

M.A.D. MONSTERS FOR THE CHTHULUCENE: RADICAL RELATIONALITY AND
CARE DURING PLANETARY CRISIS

A Dissertation

Presented to the Faculty of the Graduate School
of Cornell University

In Partial Fulfillment of the Requirements for the Degree of
Doctor of Philosophy

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December 2024

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M.A.D. MONSTERS FOR THE CHTHULUCENE: RADICAL RELATIONALITY AND CARE DURING PLANETARY CRISIS

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Cornell University 2024

ABSTRACT

This dissertation employs the creative methods found in Art, Science, and Technology Studies (ASTS, also known as art-science) to explore the following central question: *How can we Earthlings learn to peaceably transition from the Nuclear Anthropocene to the Terran Chthulucene (pronounce: THOO-loo-seen)?* Through a narrative technique known as speculative fabulation, I argue that such a transition requires a commitment to just worlding practices that dismantle pernicious hierarchies of speciesism. To support this claim, I draw from examples of just worlding practices developed in the transdisciplinary knowledge communities resulting from the convergence of three movements: the art-science movement, the action research movement, and the ecosocial justice movement. My dissertation is thus embedded within the context of my position as an ecosocial justice activist, action researcher, and art-science practitioner who has participated in these transdisciplinary knowledge communities for the last two decades. The narratives herein serve as examples of the kind of just

worlding practices that have emerged from our collaborations. They demonstrate how speculative storytelling helps dismantle the unjust systems of oppression that have led to the crisis-state conditions we collectively face in order to herald more just worlds for all Earthlings.

BIOGRAPHICAL SKETCH

Lisette Lorenz, PhD ([ki](#), [kin](#), [kins](#)), is a hybrid creature of nuclear settler colonialism: allegedly *Homo sapiens*, inhabiting an irradiated, loosely held together mindbody that is (at least) two-thirds bacterial and fungal, with the remaining “human” portion being composed of Indigenous Malibu of Mompós in what is today known as Colombia and Taíno from what is today known as the Caribbean (Dominican Republic, Haiti, and Puerto Rico); Afro-Latiné of Sub-Saharan, North African and Western Asian descent; and Southern European (Spanish and Portuguese). Ki was born and raised on Turtle Island (now called North America), specifically on the ancestral lands of the Tequesta, Mayaimi, and Ais peoples in what is currently known as Miami, Florida, USA. Lisette has a Bachelor of Arts in environmental studies from Oberlin College, a settler institution located on the ancestral lands of the Mound Builders, Wyandot, Seneca-Cayuga, and Erie peoples. Ki specializes in the socioecological impacts of nuclear disasters on more-than-human communities in an age of planetary crises. Drawing from critical social theories across the humanities and social sciences, ki utilizes the transdisciplinary methods found in Art, Science, and Technology Studies (ASTS, also known as art-science) to apprehend these crises. Possessing a bipolar neurotype, Lisette also draws from kins own embodied experiences with what is psychiatrically known as mania and psychosis to explore Earthly un/worlding in a scholarly context. With the climate crisis

already affecting vulnerable human and more-than-human communities around the world, kins dissertation research on art-science interventions for the speculative Terran epoch known as the Chthulucene (meaning “the age of monsters,” an alternative to the Anthropocene, “the age of humans”) examines how speculative storytelling serves as the proving ground for collective intra-, inter-, and trans- species survival and ecosocial justice for all Earthlings. You can find more of kins work at lissettelorenz.com.

To the seven generations of Earthlings that came before
and to the seven that come after.

ACKNOWLEDGEMENTS

[Turn this into prose and for the love of the gods do not forget anyone!!!]

I'm indebted to:

- literally everyone and everything everywhere all at once
- the Ancestors (especially Gregorio Lopez)
- *Mis Abuelo/as*
- *Mami, Papi*, and the sibs (human and beyond)
- *La Familia*/the Fam and friends
- *aaaaaaaaaaaaall my communities (human and oh so much more than human)*
- Sarah A. and the entire Cornell S&TS Department, faculty, staff, students
- all the union workers
- my illustrious committee: Rebecca, Bruce, Rachel, and Megan
- my mentors: Hannah, Ray F., Darla T. and the AAAS SEA Change team, Hiro + Annelise, Mary, Lisa O., Vincent, Tyson, Ari Sensei and IUC, Daniel McKee Japan research librarian, Jay and John and Oberlin peeps and Shansi and Obirin folks
- the Deans, Fellowship Office, Kristin Laidlaw, Emily CU Women, wellness coaches
- my collaborators, fellow readers and writers: Judith and the Nuke Geeks, the Cornell Nuclear Disarmament Group, Reppy Fellows, Autumn and Tamar, Amy and Martin and the “Ziney Gardeners” multispecies crew, Dung, Aster, Amanda, Wanheng and Kike and the OG Noumenati Reading Group, SSRG, even more reading and writing rehab/support groups, Knight Institute, QuIRI Jan A., 6S
- Everyone who gave me \$\$\$
- Everyone who put me in their diss acknowledgements
- Jackie for being my muse
- My hubby and Road Dog, Dr. William Henry Marshall V of musculoskeletal radiology (I love how we can nerd out over each other's Geiger counters <3)
- Trevor, for believing in art-science and “weird projects” like this one (I still owe you that in-depth analysis of autonomous sensory meridian response for your Qualitative Methods course)

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[Keep going keep going keep going you can do it you can do it you can do it ☺]

Prologue

...the sound of cicadas takes me back...

August 6, 1945. *The blinding light. The searing heat. My skin melts. I am dead in a flash. Does my mind even register my body's passing from this world as I am whiplashed into the next? One moment: thinking about the rising cost of wartime vegetables on my way to the market, casually wondering what wartime propaganda art is on display at the Hiroshima Prefectural Industrial Promotion Hall as I pass it on my right. Next infinitesimal moment: I'm careening back through the eternal return to the formless void of infinite potentials. Instant death made me and 80,000 other humans lucky. 80,000 would die a slower, more painful death.*

...the sound of cicadas sends me forth...

August 9, 1945. *Summer's hazy, lazy lullaby keeps me pleasantly complacent in my mother's belly as she gently bends over the goya melon patch. The cooling bitterness of those particular melons, growing in the wartime community garden behind Urakami Cathedral, is soon to be lost on the both of us, replaced with an entirely different flavor of bitterness. Engulfing us in what tastes like an intolerable hatred that fuels the grudges of vengeful ghosts. Back into the void, along with 40,000 human others.*

*How many cicadas have joined us in the
eternal return? Is that why they wail
amidst the radiance of 1,000 summer
suns?*

July 27, 1990. *A human baby is born in a bustling urban hospital a whole ocean away from the Land of the Rising Sun. Surely I'm safe from the inferno this time around...*

CHAPTER 1

Welcome to the Chthulucene

In January 2022 I lived through the nuclear apocalypse. I counted down from ten in the back seat of a friend's car, waiting panic-stricken for the bombs to fall. The car radio, set to WWOZ, had just announced the start of World War III. I could hear the sirens' wail of warning. When I got to zero, I thought, I will be consumed in a blinding flash of fire and heat. This is how I die. I continued the countdown in my head. But when I got to zero, nothing happened. My friend continued to drive me to a New Orleans hospital for what was later diagnosed as my first psychotic episode. The announcement on the radio; nothing more than auditory hallucinations. The panic I felt; acute paranoia. The nuclear apocalypse was all in my head. Or so the doctors claimed.

M.A.D. stands for "mutually assured destruction" from nuclear war. It also means being in a state of mental insanity. Madness in the West is seen as a disease, a state of dis-ease. A disorder, as a state of being dis-ordered. No doubt the creator of the M.A.D. acronym, U.S. military strategist Donald Brennan had this in mind when he ironically coined the term in 1962 to refer to the complete annihilation of both the attacker and the defender in a nuclear war. The state of international relations had reached levels of insanity. Two states in conflict with weapons of such power at their disposal that war between them would result in not only their mutual destruction, but likely in the destruction of most other nations on the planet as well. Who would risk all of life on Earth for a turf war, if there was no one left to claim said turf? Only someone inflicted with madness; a monster.

Those monsters existed; they heralded the nuclear age. And while the nuclear age did not end in a M.A.D. war and subsequent nuclear winter and end of the world, it did create more monsters. Irradiated ones. Everyone born on Earth after [1951 is irradiated from nuclear weapons testing](#). There are nervous whispers that trace amounts of strontium-90 from the fallout of those Cold War tests conducted can still be found in all of our bodies. Monsters begat more monsters.

The Cold War ended but the nuclear age did not. In fact, some scientists are advocating for the acknowledgment of a new era in Earth's history based on the splitting of the atom for violent purposes. Rather than live in the age of the Sun, the Holocene, we would be living in the Anthropocene, the age of the Human (White Man, specifically). An age when *Homo sapiens* as a species have

become geological agents of planetary change. Thanks in part to our tinkering with the atom (and our tinkering tendencies, in general), our level of impact on our planet has become monstrous. We can look forward to dying collectively by climate change operating at different speeds: a quick nuclear winter over a matter of months, or a slower kind of violence over a matter of years. By 2050, we'll know which path we as a species have taken.

The concept of the Anthropocene has received much critique since its circulation in the early 2000s for being overly general about the current state of planetary crisis. Focusing on the human at the level of species obscures how certain humans have contributed to our collective crisis significantly more than others. Critical theorists have responded with alternate names—such as the Capitalocene or the Plantationocene—that point directly to the kinds of human activity that has led our planet to its current predicament.

There is one alternative to the Anthropocene in particular that I am drawn to, due to its focus not on past causes of the crisis, but on creative potentials for life during and beyond the crisis: environmental philosopher Donna Haraway's Chthulucene. It is the Age of (non-innocent) Monsters: rather than condemn the monster, the Chthulucene calls for us to embrace the monster in all its complexities: the good, the bad, the ugly, and the beautiful. For in the Chthulucene all Earthlings are Terran monsters. What would it mean to identify with our ever-becoming monstrousness? To explore our individual and collective madness? Without condemnation, but with curiosity? What would our mad, monstrous selves teach us about living and dying *well* together in a time of crisis? I am hungry for stories, lessons, parables that can carry ours and other species through the crisis and into a more just and peaceable future for all Earthlings.

I weave a basket of yucca and Tree of Heaven and set out foraging for stories. This is what I find.¹

* * *

¹ I know introductory chapters are supposed to provide an overview of the road ahead, summarize the chapters that follow and why they matter, line them up nice and neat and orderly. Yet that is but one way to tell a story. To take such a linear approach to storytelling in the main body of the text would ruin the element of surprise that makes foraging such a rewarding activity. This story aims for a more mycelial, rhizomatic approach, like something you'd find on the forest floor: twists, turns, shoots, loops, blips, chirps, and the like. Or perhaps a better metaphor is electrons revolving around a nucleus or planets revolving around a sun. I'm not sure. Things tend to mutate in this way in the Chthulucene.



Figure 1.1. Gallery image of “Lucky Mice” from *Routledge Handbook of Art, science, and Technology Studies* (2021).

Appetizer

March 16, 2019

Dear Editors of *The Chronicle of Higher Education*,

Please find attached my submission, “Art in the Anthropocene: What is it Good For?” to be considered for “The Review” section of your publication. It is in part a response to the Chronicle’s October 11, 2018 Review article by Jonathan Kramnick, “[The Interdisciplinary Delusion](#).”

Thank you,
Lisette

During a recent guest appearance at an Environmental Humanities graduate seminar at Cornell University, ecocritic Karen Pinkus told us students to be weary of artistic projects that have explicit goals of addressing sustainability through social action. These projects, she warned, often instrumentalize and co-opt artistic forms in the service of communicating science to the public, therefore making art subservient to science. With the shift of institutional funding towards solution-oriented work that addresses global challenges (such as climate change), the increasing number of these projects over the past few decades has contributed to the overall trend in higher education of valuing the humanities only insofar as they can be “relevant to the real world,” she said, i.e. insofar as they are useful to scientists and their communication problems.

Sitting across from Pinkus during this conversation, I squirmed uncomfortably in my chair. It was as if she was admonishing me specifically, as I had just embarked on a theater project called “Climates of Change,” whose goal is to increase people’s knowledge about climate change and inspire them to tackle it through both changes in everyday behavior and political action. “Climates of Change” is a collaboration between Cornell’s performing and media arts and earth and atmospheric science departments as well as with a community theater company. Cornell students from across the different disciplines will partner with local residents of the city of Ithaca to create a play about how climate change is affecting their community, which is situated in the Finger Lakes bioregion of New York State.

For the project, students and community members will participate in a two-semester course beginning in spring 2019 that takes place both on campus and in downtown Ithaca. Participants will spend one semester using community theater techniques such as story circles and the living newspaper to create an original play. In a story circle, participants gather around in a circle and share personal stories that relate to climate change. For the living newspaper, participants gather current event articles and use them as a basis for creating new theatrical material. The purpose of using these techniques is to gather real accounts of how climate change is already affecting local communities and ecosystems, dramatize them, and act out potential scenarios and solutions onstage for a general audience. “Climates of Change” will be performed in December 2019.

My job in the project is to employ a mix of quantitative and qualitative methods to evaluate the effectiveness of the theater process and product in reaching its goals of increasing climate change knowledge, motivation, and action. I will do this by tracking participants’ attendance and level of participation, collecting surveys of participants and audience members, and conducting participant observation, interviews, and focus groups. I will then analyze the data to determine whether “Climates of Change” made its intended impact.

Back to the lecture room, I shuddered to think of Pinkus’ reaction to the “Climates of Change” project and my role in it as an art evaluator. Despite my

earnest desire to address the climate crisis, was I ultimately kowtowing to co-opting of art for scientismic aims by participating in this project, all under the guise of the environmental humanities?² Was the “Climates of Change” team paving the road to hell with our good intentions?

There is a passage in Pinkus’ *Fuel: A Speculative Dictionary*, that wonderfully illustrates her qualms over the instrumentalization of the arts by the sciences. Under the dictionary’s “Air = Nothing” entry, she imagines a dinner party between scientists and humanists. The scientists, eager to learn how the humanities might help provide cultural solutions to the problem of renewable energy transitions, are happy to receive an invitation to sit at the humanists’ table. Yet the scientists do not realize that the essence of the humanities lies in the unfurling and deepening of problems, not in their resolution. She writes:

“[The scientists] do not want to hear how critical theory might take us beyond, might transgress the limits of what could be best be defined as a certain type of value-enriched behaviorism....We should probably not speak, between sips of wine, of ‘unusable energy’ that ‘by definition does not work, that is insubordinate, that plays *now* rather than contributing to some effort that may mean something at some later date and that is devoted to some transcendent goal or principle.’ We can expect strange looks and awkward pauses if we bring up the ‘energy of the universe...that traverses our bodies, that moves them in useless and time-consuming ways, that leads to nothing beyond death or pointless erotic expenditure, that defies quantification in measure....’ Talking of sacrifice is not only a

² The term “scientism” refers to a set of beliefs that value science above all other forms of knowledge-making and understanding about the world. These beliefs can be called “scientismic.” For a typology of scientism, see Stenmark 1997.

downer, it will lead to our friends from those more quantitative disciplines look at their watches and skipping dessert.... And then if by sacrifice we mean something like... 'the void of the universe...' the evening will be over rather abruptly" (4).³

Now the reader may understand why Pinkus equated air with nothing in this dictionary entry; she wants the reader (who is hopefully a scientist) to come to terms with the possibility that nothing may matter at all, including this feverish search for climate change energy solutions, since in the end all of existence may be headed towards nothing short of the cosmic void. If only we could fully embrace our own mortality, our own cosmic uselessness, then and only then could we be finally liberated from the demands of utilitarianism, of tirelessly striving to live life for a certain purpose. Solution-driven science cannot help us with such liberation. Art, on the other hand, is perfect for it. The humanities give people room to critically ruminate on the nature of the human condition, whether it be nihilistic, as suggested by Pinkus, or perhaps something more hopeful. Speaking of "hope" and its relationship to the humanities as a profession, Pinkus has this to say:

"[Humanists'] survival depends on our ability to be nimble and offer, precisely, something others might call 'hope.' 'No doom and gloom please,' say research centers, funding organizations, and potential collaborators. That will get us nowhere. But where do we think we are going [other than into the void of the universe]?" (5).⁴

³ Karen Pinkus, *Fuel: A Speculative Dictionary* (U of Minnesota Press, 2016).

⁴ Pinkus.

To answer Pinkus' question, perhaps other than the void, the environmental humanities aim towards the survival of humans and other species during these dire ecological times. But survival of some species comes at the extinction of others, like the humanist who can afford to engage in art for art's sake alone. For Pinkus, it seems, any other use of art compromises the integrity and autonomy of the humanities. Because she is also painfully aware of the encroachment of utilitarianism and scientism on the humanities, even for the sake of climate change and the "greater good," she is sounding the alarm, alerting us of the disappearance of a critically endangered species of academic.

Pinkus is not the only humanist worried about the survival of her academic species. In *The Chronicle of Higher Education's* October 11, 2018 article, "The Interdisciplinary Delusion," fellow humanist Jonathan Krammick claims that more often than not, the university's call for interdisciplinarity across the arts and sciences is really just an excuse to eliminate departments that are seen as less relevant to real-world issues or applications—i.e. the humanities. Humanists must sell the relevance of their work to their more highly esteemed colleagues, the natural scientists. This push for interdisciplinarity and relevance, he writes, results in

"a certain shame at merely pursuing the questions of one's home discipline, at being, for example...an anthropologist who can't find an ecologist and tap into money earmarked to study climate

change...humanities departments are far more often called to justify their existence...than, say, departments of electrical engineering.”⁵

Humanists must demonstrate how their work can be used to solve “real-world” problems like climate change and are cajoled into partnering with natural scientists to produce solution-oriented work. This kind of interdisciplinarity is not only all too common but dangerous, as it threatens the very existence of the humanities as its own set of disciplines worth preserving. Instead of this kind of predatory interdisciplinarity, Krammick calls for one that values each contributing discipline equally and does not seek to reduce one (the arts) into the other (science), a desire at the very heart of scientism.

Pinkus and Krammick are both wary when art has a use beyond its own aesthetic purposes, as if art that isn’t solely for art’s sake is adulterated, tainted, and of a lower caliber. I doubt that art has ever been that pure. Art is situated in the lived experience of the artist; their hopes, dreams, nightmares, and oppressions can all manifest in the work. Art can therefore serve as a coping mechanism: a way to work through the pain of oppression, or of a dying planet and a dying way of life. Or it can be used emotively: to mourn, rage against, reminisce, or say goodbye to old orders of existence. Or it can be used to create new ways of living: ones that are better prepared to handle precarity and crisis. Moreover, it is an incredible privilege for the humanist to be able to specialize in

⁵ Jonathan Kramnick, “The Interdisciplinary Delusion,” *The Chronicle of Higher Education*, October 11, 2018, <https://www.chronicle.com/article/The-Interdisciplinary-Delusion/244772>.

art for its affective or aesthetic purposes alone, as it means that the humanist's basic needs—water, food, shelter—are somehow being met. The humanist may make art or produce artistic critique as a way to secure these needs—as a profession. (Last time I checked, Pinkus and Krammick still get paid well enough to share their intellectual positions on the purpose of the humanities in society.) As these basic necessities become increasingly difficult to secure in the late Anthropocene, those who support the wages of humanists may themselves become an endangered species, along with the tigers, the elephants, and the uncompromising humanists.

While I appreciate Pinkus' and Krammick's concerns about the instrumentalization of the arts, I am not convinced that I have sold out the humanities by participating in "Climates of Change." Unlike Krammick, I still believe in the power and necessity of interdisciplinarity to not only problem-solve, but to help us better understand a quickly changing world. Nor am I yet as cynical as Pinkus about the futility of the human and non-human condition in the Anthropocene. I believe "Climates of Change" has the potential to contribute to the humanities, the sciences, and societies determined to "keep on keeping on" in the Anthropocene—as soul singer and civil rights activist Curtis Mayfield famously crooned—without appealing to utilitarianism and scientism. I align the goals of the "Climates of Change" theater project with those of climate fiction, or "cli-fi," as outlined by Stephanie LeMenager in her essay "Climate Change and the Struggle for Genre." Cli-fi seeks to "combat this unsettling era

of climate shift and social injury” (220) by “redefining humanism and the humanities” (222). Cli-fi helps us forge new “social worlds by modeling individual consciousness in relationship with imaginary but possible worlds” and “new means of living with an unprecedented set of limiting conditions” (222-223). It seeks to make “climate change publics savvy enough to imagine both thriving and surviving with global climate change” (223). In short, cli-fi provides “a working model of stories to live by—rather than stories to die by—in a time of climate shift and potential social collapse” (226).⁶ Unlike Pinkus, not everyone has succumbed to the pull of the void. Some folks won’t go down without a fight. We can either try to shape the future or let it passively shape (or perhaps consume) us. There is space to both contemplate our own mortality, and the mortality of others, while still attempting to live. Art is capacious enough for both life and death.

During times of material paucity, we must be intellectually generous. For those of us interested in bringing about social change through our work, it is important to think about empirical ways to evaluate the success of our work—in ways that can be quantified, but also in ways that cannot. Pinkus and Krammick can help us avoid the traps of utilitarianism and scientism by urging us to remember that quantification fails to fully capture the aesthetic, emotive

⁶ Stephanie LeMenager, “Climate Change and the Struggle for Genre,” in *Anthropocene Reading: Literary History in Geologic Times*, ed. Tobias Menely and Jesse Oak Taylor (Penn State Press, 2017).

experience of engaging with art; a subjective experience that often escapes words, let alone numbers. Numbers and aesthetics, however, are not diametrically opposed, but rather complementary and equally valuable. Working at the intersection of art and science pushes scholars from across the disciplines to reflect together on what counts as empirics, evaluation, and success in world of multiple meanings. A project like “Climates of Change” promises to bring together such scholars, along with people possessing a wide range of local, technical, and critical expertise. Together we will imagine possible worlds to inhabit. Life in the Anthropocene requires art in all its pluralistic forms and purposes. The mantra of improvisational theater, “yes, and,” applies here: Yes, like Pinkus and Krammick, I believe that art does not have to be good for anything; it is simply good. And yes, like LeManager, I also believe that art is good for other things, like finding new ways to “keep on keeping on” in the Anthropocene.

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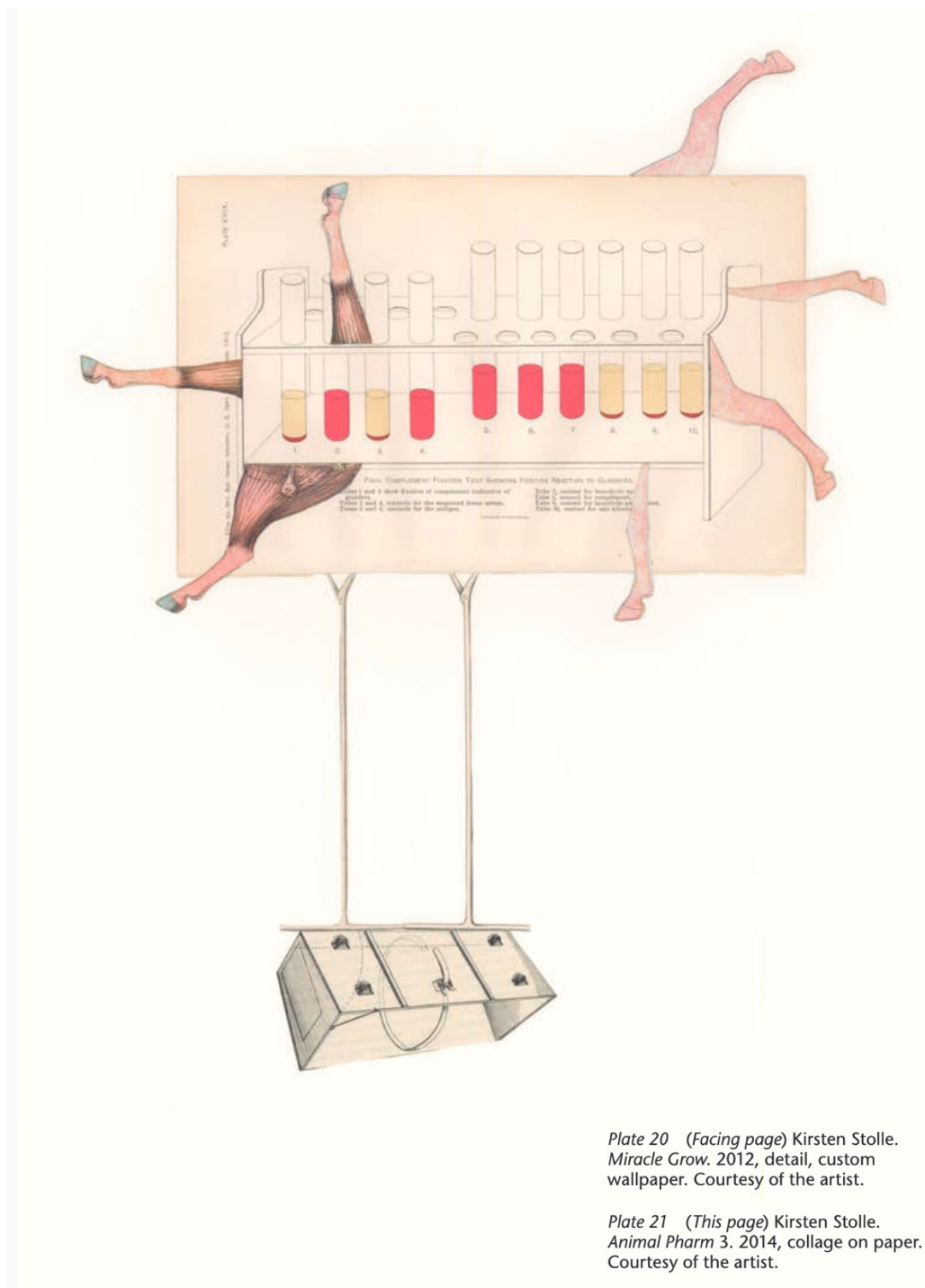


Plate 20 (Facing page) Kirsten Stolle.
Miracle Grow. 2012, detail, custom
 wallpaper. Courtesy of the artist.

Plate 21 (This page) Kirsten Stolle.
Animal Pharm 3. 2014, collage on paper.
 Courtesy of the artist.

Figure 1.2. Gallery image of “Animal Pharm” from *Routledge Handbook of Art, science, and Technology Studies* (2021).

Main Course

January 2025

Dear Editors of Science, Technology, & Human Values,

We are a transdisciplinary team of researchers coming from science and technology studies, human geography, and informal science learning looking to find a home for our most recent collaboration, a review essay entitled “Art-Science Works for Just Worlding.” After successfully hosting a discussion panel at 4S Mexico (2022) on recent publications in Art, Science, and Technology Studies (ASTS), also known as art-science, we thought we would keep the momentum going by writing a review essay of *Imagination: A Manifesto* (2024) by Ruha Benjamin, *Bauhaus Futures* (2019), edited by Laura Forlano, Molly Wright Steenson, and Mike Ananny and *A Year Without a Winter* (2018), edited by Dehlia Hannah. The journal *Configurations* initially expressed interest in publishing the piece, but by the time we completed it, the consenting editor had moved on to other pursuits and their replacement didn’t think the *Configurations* audience needed convincing as to the validity of art-science approaches (which was the angle we have taken in our essay. In retrospect, the fact that the [journal’s website](#) describes the publication as one that “explores the relations of literature and the arts to the sciences and technology,” we should have figured). After a quick, unsuccessful keyword search for “Art, Science, and Technology Studies” in ST&HV’s database, we have decided to try our luck with your journal’s audience instead (though we may admit that Owen Marshall’s [2021] “Un-silencing an Experimental Technique: Listening to the Electrical Penetration Graph,” Mike Michael’s [2023] “Furthering Ontological Pluralism, Maybe: The Strange Case of the Microbial Recordings,” and Tiago Moreira’s [2018] On “Aesthetic Publics”: The Case of VANTAbblack® do seem like promising leads). So without further ado, please consider giving our essay a home.

With anticipatory gratitude,

Lisette Lorenz, Autumn Brown, Tamar Law

Art-Science Works for Just Worlding: A Review Essay

A society where everyone has food, shelter, love? In your dreams. Exactly.

– Ruha Benjamin, *Imagination*

Reviewed Books

Benjamin, Ruha. *Imagination: A Manifesto*. Norton Shorts, 2024.

Forlano, Laura, Molly Wright Steenson, and Mike Ananny, eds. *Bauhaus futures*. MIT Press, 2019.

Hannah, Dehlia., ed. *A Year Without a Winter*. Columbia University Press, 2018.

The Art-Science Movement

Art, Science, and Technology Studies (ASTS), also known as art-science, has come of age. Take, for example, Maja Horst’s (2024) positive take on the *Routledge Handbook of Art, science, and Technology Studies* (2021), which she reviewed in *Social Studies of Science*. With 10 sections, 42 chapters, and even a final gallery, Horst writes that through the Handbook and related works, ASTS “presents fresh input into the relationship between STS and its diverse publics” (1); offers the opportunity for practitioners to “reinvigorate STS’s engagement in science-society relations and how they support renewed interest in public

communication about science and technology;” (2) and brings all these different resources into contact with each other, providing “a lot of inspiration for future work” (3-4). ASTS is thriving in other parts of the STS community as well. Just look at the theme of the 2024 quadrennial joint meeting of the European Association for the Study of Science and Technology (EASST) and the Society for Social Studies of Science (4S): Making and Doing Transformations. Making and doing would be greatly impoverished without art-science collaborations, interventions, and transgressions.

The aim of our current review essay, therefore, is to further establish art-science across more STS audiences by identifying and engaging with critical recent works that meaningfully contribute to the field’s growing repertoire. Written by a transdisciplinary team of researchers coming from science and technology studies, human geography, and informal science learning, we found our way to each other and to the art-science field through a lively discussion of three texts: *Imagination: A Manifesto* (2024) by Ruha Benjamin, *Bauhaus Futures* (2019), edited by Laura Forlano, Molly Wright Steenson, and Mike Ananny and *A Year Without a Winter* (2018), edited by Dehlia Hannah. The collections of fiction, creative nonfiction, and essays found in these texts utilize speculative means to explore and analyze planetary futures shaped by responses to pressing issues like emerging technologies, threats to democracy, and climate change. These texts provide complementary concepts and tools from across ASTS to

transdisciplinary scholars, activists, and communities interested in devising creative ways to address our interlocking planetary crises.

