy. During this time, powerful regulatory systems were implemented to translate "environmental impact" into quantifiable metrics of data analysis emblemized by NEPA's EIS. The idea was, for example, that a coal developer would need to complete an EIS to accurately reflect the impact of their project on the environment, prior to starting it. EIS were data forms (literally forms of data) used to mediate environmental projects at the nexus of private interest and government regulation. As a vaguely defined, databased regulatory standard, environmental impact statements were, from the start, vulnerable to political interpretation, obfuscation, and manipulation (*Indigenous Environmental Network v. US Department of State 2017*).

EIS became more laden with process information (draft versus final copies, readability, etc.) than information specifying language on what actual environmental impact looks like.

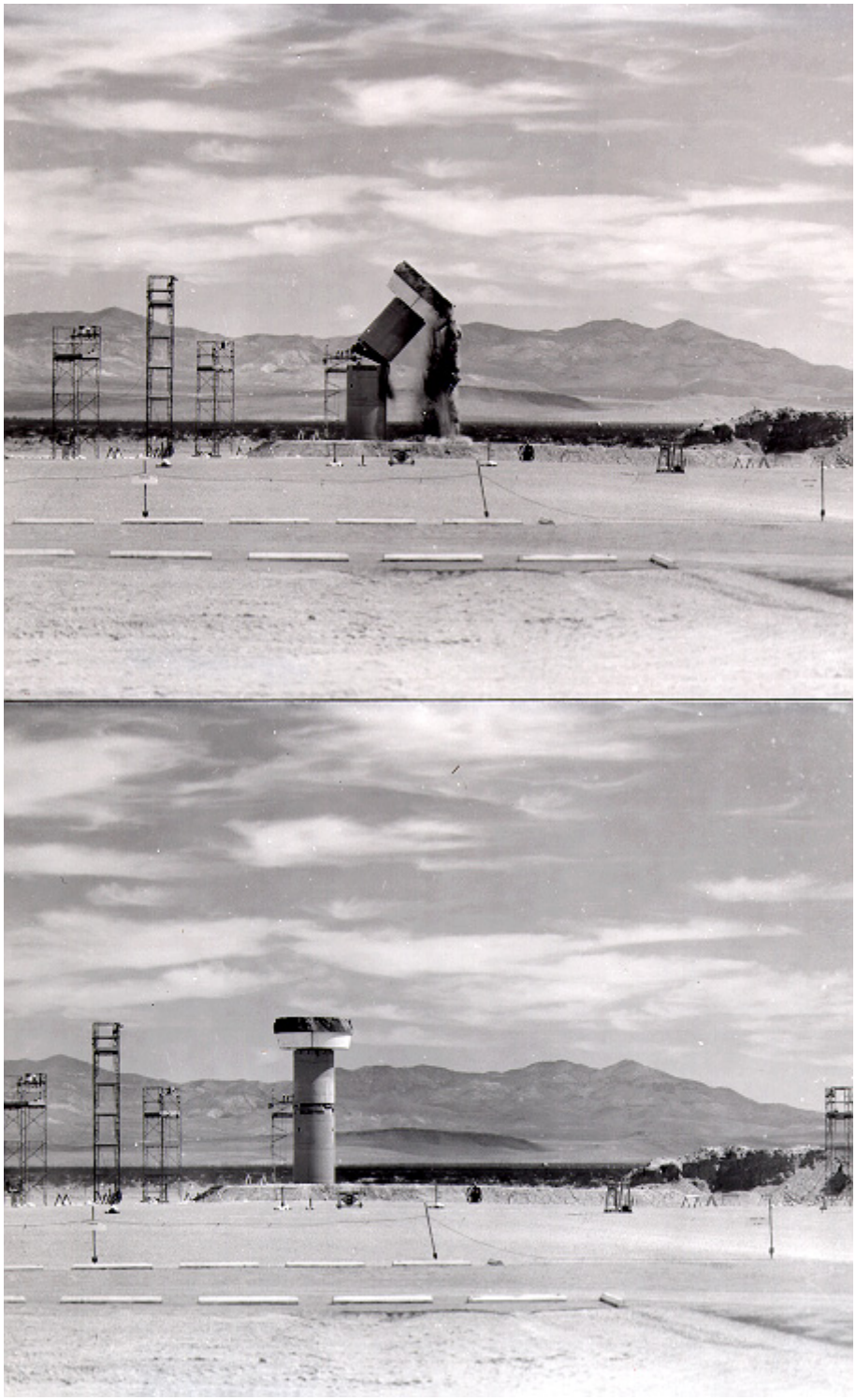
In 1971, the State Environmental Protection Act (SEPA) followed NEPA to implement policy changes at state and local levels. Over the next two decades, variegated and oftentimes confusing bureaucratic and decision-making procedures were designed to fulfill EIS directives. EIS data processing and assessment differed across localities and across state laws and policies as they were subject to different bureaucratic structures and initiatives. For example, in 1977, the City Council of Yonkers, New York, wrote local policy to fulfill SEPA directives and "encourage productive and enjoyable harmony between people and the environment" ("Corporation Notice" 1977). However, EIS became more laden with process information (draft versus final copies, readability, etc.) than information specifying language on what actual