ASTS is an explicitly porous field of practice that challenges the seemingly common-sense notion that art and science are naturally dichotomous categories. Rogers (2022) writes, “We conventionally treat art and science as necessarily separated even though these categories do not form a natural or even coherent split between materials or philosophies. Close readings of projects of science and art ready reveal overlaps” (4). ASTS values and investigates the inter- and intra-sections and connections between, throughout, and beyond art, science, and technology (Snow 2012; Muller et al. 2015; Rogers, Halpern, and Hannah 2021; Rogers 2022; Borgdorff, Peters, and Pinch 2023). ASTS examines how art and technoscience mutually affect one another. Art-science unpacks the historical, cultural, social, and ethical implications of the ever-evolving inter- and intra-active triad consisting of 1) technological advancements, 2) scientific discoveries, and 3) artistic expression; explores how their ever-recombining effects (re)shape society, culture, and the human experience; and analyzes as the ways in which artistic practices take up, contribute to, and reshape these developments. The art-science field encourages critical, exploratory, and symmetric examination of the assumptions, values, and ideologies embedded in artistic, scientific, and technological endeavors. Crucially, this includes pushing back against established boundaries and traditions and surfacing alternative perspectives.

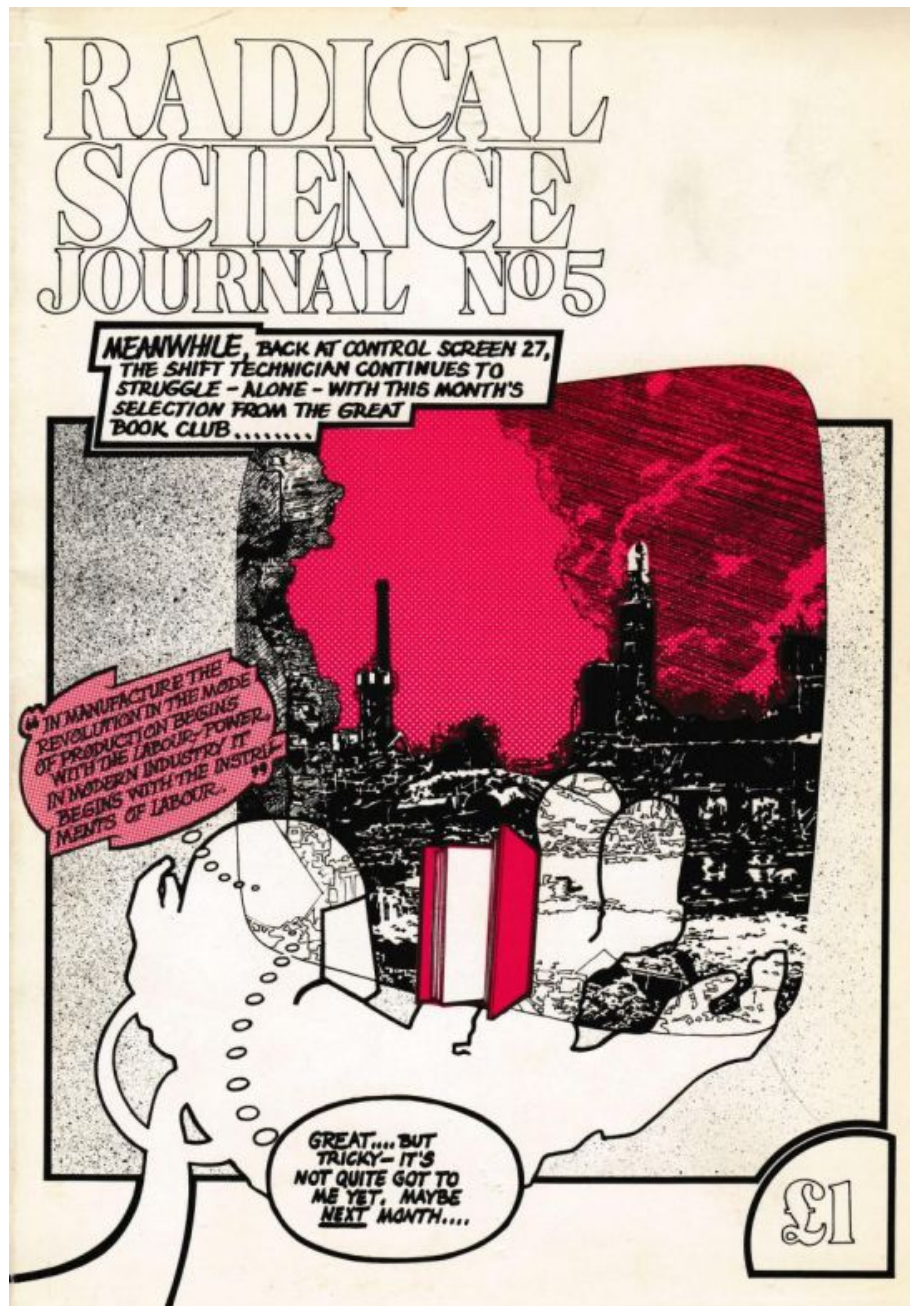


Figure 1.3. *Radical Science Journal* (RSJ), issue 5, 1977. According to Prerna Srigrayan (2023), the journal “was published by the RJS Collective from 1972 to 1980s(?) and was at the center of the radical science movement in Britain in the 1970s.” For the journal’s contents, go to:
<https://archive.org/details/radical-science-journal-5-1977/page/6/mode/2up>.

Moreover, ASTS recognizes the potential for innovation at the intersections of art, science, and technology, especially around action research and “sciences from below.”⁷ Those of us working in the ASTS space explore how art-science collaborations can lead to new forms of knowledge, expression, and technological development for the common good. A combined reading of *Imagination*, *Bauhaus Futures*, and *A Year Without a Winter* proves useful because these works serve as complementary exemplars of the critical experimental methods emerging from ASTS, particularly when those methods are aimed at working towards some form of ecosocial justice. Donna Haraway (2016) has described some experimental forms of production found in ASTS as SF, which can stand for (among other things) speculative fabulation, speculative feminism, and science fact (2-3). As a methodology, SF playfully (yet non-innocently) combines imaginative and speculative (often art-based) practices with scientific and feminist inquiry. It is a tentacular way of think-feeling and create-sharing that transcends traditional boundaries between genres and disciplines. It encourages the blending of fact and fiction, the real and the imagined, to explore complex and often marginalized perspectives. By doing so, SF as a methodology allows for the questioning of

⁷ [[Need to somehow incorporate Judith's comment about STS's activist history: activist scientists of the 70s, historian of science Robert M. Young, *Radical Science Journal* (see figure 1.3), *Science for the People*, etc. especially as it relates to a response to the Cold War (as Rebecca mentioned, too). See also my activist STS summary in my [JCOM journal article](#). Why does science for the people matter re: accessibility and engagement for justice-oriented science? See also Judith's publications on environmental and social justice (1997)]]

established narratives and the envisioning of alternative futures and possibilities. In other words, SF challenges conventional ways of knowing, proposing in its stead more inclusive and imaginative approaches to understanding the many worlds within worlds we chthonic ones inhabit. Haraway asserts that SF as method is crucial in this time of multi-scalar planetary crises, commonly called the Anthropocene (also referred to as the Plantationocene and Capitalocene—see Moore 2016).

We echo the call of scholars grappling with the Anthropocene who insist that such methods are critical for reckoning with painful histories, unstable presents, and precarious futures (Tsing et al. 2017; Bubandt et al. 2022). Surely our collective futures can be more caring and compassionate than what these forces of ongoing destruction portend: climate change, war, mass extinction—in short, ecocide. Indeed, for many human and other-than-human beings at the mercy of the forces of extractivism, colonialism, and capitalism, the past, present, and future all seem to writhe with an apocalyptic cadence. The subsequent work of (re-)worlding is precisely the charge for our texts—they begin to do the (re-)imagining beyond apocalypse and elitist techno-utopias, reframing the perspective of our current moment to reveal glimpses of possible, alternative equitable futures.

Imagination: A Manifesto by Ruha Benjamin is a short, radical, and accessible text aimed at the general reader that argues that imagination is a vital

tool for dismantling systems of oppression and creating just worlds. Benjamin posits that we inherit unjust ideas that police our imagination and make us believe that the status quo is inevitable, trapping us in dominant systems of oppression. The manifesto, she writes, “is a proposal for exorcizing our mental and social structures from the tyranny of dominant imaginaries. It is a field guide for seeding an imagination grounded in solidarity, in which our underlying interdependencies as a species and with the rest of the planet is reflected back at us in our institutions and social relationships” (8). Through a series of prompts and exercises designed to help release readers’ powers of imagination, Benjamin encourages us to create new stories and possibilities for ecosocially just futures.

Bauhaus Futures, edited by Laura Forlano, Molly Wright Steenson, and Mike Ananny, is a compelling exploration of the Bauhaus movement’s contemporary relevance in the realms of art, design, and technology. The book delves into the legacy of the Bauhaus, a pioneering German art school that operated from 1919 to 1933, and examines how its innovative ideas continue to shape current and future creative practices. Structured as a collection of essays by various scholars and practitioners, *Bauhaus Futures* transcends disciplinary boundaries, connecting historical Bauhaus principles—such as the integration of art, craft, and technology—to present-day challenges and opportunities, including climate change. The contributors investigate the intersections of design, society,

and emerging technologies, considering how the Bauhaus ethos can inform sustainable and socially conscious practices in contemporary design and architecture. The book engages with the idea of “futures” in the plural, emphasizing diverse perspectives on the potential trajectories of design and technology. It not only reflects on the historical significance of the Bauhaus but also critically assesses its implications for our ever-evolving technological and naturecultural landscapes. *Bauhaus Futures* serves as a thought-provoking resource for scholars, students, and practitioners interested in the ongoing impact of the Bauhaus movement on the fields of art, design, and technoscience.

A Year Without a Winter, edited by Dehlia Hannah, is the result of a collective thought experiment inspired by the summer of 1816, known as the year with no summer. In 1816, the eruption of Mount Tambora in Sumbawa, Indonesia was materially felt in Lake Geneva by Mary Godwin (Mary Shelley), Percy Shelley, and Lord Byron, through incessant rain and an overcast sky. Inspired by the gloomy weather, Lord Byron suggested a dare to write a ghost story, through which the novel *Frankenstein* was born. This volume takes up this dare two hundred years later, using the bicentenary of Tambora’s three-year climate crisis as the basis for delimiting the years 2015-2018 as a sample of our ongoing climate emergency. The chapters unfold in disparate locales: a volcano in Sumbawa, a utopian city built in Arizona’s desert, and the cold shores of Antarctica, among others. Through a medley of narrative essays, science fiction,

and art installations, these stories reflect on how our own unruly monster, climate change, serves as a throughline that connects these geographies and shapes our collective present and possible futures. This edited volume showcases the innovative approaches found in intradisciplinary spaces like art-science and the environmental humanities.

When put into conversation, three major themes emerge for us from our reviewed texts: the acceptance of transdisciplinary approaches for tackling our current planetary crises; the need to existentially grapple with both dystopian and utopian imaginaries using art-science methods; and how these methods play a crucial role in future worlding practices based in principles of ecosocial justice for all Earthlings.

Transdisciplinary approaches

Amitav Ghosh (2018) notably stated that climate change is not solely a scientific issue, but is also a humanities issue—bringing critical attention to the role of the social sciences and humanities in shaping understandings of our planet’s precarious present. Climate change is just as much a crisis of imagination as it is an ecological crisis. Our three chosen texts urge us to re-orient our collective imaginaries of the current moment, not just to understand the alarming predicaments in which we Earthlings find ourselves, but to conceive of alternative, equitable futures.

A central theme to these works that allows for this re-imagining is their insistence on and embodiment of transdisciplinarity—an “all hands on deck” approach to inquiry. This approach inter- and intra-actively co-creates and re-shapes the elements and methods of generating and sharing knowledge—thereby transforming knowledge (and matter) itself (see Barad 2007 on the relationship between matter and meaning. For more on transdisciplinarity in ASTS, see Hartman 2008, Rubin 2021, Triscott and Santomauro 2021, Birsell et al. 2023, and Bubandt et al. 2023). Not just a fusion of arts and sciences, ASTS is a dynamic collaboration that transcends the different knowledge domains to generate and reconceptualize challenges and solutions (Gabrys and Yusoff 2012; Muller et al. 2015; Rogers, Halpern, and Hannah 2021; Rogers 2022). ASTS brings together scholars, artists, scientists, and technologists (among many others) to foster collaboration and dialogue, recognizing that meaningful insights often emerge at the inter- and intra-section of different fields. Our three texts are in dialogue with one another about—and themselves embody—this ethos through a shared focus on re-framing current crises through means that transcend disciplinary boundaries, offering novel insights into how to respond to our collective crises with response-ability (Barad 2007, de la Bellacasa 2017; Hustack and Myers 2012; Tsing et al. 2017). Where *A Year Without a Winter* features works inspired by science fiction, visual art, history, and arcology (where architecture meets ecology), *Bauhaus Futures* utilizes the philosophy and (non-innocent) legacy of the Bauhaus design movement to unite historians,

designers, and architects who consider what the movement can teach us today. As with the first two texts, *Imagination* heterogeneously gathers insights from across a wide field of influence: from social theory and critical pedagogy to social media and pop culture. This triad of texts draws upon these myriad forms to illustrate both the critical challenges we face as well as the creative possibilities available to us for justice-oriented speculative worlding.

Discourse around transdisciplinarity is often focused on transgressive, problem focused, and transcendent approaches to storymaking and worlding (de la Bellacasa 2012; Klein 2015; Tsing et al. 2017; Vienni-Baptista, Fletcher, and Lyall 2023). Across *Imagination*, *A Year Without Winter*, and *Bauhaus Futures* we see these narratives at work, in the ways in which experimentally fluid practices are used to transcend disciplinary boundaries to find meaningful ways to collaborate across an array of knowledges and experiences. Benjamin highlights the lo-TEK (local and traditional ecological knowledge) design movement. She cites Julia Watson, who in “The Power of Lo-TEK: A Design Movement to Rebuild Understanding of Indigenous Philosophy and Vernacular Architecture” provides over a hundred examples of lo-TEK structures which resist the extractivism of high-tech approaches, offering regenerative and sovereign ones in their stead (Watson 2019 cited in Benjamin 2024, 111-112). Benjamin further elaborates on how Lo-TEK’s principles align with speculative (art-science) methods:

When it comes to climate change, in particular, we need to invest in soft systems instead of hard infrastructures, biodiversity instead of high-tech homogeneous structures, symbiotic designs instead of unsustainable, extractive schemes. Our collective survival does not depend only on ancient approaches that already exist; we must also hone speculative methods, some of which grow out of the vibrant imaginaries found in Afrofuturism and Indigenous futurism futures that are buried in the fertile soil of our past (112).

Across the triad, we continue to find ways in which methods of transgression work to “configure [systems] in ways that try to provoke, transgress or re-design our understandings of life” (Kelty 2010, 7). They present heterogeneous knowledges and creative skills emerging from a variety of spaces and minds beyond the academy—or rather, those institutions usually credited with making and disseminating expert knowledge.

Imagining Dystopia and Utopia

Public policy scholar Geoff Mulgan writes, “Utopias tend to be wrong, but they can be useful even in their wrongness” (Mulgan 2020 quoted in Benjamin 2024, 128). Benjamin further elaborates on Mulgan’s point by pointing out that “by imagining *specific* things, theories, and practices, we can turn them over in our heads and hands, examine ideas against those of others, and consult about the values animating or designs. Specificity in sum, is essential for world-building (2024, 128). In order to get to this granular level of specificity, political philosopher R. William Valliere (2023) asks: When current realities seem to teeter towards dystopia, what is needed from visions of a utopia? He posits that utopias

require an ongoing movement away from dominating, oppressive, and pernicious hierarchical practices, institutions, and systems; also a movement that remains open to constant renegotiation of what counts as such. Currently, those systems of oppression include anthropocentrism, colonialism and capitalism, authoritarianism, the patriarchy, white supremacy, heteronormativity, cisnormativity, neuronormativity, ableism, ageism, and more. These scholars encourage us to imagine—perhaps with the specificity as a 500-page sci-fi novel—worlds otherwise.

Robin Wall Kimmerer, member of the Potawatomi Nation and plant scientist, describes how the scope of our imagination dictates the possibilities of enacting caring and resplendent environmental futures. She asks, “How can we begin to move toward ecological and cultural sustainability if we cannot even imagine what the path feels like?” (2013, 6). In our Capitalocene moment, in which environmental ruin, degradation, and disaster have spurred from the logics of capital’s empire limit the scope of our vision, our art-science triad offer crucial examples of the power of imagination of worlds otherwise (Moore 2016; Serafini 2022).

In different ways, our texts speculate over how creative, expressive, and aesthetic practices guide this process of imagination. *Imagination* offers project-based prompts for groups to play, collaborate, and codesign possible, probable, and desirable futures. For example, “Welcome to Acorn” is an activity based on

SF author Octavia E. Butler’s eco-dystopian novel *Parable of the Sower*, in which participants are asked to contribute different skills to an ecocommunity called Acorn that set in that fictive world (126). Groups can also try the “On the Bus with Butler” activity to “think, feel, and create on the move,” or use their hearts, minds, and hands to make “radical imagination zines,” DIY magazines that share stories of abolition and liberation as inspired by Butler’s many SF works—because as Butler writes, “Every story I create, creates me” (126-129). In *A Year Without Winter*, the authors pose the provocative question: “If the novel was the quintessential aesthetic form of the nineteenth century, in what form would the environmental imaginaries of the twenty-first century find their most compelling expression?” (17). In reflecting on the non-innocent legacies of the Bauhaus movement, the editors of *Bauhaus Futures* ask, “How might we design futures that reflect principles of social and environmental justice, supporting a diversity of economies, societies, and worlds? What are the roles of utopian ideals that travel far and wide in time and space, such as those of the Bauhaus, with respect to more locally situated practices? Who will maintain, repair, and care for these worlds?” (xxii). Our triad identifies how creative inquiry offers hope that societal politics routinely fails to deliver through the act of imagination. Each text exemplifies what Tolbert and Bazzul (2020) have explored about the potentiality of a turn towards aesthetics, politics, science, and storytelling, promoting “a radical aesthetic shift in terms of what it allows [people] to see as visible, possible, and sensible in the world” (84).

In a *Year Without Winter*, as the romantics sit in the dust of a volcano, they imagine the world to come, a world caught between light and darkness. In the short story entitled, “A World to Die For,” Tobias Buckness (143) plays with both utopia and dystopia, invoking hope and despair by imagining a post-climate crisis world ruled by militarization and enslavement; choked of air and without vegetation; and contrasting overlapping worlds where climate change was mitigated and thus replenished with bountiful flora, fauna, and peace. In the experimental design of the Bauhaus, contributor Fred Turner sees, “an emblem of the hope that design would create the kind of society politics could not” (xxiii). In this resurgent Bauhaus’s re-imagining of existing modes of knowledge production through the creative practices of design, they reframe understandings of our current precarities, insisting that there indeed is something to imagine for.

Our authors complicate the one-dimensional stories of either doom and gloom or techno-solutionism that clutter our current moment. Using an ecosocial justice lens, they transform utopian and/or dystopian futures into vehicles for inspiring solidarity and action. *A Year Without A Winter* offers “a series of environmental disorientations designed to foster dwelling within spaces of uncertainty and ambiguity that typify forecasted climate futures” (67). In both *Bauhaus Futures* and *Imagination*, stepping away from the grasps of technocracy and the perils of techno-utopias that some Bauhaus paths have demonstrated

are unstable, we see alternate forms that might provide a more even footing. The Bauhaus's commitment to social relevance and its consideration of the broader societal context—especially as it reckons with its thornier iterations—point towards a more compelling future, one that is ethically infused with social justice. They embody the values of what Audra Mitchell and Aadita Chaudhury (2020) call “BIPOC futurisms,” narratives which “center diverse, plural subjectivities and forms of agency, undermining homogeneous notions of ‘humanity’; attune to nonlinear temporalities; and embrace lively practices of mobility and hybridity. In so doing, they imagine multiple futures and alternatives to apocalypse” (321). In sum, our authors take seriously the ethical dimensions of imagining life through and beyond the Anthropocene. As Benjamin puts it, “*alternative* theories, ideas, and imaginaries are vital to our planetary and multispecies survival” (35).

SF as art-science method for ecosocial justice

The severity of the Anthropocene demands a collective reimagining of the future of worlds beyond the Western apocalyptic or techno-eugenic utopian. Through ethico-onto-epistemic frameworks that oppose aperspectival objectivities, like situated knowledges, standpoint methodologies, and agential realism, feminist STS scholarship has explicitly called for a reorientation to social justice vis-à-vis the reimagining of technoscientific practice (Haraway 1988, Daston 1992, Harding 2001, Ahmed 2006, Barad 2007, Tallbear and Willey

2019). In the *Science, Technology, & Human Values* special issue on “Resisting Power, Retooling Justice: Promises of Feminist Postcolonial Technosciences,” Sandra Harding (2016) reminds readers that the social justice movements of the 20th century, which intended to create “sciences from below,” also meant creating worlds “otherwise” – creating a world in which the needs and desires of marginalized groups are met” (1078). Imagining otherwise, therefore, would be, as Harding states, “to start from values and interests that are outside modern Western frameworks, while not hesitating to relocate selective features of the older frameworks within the new ones. It is to create a world in which other worlds exist” (1078). To borrow from Mamo and Fishman’s definition of justice in another *Science, Technology, & Human Values* special issue “Entanglements of Science, Ethics, and Justice” (2013), just worlding is a “public matter focused on common [more than] human interests, equitable distribution of [eco]social goods, resources, and opportunities, and a commitment to fostering empowered political participation” (161).

This is where SF becomes crucial. Haraway (2016) writes, “Science fact and speculative fabulation need each other, and both need speculative feminism” (3). SF is a method involving “promiscuously plucking” and tracing collective stories “where who lives and who dies and how might become clearer for the cultivation of multispecies justice” (3). This kind of SF is exemplified by science fiction writer Ursula Le Guin’s (2022) “carrier bag theory of fiction,” which

opposes the monolithic tale of humanity being shaped by a hierarchical “man-eat-man world” of constant competition and domination. Tying this pernicious storytelling back to eugenic ideology, Benjamin writes, “Today most people would not openly espouse eugenic thinking.... Yet many of our policies and everyday social practices reflect a warrior’s ambition to crush those deemed feeble and uplift those who are powerful and considered strong” (51). What if instead of that killer story of humanity, Le Guin poses, we told the life story, one in which our species prefers sacks over spears, “holding things in a particular, powerful relation to one another and to us” (400)? Benjamin notes that this “survival of the friendliest” reframing of human evolution would shine “a light on how our development as a species has relied on prosocial actions and decisions for the collective good” (43). Valliere also gives a nod to the carrier-bag theory when he writes: “This utopia would serve as a placeholder, a carrier-bag for the billions of open practices and non-oppressive power-relations that we hope to achieve precisely because they are not like what we are facing now...we have, by implication, the outlines of another world” (2023, 16-17). Furthermore, Haraway situates SF as an art-science method well suited to multispecies worlding, as it is attuned to an emerging movement “in transdisciplinary biologies and arts [that] proposes string figures [another SF] tying together human and nonhuman ecologies, evolution, development, history, affects, performances, technologies, and more” (Tsing et al. 2017, *Monsters* 28).

According to our reading, *Imagination*, *Bauhaus Futures*, and *A Year Without a Winter* employ SF as a method for exploring how art and design merges with science and technology to imagine future just worlds. With eco-dystopias serving as proving grounds for revolution, these stories depict how diverse casts of human and beyond-human actors struggle to share collective futures. Take the short stories “Widdam” by particle physicist and sci-fi writer Vandana Singhis, and “Mother of Invention” by African futurist writer Nnedi Okorafor, found in *A Year Without a Winter*. Both take place on a heavily polluted Earth, where interspecies struggles play out in places like Nigeria, India, and the Navajo Nation in the ruins of the former United States of America. Humans become entangled with various advanced and sentient technologies that simultaneously make, break, and remake the ecologies of which all the characters depend on and are a part of. Together, biotic, abiotic, and cyborg beings look for clean water, clean air, and redemption. Notably, these stories are based in cosmologies and onto-epistemologies from indigenous and subaltern traditions. Without falling into the trap of appeals to return to a pristine, pre-colonial, pre-industrial, primordial past, readers encounter characters that work together to decenter, destabilize, and dismantle the hegemonic forces that polluted Earth in the first place. What if those of us reading these stories in the present took heed?

These stories thus serve as lessons that resonate with what media and design scholar Carl DiSalvo has proposed as pedagogies for a “postcapitalist

Bauhaus” or a “Bauhaus for the Anthropocene”: lessons that offer ontological reframings of more-than-human relations, lessons for unmaking and withdrawal, repair, remaking, and communing (80-81). Perhaps it is not too late for those of us in the present to take up the proposition of Joi Ito, Natalie Saltiel, and Andre Uhl, who in “Designing Participation: Rethinking the Bauhaus’s Legacy at the MIT Media Lab” call for re-designing participation in technological development in order to address the climate/planetary health crisis and social inequity by demanding the inclusion of historically marginalized voices and reciprocity between all stakeholders (52-53). Benjamin brings the demands for ecosocial justice even closer to our present consciousness by introducing readers to Breonna’s Garden, an augmented/virtual reality app that celebrates the life of Breonna Taylor, a Black medical first responder who was slain by police in Kentucky in March 2020. Developed by Lady Phe, viewers are transported to a lush, ethereal garden replete with flowers, butterflies, and messages of healing and hope for Breonna and her loved ones. Lady Phe encourages visitors to “expand our imaginations of justice to include the work of repair and healing,” to create justice “in community with others...where people can gather and grieve, heal *and* organize” to create “different possibilities for how to connect and care for one another as we also remake the world” (75-76). Whether it is science fiction in *A Year Without a Winter*, speculative design in *Bauhaus Futures*, or radical futuring prompts and incubators in *Imagination: A Manifesto*, SF thus becomes

a powerful tool for ASTS practitioner-scholars to wield as they engage in diversity, equity, inclusion, accessibility, and justice for all Earthlings.

Conclusion: Future Directions for ASTS

We have used the genre of the review essay to demonstrate how three art-science texts harness the creative powers of imagination to tackle the challenges of the Anthropocene. (And perhaps, in the creative spirit of ASTS, the next piece this transdisciplinary team collaboratively composes will be speculative fiction. Stay tuned.) The *Imagination* manifesto dares readers to dream of sustainable futures beyond pernicious hierarchies, including white supremacy, eugenics, and capitalism. *Bauhaus Futures* grapples with the complex legacy of the Bauhaus design movement and its potential for addressing contemporary socio-enviro-technical challenges. *A Year Without a Winter* features works that imagine how fiction and creative nonfiction can be used to address the climate crisis. Our triad of texts (as well as the ones who've composed this review) recognize how crucial and inseparable the role of art and design is to technoscientific endeavors—especially those geared toward developing more sustainable and equitable futures and just worlding practices. It is precisely this commitment to non-innocent cross-pollination, experimentation, and co-creation that makes ASTS an exciting transdisciplinary field with worlding potential. Future work in art-science can take up the many calls to creative action found in our triad of reviewed texts. As ASTS scholars and activists, we will continue to carve out

spaces that foster experimental, community-driven forms and interventions that break the contextual boundaries between art and science, fact and fiction, and other binaries in order to build more just systems for multispecies thriving beyond the Anthropocene.

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Figure 1.4. Gallery image of "Hepatophagy" from *Routledge Handbook of Art, science, and Technology Studies* (2021)

Dessert

December 9, 2022

Dear 4S Fleck Prize Committee,

I am writing to recommend that Hannah Star Rogers' *Art, Science, and the Politics of Knowledge* (2022) be awarded the 2023 Ludwik Fleck Prize. This work serves as a key foundational text for the burgeoning subdiscipline of art, science, and technology studies (ASTS), also known as art-science. Rogers carefully and deftly argues for the importance of studying the intersections of art and science, precisely because it is at these convergence points where STS scholars can examine the social processes that produce the seemingly natural art/science dichotomy. Science is better understood through art. Moreover, as Rogers demonstrates through her case studies, science and art are not divided by universal attributes but rather by their respective knowledge communities. With the rise of art-science collaborations across all institutional types over the last few decades, STS would be incomplete without exploring the knowledge communities, practices, and products that continue to emerge from this sector. *Art, Science, and the Politics of Knowledge* provides an excellent example of how to explore this growing phenomenon and the way it is reshaping contemporary societies.

Most excitingly, Rogers' book contributes to the expansion of STS theory and practice by laying out the tools of the curator-as-researcher. In addition to her training in STS, Rogers draws on her decade of experience curating art and science (and art-science) exhibitions to demonstrate how curation practices generate STS-relevant knowledge about the ways that materials and rhetoric converge to position works as belonging to either art or science; a political act with real-world consequences affecting how these works are valued, accepted, or dismissed. The chapter "Curating Art's Work in the Age of Biotechnology" shows how participant-observer and auto-ethnographic methods can be creatively and reflexively employed to develop curation-as-research protocols that are more transparent, accessible, and accountable to diverse groups of artists, scientists, scholars, and members of the public. These qualities are crucial for research that explores sensitive and far-reaching issues such as the roles of biotechnology in shaping current and future societies. This chapter documents and analyzes the steps, rationale, and results of a four-year multi-sited exhibition that challenged all involved to engage in the social issues entangling emergent biotechnologies. In addition to offering novel methodological approaches in ASTS, the case in this chapter speaks to

alternative approaches for public engagement that proves useful for the STS subfields of science communication and citizen science. The curatorial research practices developed by Rogers and her team move science communication further away from the increasingly defunct deficit model of public understandings of science by situating the public not as pupil but rather as art-science critic and meaning-maker.

The book's other chapters cover equally compelling cases of people whose works challenge conventional understandings of art and science in the public and professional domains. Like Fleck's *The Genesis and Development of a Scientific Fact*, Rogers' case history exemplifies how STS tools open up new channels for understanding. Rogers' case studies reveal how actors have positioned themselves and their work as either art or science or both to vie for funding, exposure, and legitimacy; to access or challenge current intellectual power structures; or to support or critique the very social institutions through which they create and share their work. Rogers analyzes liminal art-science interventions through the cases of the 19th century Blaschka family glass artisans; the documentary-style photography of Berenice Abbott (1898-1991); the largely internet-based tactical media art movement of the 1990s; and the contemporary bioart laboratory known as SymbioticA. Rogers plays close attention to the contexts surrounding these figures and works, adopting the STS concept of symmetry to treat the contested categories of art and science as equally revelatory and valuable to understanding issues in science, technology, and society.

Art, Science, and the Politics of Knowledge is an especially useful work for junior scholars, researchers, and practitioners like myself who have been trained in an evolving intellectual environment in which the boundaries between art and science have been contested from the get-go. Thanks to Rogers' scholarship, which is pioneering art-science as a rich yet largely untapped branch of STS, I am able to fill my conceptual and methodological reservoir with tools that are better suited to study social phenomena whose complexities transcend any one disciplinary approach. These tools are necessary as I engage in my own dissertation research on art-science interventions as a response to planetary crisis. I am indebted to Rogers for spending the bulk of her academic career spearheading the establishment of ASTS as a subdiscipline full of potential for creating new knowledges, relationships, and eco-social worlds better suited for tackling the overlapping crises of our times.

Rogers writes, “If art continues to be excluded from STS, or is included only as a form of outreach, what we might learn from these artworks and artistic practices will remain black boxed (p.18).” STS is already a highly interdisciplinary and self-reflexive field. It is ready to take heed of Rogers’ critique and follow her lead in exploring art-as-science, science-as-art, art-science, and other intriguing permutations of knowledge production. The larger STS community should welcome this new artistic branch on the STS knowledge tree. Honoring Rogers’ *Art, Science, and the Politics of Knowledge* with the 2023 Fleck Prize would serve as this very warm welcome, indeed.

Most Enthusiastically,

Lisette

First Interlude

The Nuclear Anthropocene Timeline

Key events connecting the development of nuclear technologies to the development of planetary consciousness in industrial societies include:

1945—Atomic bomb testing, US bombing of Hiroshima and Nagasaki in WWII, start of Cold War between US and USSR, United Nations created after Charter ratified by 50 member states

1950s—US and USSR begin development and testing of thermonuclear weapons for Cold War and development of domestic civilian nuclear energy projects

1953—US President Eisenhower delivers “Atoms for Peace” speech to UN General Assembly, launching the campaign

1954—Lucky Dragon (Daigo Fukuryu Maru fishing vessel) hydrogen bomb test accident

1995—The peace group, Japan Council Against Atomic and Hydrogen Bombs (*Gensuikyou*), is established in response to national protests against Lucky Dragon

1960s—Cold war “discovery” of climate change culminating in Charles D Keeling’s *Tellus* article on “The concentration and isotopic abundances of carbon dioxide in the atmosphere” published with introduction of the “Keeling Curve” of carbon dioxide accumulation; US Army “Project Iceworm” scientists collect ice core (see 2021); Kahn’s *On Thermonuclear War* about the effects of war; Rachel Carson’s *Silent Spring* on pollutants (opens with radioactive fallout pollution from nuclear testing) published

1962—Cuban Missile Crisis brings world to brink of thermonuclear war

1963—Treaty Banning Nuclear Weapon Tests in the Atmosphere (limited test ban treaty)

1960-70s—US social movements for peace, civil rights, women’s rights, environmentalism emerge, rise in transnationalism on issues of human and environmental rights

1968—NASA *Earthrise* photos published

1970—First Earth Day in US

1976—Amory B. Lovins, “Energy Strategy: the road not taken?” published in Foreign Affairs

1979—Three Mile Island nuclear power accident

1980s—Nuclear winter project, nuclear freeze movement, NIMBY movement grows in US against polluting industries like nuclear power

1986—Chernobyl nuclear power accident

1990—First Assessment Report of the Intergovernmental Panel on Climate Change (IPCC); Earth Day goes international in 141 nations; Lissette Diane Lorenz is born to Ingrid Lopez Castro and Sergio Lopez Gomez in Miami Shore Hospital

1997—United Nations Kyoto Protocol signed to curb global greenhouse gas emissions

2002—Nuclear winter scientist Paul Crutzen credited for coining the term “Anthropocene”

2005—UN Kyoto protocol enters force

2009—Chakrabarty’s “Four Theses” essay on Anthropocene published

2011—Fukushima Dai Ichi nuclear power accident

2016—UN Paris Agreement goes into effect to limit global warming below 1.5 degrees Celsius compared to pre-industrial levels

2017—UN Treaty on the Prohibition of Nuclear Weapons (Ban Treaty) signed

2019—Anthropocene Working Group, part of the International Union of Geological Sciences (IUGS) suggests starting Anthropocene with the start of nuclear age in 1945

2021—Ban Treaty enters force; IUGS expected to receive formal petition to rename current Earth epoch “Anthropocene”; Proceedings of the National Academy of Sciences, “A multimillion-year-old record of Greenland vegetation and glacial history preserved in sediment beneath 1.4 km of ice at Camp Century” discusses how “Project Iceworm” ice core indicates “the biggest reservoir of ice in the Northern Hemisphere can collapse due to relatively small

increases in temperature over a long period of time,”¹ compacting climate change concerns in 21st century

2022—Lisette dies in a nuclear apocalypse. Now the sound of cicadas takes kin back there. Have we now entered the Chthulucene?

12024—What if stars are just planets that nuked themselves into extinction before any other alien civilizations could intervene and save us?⁸ Yet we do so love our [Starry Nights](#)....

[* * *]

July 20, 2024

Dear Octavia,

Lauren Olamina, the protagonist of your *Parable of the Sower*, turns fifteen years old today. I turn thirty-four exactly seven days from now. My baby sister Sophie also turns fifteen this summer (here’s to all us sunny summer babies!), on August 29th. She was born on the four-year anniversary of Hurricane Katrina in our timeline. (It’s scary how in Lauren’s timeline, there’s also a mega hurricane that strikes the Gulf Coast “killing people from Florida to Texas and down into Mexico” with “over 700 known dead so far [page 15].” You wrote *Parable of the Sower* in 1993! All you were missing was to name the storm Katherine or Kyla and you would really be frightening folks with your prescience.)

I have a diary entry from when she blew through Miami in 2005. My family was living there at the time—still is, for the most part (the COVID-19 pandemic sent me father packing to the Dominican countryside, to my *Abuela*’s house, where not even the post delivers—and oh, let’s not forget that you wrote about a future pandemic in *Clay*’s *Ark* of your *Patternist* series. Could you imagine if it was also in *Parable*?!?!?).

⁸ As in the plot to Octavia E. Butler’s *Xenogenesis* series, when the Cold War turns hot, most humans die off, but the highly empathic, highly advanced Oankali civilization intervenes before our species goes completely extinct. For more, see Chapter 7 of this dissertation, “We are All Monsters.”

Funny enough, I'm on an Amtrak train to Alexandria, VA, to see a friend I went to high school with back in Miami. We last saw each other around Mardi Gras in New Orleans in 2021. It was the first Mardi Gras since COVID. We wore masks and met at a pizza joint with outdoor seating. We talked about whether it was ethical to attend the upcoming Joan of Arc parade.

Good thing Mardi Gras is in winter, because had it been later that summer, Hurricane Ida would have literally rained all over that parade. Can you believe she hit LOLA precisely on the sixteenth anniversary of Katrina? (Thank goodness the levees held this time.) Despite having spent the first eighteen years of my life in Florida, that year was the first time I evacuated my living quarters on account of a hurricane. Reality is stranger than fiction, I tell you....

[Note: The letter goes on four more handwritten pages—I'll spare you the rest, dear reader. Just know it was a long train ride up the East Coast on the day I started writing to Butler. Inspired by Ruha Benjamin's "On the Bus with Butler" exercise, I decided I'd write a letter to her coinciding with the date of each journal entry that her character Lauren logs in the novel. There are six more letters I've dedicated to Octavia for 2024—the last one is dated—quite intentionally, on Butler's part—November 6th, after the US Presidential election. (In the book, the present elect is a Trump-like character. Why you so eerie, Octavia???) The other impetus for this writing project came from my participation in Science Friday's "[SCIFRI Book Club](#)" this summer. The organizers chose for us to read *Parable of the Sower* because Butler's speculative eco-dystopian world begins in 2024. I will continue writing letters to Butler for each of Lauren's journal entries; the last is dated December 30, 2035.]

...wherever in the stars you may be, Octavia.

From my timeline to yours,
Lissette

P.S. Keep up with those *Interstellar*-esque spooky actions at a distance ;)

[* * *]

Twisted in Time, Far Afield, Captured by Controversy⁹ : Four Things.

People often talk about how their sense of time has been completely warped since to COVID. That has certainly been the case with me. How long have I been captured by nuclear controversy? Why does it feel like I've been "in the field" of this research since way before I started at Cornell? What is spacetime anyway, whenever since my psychotic break of 2022, the sound of cicadas takes me back (and forth and back and forth and back)?

Cue speculative bureaus, schizoanalysis, and TRALFAMADORIFICATION, and how they have shaped my dissertation fielwork.

ONE.) A passage from *Slauterhouse-Five or the Children's Crusade: A Duty-Dance with Death*, by Kurt Vonnegut (who withdrew from his undergraduate studies at Cornell University to enlist in the US Army to eventually witness the bombing of Dresden, Germany (estimated to have killed between 25,000 and 250,000 thousand people, comparable to the humans lives lost during Hiroshima, Nagasaki, and the Tohoku Triple Disaster) which inspired (or rather tortured him: "I would hate to tell you what this lousy little book cost me in money and anxiety and time," he laments on page 2) to write "a novel somewhat in the telegraphic schiophrenice manner of tales of the planet tralfamadore, where the flying sauces come from. Peace" (iii):

I, Billy Pilgrim, the tape begins, will die, have died, and always will die on February 13th, 1976.

At the time of his death, he says he is in Chicago to address a large crowd on the subject of flying saucers and the true nature of time. His home is still in Ilium [New York]. He has had to cross three international boundaries in order to reach Chicago. The United States of America has been Balkanized, has been divided into twenty petty nations so that it will never again be a threat to world peace.

⁹ I wrote a whole syllabus for Bruce Lewenstein's A Exam called "Scientific Controversies." I originally wanted to teach a course that followed developments in the nuclear power controversy from an international perspective. One question that came up in my conversations with Bruce was how I was going to make the course appealing to students. What if there weren't enough people interested in nuclear power to fill up a 15 to 20-student seminar? Just because I have been captured by nuclear power since Fukushima Dai Ichi exploded in 2011 (unless cicadas take me even further afield in Tralfamadorian fashion, as we shall learn in a moment) does not mean that many undergraduates have, too. For discussions on how controversies capture their actors, see the work of Dorothy Nelkin and Matthew Nisbet.

Chicago has been hydrogen- bombed by angry Chinamen. So it goes.
(180)

...

Billy Pilgrim says that the universe does not look like a lot of bright little dots to the creatures from Tralfamadore. The creatures can see where each star has been and where it is going, so that the heavens are filled with rarefied, luminous spaghetti. And Tralfamadorians don't see human beings as two-legged creatures, either. They see them as great millipedes—"With baby's legs at one end and old people's legs at the other." Says Billy Pilgrim. (110)

TWO.) In Anne Sophie Witzke and Jonas Fritsch's (2022) contribution to the *ASTS Handbook*, "Environ/mental Ecologies in New Media Art" the authors utilize a combination of French continental philosopher and social activist Félix Guattari's schizoanalysis (psychoanalysis' lesser known cousin, which focuses more on the phenomenon that is psychosis rather than neurosis) along with his theories on ecology to develop the concept of "environ/mental ecologies" (624): a relational understanding of health that encompasses both ecological conditions and human mental states, emphasizing the interconnectedness of these domains. This understanding is particularly relevant in the context of contemporary environmental challenges, such as the climate crisis which have profound health implications across all scales, from the micro to the planetary. They advocate for an understanding that integrates ecological, psychological, cultural, and social factors.

Witzke and Fritsch highlight that environmental changes can lead to psychological distress, a health condition they refer to as "meteoranxiety" (616). This term captures the anxiety and existential dread that arise from abnormal climate conditions and the uncertainty of the future. The psychological impacts of environmental degradation are significant, as they can manifest in feelings of anxiety, fear, grief, and even resignation. The authors argue that these emotional responses are not merely individual pathologies but are indicative of broader "psychoterratic pathologies" (621)—psychological issues that stem from an increasingly dysfunctional relationship between humans and their environment.

With this theoretical set up, the authors argue that new media art emerges as a significant medium for exploring and expressing the complexities of

environ/mental health. The art-science work “The Bureau of Meteoranxiety” serves as a case study, illustrating how such art-science works can engage with psychoterratic pathologies and promote the recomposition of subjectivity in the face of environmental distress.

Furthermore, the authors discuss how new media art functions as an art-science method. This transdisciplinary approach integrates artistic practice with scientific inquiry and technological innovation. New media art often involves collaboration between artists, scientists, and technologists, allowing for the exploration of complex themes such as the climate crisis.

The schizoanalytical approach to environ/mental health offers a transformative framework that can enhance health outcomes for individuals labeled as having psychotic pathologies by not only considering the social and political context that may influence a person, but also suggesting that subjectivity is not exclusively tied to an individual person at all; rather subjectivity is a state that emerges from specific environmental contexts. This is akin to Karan Barad’s agential cuts, in which agency does not lie in actors-as-individuals (an atomized, particle-like state of individuation), but rather in relational intra-active processes (a wave-like state of constant becoming). For those who experience psychosis and other “non-ordinary” states of consciousness, therefore, adopting a schizoanalytical approach to understanding these states can be affirming rather than stigmatizing, as it honors diverse ways of engaging with and understanding reality.

3.1.) [The Bureau of Linguistical Reality](#) combines the (non-innocent-yet-non-pathologizing, according to my reading) schizophrenic conceptions of nonlinear spacetime found in *Slauterhouse-Five* with the (yes pathologizing, as it’s in the name) psychoterratic pathologies of the Anthropocene.

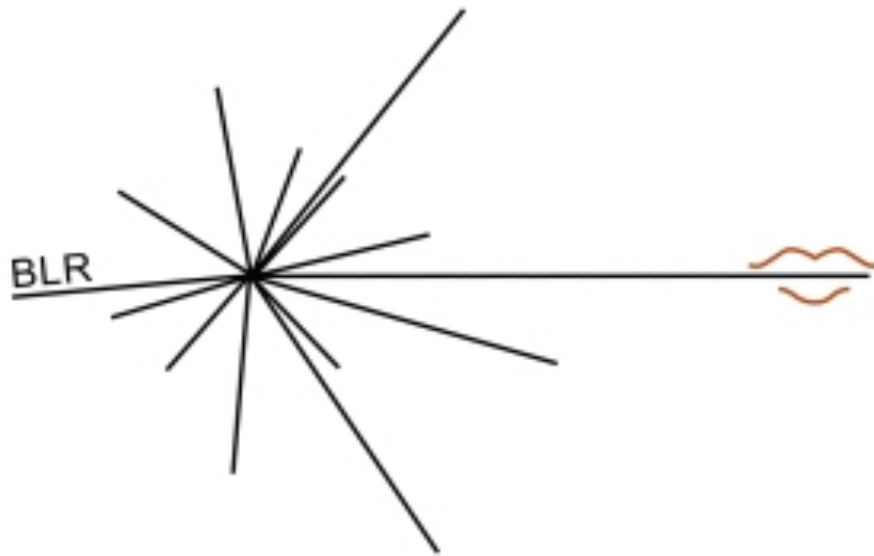


Figure 1.5. Logo for *The Bureau of Linguistical Reality*

According to their website:

“The Bureau of Linguistical Reality was established on October 28, 2014 for the purpose of creating a new vocabulary for the Anthropocene.

*Our species (Homo Sapien) is experiencing a collective “loss of words” as our diverse lexicons fail to represent the emotions and experiences we are undergoing as our habitat (earth) rapidly changes due to climate change and other unprecedented events. To this end, the **The Bureau of Linguistical Reality** is solemnly tasked with generating linguistic tools to express these changes at the personal and collective level.*

Cartographers are redrawing maps to accommodate rising seas, psychologists are counseling people on climate change related emotions, scientists are defining this as a new age or epoch. The Bureau was thus established as an interactive artwork to help fill the linguistical void in our rapidly changing world.”



Figure 1.6. Heidi Quante and Alicia Escott, creators of the public participatory art-science work *The Bureau of Linguistical Reality*

3.2.) This word: Tralfamidorification.

Definition [copied straight from the lexicon]: Borrowing from Kurt Vonnegut’s fictional alien race of Tralfamadorians (who can look at an object and know its past and future,) Tralfamidorification, is the experience of being over informed about the production line of materials, or about the systems of waste management they will eventually be filtered through. Tralfamidorification, is a disorientating experience where a discrete object becomes a node on a network. Those who experience tralfamidorification may walk through the world seeing a “beach towel” at one moment and then experience briefly the “beach towel” opening up into a black hole of information regarding the production line for the materials, the factory they were assembled on, the human suffering in creating these objects, the resources extracted, the shipping containers they were carried to and fro in, etcetera, — moments later the experiencer of tralfamidorification may feel the “black hole” close and they return to the present moment and the object or “beach towel” before them.

Usage: Just before reading your email I was idly staring at a package of Trader Joe’s dried coconut strips (product of Thailand) on my kitchen table, experiencing severe tralfamidorification.

Origin: Jenny Odell and Field Study #007 Participants, 2015.

FOUR.) A schizoanalytical approach to the field

The Tohoku earthquake and tsunami that devastated northeastern Japan in March 2011 disrupted the lives of tens of thousands of Japanese people. It destroyed homes, families, and livelihoods. It also triggered a nuclear crisis when the Fukushima Dai Ichi power plant was severely damaged. During the week after the accident, many people around the world feared of a nuclear apocalypse. I was studying abroad in Japan when all of these events took place. My parents urged me to return to the U.S. immediately, out of fear that I would get sick from the radiation that would surely spread like a plague through all of Japan. I fought tooth and nail to convince them that I would be alright.

Here is my journal entry in the wake of the triple disaster:

March 21, 2011

So much to write, so little time. I've been meaning to get to this sooner, but these past three weeks have just been one blow after another and I couldn't or wouldn't find the time to sit down for a few hours and jot some major things down...

On Friday the 11th, the 4th biggest earthquake in human-recorded history struck off the coast of Japan. The aftershock woke me up from my afterschool nap. I dreamed that I was bathing two small Japanese boys, a baby and a 2-year old (a harkening to Miyazaki's [My Neighbor Totoro](#)), when a bright light, a truck horn, and an impact disturbed us in quick succession, and the truck killed me/woke me up. I looked up from the bed at the ceiling lamp in my room. It was swaying with a fair amount of momentum.

An hour later I got a call from my parents on Skype—well, more like I got a text from Jeanette saying that Mami was crying and was I in Tokyo? because a tsunami was coming. So I called the house. Mami and Papi were up at past 2:00 AM listening to the breaking news reports about the earthquake and tsunami about to strike Northeastern Japan. I had told them I would be going to Tokyo for spring break, but they didn't know if I was there yet.

The ensuing week was panic filled. My parents wanted me to go back to Miami, and many students have been pulled out of our exchange program, either by

their parents, their schools, or their governments. This is because the tsunami severely damaged some nuclear power plant and the engineers were not able to stop it from partial meltdown. Though as of this morning, it seems that they have been able to stabilize the situation somewhat. Last week no one knew what was going to happen. The US government extended Japan's original evacuation zone from the plant to a 50-mile radius. My parents freaked out and wanted me on a plane home. I told them I was going to Taiwan for a week instead. We reached a compromise: If the situation didn't improve by the end of my spring break trip, I'd fly back home instead of to Kansai. Thankfully, things seem to be improving.

Now here we are in Taipei.

When T—'s parents cancelled their trip to Tokyo for spring break, as did everyone, T— and I decided we were not going to stay around doing nothing but worry all weeklong. So early last week we started on Plan B. T—'s parents wouldn't let him go to any of the Southeast Asian countries like Thailand or Malaysia, and Singapore was too far. Korea was more north than Osaka and would have been little consolation to parents who feared a nuclear Holocaust. So Taiwan it was.

Here is a letter I wrote for the *Oberlin Review* that never got published. It sums up the disaster's psychological impact on me and those around me:

Shaken, not stirred: I will come home when the semester is over

April 11, 2011
Osaka, Japan

A month ago today, I was taking an afternoon nap in my room at my host family's house and had the strangest dream. I was babysitting two small Japanese children, trying to get them to take a bath, when suddenly the bathtub turned over, a white light engulfed the room, and the loud roar of a truck's horn drowned out all the noise. I was startled awake by the impact of getting hit by the dream truck. I looked up and noticed that my ceiling lamp was swaying roughly. That was odd. I thought nothing much of it. An hour later I got an emergency Skype call from my family back home. Something

about a massive earthquake and tsunami. My parents, safely in Miami, FL, knew about the situation in northern Japan before I did.

The next three weeks were chaotic for me, but not due to the disaster itself. The Japanese people were calm. My host family was solemn yet collected. It was the rest of the world that was in a panic. My Facebook was flooded with messages from family and friends inquiring about my safety and urging me to come home. My parents were worried sick, their eyes glued to the hourly updates on the television about the Fukushima power plant's immanent meltdown and the coming nuclear apocalypse. They warned me that if the evacuation zone around the plant was expanded by one more mile past the 50-mile radius recommended by the U.S., I would be on the next flight home. Meanwhile, the European students were being pulled out of Kansai Gaidai at an alarming rate. Several American public universities forced their students to return home as well.

But we were safe. We are, in fact, over 250 miles away from Tokyo, and even farther from Fukushima. Kansai Gaidai University kept us informed the entire time, giving us updates on the latest news—minus the fear-mongering of the overseas media. We were still safe, my school said. Other than having been startled awake that afternoon, and having to take midterms one week later than usual, my semester abroad has not been seriously affected by the recent events in northern Japan. The scariest thing for me was watching how virally panic has spread throughout the rest of the world. All the while, in my host family's Osaka kitchen, it's been business as usual.

Despite my brave tone in the letter, there were times when the fear felt by my friends and family back home in the states would creep up on me like a disease. In order to counter that fear, for the rest of that semester abroad, I set out learn about not just the nuclear accident, but also about Japan's nuclear energy policy and the accident's implications for Japan's energy future. My search for answers culminated in a research paper that explores the past, present, and future of nuclear energy in Japan. My friend T— and I wrote this paper for a class we took together that spring called "Issues in Contemporary Japanese History and Politics." Here are some excerpts:

The establishment of nuclear energy in Japan

Before branching into nuclear energy, Japan focused mostly on coal, and then on oil, to meet its energy needs. Japan still makes use of those forms of energy— in fact, Japan gets over 50% of its energy from these sources. Gas and hydro-power also contribute to Japan's energy profile. The decision to begin financing nuclear energy was made by the government and the private sector of Japan. The Japanese government, like many around the world, has a long history of close partnership with the business realm. In addition the Japanese government received strong support from the United States for its plan.¹⁰

Japan's nuclear research program began in 1954. 230 million yen were earmarked for the program.¹¹ The Atomic Energy Basic Law, passed in 1955, limited the use of nuclear power to peaceful purposes. It sought to establish democratic methods, independent management, and transparency as the basis on which nuclear research activities were carried out. A strong emphasis was placed on international cooperation, and this is not surprising, given the enthusiasm with which the US supported Japan's program. A number of nuclear research institutions in Japan had their origins in the Atomic Energy Basic Law. Most of these exist today as a single entity, the Japan Atomic Energy Association, or JAEA.

¹⁰Imai, Ryukichi and Henry S. Rowen. *Nuclear Energy and Nuclear Proliferation: Japanese and American Views*. Boulder: Westview Press, 1980. pp.7-10

¹¹"Nuclear power in Japan." *Wikipedia*. http://en.wikipedia.org/wiki/Nuclear_power_in_Japan

After the oil crisis in 1973, nuclear energy became a nation priority for Japan. In order to prevent a fiasco like the one they had encountered in the 70s, in which the productivity of the entire country had been jeopardized, Japan decided to pursue nuclear energy all the more earnestly.¹² Japan had been hit with a trade embargo by the OPEC nations presumably for its ties with the US. Japan was heavily dependent on oil from the Middle East, in fact, it got almost all of its oil from this region. To resolve the crisis, Japan began to favor pro-Arab policies and distance itself from US Middle East positions. Japan became critical of Israel, calling for that country to withdraw from the 1967 territories. Japan also began to advocate Palestinian self-determination. OPEC eventually considered Japan a “friendly state.” Products of this time period include the self-fulfilling “toilet paper panics,” and the switch in Japan to electronics industries (as they are not oil intensive) and to lighter, more compact automobiles.

A number of factors contributed to the launch of Japan’s nuclear energy program, perhaps none more important than the simple and pressing fact that Japan is a resource-poor country. Then, as now, Japan had to import much what it used to power itself. The prospect of a power source that could be generated nationally, and required only nuclear fuel imports, was too valuable

¹²Han-Kuo, Wang. *Energy Policy in the Republic of China and Japan 1970-1985: A comparative examination of energy politics and policies*. Ann Arbor: University Microfilms, 1987. pp. 269

an opportunity to pass up.¹³ Indeed, Japan at this time was growing, and its industrial surge required massive inputs of energy. Japan's domestic resources simply could not meet the needs of this great push.¹⁴

The new light in which nuclear energy was being cast played a part as well. US President Eisenhower, in a speech to the UN in 1953 entitled "Atoms for Peace," sought to highlight the vast benefits he believed atomic energy could bring to the world. Along with the USSR, the US was effectively policing which countries could use nuclear power, and there was a certain amount of prestige that came with being a country that used atomic energy.¹⁵

Japan's current energy policy is based on three principles, as outlined in the Basic Act of Energy Policy, established in 2002: economic growth, environmental sustainability and energy security.¹⁶ Nuclear energy has played a key role in meeting these principles. The Democratic Party of Japan has pushed for the exportation of nuclear power technology as part of the nation's economic growth strategy; nuclear energy is considered a "clean" energy, since it does not run predominately off of fossil fuels, thereby meeting Japan's commitment to reducing greenhouse gases; and further, nuclear energy reduces the country's

¹³Samuels, Richard J. *The Business of the Japanese State: Energy Markets in Comparative and Historical Perspective*. Ithica: Cornell University Press, second printing 1990. pp.77-388.

¹⁴ *Ibid*, pp. 288

¹⁵Huff, Rodney Louis. *Political Decision-making in the Japanese Civilian Atomic Energy Program*. Ann Arbor: University Microfilms, 1974. pp. 64-66

¹⁶International Energy Agency. <http://www.iea.org/textbase/pm/?mode=pm&id=4149&action=detail>

dependency on oil. It is important to note that the government is still in support of nuclear energy even after the Fukushima accident. This is the perfect chance for the entire nation to rethink its energy policy, now that people are obligated to become more conscious of their energy consumption habits. Simply reverting to fossil fuels goes against Japan's environmentally-friendly "eco" trend that has gained popularity over the last few years.

Future Possibilities

A group known as Energy Shift Japan formed in the Diet at the end of April with the purpose of studying Japan's energy alternatives. Its goal is to shift Japan's nuclear energy policy towards renewable sources, primarily solar and wind. The group consists of twenty-six Diet members representing all ten political parties. Main actors in the group include Toshiro Kojima, former vice minister for Global Environmental Affairs at the Environment Ministry, and Tomoko Abe, policy chief of the Social Democratic Party. The members' stance on nuclear energy is mixed. The fact that many politicians are backed by or have strong ties to the nuclear power industry is a major area of tension and raises the question of whether Japan will make a drastic energy shift or simply modify existing nuclear policies.

It seems strange that Energy Shift Japan is not placing more focus on the potential of geothermal energy. According to some geologists, Japan, sitting on the Ring of Fire, has an estimated 23.5 gigawatts in geothermal potential. That

is enough power to replace the fourteen proposed and recently scrapped nuclear plants.¹⁷ Currently, Japanese companies such as Mitsubishi and Toshiba supply almost 70 percent of the world's geothermal equipment.¹⁸ Just last November, Japan cooperated with Iceland at the Japan Iceland Geothermal Forum 2010 in Tokyo to plan future domestic geothermal projects. Minister of Economy, Trade and Industry Akihiro Ohata, is also the chairman of the Iceland-Japan inter-parliamentary friendship delegation. The two countries have been jointly developing geothermal technology for over 30 years. Given all these positive developments, why has Japan refrained from utilizing more geothermal energy?

There are some complications involved with the feasibility of geothermal power. Finding geothermal spots is similar to finding oil deposits--one has to drill in order to be sure of a potential site, and it can be hit or miss affair. The upfront cost can be up to \$50 million dollars, and even then there is no guarantee a reserve will be hit upon. It also takes about five to seven years for commercial operations to begin, once a spot has been confirmed. In comparison, wind and solar can start producing commercial energy in a little over one year. And yet, geothermal power is still more economical than nuclear power. The cost of building a nuclear plant can be several billions of dollars. Nuclear power remains the costliest form of producing energy.

¹⁷Richter, L.X. "Japan's Geothermal Resources could help to replace nuclear capacity." *Think Geo Energy*. April 5, 2011. <http://thinkgeoenergy.com/archives/7346>

¹⁸*ibid.*

Dismantling Japan's nuclear energy industry is simply not an option. The government could never afford it, given the costs it has incurred due to the disaster. It also does not have the resources to replace over a quarter of its energy production with a different technology. Reverting to fossil fuels would be a terrible move, environmentally and politically. Japan is better off making sure its plants can run safely for the next 30 years, while developing other green technologies that could one day--in the not so near future--replace nuclear. It is unrealistic, and potentially detrimental to the environment to suddenly close all the nuclear plants, given the tendency to revert to fossil fuels when plants close. Nuclear energy currently plays the most significant part of tackling climate change in terms of funding and operations, and is a step towards weaning humanity off of fossil fuels. New technologies can be developed to make it safer and more efficient.

Japan, and every nation using nuclear energy, can prevent a disaster of this severity from happening again. I recommend the following policy options: increase the budget for nuclear power plant safety precautions; review all operational plants and update their safety measures; make the International Atomic Energy Agency stronger and able to enforce safety standards; use the government funding from the canceled fourteen nuclear plant projects to diversify the energy profile and include more green energy sources such as geothermal; and improve energy efficiency standards and initiatives. Conserving

energy is the cheapest way to reduce dependence on both nuclear energy and foreign fuels, while lowering greenhouse gas emissions.