environmental impact looks like.

Across many instances, environmental justice considerations were not actually considered. And these absences did not go unnoticed. From their inception, EIS have been contested by Native American governments and coalitions, environmental rights communities, and farm workers. In another piece, I detail the implementation of an anticolonial environmental impact statement led by members of the National Indian Youth Council (NIYC) in Albuquerque, New Mexico, that serves as a model for a justice-centered approach to environmental regulation (see Dryer 2021; forthcoming). What the NIYC showed is that data obfuscations and data manipulations are a core feature of colonial water policy and law (see Dryer 2023a). These data manipulations are emblemized by the recent 2023 *Arizona v. Navajo Nation* decision where the Supreme Court undermined the Navajo Nation's *Winters Rights* by claiming confusion about their water counts.

Over the past half century, there have been countless EIS disputes. Common across these cases, local communities and activists evidence the absurdity of energy and tech entities providing their own data and analysis for assessment of "environmental impact." For example, in 1976, Colorado representatives challenged the "one-sided" effort to prepare an environment impact statement on coal-related development. A representative was quoted saying: "The curious part of this arrangement is that BLM [Bureau of Land Management] only notified coal representatives. That is, the impact makers were asked what they wanted to do. The impact getters—the citizens of the seven counties—weren't. That's one-sided" ("Those Reluctant Companies" 1976).

In 1981, farm workers in Clovis, New Mexico, with support from the New Mexico Farm and Livestock Bureau, challenged the information in the Air Force's environmental impact statement. At that time, the Air Force was building the MX missile system. Farm union members were quoted as saying, "Water-short New Mexico cannot afford to have large amounts of water drained by the missile system […]" ("Please, No Missiles" 1981). In protest, farm workers put up a sign that read, "MX: Blows Dust, Sucks Water, Ruins Farms and Ranches, Does Not Scare the Russians."



The top part of the canister containing the simulated MX missile falls to the desert floor. Photo credit: National Nuclear Security Administration, Nevada Site Office Photo Library.

Throughout the first few decades of NEPA, contradictions and confusions in EIS implementation were evidenced and rigorously contested. Indigenous communities detailed the need for anticolonial EIS assessments, given their egregious abstraction from water rights contexts. Farm workers protested the absurdity of EIS cost-benefit assessments against the actual catastrophic impact of military developments. Beyond this, many water and land planning initiatives during this time relied on EIS to legitimate rapid energy development (including coal and uranium mining).

These examples illustrate how environmental policy and research are multiscalar, and databased decision-making policies, such as EIS, can refer to a broad suite of implementation directives and

outcomes (Guisande et al. 2018). Since the 1970s, EIS reports have increasingly converged with systems analysis. Today, many EIS reports utilize optimization algorithms, Monte Carlo methods, and other predictive analytic frameworks contributing to the unreliability of their implementation (Dryer 2021). In reflecting on Bullard's burden of proof analysis, it is evident that the datafication of environmental policy is subject to co-optation and manipulation by energy and tech developers. Much like GHG-based climate policy, the 1970s US environmentalist movement catalyzed a data-driven policy landscape that has since permitted tech enterprises tocurate profitable scientific and legal information and decision-making procedures under the guise of environmental justice and regulation.