It seems that Japan is taking advantage of the Fukushima crisis in order to review its energy policy. Hopefully the rest of the world will follow suit. In the future, we can only hope that mankind will reach a point where crises such as the one at Fukushima are not necessary to produce change. Whether or not our dream will become a reality is uncertain. We shall see.

I graduate from Kansai Gaidai. Then I graduate from Oberlin College. Fast forward to 2017-2019, graduate school at Cornell, in Ithaca (Ilium of another timeline?) where I prime myself for an ethnographic study on the ecosocial impacts of nuclear disasters in Japan, from Hiroshima and Nagasaki to Fukushima. The US government (through a National Science Foundation grant that I win thanks in part to a manic episode) even funds my proposed research. Here is the government-approved plan:

Long-Term Visions and Methods of Recovery, Revitalization, and Resilience in Fukushima

Keywords: disasters, nuclear accident, ethnography

On March 11, 2011, the most powerful earthquake recorded in Japan triggered a tsunami and nuclear meltdown at the Fukushima Dai Ichi power plant. That morning, less than 500 miles away, I was attending Kansai Gaidai University in Osaka, gaining fluency in Japanese language and culture as an undergraduate exchange student. The tragedy, known as 3/11 in Japan, struck that afternoon, killing 15,000 people and threatening millions more. I had to decide whether to flee Japan, as many international students did, or remain in solidarity with the country that had cared for me for nearly a year. I chose to stay until the completion of my program. After years of thinking about my experience and the Japanese people who were affected, I returned for my doctoral research to both unpack how the triple-disaster has reshaped people's lives and to contribute to revitalization efforts. As my father dropped me off at the airport to embark on my first summer of fieldwork in Fukushima, he warned, "Be careful. Weak thyroids run in our

family.” My father, like many others in Japan and abroad, still worried about the risk of contracting thyroid cancer from living in Fukushima or consuming its agricultural products. Yet two days after his admonition, I stood in an orchard plucking a peach only 50 miles away from the still-leaking power plant. I bit into it, letting the fruit’s nectar distract me from thoughts of its potential nuclear contamination. I wondered: How do Fukushima residents perceive and handle these risks in their daily lives?

Proposal and Rationale: Although the earthquake, tsunami, and nuclear accident known as 3/11 spurred new work in science and technology studies (STS) and anthropology on disasters, the literature is disjointed and too narrowly focused on initial impacts and emergency responses. **Situated nearly a decade after 3/11, my research will look beyond the first post-crisis years to analyze the impacts of longer-term revitalization efforts on communities in Fukushima.**¹ I will conduct an ethnographic study of Odaka residents in Fukushima Prefecture to investigate how different groups envision and carry out post-3/11 revitalization efforts in their daily lives.

Understanding long-term post-disaster revitalization is essential for Japan and all nations facing the increasing risks of disasters due to climate change. Though 3/11 was not caused by climate change, the consequences of the disaster are similarly severe to those anticipated from climate change. In the United States, for instance, cities are still recovering from hurricanes such as Katrina, Sandy, Harvey, and Maria, proving that recovery policies are inadequate. With as little as twelve years to curb the worst effects of climate change, nations must urgently learn to effectively deal with hurricanes, floods, and other disasters as part of climate change adaptation.² Moreover, as nuclear power is being considered as a means of mitigating climate change, it is essential that we better understand its risks as well as its benefits. An ethnography that examines the everyday social dynamics of revitalization efforts, including debates and decisions about future power production, will aid in the recovery process while providing alternative approaches for U.S. policymakers to partner with communities to reach long-term revitalization goals.

Questions and Initial Findings: Three overlapping groups working on revitalization emerged in my initial fieldwork in Odaka: grassroots community organizers; local and prefectural government workers; and citizen scientists, i.e. everyday people who monitor radiation.³ My future research will build on this initial fieldwork by answering the following questions: 1) How do these social groups conceive of community revitalization? 2) To what extent does engagement with science shape their knowledge about risk from radiation and future disasters and inform their revitalization strategies? 3) How do the groups

converge and diverge as they work towards community revitalization? Initial findings suggest that different understandings of science and risk significantly shape how group members conceive of, collaborate on, and work towards revitalization. Using ethnographic techniques to bolster intra- and inter-group dialogue on these issues may improve revitalization efforts collectively.

Site and Methods: Odaka reopened for settlement in 2016, and its few residents work tirelessly to revive the town. From 2020 to 2021, I will conduct participant observation by shadowing the daily revitalization activities of local community organizers, government workers, and citizen scientists, as well as conduct unstructured and semi-structured interviews in order to analyze how group members navigate and negotiate the complexities of the revitalization process. The following key informants have granted me permission to shadow and interview them: affiliates of the Fukushima prefectural planning department who are running government-led revitalization projects; members of Real Fukushima, a non-profit group giving educational tours of the disaster area; and members of Safecast, a self-identified citizen science organization that manages radiation monitoring stations in the area and communicates their data with the government, the nuclear industry, and the public. For each group, I will attend planning meetings and public-facing events, visit project sites, and help with project tasks to understand how plans are developed, executed, and presented. I will observe if and how different groups collaborate on projects and analyze the modes, tones, and styles of communication between the groups. During interviews, I will explore informants' understandings of nuclear radiation, risk, and revitalization, and how they dis/connect these themes in their work. Through qualitative document analysis of informational materials (in print and digital forms) produced by these groups for the larger community, I will examine how plans and progress are framed in relation to visions of the region's future, especially in regard to sustainable redevelopment. **I will be in the field for the ten-year anniversary of the disaster**, a time when informants may be especially reflective about the progress of their work.

Intellectual Merit: This ethnography will better integrate and expand disaster research in STS, anthropology, and environmental studies. My intervention will hone in on the dynamics of community revitalization in the face of environmental concerns, both immediate (nuclear radiation remediation) and long-term (adapting to climate change). Specifically, I will further develop the STS/environmental studies concept of *envirotechnical systems*—tightly interacting technological and natural processes—by incorporating anthropological theories of disaster vulnerability.⁴ Moreover, as most work on

envirotechnical systems and environmental justice has focused on Western contexts, my ethnographic research will show how such concepts may function in Japan, highlighting new cultural connections between humans and their ecological, social, and technical environments. I will also pay special attention to power disparities between groups as they manifest in the revitalization process, using the environmental justice framework I developed as an undergraduate to analyze which groups have bared the greatest risks of nuclear contamination and how it shapes their revitalization work.⁵ Drawing on STS, anthropology, and environmental studies, my research will delineate the social factors that make a community resilient, contributing to a more comprehensive evaluation of the revitalization and sustainability efforts.⁶

Broader Impacts: This project will develop resilience strategies to prepare communities in the United States and around the world for increases in future environmental disasters brought on by climate change. My dissertation research will improve plans to mitigate the impacts of climate change and strengthen long-term post-disaster recovery efforts by defining effective revitalization strategies and informing policy in the United States and the world. It will help policymakers weigh the risks of nuclear power against its benefits for reducing greenhouse gas emissions. I will publish my findings for a wider audience in online forums such as Public Lab. As mentioned in my personal statement, I will develop and implement sustainability curricula in schools in Ithaca and Fukushima by establishing a partnership between JSPS and GRASSHOPR. I will use my experience spearheading six service-learning projects in the U.S. and Japan to connect youth to service-learning exchange projects and draw from my five years of professional teaching experience in both countries to teach youth about sustainability. My experience working cross-culturally with communities on key environmental issues has prepared me to collaborate with Odaka residents. Together we can become global leaders in the sustainable community movement.

References: [1] B. Allen, B. & R. Beech, eds. 2011. *Dynamics of Disaster*. Routledge; Fortun, K. & S. Frickel. 2012. "Making a Case for Disaster Science and Technology Studies." [website]. [2] IPCC. 2018. [UN report]. [3] Hirata, A. 2016. *Radiation Brain Moms*. Duke U. [4] This extends an early envirotechnical analysis of 3/11 by framing it in its cultural context: Pritchard, S. 2013 in *Japan at Nature's Edge*. U. Hawaii. For anthropological theories: Hoffman S. & A. Oliver-Smith, eds. 2002. *Catastrophe and Culture*. School for Advanced Research. [5] Lorenz, L. 2012. *OhioLINK*. [6] Existing work has been highly quantitative; see e.g. Sutou, S. 2016. *Genes and Environment* 38:12.

[* * *]

I was slated to begin my year ethnographic fieldwork in Japan during the summer of 2020. Little did I know that another disaster, this time in the form of a global pandemic, would send me instead to—of all places—New Orleans, as my then partner at the time joined AmeriCorps to help with the vaccine rollout there. Turns out disasters would continue to hit there as well. Climate change now started to feel like a climate crisis. Then that crisis escalated to nuclear apocalypse. Welcome to life and death in the Anthropocene: disasters all the way down. So it goes.



**I am dead but
no one will believe me so
I guess this is
hell.**

CHAPTER 2

2023 Nuclear Pilgrimage: Lissette celebrates kins¹⁹ 33rd birthday by going on a tour of the Dai Ichi Nuclear Power Plant in Fukushima, Japan

Dear Reader: These are my fieldnotes from this research trip, which double as personal journal entries. I'll have to type these up, eventually, so that they are actually fully legible. For now, here you go: I present this chapter in the style of a [zine/copy machine manifesto](#). For more on zines as activist art-science research, see the forthcoming chapter I coauthored with [Amy Cheatle](#) and [Martin Abbott](#) entitled "Greening Our Thumbs: The narrative practice of caring for plants and people through community zine-making," for the volume [Narrating the Multispecies World: Stories in Times of Crises, Loss, Hope](#), edited by Michaela Fenske and published by Königshausen & Neuman Press.

¹⁹ A note on multispecies pronouns: Indigenous scholar and botanist Robin Wall Kimmerer's proposes we use *ki* (singular) *kin* (plural) and *kins* (singular and plural possessive) pronouns to accommodate and honor all living things (Kimmerer 2022). Such an approach is based on her—rather, kins—proposal that nature needs a new pronoun, one that recognizes the subjectivity of other beings beyond humans. Kimmerer, who is a member of the Indigenous Potawatomi nation, chose *ki* because it comes from the Anishinaabe word *Bemaadiziiaaki*, which means "beings of the living Earth" so that "we can now refer to birds and trees not as things, but as our earthly relatives" (ibid.: 344–345). By adopting *ki/kin/kins* pronouns, I acknowledge and elevate the subjecthood and agency of all Earthlings. This choice is a step towards radical relationality. See: Kimmerer, Robin Wall. "Nature Needs a New Pronoun," in Kris Dittel and Clementine Edwards, eds., *The Material Kinship Reader: Material beyond Extraction and Kinship beyond the Nuclear Family*. Eindhoven: Onomatopee, 2022.

2023 Nuclear

[Total exposure: 0.124 mSv/8 days] Pilgrimage
(5.6 x recommended dose of <1 mSv/year)

July 22, 7:35 ET, 2.02 mSv/hr

Flight #1 to Japan. Geigy is on, first time since Mardi Gras 2022, I think. That was the last chapter of this pilgrimage. Peter and I were still together, marching in the Krewe of Boxed Wine, friends of Victor and his husband, the guy who ^{accidentally} killed his chickens in a blind rage one day and was immediately plunged into deep grief and remorse.

hook on it unintentionally and let it lie atop it, suffocating it. It wasn't until months later that I had recognized my negligence. I couldn't revive it. I also didn't know how to safely dispose of it. So I just kept it and got a new one.

Lost the new one at a Mardi Gras parade. Wor prevented me from easily acquiring another. Made a hell of an effort to revive the one that I had rescued long-lead. Tapped in some AAA batteries... and it lived.

So here I am, with a Geigy strapped to the waistband of my leggings,

~~make~~ There were people dressed in bright sunny costumes in support of Ukraine that year. Their blue and yellow outfits complemented my Ukrainian-made Geiger counter. I lost that Geigy on the parade route and was devastated (though not ~~as~~ nearly as much as Victor's chicken-slaughter husband). With the war in Ukraine raging, a replacement dosimeter was going for thousands of dollars instead of its usual \$100. Then, a miracle.

A couple years before I had broken my first Geigy of the same make and model. Forgot to turn it off, put a heavy

on my first leg to Japan. This time Bill the Radiologist is in town, not Peter, the disaster accessibility coordinator. We flew out from Norfolk, not NORA, though that is where Bill and I met. In one of our last conversations, Peter asked me not to return to NORA "with that man." I responded with a handwritten letter, letting him know that Bill and I would be attending Mardi Gras 2023, and that one day we might move back there, and that I hope we could be friends.

1 Bill and I did go to Mardi

Given this year. I did NOT
 bring Georgy. I did not see
 Peter, ~~and~~ though I did avert
 my gaze as Bill and I walked
 passed the handicap seating
 across Grainger Hall, which is
 where Peter and I saw Kween
 or Zulu and Rex the year before.
 I don't know if he was there
 or if he saw me.

I miss him. I dreamt
last night that he reached
out to me to work things out.
He was still with Bill.

I am still with Bill. I'm taking him on his first trip to Asia. He only has a

my host ~~man~~ would purchase
a middle seat on coach and hope
for the best. She's a great-
grandmother now, twice over.
I miss them all. Even Ntola
who accidentally came to my
room one visit, where I
was thin and long haired
and attractive compared to
my study abroad days.
He stopped at the doorway
in the middle of the night.
Paused. I'd not enter. Told
me to turn off the AC instead.
If he had ~~not~~ closed the
to - hold - would have

week off from ~~two~~ practicing
nuclear medicine at the hospital
on the Eastern Shore of Virginia,
~~So~~ our trip will be "painfully
short" as ~~some~~ Hiroshima-
based peace activist Steve
Jeepers put it, when I
reconnected with him last
month. But still take it,

could take \$15,000 worth of
debt to do it Delta Diamond
Medallion style, to boot.

a doctor like Bill likes to fly in style, ~~with~~ in a pod that ~~the~~ transforms into a bed as it soars over the ~~the~~ Pacific ocean. I would have done it Joshiko-Style:

we are starting our initial descent into ~~the~~ Detroit. My right hand has been resting on Bill's slightly excited member for the last half hour. I have not finished my hot toddy, which was barely warm when I got it and is now less than tepid. We are seated in first class. Bill and the Big Boy are stirring. I hope being Black in Japan is not an issue. Emmanuel managed it alright back during studies abroad. And

Yoko: Racism in Fukushima
could be ironic, indeed. Black
rain created its own kind
of black bodies after the
nukes dropped during WWII.
People were marked, their
blood deemed contaminated
and married off to not
to create with Hibakusha,
their children will be turned
out deformed. That myth
resurfaced after 3/11.

You'd think yoko would
stop calling Kettles black,
but they don't. ~~And~~ In
the early days of the
extension due to COVID had run
out. I could have gotten a work
visa like Peter and taught
English at conversation school
(virtually, of course), but Peter
was leaving his post in order
to serve in ~~the~~ America's
domestic version of the
Peace Corps. He got placed
in disaster zone New
Orleans still recovering from
Katrina when COVID hit, still
one year out before Eliza hit
on Katrina's 16th anniversary.

So no work visa for me. We
left Japan in November 2020
with no idea when or if
we'd get to return. So much

Mr. Gump, decided to take a
research trip from Yoko-
hama to Fukushima. It was
summer 2020. We were surp-
rised to learn that people in
Fukushima were harassing
people with Tokyo license
plates. Don't infect us
with your city plague, the
rural folks said. I guess
taking the high road is just
not as satisfying as throwing
stones from glass houses.

It's been nearly three
years since I was last in
Japan. My emergency visa

for my "photography" work of
fieldwork in Fukushima
for the dissertation.

* * *

21:57 ET, 3.24 m/su/hour

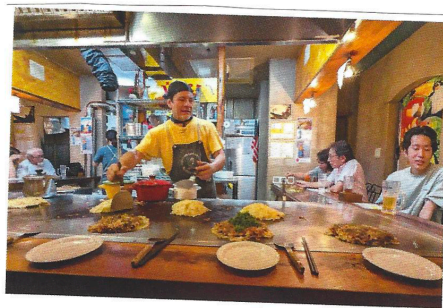
Only two hours to Tokyo.

Bill is rapping, lips parted,
body rapping, serene thanks
to the ^{\$7000} Rod in the sky. I'm
in my own pod, wondering when
the final meal service will
start. First class spoils you.

When Bill wakes up, ~~will~~
I hope there will be enough
time to watch Dr. Strangelove.
Someone at Delta has a deck

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sense of humor, making that
 on my flight movie screen. That
 and Titanic (and I'll always
 remember it was on my flight
 to Hong Kong to give a partici-
 pate in a conference about
 Fukushima in 2019, watching
 Titan's just as the plane
 hit a bad patch of the
 ocean, that for the first
 time in my life I became
 afraid of flying, I must
 be getting older, I thought,
 to feel my own mortality
 like this. Should I stop
 watching Titanic? (I didn't.)



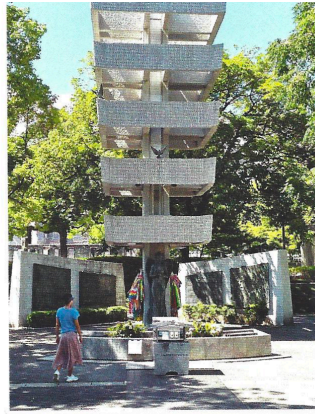
July 26 (Jk) 10:00 JT, 0.10 m/s/hr
 On the Shinkansen from Hiro-
 shima to Fukushima. Total
 exposure since we began our journey
 in Norfolk is 0.052 mSv. downtown
 Hiroshima was registering 0.13
 - 0.14 mSv/hour. Still slightly
 elevated over 70 years after
 the nuclear attack.

We got okonomiyaki from
 Japen-San, the Guatemalan
 who owns ~~the~~ the open-
 air shop with his Japanese wife
 whom he met in Hawaii. I had
 eaten at their place the last time
 I was in town in 2019, with
 Annalise and her gay Japanese
 friend. I was in town with Bill

about that evening, now I felt
 Annalise might have wanted to
 kiss me goodnight. A couple hours
 later, there we were, eating
 at the same restaurant, but
 this time with Steve Yeager of
 Peace Culture Village. He's
 putting the farm up for sale
 and starting a new one in his-
 cousin. He's in his mid sixties.
 His sons will help him run it.
 The Hiroshima farm was
 done in by Corona. All the
 young people who run it found
 remote jobs and preferred
 that over toiling in the soil
 in the outskirts of town. I
 had hoped Bill and I could

Steve cited research that showed that working the soil releases endorphins and is a good remedy for depression. Maybe paremora, too. It's doing Papi well over in moca. COVID is no longer his obsession. His Yuca and plantanos are.

Steve is motivated to continue farming because he considers it a key component of peace education: peace within, peace with others, peace with nature. He says peace education efforts in Hiroshima focus on the first two ~~at the expense~~ and



Forget the third. But when others and nature/environment is an extension of self, then mistreatment of ~~the~~ others + the environment is a violation of self. And an imbalance in the ecosocial environment leads to an imbalance in the individual. To balance oneself then helps balance the other two.

It would have been nice to ~~study how~~ examine how studying Hiroshima, Nagasaki, and Fukushima's versions of peace culture together could provide a more holistic understanding of environ-mental

health. It would have been fun to bring in the Quantum Perspective in conversation with the Buddhist, Shinto, and Christian ones as well.

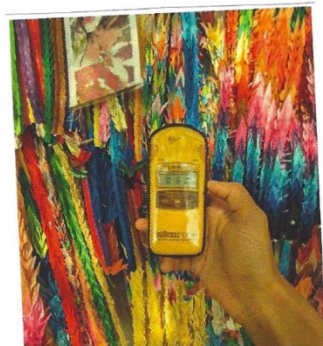
Oh well. ...

I delivered a message from San Diego to Hiroshima via a poem & drawing on a paper crane. I offered it to the fallen students memorial which ~~is~~ serves as the depository for ~~the~~ strips of benzene. I'll deliver more of these messages to Fukushima. Maybe leave one inside Dai-ichi.

Where Geigy would not stop screaming, ~~even though~~ because I can't make it be quiet past 9.99 mSv/hr . The highest reading I picked up was 7. The highest reading TEPCO had picked up that day at the same spot was 80.0 mSv/hr . Bill asked what nuclides were hitting us. ~~The~~ Our TEPCO guide wasn't sure, but probably cesium and strontium as he said. The Tritium remaining in the treated water that international bodies have approved

July 28 (金) 11:47 JT, 0.08 mSv/hr

I scattered my paper crane messages across the different stops on the Real Fukushima tour yesterday. The last one I left in our room at Futatabi Inn in Odate early this morning along with the flower ~~box~~ bouquet I got for my birthday. The room reading was 0.16 mSv/hr . I'm now at 0.070 mSv of cumulative exposure. I got 0.01 mSv while touring Dai-ichi for an hour. (The same as a dental X-ray, they like to say). We spent about ten minutes standing in front of Reactor 3





(and which has been stirring controversy in the news recently) was a popular topic and target of science communication. I could ~~not~~ do some analysis on public understanding of science during this moment, I thought as our guides passed around a ~~be~~ bottle containing a sample of clean-looking water that had been treated for cesium and strontium. There is no commercial method for removing tritium, which is ~~as~~ similar to a water molecule, they said. But these levels are way below the international levels, as other

plants currently release this treated water into the ocean.

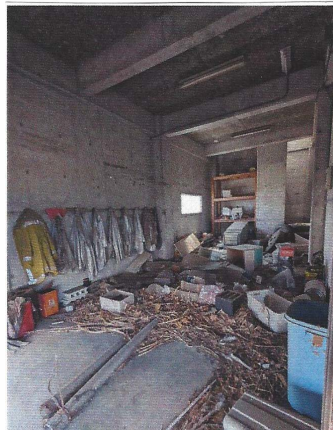
Who would you believe was sitting just behind me during the TEPCO tour's opening lecture but Richard Hawking, the English professor Peter described at Obirin Daigaku. He was following the recent Dai Ichi controversy and stumbled upon the tour.

He had to join a waitlist. He ~~said that~~ jokingly called this kind of nuclear tourism a hobby: he ^{unwittingly} got caught in Chernobyl's fallout ~~during~~ during a holiday at the Black Sea. Not now.

Albino for 12 years
after his exposure
everytime he sneezed.
There was someone else
among our party of about
15 who caught my attention
an Australian of about
my stature who reminded
me of Peter. Not as attr-
active, but there again I
think of ~~me~~ for those
early days when I wrote
in my journal that I didn't
find Peter attractive "at
all"... People grow on you.

Bill is in many ways
the opposite of Peter.
~~Yes~~ Besides the obvious

physical features, he's
the kind of person Peter
dislikes. Overly confident
and self assured ("big
click energy; some say,
and they wouldn't be wrong");
affectionate in public;
risk tolerant. Bill and I
spent our last nights in
Fukushima at Tomoko
and _____'s Futaba-
aya Inn, where Peter and
I stayed during my last
trip in 2010. I remembered
the argument we had in our
room after visiting Futaba
station, how he had been
wearing shorts. How I had



visitors to wear long pants
 cause parts of town were
 tin irradiated. How he
 at developed a rash on
 son's leg and was worried
 he had been exposed. His
 anger over me not taking
 is safety into consider-
 ation as I eagerly conduct
 my fieldwork. He
 then accused me of not
 considering him. Meanwhile,
 Bill often thanks me for
 choosing him.

Because I just turned
 33 and am in my prime

Steve Zepherum
 as over Japan's economy
 and (he told Bill to take
 care of me, being an expert
 radiologist, especially if I
 wanted kids - he wouldn't be going
 to Fukushima if he was me -
 and especially not if I'm
 pregnant). Bill brought up
 us having a baby - did so more
 than once this trip. He said
 he'd seriously consider it if that's
 what I wanted. And he has
 fantasized about us having a
 child together before. He'd reverse
 his vasectomy. But if we did
 decide to do it, we'd have to do it soon.



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of change. Country transformed
into a test community ^{side} for the
future. The prefecture may
have shown off producing
nuclear energy, but the
nuclear industry remains.
Just different. Nuclear
tourism, the economy of
decommissioning and the
ecology of environmental
remediation. The triple
disaster produced a des-
erted landscape for pion-
eering peoples (human and
beyond human) to inhabit.
It is a stern night.

Will this disaster night
end up moving to Fukushima?
I'm not sure. I feel like I
may not be back there (and
maybe even Japan) for a while.
For twelve years I've been
captured by this controversy.
After seeing all the progress
that's been made in the region -
including the triple disaster
memorial museum, to match
Hiroshima's and Nagasaki's
museums - I feel hopeful.
The people there are indu-
strious and up to the task of
recreating this land.
And the radiation will guide
the way. Just as it has guided

July 29 (±) 10:11 ET, 4:47 AM S/H

On the last hour of the
long plane ride back to the
US. Accumulated radiation
dose is 0.118 mSv. Will see
if I get to 0.2 by the
time we get back to VA Beach.
I wonder which particles
are bouncing off (wrong?)
me. Not cesium, strontium,
or tritium, I imagine. I've
become quite vocal about
radiation exposure.
I would move to Fukushima,
especially if I ended up
not having kids. The radia-
tion there is like a nuisance



3/11/24
* I cried
as I exited
the plane
from Tokyo
to Atlanta. That
was the
brightest moment
I've had in
my life. Thanked us
for our
safety & health
with

CHAPTER 3

From the Products of the Atomic Age to the Consequences of the Anthropocene:

An Art-Science Practitioner Attempts a Social and Intellectual History to Satisfy the Requirements for Admission to Doctoral Candidacy²⁰

Introduction: Telling a prehistory of the Anthropocene connected to nuclear technologies

The Earth is too deeply inscribed with the traces of our having been. There is no easy undoing of the biogeophysical impacts of colonialism, industrialization, the effects of automobility, the plastics in the ocean, the engineering of plant life, the loss of biodiversity, or the fallout from nuclear testing.

– Sheila Jasanoff, *Humility in the Anthropocene*

Living in the geological epoch unofficially known as the “Anthropocene” means recognizing that human beings as a species are geological agents with the power to alter Earth’s planetary systems. That power is, in part, nuclear. In 2019, dozens of members of the International Commission on Stratigraphy (IUG), as part of the International Union of Geological Sciences (or IUGS, the scientific body that names geological time periods), voted to rename the period of Earth’s history from the mid-twentieth century onward the Anthropocene instead of the Holocene. While the official proposal to adopt the term remains upcoming,

²⁰ WHERE DID ALL MY FOOTNOTES FOR THIS CHAPTER GO THEY LITERALLY DISAPPEARED THANK GOODNESS I HAVE OTHER VERSIONS OF THIS DOCUMENT
AAAAAAHHHHHHH!

members of the Anthropocene Working Group (AWG) in charge of the proposal are considering beginning the epoch in 1945, with the first atomic bomb test. Also commonly known as the start of the “Atomic Age” or the “nuclear revolution,” from 1945 onward radionucleotides have left long-lasting stratigraphic markers in the Earth’s soil. This time period also coincides with rapid increases in both the human population and industrialization.²

If we follow the logic of the AWG, then the Anthropocene was heralded in part by humans associated with American and Soviet governments who during the nuclear revolution harnessed nuclear power in the form of atomic weapons followed by civilian nuclear energy stations.³ The connection between nuclear technologies and the Anthropocene concept has led me to the following question: *How have elite and grassroots communities understood the products and consequences of nuclear technologies, and how has this reshaped their understandings of their relationships to other communities of humans, non-humans, and their shared planet?* For this examination paper, I will answer this question by presenting a prehistory of the Anthropocene concept as it relates to the development of nuclear technologies and the ways that different elite and grassroots communities responded. By doing so, I argue that transnational peace and environmental movements emerged in response to nuclear technologies, coalesced around a shared opposition to nuclear war and nuclear pollution, and helped spread a planetary consciousness about the impacts of human activities

on the biosphere, which in turn has made the Anthropocene concept so salient today among publics concerned with the future of life on Earth.

I have divided my prehistory of the Anthropocene into three periods covering the testing and deployment of atomic weapons in 1945 through the popularization of the Anthropocene concept beyond the scope of scientific insiders thanks to an article in *Nature* magazine in 2002. I present an overlapping chronology of peace and environmental movements made up of elite and grassroots communities, both of which responded to the products and consequences of nuclear technologies and come together to foment new planetary understandings and help shape the Anthropocene concept. The chronology reflects how the communities working on peace issues (nuclear arms control and abolishment) and those working on environmental pollution (nuclear waste and climate change) increasingly overlapped from the 1970s, as well as how peace and pollution became issues of increased international political concern from the 1980s onward.

To help me tell this prehistory of the Anthropocene, I follow authors who show how this dual military and civilian power-producing technology—nuclear power—became entrenched in our current epoch, as well as implications for nuclear power’s continued presence in the face of an ecologically precarious planetary future. By nuclear *power*, I refer to the energetic activities involved in both civil and military nuclear technologies: the physical power released when

certain humans split the atom, as well as the political power brandished by the nuclearized nation-states of which these humans belong, in order to pursue national interests like fueling economies and claiming control of resources. For although some would like to draw hard boundaries between civilian nuclear power generation and military nuclear weaponry on the grounds of their intended usage—the former being a “peaceful” technology that fosters collective progress, the latter a technology so destructive that its use in even limited warfare would be MAD (mutual assured destruction)—I find it more productive to think about nuclear energy stations and nuclear weapons as two sides of the same radioactive coin. ⁴ As the physicist and energy policy specialist Amory Lovins has put it, “by no longer artificially divorcing civilian from military nuclear technology, we would recognize officially the real driving forces behind proliferation...and start to treat nonproliferation, control of civilian fission technology, and strategic arms reduction as interrelated parts of the same problem with intertwined solutions.” ⁵ I am thus interested in communities that grappled with the new kind of destruction wrought upon Hiroshima and Nagasaki; the negative consequences of nuclear fallout from thermonuclear weapons testing and nuclear energy station accidents; and the potential risks and benefits of relying on both bombs and energy stations to fuel national economies.

Key communities and events in this prehistory are tied to the warring nation-states of the late 20th century. Many countries were involved in World War II and Cold War operations during this period; however for this paper I focus on communities in the United States, the Soviet Union, and Japan. The United States and the Soviet Union also began utilizing civilian, “peaceful” nuclear energy during this time of war. From the threat of radioactive fallout from nuclear weapons testing or a major nuclear energy station failure circulating through air, water, and land and poisoning life around the globe; to the threat of thermo-nuclear war leading to a global nuclear winter and mass extinctions; to the threat of climate change discovered during the Cold War—the scholarship I cover in this paper suggests that these threats first introduced humans to the notion of human-caused planetary-scale disasters that are becoming increasingly characteristic of the Anthropocene epoch.

1945-1987: The development of nuclear weapons inspires collective action to prevent planetary apocalypse through peace movements

The horror of a nuclear holocaust is universally acknowledged. Today, the United States and the Soviet Union possess 50,000 nuclear weapons. In half an hour, a fraction of these weapons can destroy all cities in the northern hemisphere. Yet over the next decade, the USA and USSR plan to build over 20,000 more nuclear warheads, along with a new generation of nuclear missiles and aircraft...Rather than permit this dangerous future to evolve, the United states and the Soviet Union should stop the nuclear arms race.

– Randall Forsberg, *Call to Halt the Nuclear Arms Race*

The transition from World War II to the Cold War—from a war that introduced nuclear weapons to another whose participants struggled with the existence of such weapons—marks this nearly 15-year period. It begins with the first nuclear weapons test conducted by the United States at the Trinity site in New Mexico in 1945 and ends with the 1987 Intermediate-Range Nuclear Forces (INF) Treaty, the arms control treaty between the United States and the Soviet Union that resulted in the bilateral reduction of missiles. As the introduction of nuclear weapons revolutionized the consequences of violent conflict between states, elite and grassroots communities among states made urgent calls for peace. At the elite level, some scientific and research communities involved in nuclear arms development grew increasingly concerned about the ethical implications of their work, and soon formed organizations dedicated to nuclear arms control. Through these organizations and the media, these elite communities shared their concerns about peace through arms control with publics around the world. Subsets of these publics formed their own grassroots organizations, and along with the elite groups, they engaged in peace movements that focused on nuclear arms control and abolition. The political activism of these movements helped bring about the INF Treaty and other arms control deals.

Just weeks after the United States attacked Hiroshima and Nagasaki, British philosopher and political activist Bertrand Russell published “The Bomb and Civilisation,” in the Scottish socialist newspaper *The Glasgow Forward*.⁶ He warned his readers in apocalyptic tones that without new political ways of thinking, “the prospect for the human race is sombre beyond all precedent.”⁷ By 1955 he released the Russell-Einstein manifesto at a press conference in London. The manifesto was signed by ten other intellectuals and scientists like Albert Einstein and Hideki Yukawa and called for a scientific conference that would assess the dangers of nuclear weapons for all of humanity. The Canadian-American businessman and philanthropist Cyrus S. Eaton sponsored the first of such a conference at his birthplace in Pugwash, Nova Scotia in 1957.

Since then, the Pugwash Conferences on Science and World Affairs have been held every 18 to 24 months around the world. (The 63rd conference was meant to take place March 1-5th 2020 in Doha, Qatar but has been indeterminately postponed due to the COVID-19 pandemic). According to their website, 31 nations currently have Pugwash groups.⁸ This elite, international community of scientists, experts, and policymakers has for over half a century remained focused on eliminating all weapons of mass destruction, as well as war and armed conflict.⁹ Pugwash communicates its ideas and proposals to decision-makers and publics through its website, publications, press conferences, and as they emphasize “above all – from the personal interactions of individual Pugwash

participants with political leaders and opinion makers.”¹⁰ Other elite organizations, like the Bulletin of Atomic Scientists which was founded in 1945, have contributed to Pugwash conferences as well. These elite organizations also connected with grassroots peace organizations, and together formed a strong foundation for transnational peace movements.

Political sociologist David Meyer notes that while grassroots peace movements and organizations in the United States have a history longer than the country itself, the nuclear age “heightened both the scope and intensity” of the threat of war and thereby added a new concern for peace activists. When nuclear weapons became a frightful reality, US peace organizations and their supporters were predominantly middle-class sympathizers of peace churches and the political left. They remained at the fringes of politics until civil defense planning introduced fallout shelters and nuclear attack drills to American publics in the 1950s. Once the possibility of nuclear war became an everyday reality for mainstream American, the efforts of peace organizations against nuclear weapons began to gain more attention and traction.¹¹

An example of an American peace group that gained popular national support was the National Committee for a Sane Nuclear Policy, or SANE, which was founded in 1957 by poet and novelist Lenore Marshall, journalist Norman Cousins, and others.¹² The organization became SANE/FREEZE in 1987 when it united with another major grassroots organization and movement that had

begun in 1979, the Nuclear Weapons Freeze Campaign led by peace scholar and activist Randall Forsberg and others. Both SANE and the Freeze movement shared the goal of halting the testing, production, and use of nuclear weapons. By 1993 the SANE/FREEZE organization changed its name to Peace Action, as it is known today. According to the organization's website, it is the largest grassroots network of peace organizations in the United States.¹³

Across the Pacific Ocean, the devastation of Japan during WWII—and the novel gruesomeness of the nuclear attacks of Hiroshima and Nagasaki—inspired peace movements among the surviving generations of Japanese people. Stories of the nuclear attacks from A-bomb survivors spread to Japanese publics in the 1950s thanks in part to one of Japan's largest peace organizations, the Japan Council Against Atomic and Hydrogen Bombs (*Gensuikyou*). The organization was founded in Hiroshima in 1955 by international law professor Yasui Kaoru after a nuclear weapons testing accident known as the Lucky Dragon Incident made international news and sparked nation-wide protests in Japan. In 1954, the Japanese fishing crew of the Lucky Dragon vessel was exposed to radioactive fallout from a US thermonuclear weapons test over the Bikini atoll in the Marshall Islands. The twenty-three member crew grew sick from the exposure, and one member died six months later.¹⁴ According to international relations and Japan scholar Volker Furht, *Gensuikyou* mobilized all sectors of Japanese society to participate in the peace movement by linking the stories of the

survivors of Hiroshima and Nagasaki with the stories of the Lucky Dragon crew.¹⁵ *Gensuikyou* remains active today, and has since become international, hosting a virtual World Conference against Atomic and Hydrogen Bombs in 2020.¹⁶ *Gensuikyou* is but one of many Japanese peace organizations supporting nuclear weapons abolition efforts in Japan and around the world.¹⁷

Both elite and grassroots communities around the world worked together during the last quarter of the 20th century to push for nuclear disarmament. Their collective efforts helped to get international agreements like the INF Treaty and others passed. But as we have already begun to see with the peace movement in Japan—which rose partially in response to radioactive fallout from nuclear weapons testing (and as we shall see during the next overlapping period I present in this paper)—the growing environmental movements of the 1960s and 70s—fueled in part by concerns about exposure to radioactive fallout from nuclear weapons and nuclear energy stations—coalesced with peace movements to oppose nuclear power.

1954-1986: Concerns over the global spread of pollutants shape environmental movements

In unlocking the secrets of the atom, modern man has found himself confronted with a frightening problem—what to do with the most dangerous materials that have ever existed in all the earth's history, the by-products of atomic fission. The

stark problem that faces him is whether he can dispose of these lethal substances without rending the earth uninhabitable.

– Rachel Carson, *The Sea Around Us*

This period opens and closes with two global events that alerted publics around the world to the dangers of pollution in the form of radioactive fallout. It opens with the 1954 Lucky Dragon Incident (introduced in the previous section) and closes with the 1986 Chernobyl nuclear energy station accident (the latter which remains the biggest nuclear power accident in history followed by Fukushima Dai Ichi in Japan in 2011).¹⁸ During this period, just as elite and grassroots communities and their supporting publics had risen to oppose nuclear weapons for peace, some of these same communities, along with new ones, began to oppose nuclear weapons because of the health risks posed from pollution that weapons testing emitted. Once civilian nuclear energy stations began opening (in the 1950s in the United States and the Soviet Union, and in the 1960s in Japan), some of these communities also came to oppose nuclear energy due to similar health concerns about the effects of radioactive waste that the energy stations produced. The fact that nuclear energy stations could—like nuclear bombs—produce radioactive fallout (either from accidents or perhaps terrorist attacks at their facilities) helped make the dual case against nuclear weapons and nuclear energy stations stronger for opponents of nuclear power.

Partly due to pressure from publics in Japan and the United States that were concerned about the health impacts of fallout, scientific communities began conducting fallout studies in the 1950s and 60s. For example, the Greater St. Louis Citizen's Committee for Nuclear Information (CNI) worked with Washington University and St. Louis University to conduct what became known as the Baby Tooth Survey from 1958 to 1970, in which researchers tracked a rise in the radioisotope strontium-90 in the teeth of children born after 1950. Other studies took place in Canada and Germany.¹⁹ The findings of these kinds of fallout studies helped convince leaders in the United States, the Soviet Union, and Great Britain to sign the Limited Nuclear Test Ban Treaty in 1963.²⁰

In the United States at least, these studies also contributed to a rise in environmental consciousness that was taking place in the 1960s. Concerns about industrial pollutants of all kinds (not just from fallout from nuclear bombs or nuclear energy stations); combined with the dissemination of new scientific information about Earth's geophysical processes (including climate change); as well as the popularization of new images of the Earth from space (such as National Aeronautics and Space Administration's or NASA's *Earthrise* photos in 1968); helped to foment an environmental movement that understood the Earth to be a fragile home for all life in the solar system and humans to be either the caretakers or destroyers of that home.²¹

Similar environmental movements emerged in other parts of the world during this time. For example, the mass protests in Japan sparked by Lucky Dragon Incident were also part of a larger movement against industrial pollutants that gained national attention in the 1960s and 70s.²² Like the peace movements, concerns taken up by environmental movements were reshaped by the new risks nuclear power presented to the world. These environmental movements folded concerns about nuclear pollutants into broader concerns about industrial pollution, human health, and environmental degradation.

Fallout studies were also part of a larger Cold War science project being conducted in the United States and the Soviet Union to understand the effects of nuclear weapons on earth systems.²³ Here I unpack the shared history of Cold War earth and space science and climate science and return to looking at elite communities. The US and Soviet governments dedicated extensive military funding to researching the impacts of thermonuclear weapons on air, land, and sea, as well as for the development of technologies that could weaponize the climate itself. ²⁴ Military research advanced not only nuclear but also surveillance and computing technologies needed to process such large amounts of collection data and produce earth systems knowledge. It was through Cold War scientific inquiry that a subset of scientists discovered an increased accumulation of carbon dioxide in the atmosphere in the 1960s and began to grow concern about the “greenhouse effect” or global warming. From the 1960s

onwards, these scientists then discussed the political and planetary implications of their work on climate science with governments, media, and publics.

Historian of science Spencer Weart has offered an account of the development of climate change research that begins as early as the 1890s; however he claims that it was not until the early 1960s, with the scientific debate over Charles D Keeling's "epochal" paper, "The concentration and isotopic abundances of carbon dioxide the atmosphere," that scientists and the US government took climate change seriously.²⁵ This turning point in the research, Weart asserts, was thanks to the social environment of US Cold War military priorities and activities, which when combined with Americans' growing concerns and social unrest since the 1950s surrounding fallout, propelled climate science from the esoteric research plans of a few obscure scientists curious about the Ice Ages to a high-priority scientific agenda for the United States military.

Before the advent of nuclear power, Weart writes, "most people could scarcely imagine that modern industry and agriculture already matched the planetary scale of geophysical systems."²⁶ Climatology remained a minor branch of science in the 1950s, primarily taken up in the United States because, as Weart writes, "the rest of the industrialized world was still digging out from under the rubble left by invading islands."²⁷ Then, concerns over fallout from nuclear weapons testing beginning in the mid-1950s provided an opening for more

serious climatic research. According to Weart, “Many suspected that dust from atomic blasts was already changing the weather. Around 1953 it became popular to blame faraway bomb tests for almost any unseasonable heat or cold, drought or flood.”²⁸ Then after the 1954 Lucky Dragon Incident, the US Atomic Energy Commission “stepped up its program of research on where fallout ends up on the environment.”²⁹

The anthropologist Joseph Masco has argued that the whole world became a laboratory during the Cold War period when nuclear tests spread radiation to “each biological being on the planet.”³⁰ As some scientists began tracking radioactive materials from bomb fallout around the globe, others also tracked carbon absorption in the oceans and air. Roger Revelle was an oceanographer who studied both fallout and carbon dioxide. In the 1940s and 50 he worked on the effects of nuclear testing on the waters around Bikini Atoll. At the same time, he became interested in oceanic carbon absorption.³¹ By 1956, it was the industrial release of carbon dioxide, rather than radionuclides, that he likened to a global experiment, writing, “Human beings are now carrying out a large-scale geophysical experiment of a kind that could not have happened in the past nor be reproduced in the future.”³² Revelle’s story demonstrates how Cold War research helped set the stage for “greenhouse warming” research in the 1960s, so that by 1965 a “panel of the President's Science Advisory Committee established greenhouse warming near the top of the growing list of

environmental problems that required close national attention.”³³ Weart claims it was in the 1960s that “scientific opinion first accepted that human industry might well change global climate radically.”³⁴

I have attempted to show in this section how concerns over pollution—which became central to the rise of US and Japanese environmental movements in the 1960s and 70s as well as other environmental movements around the world—arose in part due to nuclear fallout from weapons and energy stations. The Three Mile Island and Chernobyl accidents in the 1970s and 80s only heightened those concerns. Then, with the climate change issue gaining attention during this period, carbon dioxide joined alongside radioactive fallout as a worrying industrial pollutant. Peace and environmental movements shared not only activities that succeeded in mobilizing publics against nuclear technologies; they also shared information and campaign resources with women’s and civil rights organizations during this period to mobilize publics transnationally over human rights issues, helping to foster a global community people with a shared humanity and a shared planet.³⁵ As we shall see in the next period, the Earth Day campaigns from 1970 forward, as well as international cooperative efforts such as the UN Earth Summits and subsequent UN climate change policies, echo this sentiment of a shared planet with a precarious future.

1970-2002: Convergence of peace and environmental movements culminates in the popularization of the Anthropocene concept

States shall cooperate in a spirit of global partnership to conserve, protect and restore the health and integrity of the Earth's ecosystem...Warfare is inherently destructive of sustainable development...Peace, development, and environmental protection are interdependent and indivisible.

– Universal Principles 7, 24, and 25,

United Nations 1992 Rio Declaration on Environment and Development

From 1970 through 2002, the combined efforts of peace and environmental movements, supported by a growing body of scientific knowledge about the human impacts on Earth systems, led to international attention and response to the negative planetary-scale impacts of nuclear technologies specifically, and industrial pollution more generally. The convergence of peace and environmental issues helped to shape various iterations of the following question in the minds of a growing number of individuals: *How could humans share the Earth with each other and other species peacefully, without polluting it to the point of uninhabitability for current and future life forms?* This would become a key question stimulating discussions around the Anthropocene concept among communities of scientists and other intellectuals beginning the 1980s, and among a wider public audience in the 2000s.

On April 22, 1970, twenty million people across the United States participated in the nation's first Earth Day. Twenty years later, on Earth Day 1990, 200 million people in 141 countries participated in voicing their concerns about the state of their shared planet.³⁶ In 1972, 113 states attended the United Nations first ever Conference on the Environment in Sweden. Conference members created principles that called for a halt on pollution and the elimination of nuclear weapons. It was followed in 1992 by the UN Conference on Environment and Development (UNCED), also known as the first "Earth Summit," held in Brazil. UNCED led to the UN Framework Convention on Climate Change (UNFCCC), from which climate change treaties like the 1997 Kyoto Protocol and the 2016 Paris Agreement emerged.

A decade after the first UN Earth Summit, the Dutch climate scientist Paul J. Crutzen—who had in the 1980s helped popularize the theory of nuclear winter, a scenario in which nuclear warfare would produce enough debris from firestorms to pollute the entire atmosphere, causing a global cooling effect and triggering mass species extinction—helped popularize yet another planetary-scale concept: the Anthropocene.³⁷ In 2002, Crutzen published a short article in *Nature*, writing that "It seems appropriate to assign the term 'Anthropocene' to the present, in many ways human-dominated, geological epoch."³⁸ This article is credited for the popularization of the Anthropocene concept beyond the

research circles of geologists and other natural scientists and into the arenas of the social sciences, the humanities, and their respective publics.³⁹

It is no coincidence that Crutzen's research on the atmosphere and climate proved influential to both the nuclear winter concept of the 1980s and the Anthropocene concept of the 2000s. Both concepts deal with the notion that, if left unchecked, industrial activities have the potential to produce cataclysmic consequences at the planetary level. Nuclear winter studies demonstrated that excess carbon emissions were not the only way that human activity could alter the global climate. Moreover, as Weart noted, Cold War research in earth and space science overlapped with climate science. This research, combined with decades of elite and grassroots concerns about the real-world impacts of all out nuclear warfare, helped shape the development and popularization of the nuclear winter concept.

Nuclear winter studies provided the science to back international political action for the elimination of nuclear weapons, granting weight, for example, to the following statement in the 2017 UN Treaty on the Prohibition of Nuclear Weapons (Ban Treaty), the first treaty to internationally outlaw the weapons:

The States Parties to this Treaty....cognizant that the catastrophic consequences of nuclear weapons cannot be adequately addressed, transcend national borders, pose grave implications for human survival, the environment, socioeconomic development, the global economy, food security and the health of current and future generations...have agreed as follows...[that] Each State Party undertakes never under any circumstances to....develop, test, produce, manufacture, otherwise

acquire, possess or stockpile nuclear weapons or other nuclear explosive devices.⁴⁰

The Ban Treaty text points to how issues taken up by peace and environmental movements converged around issues related to nuclear technologies whose pollutants threatened not just human health but the health of the biosphere. The nuclear winter project offers a key example of this convergence, by connecting the concerns of peace and environmental movements, namely controlling the spread of nuclear weapons and global pollution while averting human-induced climate change.

Political sociologist Eglė Rindzevičiūtė has explored the history of East-West cooperation on nuclear winter studies between the United States, the Soviet Union, and other Western European countries during the 1970s and 80s. Rindzevičiūtė notes that the studies “provided evidence of human activities as geological agency, demonstrating that human activities can lead to irreversible climate change.”⁴¹ Further, she claims that nuclear winter research “propelled studies of global environmental change to the top of the political agenda...articulating a different relation between man and nature and positing a need of new institutions and expertise for world government.”⁴² Nuclear winter research is thus part of the legacy of the pivotal climatological research of 1960 described by Weart that catalyzed international concern over climate change.

Crutzen, together with chemist John Birks, wrote the first publication introducing the nuclear winter theory in the Norwegian journal *Ambio* in 1982.

⁴³ A year later, another nuclear winter article was published in *Science* by a group of American atmospheric scientists and astrophysicists. ⁴⁴ One of the article's co-authors, the astronomer and public scholar Carl Sagan, would go on to co-author a book in 1984 with his public scholar colleagues Donald Kennedy, Paul Elrich, and Walter Roberts entitled *The Cold and the Dark: The World After Nuclear War*. The book is based on the 1983 Conference on the Long-Term Worldwide Biological Consequences of Nuclear War, held in Washington, D.C. One of the participants, the biologist and former Commissioner of the US Food and Drug Administration, concluded the following:

...The most striking new information presented at this Conference, and indeed the most potentially disturbing of all the chronic effects of nuclear war so far described, is the prospect of major climatic consequences....What our most thoughtful projections show is that a major nuclear exchange will produce, among its many plausible effects, the greatest biological and physical disruptions of this planet in its last 65 million years—a period more than 30 thousand times longer than the time that has elapsed since the birth of Christ, and more than 100 times the life span of our species so far. That assessment of prospective risk needs to form a background for everyone who bears responsibility for national security decisions, here and elsewhere. ⁴⁵

Nuclear winter thus describes not only a nuclear disaster induced by human warfare, but a rapid form of climate change the likes of which have not been seen in human history. Rindzevičiūtė shows how the risks from nuclear technologies, nuclear disasters, and climate change have become further entangled when she

writes, “from [the nuclear winter studies of] 1983 onward, the phenomenon of nuclear winter would be invoked time and again in connection with various risks and disasters related to nuclear technologies, be they the India-Pakistan conflict in the late 1990s or the Fukushima meltdown in 2012.” ⁴⁶

Conclusion: Expanded planetary consciousness in Western scholarship during the Anthropocene

The challenge the Anthropocene poses is a challenge not just to national security, to food and energy markets, or to our “way of life”—though these challenges are all real, profound, and inescapable. The greatest challenge the Anthropocene poses may be to our sense of what it means to be human...The rub is that now we have to learn how to die not as individuals, but as a civilization.

– Roy Scranton, *Learning How to Die in the Anthropocene*

In the decades since Crutzen’s 2002 *Nature* article, peace and environmental concerns have continued to converge over planetary threats, such that we can now refer to their convergence as an *ecosocial justice movement*. Organizations that were first involved in peace issues have since expanded their concerns into the environmental sphere. Pugwash, for example, is now interested in other “critical issues at the intersection of science and society, including climate change, environmental deterioration, and resource scarcity and unequal access, which are deplorable in themselves and which give rise to resentment, hostility, and violence throughout the world.” ⁴⁷ One of Peace Action’s campaign

priorities calls for the divestment of US military spending into renewable energy projects. ⁴⁸ Physicians for Social Responsibility, an organization that helped spearhead the Baby Tooth Survey and contributed to the 1983 nuclear winter conference from *The Cold and the Dark*, has a “Countdown to Earth Day” timer on their website home page. ⁴⁹ And in 2020, the organizers’ statement for the *Gensuikyou* World Conference Against Atomic and Hydrogen Bombs reads: “Nuclear weapons pose existential threat to the very survival of humanity. Scientists warn that even small portion of nuclear arsenals, if used, would cause climate change, leading to global famine, in addition to the immediate deaths of millions of people from the detonations. Their catastrophic consequence would be far beyond the level of the devastation in Hiroshima and Nagasaki.” ⁵⁰ From nuclear weapons testing and fallout to nuclear winter and climate change—the nuclear crises of the last nearly eight decades have compelled researchers, policymakers, scholars, and publics around the world to reckon with the eco-social consequences of nuclear power in the Anthropocene.

From Crutzen’s 2002 article to current studies of how the COVID-19 pandemic has lowered carbon emissions, several global developments of the 21st century further challenged human societies to think beyond national interests and borders. ⁵¹ As I previously discussed, the UN adopted treaties like the Kyoto Protocol (2005), Paris Agreement (2016), and Ban Treaty (2021) to address both the slow violence of climate change and the quick violence of nuclear winter. The

2011 Fukushima Dai Ichi nuclear accident in Japan reignited the nuclear energy debate around the world, highlighting the vulnerabilities and risks of depending on this power source amidst increasingly unstable Earth conditions. It was also in 2011 that Crutzen and his international colleagues, in their analysis of the further development and implications of the Anthropocene concept for *The Royal Society*, wrote about “the emergence of our modern planetary ecological conscious,” with “our” likely referring to the “global change research community” and its informants.⁵² I have attempted to show in this paper how that research community in part shares its origins with and has been co-shaped by other elite and grassroots communities that joined together in peace and environmental movements concerned with the planetary-scale consequences of nuclear technologies.

I will conclude this paper with reflections on the intellectual conversations that have developed in the last decade around the Anthropocene concept. Crutzen and his colleagues concluded their 2011 piece with a grim warning for its readers: “The ultimate drivers of the Anthropocene...if they continue unabated through this century, may well threaten the viability of contemporary civilization and perhaps even the future existence of *Homo sapiens*.”⁵³ They also stressed the urgency of setting up effective systems of global governance to deal with the existential threat of increasingly inhospitable Earth systems while pointing out that equity issues are magnified in the Anthropocene.

As STS scholar Sheila Jasanoff has pointed out, equity is a key ethical discourse that arises from a planetary rather than national framing of Earthly governance.⁵⁴ The Global North has been responsible for more carbon emissions than the Global South, as developed countries have consumed more resources than developing ones. Yet the South suffers more acutely the brunt of climate change. Global environmental stewardship in the form of international or supranational governance thus remains contested and held with suspicion over loss of sovereignty and persistent inequitable structures of colonialism.⁵⁵ The challenge is to create equitable systems of human cooperation that can handle the existential threat of fallout while supporting diverse lifeways on Earth. In response to this challenge, international relations scholars Anthony Burke, Stefanie Fishel, and their colleagues have suggested that humans practice “planetary politics,” defined as a politics that goes beyond the still-human-centric global sphere and into “a politics to nurture worlds for all humans and species co-living in the biosphere....binding environmental justice and social justice inextricably together.”⁵⁶

Thinking with the Anthropocene brings up questions not just of governance and equity, but of life and death itself. In 2013, Iraq war veteran *Roy Scranton* wrote an opinion piece for the *New York Times* called “*Learning how to die in the Anthropocene*,” asking readers to consider how our species was going to deal with the crises of the new epoch: global warming, extreme weather events,

radical destabilization worldwide, large-scale species die-off, and our own possible extinction as Homo sapiens. ⁵⁷ Yet for Scranton, these crises point to an even larger challenge. He wrote, “The biggest problem we face is a philosophical one: understanding that this civilization is *already dead*. The sooner we confront this problem, and the sooner we realize there’s nothing we can do to save ourselves, the sooner we can get down to the hard work of adapting, with *mortal humility*, to our new reality.” ⁵⁸

Earlier this year in 2021, nearly a decade after Scranton’s piece, Jasanoff also called for humility in the Anthropocene. While even more people and institutions embrace the Anthropocene concept, thereby acknowledging that humans are geological agents of change at the planetary scale, Jasanoff reminded her readers to humbly recall that humans do not control that change. She demonstrated how the hubristic beliefs still operate in the Anthropocene: that humans can eventually control earth systems through technology to serve human needs and desires; that technological fixes or tweaks in economic systems to account for something like a carbon market will “solve” climate change; that human ingenuity will allow industrial societies to operate with the same cultural norms and values that caused the ecological crisis in the first place. Jasanoff then urged researchers, lawmakers, and other knowledge-makers concerned with the challenges of the Anthropocene to critically engage with normative questions such as what matters in times of uncertainty and use

those answers to help guide humanity's planetary future without assuming that humans control that future.

Scranton, too, proposed other deep philosophical questions for the Anthropocene:

“What does it mean to be human?” and “What does it mean to live?” In the epoch of the Anthropocene, the question of individual mortality — “What does my life mean in the face of death?” — is universalized and framed in scales that boggle the imagination. What does human existence mean against 100,000 years of climate change? What does one life mean in the face of species death or the collapse of global civilization? How do we make meaningful choices in the shadow of our inevitable end? ⁵⁹

When read together, Scranton and Jasanoff ask humans living in the Anthropocene to critically reflect on what really matters to them, and how to make meaningful choices based on what matters. Those questions are especially salient during a global pandemic that feels like a harbinger for mass deaths yet to come.

Yet the Anthropocene offers more than death and destruction. Other scholars in STS have pointed out that the planetary crisis we face in offers spaces of hopeful creativity amidst destruction, precarity, and uncertainty. From Anna Tsing's “contamination as collaboration”, Karen Barad's “agential realism” and Donna Haraway's “tentacular thinking” to Bruno Latour's “Earthbound being” and Vinciane Despret's “being with” and “becoming,” these scholars have responded to the crisis by offering new ways of relating to the living and non-living. ⁶⁰ These authors recognize that in times of planetary crisis, humans need

alternative, more generous ways of interacting with others in the world that are not based on the assumption of human exceptionalism and dominance. With humility, perhaps us Moderns, in Latour's words, can embrace that there is no true "solving" the ecological crisis of the Anthropocene; rather we "stay with the trouble" as Haraway suggests: we challenge ourselves to open up our spheres of awareness, concern, and care to as many human and non-human, living and non-living others as we dare to while we are alive, before we inevitably die.

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Second Interlude

Letters from the Cornell Nuclear Disarmament Group

CORNELL DAILY SUN: LETTER TO THE EDITOR – The Sky Falls Only if You Let It

March 14, 2019

To the editor:

There's an earthquake of student action regarding climate change going on. One great example of this is the Juliana v. United States Youth Climate Lawsuit, which is headed for the Supreme Court. Young people filed a lawsuit against the United States federal government in 2015 for violating their and future generations' right to "life, liberty and the pursuit of happiness" by refusing to seriously tackle climate change. Cornell students will surely join in on this scale of climate justice activism.

But there's something missing here. Despite their multi-tasking fame, millennials focused on environmental justice are often silent about the dangers of nuclear war. It's a war that, if it happens, will lead to nearly instantaneous climate change in the form of nuclear winter, exponentially accelerating mass extinctions on a planetary scale. Nuclear winter refers to a canopy of atmospheric ash that will encircle the globe, obscure sunlight and threaten food production.

But this silence is lifting. Proponents of the Green New Deal are thinking big and thinking well. They have built a "no first use" nuclear provision into their GNE commitment — a policy in which nuclear powers forswear using their nuclear arsenals unless attacked first with nuclear weapons. This provision is profound because the U.S. just exited the Intermediate Range Nuclear Forces Treaty and first strike narratives are afoot.

Think about the many ways climate change reform and sane nuclear policies support each other. Under conditions of war, governments assert martial law, wherein environmental laws go out the window. Moreover, the U.S. military is

among the world's largest source of global carbon dioxide emissions. Climate reform regresses during wartime. Think of this way: The first casualty of war is the environment and that includes a stable climate.

Students who get the connection between a clobbered climate and nuclear war can take heart. There are tangible ways to get active and be helpful. Besides supporting the GND and the Global Climate Strike, you can foster resolutions at Cornell to divest from nuclear war (as promoted by the Future of Life Institute) and to support the “Back from the Brink” (<https://www.preventnuclearwar.org/>) movement (as championed by the Nobel Peace Prize organization, ICAN). The City of Ithaca just passed the “Back from the Brink” resolution.

And how about urging professors lecturing on sustainability to address nuclear arms and what their use will do to jobs, environment and society? You can also attend monthly meetings of the Cornell Nuclear Disarmament Group. On March 18, CNDG is hosting a lecture by Dr. Ira Helfand on the folly of “limited” nuclear war in G08 Uris Hall at 2:00 p.m.

The sky — and the climate we associate with it — will fall only if you let it.

Solemnly and Sincerely,

Lisette Lorenz, Ph.D. Student, science and technology studies
Prof. Charles C. Geisler, developmental sociology

[* * *]

March 11, 2024

Dear [Randy](#),

I happened upon your postcard yesterday while searching for other things. I imagined you six years ago, breaking into that nuclear weapons storage facility in the dead of night to graffiti “SAY NO TO ECOCIDE” on a warhead. Then I imagined you with pencil in hand: both it and the postcard courtesy of the county jail, where you awaited trial for ecoterrorism.