The Artificial Future is Repulsive

Artifice is a word, like most words, that holds different meanings, histories, and uses. Merriam-Webster defines it as "clever or cunning devices, especially as used to trick or deceive others." The word artifice fastens technologies to deception. Artifice sits within a constellation of related words such as *art*, which holds creative and skillful connotations, and *artificial*, which more explicitly denotes falsity and something made by humans (defined as *not* natural). Ironically, the related "artificial intelligence" is an amorphous terminology often used to describe the theory and development of computer systems that purportedly function *without* human intelligence. Yet there is consensus that this definition of artificial intelligence is mythology, a scam, a red herring. AI is not superhuman nor supernatural, it is saturated with all the affects and desires and violence of human subjectivity and its systems extract from human labor, water, and environmental resources (see Dryer 2023b). Undeniably, artificial intelligence exacerbates climate change.[12]

> *Environmental justice leaders have long fought the battle of clarity-making, to produce evidence and data of stratified histories of toxic colonialism and environmental racism that are more than evident.*

The stories I shared about artifice—carbon artifice, artificial rain, and data artifice in environmental regulatory policy —illuminate the urgency of clarifying our terms of engagement as well as the stories we tell about climate change and about our individual lives and relationships to knowledge.[13] These stories remind us of the long history of clarity-making in the environmental and climate justice movements and the abundant amount of information that already exists to inform our critiques. Environmental justice leaders have long fought the battle of clarity-making, to produce evidence and data of stratified histories of toxic colonialism and environmental racism that are more than evident.

The stories we tell about the climate crisis reflect our positionality in the world. Our climate stories mirror what we were taught of our histories, of our communities, and of ourselves; they inform what we believe is possible for the future. Energy and carbon are powerful historical forces dictating change over time, and these paradigms undergird technological designs of artificial futures. Yet carbon data represents only one feature of climate change. It is essential for us to create a multidimensional and

informed understanding of climate change, to learn from the kaleidoscopic visions of those who have authentically embraced it.

Given its indeterminate foundations, the antonym to artifice is not necessarily truth, but clarity. Artifice thrives in obscurity and in the confusion of smoke and mirrors. Collective change grows from understanding the limitations of artificial systems and embracing indeterminacy. We all live in a world backdropped by climate change, and we get to actively participate in this reality. What is your relationship to climate change beyond the carbon artifice? What stories have you been taught? Which stories are you learning and which stories are you unlearning? Which stories have you unearthed and which stories can you imagine? The world-making difference is between chasing after deadly ambitions of artificial futures and grounding ourselves in a historically informed reality–a reality in which collective healing, repair, and justice are possible.

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Footnotes

1 In March of 2020, Indigenous Action published a clear rejection of imperial explanations of Covid-19 (Bennally 2020).

2 For a recently published history, see the work of Teresa Córdova, José Bravo, and José Miguel Acosta-Córdova (2023).

3 There are many histories of energy that clarify how the energy paradigm makes and shapes nations and empires, such as Richard Rhodes' *Energy: A Human History* (2018; see also Raimi, Eherman, and Curley 2023).

4 Please read our water stories. Organizations that focus on protecting Indigenous lands and waters from lithium mining for the energy economy include the Observatorio Plurinacional de Salares Andinos and the Center for Interdisciplinary Environmental Justice.

5 "Don't hit reply all […] I use the concept of the carbon copy and 'cc' to detail the pressure, transfer, and circulation of colonial concepts of nationhood and belonging constructed through legality and archival surveillance in Indian country to critique the tertiary effects of this reproduction on Indigenous determination and decolonization. Colonial recognition is based on archival documentation and legal proceedings which were designed to erase and eradicate Indigenous peoples for the process of extracting land and energy and containing life" (Salomón 2022, 237).

6 N. K. Jemisin touches on the idea of a broken Earth in her Broken Earth Trilogy of science fiction novels.

7 A response to IPCC's limitations was published by *Mold* magazine (*Mold* editors 2022).

8 My research on artificial rain programs is part of my forthcoming academic book based on my doctoral research (see Dryer 2019).

9 Harper (2008, 2017) and Daipha (2015) examine the history of data and weather modification.

10 There is a lot of literature on these movements, such as Bullard (1990) and Wilks (2020).

11 I am deeply inspired by Sara Ahmed (2016) and Toni Morrison's work on the potency and power of understanding evidence and distraction as functions of inequality.

12 Ali (2016) provides an introduction to decolonial computing. For an examination of AI, computing, and the environment, see the works of Wang (2020), Hogan (2015), and Brain (2018).

13 Audre Lorde (1988) wrote: "We must observe the implications of our lives […] the personal is political and we can subject everything in our lives to scrutiny. We have been nurtured in a sick, abnormal society, and we should be about the process of reclaiming ourselves as well as the terms of that society."