First I shed a tear. Then two. Then, unexpectedly, the levees burst. The waves crashed over the sea wall and inundated me. I tasted salt and drowned for a while.

I woke up this morning to more salt running down my cheeks. Then I remembered the date and decided to finally write you back, my atomic confidant. You understand how nuclear weapons and nuclear power stations are two sides of the same coin. You had written me that you had “the best lawyers who are familiar with the laws that prohibit weapons of mass destruction...weapons that poison the lands, air, and water....” Needless to say I was glad to hear your lawyers managed to reduce your sentence from twenty years down to one.

Your note reminds me of the water. I need to replenish all that salt.

It’s windy today on the Chesapeake Bay. The waves are fierce and make a foam I’ve not experienced here in the two years since I left New Orleans and the Mississippi. The foam lingers like soap suds. I scoop up a cup of the frothy Atlantic and imagine it’s the Pacific. I drink up to commemorate this day, when thirteen years ago the Great East Japan earthquake, tsunami, and Fukushima Dai Ichi nuclear power plant accident rose up from the depths like a real-life Godzilla.

Did you know that Godzilla was dreamt up as a response to the 1954 Castle Bravo nuclear test over the Bikini Atoll? I recently got an email from the Japan Council against A and H Bombs reminding me that March 1st is Bikini Day, as well as the start of the newest international push to achieve a nuclear weapon-free world. Do you think it’s a coincidence that the Castle Bravo and Fukushima nuclear disasters both happened in March?

Speaking of dreams and coincidences: My mother and I both had premonitions in the form of dreams just days and moments before the 2011 triple disaster. She was by the Atlantic in Miami, I was by the Pacific in Osaka. It sounds crazy, but so is the nightmarish game of nuclear chicken we still find ourselves in. Plus, I recently came across the work of [Harald Atmanspacher](#), a well-respected quantum physicist and philosopher of science who specializes in mind-matter relations and uses quantum mechanics to study “coincidence phenomena” like these dreams. Not so crazy, after all.

Perhaps, then, it wasn’t a coincidence that I found your postcard yesterday. After all these years, on the eve of 3/11, while searching for other things. Do you believe in such synchronicities?

In solidarity my friend,

Lisette

CHAPTER 4

Foraging for Mushroom Clouds: Practicing Art-Science on a Damaged Planet — Another Examination Paper for Admission to Doctoral Candidacy

Introduction: My Matsutake Story

When anthropologist Anna Lowenhaupt Tsing (2015) first smelled a matsutake (Japanese for “pine mushroom”) in Oregon’s Cascade Mountains, she was astonished: “It’s not an easy smell.... It’s disturbing. Many people never learn to love it. It’s hard to describe” (14). The first time she cooked the mushrooms, the smell was so overwhelming to her that it ruined her “otherwise lovely stir-fry.” She threw the dish away and ate plain rice instead (47). When I brought my first pair of matsutake home from the grocery store one autumn evening in Yokohama, Japan, Tsing’s first experiences with the mushroom came to mind. Like her, I was cautious.

Thanks to having read Tsing’s ethnography of matsutake and its dizzying global commodity chain, I was not only prepared for my first encounter with the mushroom, but also full of anticipation. This was the same homely mushroom that has for over a decade swept up Tsing, a team of researchers at the Matsutake Worlds Research Group, other scientists, pickers, traders, forest managers, and consumers into its mysterious mycelial network. By the time it was my turn to finally try matsutake—three years after first learning about “the

mushroom book,” and months into thinking with Tsing’s prose for my A exams—I felt like I was meeting a celebrity. [\[1\]](#)

On September 13, 2020, I washed my hands in hot water, put on my face mask, and biked to the small grocery store at the bottom of the hill I lived on. Keeping my distance from the other costumers, I paid the equivalent of about ten US dollars for two mushrooms whose packaging informed me had come from China. (I knew the nicer grocery store in Yokohama Station a few miles away sold Japanese-grown matsutake, but I wasn’t willing to pay over a hundred dollars for a couple of shrooms I might hate.) After huffing back uphill, returning to my apartment, removing my mask, and washing my hands in hot water, I unwrapped the matsutake and braced myself for the smell.

It’s not so bad, I thought. The smell was indeed difficult to describe; all I could come up with was *definitely earthy*. I imagined that the matsutake Tsing had sniffed, being fresh off the forest floor, had a much stronger presence than the one I had gotten from overseas. Had my matsutake come from a forest in the mountains of Chuxiong Prefecture in central Yunnan, where Tsing notes matsutake is the prefecture’s most valuable forest product (268)? Had a “matsutake boss” or *laoban*—an influential merchant who bought matsutake in-bulk from small village pickers for trade in larger cities—arranged the trade from Chinese forests to government-licensed wholesalers in Japan (124, 271)? Did the Chinese *Tricholoma zangii* smell differently than the American Pacific

Northwestern *Tricholoma magnivelare* (231)? Or perhaps mine were simply not as ripe as Tsing's when they were picked?

I wondered how differently it would taste as well. I carefully followed a Japanese cooking tutorial on YouTube and prepared the matsutake the simple way: a pinch of salt, grilled with no butter or oil, finished with a squeeze of *sudachi* lime juice.

Not bad, I thought. It tasted like it smelled. I felt like I was eating the meat of a strange animal that had spent all of its life consorting with the ground.

Seeking out, preparing, and eating these pine mushrooms was much like reading Tsing's ethnography, *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins*; a grounding experience. For this A exam, I reflect on the similarities and differences between an ethnographic approach to investigating life, death, and possibility on a damaged planet, such as Tsing's, and a more theoretical approach found in other damaged planet literature that I have mapped out for this exam. The "damaged planet" concept comes from a 2014 conference and subsequent edited volume called *Arts of Living on A Damaged Planet: Ghosts and Monsters of the Anthropocene* (2017). Tsing, along with STS scholar Donna Haraway and over a dozen other scholars across the sciences and humanities contributed to this volume, which challenges readers to live (in) and think (with) the Anthropocene. [\[2\]](#) For this paper I refer to those who write about

the Anthropocene as damaged planet scholars: Historians Dipesh Chakrabarty (2009, 2021) and Jason Moore (2016), Haraway (2016), Tsing (2015, 2016), and the *Arts of Living* contributors (2017).

Tsing's *Mushroom* follows the commodity trails of one of the world's most expensive mushrooms, the matsutake, which is considered a delicacy in Japan. Tsing and her team meet a diverse group of characters, both human and not human, who are involved in the cultivation, procurement, transport, sale, and consumption of the matsutake. Using *Mushroom* as my guide for this exam paper, I argue that while the ethnographic and theoretical approaches to studying the Anthropocene share several themes about life, death, and entanglement in common, it is the *grounding* nature of ethnographic practice (methods and composition) that makes it more accessible and memorable to a wider audience of readers than its headier counterpart, which is what makes ethnography an important form of inquiry and storytelling for the Anthropocene; for the stories we tell about our relationship to the Earth shape how we live on and with it.

Mushroom is an exemplar for how to practice multispecies ethnography in an age of mass extinction. Tsing employs compelling, richly detailed storytelling that helps guide humans towards multispecies collaborative survival amidst capitalist ruins. She grounds theory about a damaged planet by weaving ideas about capitalism, encounters, and entanglement into the fabric of her stories.

And when it comes to ethnographic practice, I have found the literatures on sensing and care to be useful to think with alongside *Mushroom*.

Sensory scholars like the anthropologists Tim Ingold (2011), François Laplantine (2015), and David Le Breton (2017) focus on the myriad ways that subjects sense and therefore make sense of their environments. A subject's sensibility is a physio-social world co-constituted by biology, environment, and society. Sensing literature thus attends to the fluctuating and multiple states of the bodily subject and its sociality, and its changing connections with others in the world. Vinciane Despret (2004), Aryn Martin, Natasha Myers, and Ana Viseu (2015), and Maria Puig de la Bellacasa (2011, 2012), whom I call the care scholars, push the sensing scholarship a step further by insisting that it is essential not only to attend to the subjectivities of both the self and the other in order to understanding the world, but to commit to respecting and nurturing the relationships between the self and the other for collective wellbeing. So when Tsing and her colleagues explore capitalist fungal worlds, they use their senses (by opening themselves up to experiencing human and beyond-human others and the spatial and temporal landscapes they inhabit) to get to know and care for (by affectively connecting with, consciously growing attachments, and committing to supporting and sustaining) those worlds of multispecies relations.

Similar to the damaged planet literature, however, these sensing and caring literatures (as I have carved them out for my exam) are more theoretical

in nature. These literatures make the acts of sensing and caring their objects of philosophical analysis. In contrast, Tsing's object, the mushroom, is tangible. It is through her encounter and analysis of the mushroom that other theoretical themes emerge. The acts of sensing and caring are crucial to her ethnographic work as methods of discovery and encounter; yet she does not make these acts the main focus of her analysis. She is faithful to the matsutake and wide cast of multispecies characters that are connected to it. She uses sensing and caring as part of her practice.

For this paper I focus on how the damaged planet literature speaks to Tsing's theoretical discussions, how the sensing literature speaks to her methods, and how her ethnography speaks back to both. I had hoped to include the care literature in this discussion as well, but do to spatial and temporal constraints I will have to explore the act of caring for a damaged planet in a different paper. Perhaps in a future dissertation chapter. Suffice to say for now that if scholars of the Anthropocene want to do more than describe the causes, conditions, and trajectories of our damaged planet, they will need to commit to caring for the multispecies, multiscalar relationships that they examine. I also reflect on lessons I learned about practicing ethnography as part of the art and science of noticing complex webs of eco-social relationships that inhabit the Anthropocene. I conclude with an answer to Tsing's call at the (anti-) end of *Mushroom* to "think through mushrooms" and imagine "intellectual life as a

peasant woodland, a source of many useful products emerging in unintentional design” (286).

Theory

The damaged planet scholars all agree that the planetary state of affairs is in crisis, and certain forms of human organization and activity are more to blame than others. The authors discuss the big drivers to different degrees: racism, sexism, colonization, capitalism, industrialization. They also discuss the philosophies that support these drivers—the predominately white Christian beliefs about the “proper” place of human beings amongst the rest of life on Earth. Theories about these drivers and underlying ideologies make up the stories of the Anthropocene that the damaged planet scholars tell. But if anyone cares about finding alternatives to the doom that the Anthropocene portends, then they should pay attention to scholarship that takes these important theoretical discussions, embeds them into the quotidian experiences of life, death, and meaning-making in precarious times, and thereby makes them more likely to inspire action across wider audiences. For this purpose, Tsing’s ethnography is a useful example.

In 2016, in the article *Earth Stalked By Man*, Tsing suggested that anthropologists may play an important research role in the Anthropocene if they could engage with the “human and not human” world, “in both its entangled livability and the new forms of death that have come to plague us” (13). This is

not to say that other social scientists and humanities scholars cannot also play important roles; just that the roles differ. All scholars tell stories. But their cast of characters, settings, and plot devices differ. The unfolding of stories, their narrative flow, the genre, all differ. This matters because different readers gravitate towards different genres, and lessons stand out differently to those readers depending on the kind of storytelling employed.

Take the work of the damaged planet scholars. In *Earth Stalked by Man*, Tsing is speaking to other anthropologists and their kin, reflecting on fellow anthropologist Marilyn Strathern's ideas about ambivalence and incommensurability and what they can offer to the unravelling of the "Man/Nature" notion of human dominance over the rest of creation (5). Chakrabarty (2009) specifically address other historians and humanities scholars, challenging them to reconsider what it means to do history in the Anthropocene when "natural" history and human history collide. And when Moore writes that he notices a "flowering of an ontological imagination beyond Cartesian dualism," who do we imagine is doing the imagining, using such terminology (11)?

In *Mushroom*, Tsing builds on the conversations of Moore and his colleagues in the *Anthropocene or Capitalocene?* anthology, but does so at a different register. Both works deal with the history of capitalism as a force of simultaneous disruption, destruction, and creativity. Moore calls capitalism a form of "human organization." Along with empires and world markets, these

human organizations consist of environment-making processes and projects, while “in turn the web of life shapes human organization[s]” (79). These organizations are “*more-than-human* and *less-than-social* [emphasis added]” (5). In *Mushroom*, Tsing picks up similar threads as Moore while further decentering the human. She writes about unintentional design, the “overlapping world-making activities of many agents, human and not human” that shape ecologies. “Indeed,” she writes, “one could say that pines, matsutake, and humans all cultivate each other unintentionally. They make each other’s world-making projects possible.” The resulting worlds are landscapes (such as the matsutake forests her team investigates in Japan, China, and the United States) that are “sites for more-than-human-dramas...patches [that] emerge from disturbance. Thus precarity is enacted in *more-than-human sociality* [emphasis added]” (152).

Unlike Moore, however, Tsing attends to the drama of capitalist world-making. She tells the tale, for example, of how Paula, a Lao picker in Oregon, berated the police after they caught her and her husband picking mushrooms ten days before the US Forest Service opened the season:

Paula is cute and looks like a child; she can get away with more sass than others. Still, I was surprised at the chutzpah she claimed. She said she dared the police to interfere with her activities. They asked her where she found the mushrooms. ‘Under green trees.’ Where were these green tress? ‘All trees are green trees,’ she insisted (93).

The nematode’s story is even more action-packed. Tsing follows a species of nematode partially responsible for the sharp decrease in matsutake in Japan

and the country's subsequent need to import the mushroom from China or the United States. Originally from American forests, the nematodes entered Japan's Nagasaki harbor on American pine timber in the early twentieth century when Japan was industrializing. The Asian pines were unprepared for this invasive species, and Japanese matsutake forests began to die out. But rather than end this piece of natural history on that note, Tsing invites readers to understand the world from the nematode's perspective:

‘Call me *Bursaphelenchus xylophilus*. I’m a tiny, wormlike creature, a nematode, and I spend most of my time crunching the insides of pine trees. But my kin are as well-traveled as any whaler sailing the seven seas. Stick with me, and I’ll tell you about some curious voyages’.... Just as whalers catch whales, pine wilt nematodes catch pines and kill them and their fungal companions. Still, nematodes were not always involved in this way of making a living. Just as for whalers and whales, nematodes become killers of pines only through the contingencies of circumstance and history (156-157).

Tsing unfolds the drama among the pickers and the police, the nematodes and the pines. They are a part of forest landscapes, assemblages of actors in a certain space and time. Tsing's aim is to tell the adventures of such lively landscapes vis-à-vis assemblages, because “if we want to know what makes places livable we should be studying polyphonic assemblages, gatherings of ways of being” (157). All actors in the landscape, human and beyond human, living and not living, have a role to play in Anthropocene dramas. These kinds of beyond-human stories animate Moore's claim that history is “humanity inside nature,

and nature inside humanity” rather than mythical Humanity separate from Nature (79).

Whereas the other damaged planet scholars on my exam reading list offer a breadth of broad-sweeping ideas such as cheap nature (Moore), sympoiesis and symbiogenesis (Haraway), and negative universal history (Chakrabarty), Tsing’s ethnography offers depth and situatedness by following a mushroom. Her ideas about assemblages, alienation, and disturbance are always tied back to the matsutake and its kin. Her sustained focus on the tangible fungal forests helps bring to life and make memorable the intangible notions of contaminated diversity and indeterminate encounter (37). My other authors support their arguments with a sampler of case studies, discourse analysis, and historiography. Tsing does this too, but always with the mushroom as her guide, grounding her to the particulars so that she may travel between the general and the specific.

Contrast *Mushroom* to Haraway’s *Staying with the Trouble: Making Kin in the Chthulucene*. Haraway’s ideas about multispecies kin through sympoiesis or “making-with” and “worlding-with” are accompanied by many disparate, far-flung actors and places (58). Systems for “sympoietic, multiplayer, multispecies thinking and action” include the Great Barrier Reef, a video game simulation of the Inupiat indigenous lands in Alaska, and the Republic of Madagascar (71). Then there’s a story about Haraway’s geriatric dog, Cayenne, and the multispecies relations involved in caring for Cayenne’s urinary leakage problem.

The cast of characters include “an aging California dog, pregnant mares on the western Canadian prairies, human women who came to be known as DES [diethylstilbesterol estrogen] daughters, lots of menopausal US women, and assorted other players,” including of course, urine. Like *Mushroom*, the story is indeed dramatic. It’s also meant to “help open passages for a praxis of care and response...in ongoing multispecies worlding on a wounded terra” (105). Yet it is one of many, many stories ever-so-loosely connected by theme of worlding. The book even ends in a completely fictional world of Haraway’s making, “The Camille Stories.” The reader follows five generations of Camilles, human-critter symbionts part human and part monarch butterfly, from 2025 through 2425. During this period the human population rises from 8 to 10 billion, only to crash at 2 billion. Meanwhile the symbiont community of human-animal hybrids grows from five children in the fracked mountains of West Virginia to 1 billion. Part sci-fi novella, part literature review, and part eco-feminist critique, *Staying with the Trouble* is much like the collage art that decorates the book’s cover. It is intentionally heterogenous and far-flung, taking a little bit of this and a little bit of that and reconfiguring it into something dizzying and deliciously monstrous.

[\[3\]](#)

Mushroom is different. If you asked me what *Staying with the Trouble* is about, I might say it’s about many different kinds of monsters making kin with each other for a more livable world. Then I might struggle to recall all the different monsters involved (*there’s a spider, I think, and an octopus, and a cyborg, and a*

protist and a...). Yet I can say with confidence that *Mushroom* is about a mushroom. A mushroom making kin for a more livable world. Tsing even describes the structure of her book using fungal simile:

Following a mushroom...what follows is a riot of short chapters. I wanted them to be like the flushes of mushrooms that come up after a rain: an over-the-top bounty; a temptation to explore; an always too many. The chapters build an open-ended assemblage, not a logical machine; they gesture to the so-much-more out there. They tangle with and interrupt each other—mimicking the patchiness of the world I am trying to describe (viii).

This is not to say that depth is better than breadth or vice versa. In fact, I would argue that Tsing's description of *Mushroom* as an open-ended assemblage that gestures to the "so-much-more out there" also applies Haraway's *Staying with the Trouble*. Yet how they assemble and gesture is different, and so they accomplish different things. The detail and depth of ethnography helps makes stories and their lessons memorable because of the recursive nature of revisiting the same object—like a mushroom—from different angles and affects, moments and perspectives. And those interested in turning the destructive tides of the Anthropocene could use memorable stories and lessons that stick. Memorable is the first step to inspiring and catalyzing.

I have attempted to show in this section how Tsing's ethnography of life and death among capitalist ruins effectively blends theory about the Anthropocene into ethnographic practice, developing theory through sensuous and accessible writing about everyday planetary inhabitants. In the next section,

I put down the damage planet scholarship in order to pick up the sensing literature and compare how theories about sensing play into Tsing's ethnographic practice.

Practice

Since the highly prized matsutake grows best in damaged and disturbed environments, *Mushroom* takes readers on a global adventure of both ruin and refinement. It also shares with readers a smorgasbord of sensory delights that make this book a true exemplar of how sensuous a piece of ethnographic writing can be; it demonstrates the potential for such works to fruitfully contribute to anthropology in/of the Anthropocene. I opened this paper with a story about eating my first matsutake to signal the importance of tuning into one's sensory experiences of the world, not only for crafting ethnography, but for "making-with" and "worlding-with" multispecies kin, as Haraway has suggested. The sensory scholars Laplantine, Ingold, and Le Breton have theorized about the physiological and philosophical aspects of sensing beings and the worlds they take in and simultaneously shape. They also offer guidance for a more sensuous way of knowledge-making and world-living. Tsing's ethnographic methods and narrative quality embody the ideas about sensing that these scholars explore by thinking through and with the earthy matsutake and its world.

In *Life of the Senses: Essays on Movement, Knowledge and Description*, Laplantine discusses the ways in which anthropologists can move beyond the

mind/body dichotomy by thinking *with* the body, or living *through* the senses. He critiques the Cartesian separation of mind and body that still haunts much of the social sciences today and calls for a “politics of the senses” in which thinking and feeling are not considered as separate modalities (30). He introduces readers to the notion of “rationalocentrism,” which describes the Western tradition of creating logical categories and hierarchies of knowing the world. Different states, or modalities, are categorized as belonging either to the intelligible (the mind) or the sensible (the body). Intellect is logical, rational, objective, and of the mind. Sensing is emotional, uncontrollable, irrational, of the body, and therefore inferior to the intellect. He writes frustratedly, “Why, finally, must an argument for objectivity against subjectivity or on the contrary subjectivity against objectivity always be made?” (30). Enlightenment and modern science favor the objective mind and relegates the subjective body to the arts and humanities.

As if hearing Laplantine’s frustration, Tsing argues that the art of noticing she employs in *Mushroom* is, indeed, also a science. She writes, “To listen to and tell a rush of stories is a *method*. Any why not make the strong claim and call it a science, an addition to knowledge?...To learn anything we must revitalize arts of noticing and include ethnography and natural history” (37). She also writes, “Twentieth-century scholarship...conspired against our ability to notice the divergent, layered, and conjoined projects that make up worlds” (22). For Tsing, the art (and science) of noticing means “watching the interplay of temporal

rhythms and scales in the divergent lifeways that gather” in what she refers to as the “assemblage,” that is, open-ended gatherings that are unpredictable, unstable, and yet “defined by the strength of what they gather” (22-23, 43). ^[4] Through her prose, the reader notices “drawers and drawers of folded envelopes, each guarding a dried fungus” in a botanical garden storeroom (229); the busy traffic of Yunnan peasant forests, quite young yet “badly scarred,” full of goats eating pine saplings, and people collecting firewood, medicinal plants, and pig food (269-270); and the fantasies of matsutake aficionados in Japan who dream of gorging on the delicacy despite (or because of) the mushroom’s “cardinal rule” stating that the mushroom must be shared with others (“to stuff oneself with an endless pile would be so thoroughly and deliciously bad”) (125).

Tsing’s attention to assemblages, as well as her critique of more “traditional” forms of social scientific inquiry, remind me of Ingold’s notions of anthropology (and life) as a kind of “wayfaring,” or moving along a web of lifelines connecting all beings, human and not human. Though *Being Alive* is a philosophical treatise on sensory anthropology, and as such a different genre from *Mushroom*, the connections are striking. He writes:

But if my kind of anthropology is actually philosophy, then it is a philosophy that has been pitched out of its traditional academic turrets and forced to do its thinking both in and with the very world of which it writes....Why do we [scholars] acknowledge only our textual sources but not the ground we walk, the ever-changing skies, mountains and rivers, rocks and trees, the houses we inhabit and the tools we use, not to mention the innumerable companions,

both non-human animals and fellow humans, with which and with whom we share our lives (xi-xii)?

Existence thus unfolds along these paths on the ground, in the skies, rocks, and trees; and “where inhabitants meet, trails are entwined, [and] as the life of each becomes bound up with the other every entwining is a knot, and the more that lifelines are entwined, the greater the density of the knot” (149). Tsing uses similar language when she describes assemblages:

I need to see *lifeways*—and non-living ways of being as well—coming together.... Foraging for mushrooms is a way of life—but not a common characteristic of all humans. The issue is the same for other species. Pines find mushrooms to help them use human-made open spaces. Assemblages don’t just gather *lifeways*; they make them [emphasis added] (2015, 23).

Ingold’s idea of being alive also serves as a metaphor for the way knowledge is treated and produced in contemporary society. He writes that the natural sciences (among other Western scholarly disciplines) treat the world as a static set of objects to be examined and catalogued, rather than a lively constellation of moving parts in flux. Ingold calls for academic disciplines to “reanimate” the world they study (68). To reanimate is to acknowledge the dynamism in all matter and concepts, and not flatten in them for “objective” scientific pursuit. This requires viewing the life-world not as a set of discrete objects but as a series of relationships between beings. *Mushroom* is teeming with life, even in the rocks. In describing Oregon’s easter Cascades, she notes:

The landscape has not made forest management easy.... A volcanic eruption some 7,500 years ago covered the region with lava, ash, and pumice.... If there was organic soil there before, it was buried. There are still blocks of lava and pumice bed where almost nothing grows. That pines grow at all on this unfriendly ground seems a miracle—and one for which matsutake can claim some credit (194).

Without being beholden to the other, Tsing's lifeways and Ingold's lifelines are quite compatible, indeed.

In *Sensing the World: An Anthropology of the Senses*, Le Breton reminds us that the way we move along lifeways and lifelines is through our senses. Like Laplantine, he argues that sensing is a form of thinking. Reality becomes social, cultural, and personal by making meaning through one's sensory experiences. Reality thus reveals itself to us as an endless possibility of meanings and flavors" (12). He also critiques the Western hierarchies of sensing, in which vision reigns and smell is mistrusted. Yet no sense operates in a vacuum. Le Breton reminds readers that sensing modalities overlap and complement each other.

This overlap is perhaps most clear in smelling and tasting. The matsutake's musky smell is just as valuable—if not more so—than its flavor. In her interlude "Smelling," Tsing shares the story of a vegetable shop owner in Kyoto who carries expensive matsutake. Most people just visit to take a whiff of them, not to buy. But he sells them for the sheer pleasure the scent brings people. Its a nostalgic scent, reminiscent of simpler times in the autumn countryside visiting grandparents and chasing dragonflies (2015, 48).

Tsing's chapter on smelling is not only an example of careful attention to the sensory world; it also demonstrates how central the act of smelling is to her understanding of assemblages in general, and matsutake assemblages in particular. Smell is ineffable, indeterminate, yet present. These are key features of assemblages as well (43). The "Smelling" interlude opens with three photographs of a chef, his prized matsutake, and a poetic caption: "Smell is the presence of another in ourselves" (46). Tsing argues that smells act as the intermediary between things just about to be encountered. "Something is coming," says the smell. What that thing actually is remains indeterminant, remains a range of possibilities for the smeller, who draws on their memories to place the smell as best they can. Once smelled, it gets stored in the memory back, and tied to the emotional state in which the smeller smelled the smell. A history of encounters is created, shaping future indeterminate encounters.

But the connection between smell and affect can change over time. Remember how the first time Tsing cooked with matsutake, she hated the smell so much she couldn't eat it any of her stir-fry. But the more she got to know the mushroom—and all the other human and beyond-human beings who obsessed over it—the smell transformed, and she could no longer remember what it was about the smell that bothered her. I imagine now whenever Tsing smells matsutake, she is transported to all those years of fieldwork spent on olfactory matsutake's trail. For Tsing, smells are a great way of signaling a particular "nature-culture knot" or "affect-laden knot" of experience between smeller and

environment (52). This description reminds me of Ingold's lifeline "knots," discussed earlier, but with the added sensory component necessary for traveling along those lines and knots in the web of life.

Lifelines appear in a second sensory interlude in *Mushroom* called "[Dancing](#)." Here, Tsing reflects on how mushroom foragers know the forest through a kind of dance along "lines of life...pursued through senses, movement, and orientations. The dance is a form of forest knowledge (241). Ting, too, has to use all her senses to find matsutake. "Sometimes I pick up the pungent aroma before I find any mushrooms," she writes. "Then my other senses are alert." She gets down on the ground to feel for traces of movement made by matsutake. "I think of sensing a heave, an effect like the inhalation of breath in the chest...Mushrooms do not breathe like that—and yet this recognition of common life forms the basis of the dance" (242).

Tsing expands upon the idea of sensing lifelines by describing a botanical dance on the forest floor. Foragers look for the "candy cane plant," a species that feeds off sugars from matsutake living below ground. The plants' stalks are striped like a candy cane, making them good markers for the presence of matsutake. After sharing this example, Tsing reflects on how lifelines are entangled:

Candy cane and matsutake; matsutake and its host trees; host trees and herbs, mosses, insects, soil bacteria and forest animals; heaving bumps and mushroom pickers. Matsutake pickers are alert to life lines in the forest; searching with all the senses creates this

alertness...searching brings us to the liveliness of beings' experiences as subjects rather than objects (243).

As the sensory scholars theorize, and as Tsing exemplifies through her methods of noticing, living through the senses means applying a sensible thinking; the kind of thinking that accepts that experience is always embodied, multiple, and in flux, eluding static categories. Rather, experience is understood as moving through different rhythms or modalities. Practicing ethnography thus means drawing from the multiple states of the body in its physical and social context to understand how our own bodies think and feel with others in order to create livable worlds.

The art-science of noticing a damaged planet

In the fall of my second year as a doctoral student, I took a course run by Cornell's Anthropology Department called "Ethnographic Field Methods." My motivation for taking the course was simple: I had just returned from my first summer as a self-ascribed "anthropologist-in-training," doing exploratory fieldwork of sites of nuclear disasters in Japan, and wanted to process my experience with a trained anthropologist and others who were interested in learning ethnographic methods.

By the end of the course, I had learned that ethnographic research is malleable in its definition and flexible in its practice. Some of the more memorable ways that classmates came to think about ethnography were:

participant observation and interviews (the “traditional” approach as described in the methods sections of our grant proposals); deep hanging out (a quick-and-dirty colloquial definition that we could tell our friends and family when they invariably asked what it was we “really” did as “aspiring anthropologists”); a hermeneutic circle of understanding culture (in which we are constantly having, noting, and returning to small moments in our fieldwork and tying them into the “bigger picture” over time and experience); and an iterative, discursive, and narrative process by which people interact, interpret, and create a specific cultural world.

What I did not yet realize during that course is how historical and scientific methods can be woven into ethnographic methods to create even richer stories. Tsing’s “art of noticing” as depicted in *Mushroom* accomplishes just that. Tsing articulates her methods in the following passage:

Telling stories of landscape requires getting to know the inhabitants of the landscape, human and not human. This is not easy, and it makes sense to me to use all the learning practices I can think of, including our combined forms of mindfulness, myths and tales, livelihood practices, archives, scientific reports, and experiments..... I offer stories built through layered and disparate practices of knowing and being. If the components clash with each other, this only enlarges what such stories can do. At the heart of the practices I am advocating are the arts of ethnography and natural history.... We need to know the histories humans have made in these places *and* the histories of nonhuman participants (159-160).

On the arts of ethnography: Ingold has argued that theory and method come together in craft. This is the opposite of the idea of the “social theorist” who is “sunk in his armchair” interrogating the works of others, and of the “lowly ‘ethnographic researcher’” who collects data from interviews of “a selected sample of informants” (240). Ingold insists that there is “no room for either in anthropology” (241). Instead, anthropologists “do their thinking, talking, and writing in and with the world” (242). Ethnography, therefore, is not method, he argues, but part of the craft of anthropology, a practice of verbal description of being with the world and its human and beyond-human inhabitants (243). I find Ingold’s explanation of ethnography useful for thinking with Tsing’s quote about practices. Notice how she did not advocate for the art of *anthropology* and natural history, but rather the art of *ethnography*. This is an important distinction because it is through the ethnography—the carefully crafted and curated prose—that captivates readers enough to care about the world inscribed within its pages. And if the ethnographic tale gets readers to care enough about the world, then perhaps they will be inspired to contribute to the wellbeing of that world. I believe Tsing has achieved such an ethnography.

On the arts of history: The blending of human history into natural history that Tsing both advocates for and practices is precisely the kind of history Chakrabarty has argued for as scholars confront the Anthropocene. He argues that until recently, humanist historians have contemplated history at the scale of the globe, which is human-centered. Yet human-driven climate change is a

historical process unfolding at the scale of Earth's system, the planet. The planetary scale decenters the human. If the causes and consequences of climate change cannot be understood solely at the global level, then historians are required to "think about how various forms of life, our own and others' may be caught up in historical process that bring together the globe and the planet" (2021, 4). No longer can human history be taken outside of the context of natural history. Yet Tsing's art of noticing goes above and beyond Chakrabarty's call to integrate global and planetary histories. She insists on employing as many methods of storytelling as are needed to depict the rich worlds that are in danger of collapsing in the Anthropocene.

It's funny that Tsing refers to her practice as the "art" of noticing, when really it sounds like the "art and science" of noticing. She said it herself earlier; why not call the act of listing and telling a rush of stories a science (37)? I imagine she has some colleagues in anthropology who regard science with suspicion. And rightly so, as the philosophies, practices, and products of science have historically contributed to the deadening of the world that Ingold contends with in *Being Alive*. Says Tsing, "To mix scientific and vernacular forms of evidence invites accusations of bowing down to science. Yet this assumes a monolithic science that digests all practices into a single agenda." Perhaps Tsing ultimately chose to call her "hodgepodge" of methods the "art" of noticing to appeal more to her cultural anthropologist colleagues (159). But as a science studies scholar, I have no problem referring to it as the art *and* science of noticing.

Tsing has something to say not just to her fellow cultural anthropologists, but to science studies scholars as well. In reflecting on the challenges of telling the stories of landscapes, she critiques the intellectual apparatus that separates the arts from the sciences:

[There is a] wall we have built between concepts and stories. We can see this, for example, in the gap between environmental history and science studies. Science studies scholars, unpracticed in reading concepts through stories, don't bother with environmental history.... Such refusals impoverish science studies, encouraging the play of concepts in a reified space. Distilling general principles, theorists expect that others will fill in the particulars—but “filling in” is never so simple (159).

I have to admit that my reading list for this A exam has favored the concepts at the expense of the stories (though I do have a handful of social and environmental histories and ethnographies that follow nuclear things). ^[5] But the truth is I love stories. And I am not one of those STS scholars who ignores environmental history. If anything, I am more unfamiliar with the “history” part of environmental history. ^[6] Before finding the field of STS, I lived in the intellectual spaces occupied by environmental studies, an interdisciplinary field unafraid to blend art and science. ^[7] I plan to take this sensibility with me as I dive into my own science studies research. Like the matsutake, Tsing's art and science of noticing serves as a good guide.

Finally, I want to mention the collaborative nature of “the mushroom book.” In the brief smell interlude that I discussed earlier—and indeed all

throughout the work—Tsing weaves together poets, scientists, pickers, salespeople, cooks, ancestors, grandparents, friends, mushrooms, trees, elk, slugs, dragonflies, and soil. The photographs and illustrations that punctuate the text document the collaborations between Tsing, the Matsutake Worlds Research Group and affiliates, and the beings who opened up their world to them. The book itself is part of a larger project that includes volumes written by other team members, a documentary film, essays, articles, and a website.

Tsing's ethnography is collaborative and experimental in form and content. It is a testament to the art and science of noticing, *together*. Tsing argues that staying alive for all species requires liable collaborations; without it we all die (28). Collaboration is a way of caring for all the beings wrapped up in the narrative. As I transition from doctoral student to candidate, poised to create ethnography myself, I strive to practice the art and science of noticing that Tsing and her colleagues have laid out. An ethnography like *Mushroom* combines theory with description, and art with science. Through creative and attentive prose, such an ethnography can draw readers into both the stories on the ground and the meanings that arise from them. It's the kind of ethnography can move its readers to care about and for the lifelines and assemblages of all beings on a damaged planet. It is ethnography of and for the Anthropocene.

Conclusion: Foraging for Mushroom Clouds

Like *Mushroom at the End of the World*, this A exam journey into the history, anthropology, philosophy, and communication of science and technology is pushing me to grow as a scholar. And I still have much growing to do. It is important for me to pay attention to method, to practice. As exciting as it is to find a bright, shiny idea that connects me to the collective human and beyond-human experience of the world, these ideas do not live in vacuums. (I would be a terrible science studies scholar if I believed this to be the case!) As Rebecca stated in this year's Student Progress Review, focusing on disciplinary methods (especially those in anthropology and history) will push me to think more systematically and rigorously about the social, cultural, and historical context of the ideas that call out to me. By continuing to engage with specific disciplinary practices, I will further develop this scholarly rigor and grounding.

Yes. Many times, yes.

And.

The science and *art* of noticing beckons me. Inspired by Tsing's *Mushroom* and contributors to the *Arts of Living on a Damaged Planet* anthology, I am compelled to dedicate at least a few pages of my A exam writings to artistic expression. Whether through ethnography or poetry or some other narrative form, creative writing opens us up to possibilities. It is a generous medium for a

wide range of characters to come and go, sharing secrets and stories and changing their own and others' lifelines along the way.

For Tsing and the Matsutake Worlds Research Group, mushrooms serve as guides for understanding the post-WWII period as it is enveloped in the Anthropocene; a period when the logics of progress and domination of nature—and the devaluation of human and beyond-human life at the expense of a nation's progress—threaten the Earth. Mushrooms are also guides for how to move forward in non-teleological ways. “On the one hand,” notes Tsing, “no place in the world is untouched by that global political economy built from the postwar development apparatus. On the other, even as the promises of development still beckon, we seem to have lost the means...We might look around to notice this strange new world, and we might stretch our imaginations to grasp its contours. This is where mushrooms help” (3). Following Tsing's suggesting, I stretch my imagination in order to explore the subject of my dissertation research: life and death on a planet damaged by nuclear technologies.

So I end this A exam on an artistic note, with a narrative experiment inspired by mushrooms inside of mushrooms inside of mushrooms. I'd like to imagine four scholars of feminist technoscience having a conversation under a tree. Their work has been influential to my thinking about how to approach Fukushima as (to borrow Rachel's phrasing for my exam question) an “extraordinarily complex socio-technical-natural phenomenon.” Here's how the conversation goes:

Foraging for Mushroom Clouds: An Exchange Among Four Scholars

I imagine them sitting under a western sycamore tree one sunny day in May 2014. The air around the UC Santa Cruz campus is abuzz with stimulating chatter about what it means to do scholarship amidst great ecological precarity. The lively conversation between these four scholars feeds into the current that's running through the Anthropocene conference being held at the campus. [8] Longtime friends, the four have had much to catch up on with each other during lunchtime. In between bites of sandwiches and sips of iced tea, they also ponder together about their craft and the kinds of stories they tell. Casually passing by, I spot these women but am too shocked by their electricity to introduce myself. Instead, I perch myself nearby, half out of earshot. I catch only snippets. The sycamore catches it all.

Ursula K. Le Guin: Storytelling might pick up diverse things of meaning and value and gather them together, like a forager rather than a hunter waiting for the big kill (Tsing 2015, 287).

Karen Barad: The clocks were arrested in Hiroshima on August 6, 1945, at 8:15 A.M. (Loc 2567).

Anna Tsing: Grasping the atom was the culmination of human dreams of controlling nature. It was also the beginning to those dreams' undoing. The bomb at Hiroshima changed things. Suddenly we became aware that humans could destroy the livability of the planet—whether intentionally or otherwise. This awareness only increased as we learned about pollution, mass extinction, and climate change (3).

Karen: The heart of the atom was broken apart with a violence that made the earth and heavens quake. The distance between heaven and earth was...physically crossed out by a mushroom cloud (Tsing et al. 2017, Loc 2567).

Anna: When Hiroshima was destroyed by an atomic bomb in 1945, it is said, the first living thing to emerge from the blasted landscape was a matsutake mushroom.... The timing of the bomb in August would have corresponded to the beginning of the matsutake fruiting season. How radioactive those mushrooms were is a continuing mystery (2017; 3, 290).

Karen: It is not simply that there is a homology between terrestrial and atmospheric mushrooms; rather, there is *an uncanny material typology*: each inhabiting the other.... Tiny radioactive particles rain down from the sky,

radiotrophic mushrooms thriving in nuclear contaminated areas, wildlife thriving around the reactors in Chernobyl, mushrooms living inside reactors, Fukushima multiple reactors meltdowns, remediation by mushrooms....power plant failure and uninhabitable areas, mushrooms growing. And much more (Tsing et al. 2017, Loc 2009-2020).

Ursula: Go on, say I, wandering off towards the wild oats....You just go on telling how the mammoth fell on Bood and how Cain fell on Abel and how the bomb fell on Nagasaki and how the burning jelly fell on the villagers and how the missiles will fall on the Evil Empire, and all the other steps in the Ascent of Man.... Pity your fearful, foolish children, O Aphrodite of Fukushima (Tsing 2015, 287; Tsing et al. 2017, Loc 3379).

Donna Haraway: [laughs] Nuclear, after Fukushima (2016, 183)!

Octavia E. Butler: [* * *]

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[1] Thanks go to Rachel for making “the mushroom book” central to my exam question.

[2] For a more detailed discussion of the Anthropocene concept, see Rebecca’s A Exam paper, “From the products of the Atomic Age to the consequences of the Anthropocene: A Social and Intellectual History.”

[3] Essay versions of *Staying with the Trouble* and its monstrous beings also appear in both *Arts of Living on a Damaged Planet* and *Anthropocene or Capitalocene?* Like Haraway’s book, these anthologies offer more breadth than depth.

[4] Tsing draws on the art of noticing assemblages as method from the anthropological thinking of Strathern (1999) and Haraway (2003); the former for her ideas on how surprise interrupts common sense and allows for new ways of noticing, and the latter for how attention to divergence may actually reveal convergence.

[5] See: Brown (2015, 2019), Gusterson (1996, 2004), Hecht (2012), Kimura (2016) and Masco (2016).

[6] Thankfully, the folks in our STS department do not ignore environmental history. I’m grateful to our own Sara Pritchard for guiding me through my first college-level history class, which just so happened to be “Environmental History.” And never mind that it I had gotten through my undergraduate

education without taking a single history course. I guess I was too busy taking theater and Japanese classes instead.

[7] Thankfully, again, graduates affiliated with Cornell STS have been happy to blend science and art. See the forthcoming *Routledge Handbook of Art, Science & Technology Studies*, edited by Hannah Star Rogers, Megan K. Halpern, Dehlia Hannah, and Kathryn de Ridder-Vignone, of which I am a contributor.

[8] The “Anthropocene: Arts of Living on a Damaged Planet” conference was held May 8-10, 2014. Le Guin was the keynote speaker and Haraway was one of her discussants (along with anthropologist James Clifford).

CHAPTER 5

From Fujiyama Mamas to Fukushima Siblings: Natural Community Building via Conference Devising – A Conference Presentation



Asian Studies Development Program

A joint project of the East-West Center and the University of Hawai'i

Presents:

ASIA AND THE *ANTHROPOCENE*

**VISIONS OF BEING HUMAN IN A
MORE-THAN-HUMAN WORLD**

**March 3-5, 2022
Hilton San Diego Gaslamp Quarter**

From Fujiyama Mamas to Fukushima Siblings:

Natural community
building via
conference devising

Lisette Lorenz

PhD Candidate

Science and Technology
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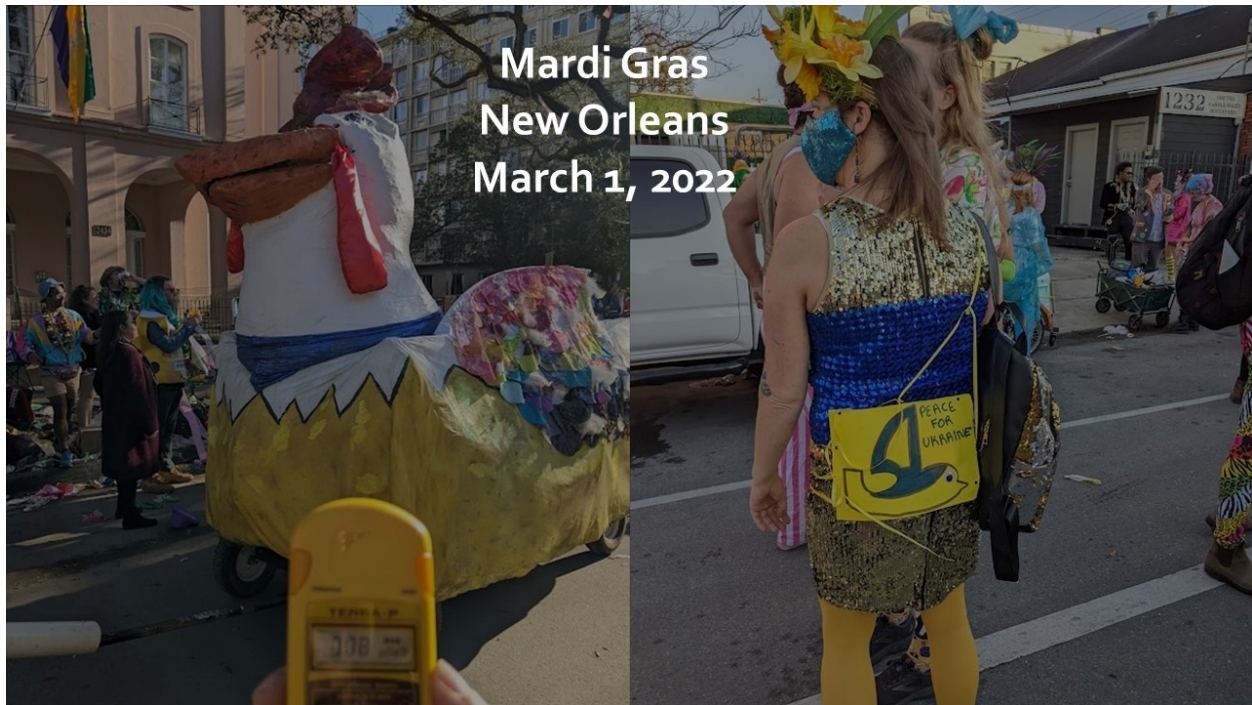


[Run of Show: Pass out papers and pens. 2 sheets of paper per person.]

1. Introduction to devising

Good afternoon, everyone! To start, I changed my presentation to better match this session's theme. Welcome to **From Fujiyama Mamas to Fukushima Siblings: Natural community building via conference devising!** We are going to be trying something a little different today. We are going to do some community devising. "Devising" is a fancy theater term for creating art together. And by creating art together, we will be creating collective knowledge as well. What I am offering here and now is a method of collective inquiry that will hopefully contribute to a better understanding of—and then inspire action towards—collectively surviving and thriving in the Anthropocene.

[Slide 2: Mardi Gras]



Because we are in it. The Anthropocene. Right now. As we speak. I know I'm preaching to choir here, but grant me the dramatic effect. We are caught in the Anthropocene's tumultuous throws. Recent fears of the start of World War III, of nuclear apocalypse—those old MacArthur era paranoias are back with a vengeance, spiked with COVID fever dreams. The 24-hour news cycle, now fueled by social media and which is covering the reignition of the Cold War, is reaching a fever pitch. And by the way, pitch is a sticky polymer that comes from petroleum, coal tar, or plants. It was used as the torture device known as the "shirt of flame" in the Persecution of Christians in the Roman Empire. That's how a Cold War revival reaches fever pitch, becoming a *tunica molesta* torture device for all who compulsively tune into the news these days.

But I digress. **[Pause]** The 20th century Cold War produced much more than paranoia. It also led to the discovery of planetary scale climate change. The social environment of US Cold War military priorities and activities, when combined with Americans' growing fears surrounding nuclear fallout in the

1950s and '60s, propelled climate science from the esoteric research plans of a few obscure scientists curious about the Ice Ages to a high-priority scientific agenda for the United States military. Included in the agenda was the nuclear winter project, which scientifically describes a scenario in which nuclear warfare would, in a matter of months, produce enough debris from firestorms to pollute the entire atmosphere, causing a global cooling effect and triggering mass species extinction. The speed of climate change from CO2 emissions is glacial compared to that of climate change from nuclear fallout.

And if a nuclear winter is just the quickest form of climate change, and if Vladimir Putin has just put his world-ending nuclear arsenal on high alert, and if Europeans are currently panic-buying iodine pills the way some of us once panic-bought toilet paper—then do the 1 million people currently fleeing Ukraine count as climate change refugees?

Welcome to the Anthropocene, folks. Time to devise some survival strategies together.

[Slide 3: Contents]

CONTENTS

1. Ceremony
2. Freewrite/draw #1
3. Devising
4. Freewrite #2
5. Conclusion
6. Discussion



2. Outline for today's devising

Here's how the devising will work. First I will begin the ceremony. I will pass out some items you can interact with throughout today's devising session. Then I will ask you to freewrite and/or draw for 3 minutes about what life on Earth is like for you today, right now, in this room, in this moment. No one will see this piece of work if you don't want to. Next, you will observe a performance. You will also be a part of the performance. Please don't be shy. At the end of the performance, you will freewrite again for 3 minutes. Write down any thoughts that the performance has brought to mind for you. At the end of the 3 minutes, you will anonymously submit your writing to me. I will collect this writing for future devising projects that I will facilitate with community members in Fukushima later this year (provided the border re-opens, of course). By submitting to me your written pre- and/or post- devising work, you are consenting to contribute to a new world-making endeavor for the Anthropocene by collaborating in a global community based research project. I will assure you once again, your identity will remain anonymous.

Let us begin the ceremony.

[Slide 4: Shinto prayer.]²¹

Shinto prayer for 73rd on Eve of Anniversary of Nagasaki Bombing

Nagasaki Peace Hill
August 8, 2018



3. Start the devising [5 min]

[Play Shinto prayer and take a measurement of the room. Pass out the photobook, and picture book of Fukushima and Geiger counter packaging boxes. Take a Geigy measurement of the room.]

²¹ Insert the soundscapes I used for the presentation somehow (wherever the slide has a little speaker symbol).

[Slide 5: Freewrite. Start 3 minute writing timer and collect papers after timer is up.]

Freewrite #1: **How's life on Earth for you right here, right now?**



Global hibakusha exhibit at Nagasaki Atomic Bomb Museum, 2018

Take your paper and pen. Label this paper “Freewrite #1” and begin writing/drawing about what life on Earth is like for you today, right now, in this room, in this moment. The 3 minutes starts now.

Thank you. Now it's show time.

[Pause. Slide 6: Showtime. Begin reading the environmental history.]



IT'S SHOWTIME

The 2011 earthquake, tsunami, and nuclear power accident in Fukushima, Japan, known internationally as 3/11, was a disaster of the Anthropocene. The Anthropocene is the scientifically proposed geological epoch in which we currently reside, a time which constitutes a “new” age of the Earth’s history marked by anthropogenically driven and globally scaled eco-social disruption. Some geologists have proposed that the Anthropocene began during the atomic age in the 1950s, when nuclear weapons testing scattered radionuclides around the earth’s surfaces. And yet the historical processes that contributed to the triple disaster in Fukushima, the triple disaster of the Anthropocene—these historical processes long predate the development of nuclear technologies whose radiological markers stand to mark the start of this new epoch at the 1950s. Others have argued for a much earlier start date, beginning as early as 50,000 years ago, when humans began driving large land animals to extinction through their hunting practices. The start of anthropogenic climate change would thus have begun not just with an increase CO₂ in the atmosphere, but with a decrease of species on *terra firma*. 50,000 years ago seems like an apt start date to me, since the systemic eroding of the two million + species of critters on Earth continues to this day, and may continue until the planet experiences its sixth mass extinction event.

And so with the Anthropocene comes the threat of an increased frequency of global-scale disasters; disasters that can no longer be distinguished as either “human,” such as war, or “natural,” such as hurricanes. 3/11, climate change, the COVID-19 pandemic, increased nuclear brinkmanship among the global superpowers, and the war between Russia and Ukraine that has recently captured everyone’s attention are chilling examples of what the Anthropocene has in store for life (and death) on Earth. It is therefore imperative that human reckon with what it means to share planet Earth if human societies hope to survive the next 100 years.

I want us to focus today’s reckoning on Fukushima. *Fuku*, meaning luck, and *shima*, meaning island. I will share a creative environmental history of this “lucky island,” the triple disaster, and its ties to other disasters of the Anthropocene. It is a history that reaches beyond the “lucky island’s” unfortunate connections to nuclear power to include how different migrations, exterminations, and empire creation projects over the millennia have contributed to the environmental injustices currently impacting vulnerable communities in Japan and around the world.

Fukushima is part of the Tohoku region of Japan, *tou* for east, *hoku* for north. It is part of an archipelago that began separating itself from the Eurasian supercontinent about 26 million years ago. This archipelago is attached to the Ring of Fire, a region of the Earth’s crust where tectonic plates scrape against each other, producing most of the world’s volcanos and earthquakes. The majestic Mount Fuji was born from the Ring of Fire, and remains active (though dormant) to this day. The earthquake and tsunami of 3/11 are thus part of a long history of large-scale disasters that have shaped the Japanese archipelago and its multi-species residents.

Speaking of Mount Fuji. Have you heard the 1955 song, “Fujiyama Mama”? It was written by the American musician Jack Hammer, the same guy who co-wrote “Great Balls of Fire”. It was not so popular in the United States, but the song became a #1 hit in Japan for several months in 1958. Here is a recording by the bands The Clash and Pearl Harbor covering the song during a Cold War concert in Tokyo in 1982. If the spirit calls you, feel free to dance along. [8:20]

[Slide 7: Fujiyama concert. Play the clip of the concert and dance and encourage the audience to dance, too.]

I've been to Nagasaki, Hiroshima too!

The same I did to them, baby, I can do to you!

'Cause I'm a Fujiyama Mama and I'm just about
to blow my top!



Fujiyama-yama, Fujiyama!
And when I start you up, there ain't nobody
gonna make me stop!

[Slide 8: It's Showtime again]

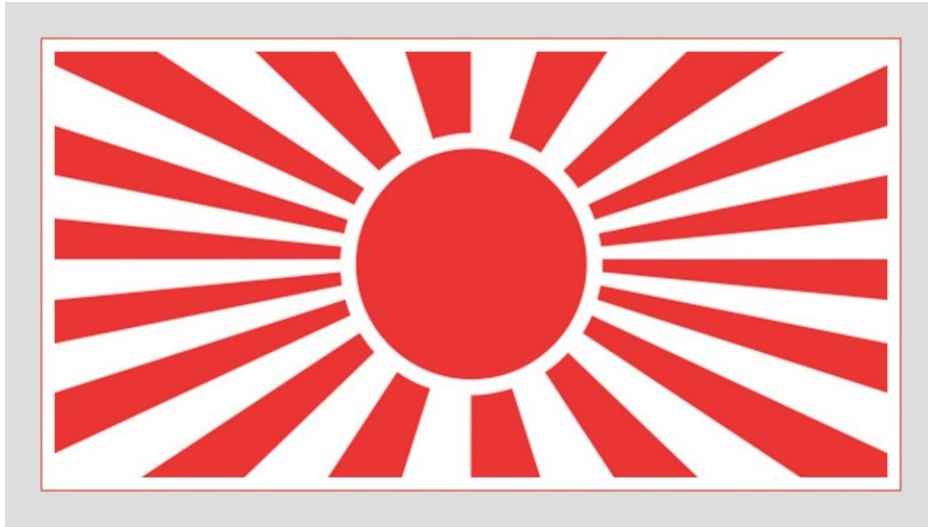


IT'S
SHOWTIME

[Presentation runtime: 11:00] Okay. Fast forward to 30,000 to 40,000 years ago, when humans are believed to have first arrived on the archipelago, possibly chasing animal migrations through land bridges that still connected the islands to Eurasia. Archeologists and historians have found evidence for two more ancient migrations to the archipelago: the second as farmers from China and Korea during the agrarian period 23,000 years ago, and the third as ancestors likely related to the Han Chinese during the state formation period, in the first millennium of our present Common Era. Fast forward even more, to 1,000 years ago, to the Medieval period in Japan, when one mega conglomerate of ethnic groups, the Yamato People, residents of the biggest island of the archipelago (who I call the “Big Peace People” according to their Chinese characters), began building their empire by unifying the archipelago, including Tohoku. The Yamato dispossessed, exterminated, and subjugated the other indigenous groups such as the Ainu, Emishi, and Koshibito peoples. Fukushima’s famous samurai history also enters history books during these feudal times. The 1,000 year-old Samurai horse-riding festival, *Nomaoi* still takes place every summer in Fukushima, for example, surviving 3/11 and the COVID-19 pandemic.

[Slide 9: Watch the Nomaoi YouTube video. Slide 10: Imperial Flag]





By the 1800s, the Yamato Empire, now synonymous with the nation of Japan, had succeeded in colonizing and conquering the other tribes and clans and nations across the Japanese archipelago, from the Ainu People in Hokkaido to the Ryukyu Kingdom in Okinawa, while keeping other Eastern and Western empires *mostly* at bay. Industrialization, modernization, and capitalism swept the nation during the mid to late 1800s thanks to the Meiji Restoration of military rule. Yet rather than modernize in the way of Tokyo or Yokohama to the south, Fukushima remained relegated to serving as the agricultural base for the Japanese empire, an empire which by 1942 had briefly and violently expanded to its zenith, with tentacles latched onto parts of Russia, China, Korea, Taiwan, Indonesia, the Philippines, and other parts of Southeastern Asia and the Pacific Islands. The Japanese government named its colonies the Greater East Asia Co-Prosperity Sphere, a euphemism for extermination, domination, and assimilation. *[Runtime: 12 min]*

By 1945, however, Japan's empire all but crumbled in the face of the nuclear power-backed United States of America. The mushroom clouds that bloomed over Hiroshima and Nagasaki irrevocably changed the course of Japanese, US, and world history by spreading its radiological mycelium around the planet. In the hopes of economic recovery after the devastation of World War II, and despite the particularly grotesque form of tragedy that nuclear weapons had wrought upon its own people, the Japanese government accepted nuclear power from its former wartime enemies, the US and the UK.

[Slide 11: Play Fujiyama Mama with lyrics. Slide 12: Family mart]

I've been to Nagasaki, Hiroshima too!

The same I did to them, baby, I can do to you!

'Cause I'm a Fujiyama Mama and I'm just about
to blow my top!



Fujiyama-yama, Fujiyama!
And when I start you up, there ain't nobody
gonna make me stop!



The Japanese government located the power plants away from its economic centers, placing them instead in the nation's languishing rural peripheries, such as in Fukushima. The forces of nuclear colonialism thus shifted from domination with nuclear bombs to domination with nuclear power plants.

The Tokyo Electric Power Company, or TEPCO, built the Fukushima power plants in the 1970s to help supply the metropolis with desperately-needed energy during the global oil crisis. Fukushima thus contributed to the Japanese economic miracle in Tokyo. By the 1990s, both the United States and Japan had the biggest economies in the world, fueled in part by nuclear technologies alongside fossil fuels. However, Fukushima's rural residents did not receive the same economic boons as their urban counterparts. While the nuclear power industry brought more wealth to Fukushima than agriculture could alone, uneven economic development between Japan's urban centers and its rural peripheries was already taking its toll on communities in Fukushima. More and more young people moved from rural areas to city centers, decreasing the region's population years before the earthquake, tsunami, and nuclear accident of 2011 violently slashed the population further. Thousands of years of Anthropocenic forces make 3/11 a triple-disaster in a different way—as imperialism, capitalism, and nuclear colonialism relegated Fukushima to an inferior position within the Japanese state. Exploring the *long durée* environmental history of 3/11 thus reveals how these three forces exposed

marginalized communities to unequally distributed environmental risks under the false guise of human progress.

The triple-triple-disasters of 3/11, along with the predicted increase in disasters during the Anthropocene, compel us to find alternatives to millennia of destruction. As demonstrated by the violence that came with imperialism, capitalism, and nuclear colonialism that set the stage for 3/11, the logics of domination and extraction, backed by both nuclear bombs and power plants, have destroyed livelihoods rather than built them up over the long term. The question of how to build sustainable livelihoods that do not rely on the risks of nuclear technologies has been taken up by the transnational anti-nuclear movement. However, this movement is often split between weapons and civilian energy production. An environmental history of Fukushima and 3/11 provides an alternative genealogy for both anti-nuclear weapons and energy movements, to help demonstrate how both weapons and energy plants are part of larger issues of environmental violence and injustice that have contributed to the development of the Anthropocene. Such a genealogy shows how the causes of the Anthropocene not only extend beyond the Atomic Age but helped create both time periods, as philosophies of extraction and exploitation underpin nuclear colonialist projects that connect Fukushima to other environmentally exploited populations in the Asian Pacific and the American Southwest. Such a history can help support coalition-building between anti-nuclear weapons and anti-nuclear power plant resistance groups to create a stronger anti-nuclear *power* movement, one that opposes the energetic activities involved in both civil and military nuclear technologies: the physical power released when certain humans split the atom, as well as the political power brandished by the nuclearized nation-states to which these humans belong, in order to pursue national interests like fueling economies and claiming control of resources at the expense of future generations of planetary viability for diverse human and beyond-human communities.

The COVID-19 disaster has kept me away from Fukushima for nearly two years. My goal as a researcher is to return to Japan as soon as I can, equipped with the tools I've developed in communion with beautiful people like you, tools developed through the act of community building and artistic devising. I strive to use these tools with communities, as well as artistic and scientific knowledge we produce in communion, to help unite people across the world; not just anti-nuclear weapons and anti-nuclear power groups, but also anti-racist, anti-colonial and anti-fascist groups, and all the ecological and social justice groups there are. *Homo Sapiens* are going to need as much help as we

can get if we are to shepherd ourselves and other species through these disastrous times.

[Slide 13: Final “thank you” slide with Geigy at Cornell’s bell tower. Play soundscape of nature sounds from Fukushima. Ask the audience to get up and breathe and shake it out]



4. Wrap up

Thank you for participating in world-building today. Now it's time to freewrite again for 5 minutes. Write any thoughts that today's devising session has brought to mind for you. I will collect everyone's papers at the end. Thanks again!

Sources [Author's note: Have to flesh these out!!!!]:

<https://www.smithsonianmag.com/smart-news/japanese-ancestors-came-from-three-ancient-groups-180978725/>

https://en.wikipedia.org/wiki/Yamato_people

https://en.wikipedia.org/wiki/Category:Tribes_of_ancient_Japan

Third Interlude

The Nuclear Pilgrimage: A Quantum Approach to Peace Culture in Japan's Post-Nuclear Disaster Zones

[The following is an abstract I submitted for [a workshop and edited volume](#) on "Quantum Approaches to Peace, Conflict, and Security" organized by the Ohio State University's Mershon Center for International Security Studies.]

Set in Hiroshima, Nagasaki, and Fukushima, Japan, this paper is based on over a decade of ethnographic research I have conducted in these places which began after the Fukushima nuclear accident in 2011. My research has focused on peace tourism activities in each site, and I have argued for a reframing of tourism as part of a larger "nuclear pilgrimage" in order to better capture the depth and significance of the experiences at post-nuclear disaster sites. This shift in perspective suggests a more profound engagement with the narratives and histories associated with these locations, moving beyond superficial tourism to a more meaningful exploration of peace culture and the impacts of nuclear technology on society. My previous theoretical framework for this research has been based on the work of peace scholars Daisaku Ikeda and Elise Boulding, among others. To do even deeper still, I now put these perspectives in conversation with Karen Barad's quantum-philosophical system of agential realism. As a key stream of thought in quantum social science research, agential realism's emphasis on intra-connectivity between all matter and meaning offers exciting new insights into how peace culture operates: not only between and among, but through all the actors—both human and nonhuman—that are irrevocably linked together by the nuclear pilgrimage. Challenging traditional views that see these pilgrimages as interactions between separate entities, I demonstrate how nuclear disaster zones are not passive backdrops but active participants in a web of intra-actions that co-constitute the identities and meanings of both the pilgrims and the sites themselves. By applying this quantum perspective, this paper reveals how these pilgrimages reconfigure the entangled relationships between human and non-human actors, memory and materiality, and past and future. This approach thus contributes to collective healing and transformation for more a more peaceable planet. The paper ultimately proposes that peace in these contexts is not a static goal but a continuously evolving process, deeply inter- and intra-twined with the complex, entangled realities of post-disaster landscapes.

CHAPTER 6

Nuclear Pilgrimages as Peace Culture for the Chthulucene

[Dear Reader: This chapter (much like this entire monstrous monograph) is hybrid, cyborg, chimera. Some sort of Frankensteinian—CHTHONIC—thing: bits and pieces of previous writings I composed before (and during) the (ongoing?) COVID-19 pandemic (see the source list below). Prior to COVID, I was slated to complete a straightforward dissertation: an ethnographic study of nuclear disasters in Japan. I was due to begin my year of multi-sited fieldwork in Hiroshima, Nagasaki, and Fukushima in the summer of 2020. Yet another disaster—the pandemic itself—had other plans for me and the rest of the planet (and how on brand for the Anthropocene, no?). From 2020 until 2022, while based in New Orleans, Louisiana, (no wonder media studies professor of the practice Jon McKenzie calls me a [disastronaut](#) later on in Chapter 7) I desperately waited for Japan’s borders to reopen. I was perhaps a bit too desperate, as I then proceeded to go clinically insane. (So it goes.) In true M.A.D. art-scientist fashion, I turned my madness into an experiment, and that experiment is now my post-(?????)COVID art-science dissertation. Unsure of what to do with all my previous nuclear-Japan-related writings, I had (mostly) left them out of the first draft of my dissertation (which, in case you are interested, was actually an entirely different-though-tightly-coupled dissertation called “ART-SCIENCE INTERVENTIONS FOR THE CHTHULUCENE: ACTION RESEARCH FOR ECOSOCIAL JUSTICE²²”). Now they live here, in Chapter 6 of this monstrous monograph. It’s also partly in Japanese, still. LOOOOLLZ.]

²² Yes, I wrote an entirely different (though, as I said, tightly coupled) dissertation before the one you currently (most likely metaphorically) hold in your hands. It got nixed (so it goes) so I wrote a second. (By the way, I really do encourage you to hold this second one in your hands, if you can somehow. I’d like for you to encounter it like you would those dissertations of yesteryear, those old-school oversized tomes forlornly collecting dust deep in the bowels of Uris Library. If touching tomes is of interest to you, hit me up. I’ll send you a physical copy of my diss. Anyway, here’s the abstract to my first: “My dissertation, entitled *Art-Science Interventions for the Chthulucene: Action Research for Ecosocial Justice*, presents five case studies to explore the following central question: **How can we Earthlings learn to peaceably transition from the Anthropocene to the Chthulucene?** My main thesis is as follows: I argue that in order **to transition from the Anthropocene to the Chthulucene, we need to engage in just worlding practices.** To support my thesis, I draw from examples of just worlding practices that are found in the transdisciplinary knowledge communities and spaces resulting from the convergence of three movements: the art-science movement, also known as art, science, and technology studies (ASTS), the action research movement, and the ecosocial justice movement. As an ecosocial justice activist, action researcher, and art-science practitioner, I have participated in these transdisciplinary knowledge communities and spaces for the last two

Sources

- Pre-dissertation project for Cornell S&TS Department ✓
- All my “nuclear pilgrimage” writings during my time as a Nippon Foundation Fellow at the Inter-University Center for Japanese Language Studies in Yokohama, Japan, summer 2019 - fall 2020 ✓
- What about the fact that the edited volume [*Toxic Immanence: Decolonizing Nuclear Legacies and Futures*](#) (2022, McGill-Queen’s University Press) is basically everything I had hoped my pre-COVID nuclear pilgrimage dissertation would be ? (Does that mean my job is done????)
- Anything else ?

Tourism and peace culture in Japan’s post-nuclear disaster zones

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decades. **The work I have developed, produced, and now selected as cases for analysis in my dissertation serve as examples of the kind of just worlding practices that have emerged from our collaborations.** These peer-reviewed cases, which I call **art-science interventions**, utilize a methodology found in ecosocial justice-oriented art-science that technofeminist scholar and environmental philosopher Donna Haraway has playfully identified as **speculative fabulation** (among other SFs, including yet certainly not limited to: science fiction, science fact, speculative feminisms, string figures, etc.). My cases are as follows: 1) a community-based play and reflection called *Rustbelt Theater*; 2) a speculative letter written to an imprisoned anti-nuclear activist on the anniversary of the Fukushima nuclear accident called *Salty Synchronicities*; 3) a staged literary encounter of nuclear apocalyptic narratives known as *We are All Monsters*; 4) a field/garden experiment I conducted during mental health awareness month in the United States which I named *Madness, Monsters, and Maypops*; and 5) a community-created zine about narrating the multispecies world called *Maybe the Mustard Will Save Us*. Through my cases studies, **I demonstrate how SF helps dismantle the unjust systems of oppression that have led to the crisis-state conditions currently found in the Anthropocene in order to herald more just worlds for all Earthlings.** I contend that the thriving of these worlds will indicate that planet Earth has successfully transitioned the Anthropocene to the Chthulucene.”

Pre-Dissertation Research Project
June 30, 2020

“Perhaps travel cannot prevent bigotry, but by demonstrating that all peoples laugh, cry, eat, worry and die, it can introduce the idea that if we try to understand each other, we may even become friends.”

- Maya Angelou

Wouldn't Take Nothing for My Journey Now

It is said that during WWII, Secretary of War Henry L. Stimson was so moved by the cultural richness he experienced on his pre-war trips to Kyoto that he refused to drop a nuclear bomb on the city. “I struck off the list of suggested targets the city of Kyoto. Although it was a target of considerable military importance, it had been the ancient capital of Japan and was a shrine of Japanese art and culture” (Sato, 2015). A poignant sentiment. Yet cultural appreciation only went so far during the ravages of war; history reminds us that while Kyoto may have been spared from nuclear devastation, Hiroshima and Nagasaki were not. There is still, however, something in this story that gives me hope. Perhaps a truly deep commitment on the part of human societies to foster and strengthen multi-cultural appreciation and diversity is one path towards the prevention of war and the building of peace.

My second-year project investigates the opportunities and limits of travel and tourism for peace building through the cultivation of what is known as “peace culture.” I focus on travel to conflict zones, specifically sites of nuclear disasters in Japan, they connect directly to past, present, and future issues of peace and conflict. From its inception, nuclear technology, both military and civil, promised to be at once a tool for incredible prosperity or incredible destruction. As demonstrated by the consequences of nuclear warfare during WWII; the struggles against nuclear proliferation during the Cold War; the current debate over an impending Second Cold War in an increasingly insecure international political climate; and worse still, growing anxieties over the biggest global crisis, climate change, triggering an active nuclear war[\[RS1\]](#) ; traveling to post-nuclear disaster sites may offer human societies crucial lessons about how to co-exist with not only each other, but with the rest of the non-human world which supports them.

Japan is a top travel destination. Ranked the fourth most-visited country in 2017 (World Economic Forum), it is perhaps best known for its combination of ancient tradition, modern innovation, and pop culture icons. Hiroshima and Nagasaki, though not as popular as Kyoto, Tokyo, or Osaka, have been a strong part of the tourism circuit. But since the Great East Japan Earthquake on March 11, 2011—which triggered devastating tsunami along the Tohoku coast, resulting in the Dai Ichi nuclear power accident in Fukushima Prefecture—

international travelers have added Fukushima to their itineraries. There is a renewed interest in experiencing the nuclear side of Japan.

Japan makes a good candidate for peace tourism related to nuclear conflicts because you can find places that have dealt with both the consequences of nuclear war and nuclear power accidents. Hiroshima, Nagasaki, and Fukushima are the prime examples of such sites, but there are many more besides. For example, there is the Lucky Dragon #5 Exhibition Hall in Tokyo, which houses the original fishing ship caught in the nuclear fallout of the Castle Bravo hydrogen bomb test that the US orchestrated in the Bikini Atoll of the Marshall Islands in 1954. All twenty-three of the ship's crew became ill with acute radiation syndrome, killing one member. The incident caused an upsurge of anti-nuclear sentiment in Japan (and Godzilla, the infamous radioactive monster, terrorized theatergoers that same year).

Then there is Wasaka Bay in Fukui Prefecture, known as the “silver seat of nuclear power” or “Nuclear Ginza,” named after the wealthy Ginza district in Tokyo. Instead of high-end shops this coast is lined with five nuclear power stations. Nicholas Röhl's 1995 documentary, “Hidden Irradiated Labor—the story of Japan's nuclear power laborers” (translated from Japanese, called “Nuclear Ginza” in English), follows the story of how the nuclear industry conscripted low-wage laborers to work under dubious conditions at these plants beginning in the 1970s, when Japan's nuclear industry quickly expanded. Similar exploitation concerns resurfaced post-3.11 during the “Fukushima 50”

incident, in which (hundreds more than 50^[RS2]) workers remained inside the nuclear exclusion zone to stabilize the damaged Dai Ichi reactors.

The nuclear issue even pops up in Japan's pop culture scene, a facet that inspires much international interest in Japan, making it a key element in the nation's soft power. Setsurō Wakamatsu directed the Japanese film *Fukushima 50*, which was released in theaters spring 2020 (it enjoyed a few weeks of movie-going before the COVID-19 epidemic forced theaters across Japan to close.) Before that, Kazuto Tatsuta's comic, *Ichi-F: A Worker's Graphic Memoir of the Fukushima Nuclear Power Plant* gained international popularity after being translated in at least 5 different languages, including English. Between *Godzilla* and these more recent titles, enjoyers of Japanese comics and animation can choose from a range of nuclear-themed content, such as *Astro Boy*, *Akira*, and *Neon-Genesis Evangelion*, all of which have been extremely popular worldwide.

I mention Japanese pop culture as a vehicle for the nation's soft power because it inspired me to first travel to Japan in July 2010 as a study-abroad student in college. On March 11, 2011, I was living with a host family in Osaka, 400 miles south of the Fukushima Dai Ichi nuclear power facility, completely unaware of its existence. With my poor geographical knowledge, I might not even have been aware of the existence Fukushima Prefecture. The 3.11 triple-disaster shocked the world, me included. The 9.0 earthquake and resulting tsunami waves of over 100 feet claimed around 20,000 lives. The nuclear accident added to the calamity, forcing 300,000 people to evacuate their towns and cities. Nearly

10 years later, some of these places remain off-limits due to high radiation levels. Many evacuees will never return to their homes in Fukushima.

Indeed, Japan is the only country to have experienced nuclear disasters caused by direct nuclear warfare^[RS3] , nuclear weapons testing, and major civilian nuclear power accidents. Its post-nuclear disaster sites offer special insights into the social impacts of civil and military uses of nuclear technology. One such impact is the reconceptualization of Japanese “peace culture.”

I first heard the term “peace culture” when I visited the city of Hiroshima as a tourist in summer 2014. After the stark outline of the A-Bomb Dome along the city’s central river, the next thing I noticed were colorful strings of folded paper cranes. I learned about the story of Sadako Sasaki, a girl from Hiroshima who, after developing leukemia due to radiation exposure after the A-bomb explosion, attempted to fold one thousand paper cranes. According to ancient Japanese legend, completing this task would heal her illness by granting her one wish. Despite her best efforts, she succumbed to the disease before she could finish.

This tragic story spread across Japan and the rest of the world, turning the paper crane into a Japanese cultural emblem of peace. Every year, millions of paper cranes are folded around the globe and sent to Hiroshima, Nagasaki, and, since 3.11, Fukushima as prayers for peace and recovery from tragedy. The paper cranes are thus symbolic ambassadors for spreading peace culture around

the world. Both international and domestic visitors come to Hiroshima and Nagasaki to experience this peace culture first-hand. But what is actually meant by peace culture? And how does the peace culture concept change when Fukushima is added to the travel itinerary? Beginning summer 2018 until now, I have traveled to these three areas to investigate.

The term “peace culture” is not only used by people in Hiroshima or those familiar with the symbolism of paper cranes. The academic literature on peace culture can be found across many disciplines in the social sciences and humanities.[\[LL4\]](#) For my second-year project, I engage with a range of disciplines that converge around peace culture scholarship: science and technology studies, peace and conflict studies, anthropology, sociology, Japan cultural studies, political science, and tourism studies. I entered the literature through a founding figure of peace and conflict studies, sociologist Elise Boulding. She defines peace culture as

a culture that *promotes* peaceable diversity. Such a culture includes lifeways, patterns of belief, values, behavior, and accompanying institutional arrangement that promote mutual caring and well-being as well as an equality that includes appreciation of difference, stewardship, and equitable sharing of the earth’s resources among its members and with all living beings (2000, loc 70; emphasis added).

Boulding describes “peace” as a process in which conflicts are dealt with cooperatively so that all parties involved may leave the conflict in a state of well-

being, without resorting to violence of any kind, be it physical, emotional, or structural. The conflict-resolution process occurs intra-personally (within an individual), interpersonally (between individuals), all the way up to the social grouping of nations and states, between states (international relations), and between humans as a species and the rest of life on earth. “Culture” refers to people’s beliefs, the actions stemming from those beliefs, and the social patterns associated with those actions. According to Boulding, a peace culture, then, is a set of beliefs, actions, and organizational structures that *promote* ways of life in which different peoples and species can live together on earth in ways that care for and support each other’s well-being. Boulding’s understanding of peace culture is a capacious one, in line with a pluralistic and holistic understanding of peace and culture. Using Boulding’s broad definition of peace culture as an anchor point, I explore the opportunities and limits of travel for cultivating peace culture, focusing on Japan’s post-nuclear disaster sites. I draw from the interdisciplinary body of literature that converges around travel, peace culture, and the social impacts of nuclear technologies, combining it with empirical ethnographic research I have been conducting in three of Japan’s nuclear disaster sites, Hiroshima, Nagasaki, and Fukushima. As travelers and locals exchange nuclear stories, I uncover what these stories hope to teach the rest of the world about the past, present, and future of nuclear technologies during increasingly precarious times.

I first heard mention of peace culture as a tourist in 2014. When I began my fieldwork four years later, I utilized my familiarity with Japan's strong tourism infrastructure to gain preliminary access to its nuclear disaster sites. Moreover, the Japanese government has partnered with the tourism industry as a form of disaster recovery at these very sites, and I wanted to study this dynamic. (A recent example of this is Japan's decision to host the 2020 Olympic and Paralympic games, which is supposed to help support 3.11 recovery efforts. After COVID-19 put those plans on pause, the Japanese government has once again turned to tourism for recovery: the Japan Tourism Agency is responding to the pandemic by considering a "Go to Travel Campaign" that will reinvigorate domestic travel during summer 2020 by covering part of people's travel expenses.) With tourism as my reference point, and equipped with Boulding's concept of peace culture in mind, I next turned the scholarly debate on "tourism for peace" to make out the connection between tourism and peace culture.

The "tourism for peace" debate that I encountered in the literature specific to tourism research asks how, if at all, tourism contributes to peace. For the past three decades, scholars have tried to determine the causal relationship between the two factors: whether tourism leads to a more peaceful world, or whether tourism in a given region of the world is the result of peace in said region. Louis D'Amore (1988a, 1988b) seems to have sparked the conversation when he claimed that global tourism, if "properly designed and developed" (1988a, 154) had the potential to bring about world peace. He argues that socially responsible

forms of tourism are a vehicle for practicing and spreading “cultures of peace” around the world (1988a, b; 2009; more on his use of “cultures of peace” below). However, some scholars believe that there is not yet enough empirical evidence to support this claim, nor the claim that an increase of tourism as a global industry will lead to a more peaceful world overall (Becken and Carmignani; Farmaki; Pratt and Liu). Indeed, D’Amore did not offer empirical evidence in his writings.

He did however attempt to theoretically expand our understanding of peace. D’Amore refers to “positive peace,” defining it as more than just the absence of violence. Unfortunately, he only hints at what that “more” is. Positive peace seems to be related to the building and maintenance of “bridges of understanding between civilizations, culture, and religions” (2009, 362); bridges that people can openly travel across in order to “come to an appreciation of rich human, cultural, and ecological diversity that our world mosaic has to offer; to evolve a mutual trust and respect for one another and the dignity off all life on earth” (1988b, 81). With this “peace as a bridge” metaphor, peace for D’Amore is understood as a way for an individual to connect to themselves and the rest of the world: peace within themselves, between people and nations, with nature and the planet, and with the entire universe.

It is worth noting that D’Amore does not engage with the wealth of literature on positive peace theory found in political science, which offer more concrete, if competing, definitions of peace as either being the absence of violence

or the presence of something more, such as social justice. (Matthew Evangelista [2005] offers a comprehensive review of the academic discussion on definitions of peace in this field. He includes the debate over “positive peace” between peace studies pioneers like Johan Galtung and Harald Mueller.)

I was disappointed to find that D’Amore quotes “culture of peace” in his discussion on positive peace without citing the quotation in his notes (2009). Nor does he define the term explicitly in his article. After a brief internet search, I found the term on the International Institute for Peace through Tourism (IIPT) website, of which he is the founder and president. Interestingly enough, the IIPT also uses the term in quotations (2018). After further investigation it seems that the organization borrows the term from the UN’s resolution 53/243, “Declaration and Programme of Action on a Culture of Peace” (1999). Neither D’Amore nor the IIPT provide an explicit a definition of the term; yet the UN declaration’s definition is explicitly stated, and highly compatible with Boulder’s (ibid, 2-3). Ultimately, I categorize D’Amore’s understanding of positive peace and peace culture as being in line with scholars like Boulding who are open to more holistic definitions of peace (Boulding and Ikeda; Williams) than those debated in political science.

D’Amore’s holistic understanding of peace and peace culture thus feeds into his notion of “peace tourism” (2009), which, unlike positive peace, he *does* explicitly define as a global socio-economic industry that focuses on “peace within ourselves, peace with others, peace with nature, peace with past generations, peace with future generations, and peace with our Creator” (559).

He developed this definition of peace tourism with the IIPT. According to the organization, peace tourism as an industry with a “higher purpose” that believes any traveler can be an “Ambassador for Peace” by “promoting international understanding and collaboration among nations; environmental protection and preservation of biodiversity; enhancing cultures and valuing heritage; contributing to sustainable development and poverty reduction; and healing wounds of conflict” (ibid). In summary, For D’Amore and his colleagues at the IIPT, peace tourism, then, goes beyond *promoting* peace culture; it is the vehicle by which positive peace may be *achieved* throughout the world.

A decade after D’Amore’s arguments were published, Stephan W. Litvin (1998) rebutted him and others (Khamouna and Zeiger; Zeiger and Caneday) by pointing out a serious gap in the “peace tourism camp” (64) argument, which only focused on the normative *potential* of tourism, providing neither empirical evidence nor a future research agenda for finding such evidence. Moreover, Litvin questioned whether a global industry can really be an agent of positive change, given how tourism is entrenched in established economic orders teaming with structural inequalities. Part of the issue is the nature of tourism, which is often short and superficial. He writes, “if tourists often visit destinations within the comforts of mass tourism's ‘environmental bubble’ (Cohen 1995), then...real understanding between tourists and locals is not likely” (ibid).

Litvin points to two limitations to using tourism as the main analytical category for understanding the connection between travel and cultivating peace

culture. First, tourism is an industry, and industries operate within an unjust global economic system. While D'Amore would argue that injustice is not inherent to the tourism industry and can be conducted responsibly by fighting poverty through economic development, for example, he in fact presented no evidence to back up this claim. Second, tourism as a category emphasizes the commercial aspects of travel. This includes money-making ventures willing to pitch tourist spots at any angle to appeal to the widest range of consumers. People engage in tourism activities for superficial reasons like entertainment and shock value, to escape from their normal routines, and will pay for experiences that promise these things. The tourism in the "tourism for peace" literature I read did not people's reasons for traveling into account.

Accounting poses another problem in this part of the literature. Litvin's was right in pointing out that D'Amore did not offer evidence to support his grand claim that tourism could bring about world peace. I also understand Litvin's and others' response to D'Amore's claim—prove it through quantitative analysis. Litvin calls on other scholars to move from conjecture to research that aims to determine the relationship between tourism and peace through "statistical and predictable correlation exists between these variables" (65). While quantitative analysis tackles D'Amore's "tourism leads to world peace" claim, the literature has forgotten to address his other, more reasonable claim about socially-responsible tourism being a vehicle for practicing "cultures of peace." It is this oversight that my research will address.

Moreover, the quantitative side of research exploring the travel/peace connection has produced mixed results. For example, Becken and Carmignani (2016) used statistical modeling of tourism data from 203 countries to determine if larger tourism inflows reduce the probability of conflict in that country. They found that larger inflows do reduce the probability of conflict, especially if countries develop their tourism industry over a period of at least a decade or more. In contrast, Pratt and Liu (2016) tested the bilateral relationship between tourism and peace by modeling data from 111 countries and found that tourism is the beneficiary rather than the cause of peace in a country. While they acknowledge that case studies have shown that tourism contributes positively to interpersonal peacebuilding (by fostering cross-cultural exchange and understanding between individuals), it does not scale up to nation-state level. Both studies defined peace negatively (as the absence of war and/or violence). Pratt and Liu suggest that using positive peace indexes in future research may offer further insight.

Farmaki (2017) conducted a review of the literature (which included Pratt and Liu's study, but not Becken and Carmignani's), also finding inconclusive results. In line with Litvin and Pratt and Liu, she states that the methods used in the literature thus far have relied too heavily on case studies and description, which are insufficient because they cannot be generalized. She then calls on scholars to draw more from the theories and methods of political science to clarify the causal relationship between tourism and peace. She offers an overview

of past theoretical frameworks in political science that can be applied to tourism and peace (such as game theory, human needs theory, and the hydraulic model of motivation) but does not clarify what specific types of methodologies should be used. Based on her critique of case studies, however, she seems to be calling for the more quantitative methods that political science offers, such as those conducted by Becken and Cramignani and Pratt and Liu.

All these scholars seem to believe that the trouble with the “tourism for peace” research is its dependence on case studies. I think the trouble is in the unresolved discomfort in political science between quantitative and qualitative approaches. No, a case study will not answer if tourism leads to world peace, as the question at hand is about causation. Yet case studies are not simply conjecture. As part of qualitative research, they provide the fine-grained detail necessary to address D’Amore’s other claim about tourism being a vehicle for spreading peace. I argue that the issue is not a lack of quantitative analysis on the subject of tourism and peace; rather, the problem lies with the focus on determining causation. Quantitatively untangling these two factors to determine whether tourism leads to world peace, is a massive task. Meanwhile, these scholars neglect exploring *how* tourism is a vehicle for peace, and this query is equally worth pursuing. Qualitative methods, such as ethnography (which political scientists may call a super in-depth case study), are better suited for this latter question than statistical analysis. Farmaki writes,

...Most research findings are deduced from case study investigations, which although are prominent, often lack the generalizability effect that credits their validity. The contextual factors surrounding the development of tourism in previously and/or currently conflict ridden areas are inherently linked to the degree to which tourism can contribute to peace. Yet, these have been to a great extent described rather than theoretically underpinned (529).

Contrary to what Farmaki claims, if done rigorously, solid theory *does*, in fact, underpin thick ethnographic description that addresses socio-cultural context with great care (Geertz). The point of exploring this question qualitatively is not to scale up or provide generalizations that can be applied to any situation around the world. Case studies are important precisely because issues related to peace and politics are complex and need to be understood within their socio-political contexts in order to glean valuable insights about the ways in which cross-cultural human relationships are affected by tourism and travel. If Farmaki is serious about her call for “a holistic view to acknowledge the interrelatedness of factors, actors and situational dynamics that predispose groups to enter a conflict” (534) then ethnographic approaches to unpacking those dynamics across time and place need to be taken seriously. Researchers interested in the connection between travel and peace should put quantitative and qualitative approach and findings in conversation with each other. Being one such researcher, I bring the qualitative back into the conversation, and take up D’Amore’s second claim by examining the opportunities and limits of tourism for cultivating peace culture.

Hence, I turned to a different set of literature for ways of qualitatively exploring travel beyond the peace tourism research I had encountered so far. Despite what Farmaki and others claim, ethnographic approaches to this subject do in fact provide rich cultural theories in need of acknowledgement within the literature (Haraway; Laplantine; Le Breton; Pink). By acknowledging both the quantitative and qualitative aspects of travel (not just tourism), we can approach the subject of travel for peace from both effective (causation) and affective (sensation) ways of knowing.

Ethnography involves a hermeneutic circle of understanding culture, in which we are constantly having, noting, and returning to small moments in our fieldwork and tying them into the “bigger picture” over time and experience. It is an iterative and discursive process by which the researcher and the research participants—all us of actors—interact, interpret, and create a specific cultural world. Moreover, some scholars argue that the best kind of ethnographic practice pays careful, explicit attention to the sensory experiences that connect actors to their worlds (Laplantine; Le Breton; Pink). Pink asserts that at its core, ethnography is a “reflexive and experiential process” (8). Sensory ethnography works from this core, “attending to the senses throughout the research process, that is during the planning, reviewing, fieldwork, analysis, and representational process of a project” (10). Pink introduces the term “emplacement” to describe the heart of sensory ethnography (23). Emplacement combines “embodiment” and “placement,” and deals with a body’s sense of place, or their connection to

their physical and social world. In Pink's view, sensory ethnographers take great care in noticing how their own bodies and the bodies of others interact with, interpret, and re-produce their environments. I made sure to practice this active noticing while in the field, paying attention to the affective qualities of my surroundings. While traveling to disaster sites, I came to especially notice ruins and ruination. I unpack the *affectiveness* of ruins a later in this paper.

Back to the practice of fieldwork. Ethnographers should attend to the senses during participant observation and interviewing, but they should also go beyond these two practices, as they do not necessarily cover the wide sensorium of experience encountered during fieldwork. Pink notes that to get this deeper sensory understanding, ethnographers can use more intentional techniques and activities designed to bring out certain affectations in both the research participants/actors and the ethnographer. For me, that meant using the Ukrainian-made, bright yellow Terra-P Geiger counter on my travels.



Figure 1: I carried my Geiger counter around in everyday settings to understand what a baseline reading was for my typical environs. Cornell’s Arts & Sciences Quad came in at 0.10 microSieverts per hour, which turned out to be on the lower end of the scale as I traveled around the world.

Laplantine, in turn, argues that the Cartesian separation of mind and body still haunts much of the social sciences today—despite many scholarly attempts to unify thinking and feeling, emotion and reason, and for that matter, art and science (2015). He introduces readers to the notion of “rationalocentrism,” which describes the Western tradition of creating categories and hierarchies of knowing the world. Different states, or modalities, are categorized as belonging either to

the intelligible (the mind) or the sensible (the body). Intellect is rational, objective, and of the mind (as well as a predominately male quality). Sensing is emotional, uncontrollable, irrational, and of the body (and predominately female). He writes frustratedly, “Why, finally, must an argument for objectivity against subjectivity or on the contrary subjectivity against objectivity always be made?” (30).

This “objectivity versus subjectivity” argument Laplantine refers to is an extension of the mind/body divide (with the mind being objective and the body subjective). It is an argument and tension I have particularly felt in anthropology, with its four-field approach. Are cultural approaches to social phenomenon somehow inferior to quantitative approaches because they are too humanistic, too subjective? This was certainly the sense (intentional pun) I got from reading the “tourism for peace” literature.

Important work has come out of the social sciences in the last quarter-century that challenges the notion that anything—including science—can be objective. As science and technology studies scholar Donna Haraway so eloquently stated, calls for objectivity in research are a Western “god trick;” a disembodied view from nowhere (1988). Attempts to separate oneself from one’s own bodily experiences and perceptions in an effort to “purify” the knowledge being produced in any given field are futile. Instead of vainly searching for objectivity, researchers should be focusing on the inter-subjectivity of their own experience and others.’ Pink writes that embracing intersubjectivity hence “requires a form of reflexivity through which the ethnographer engages with how

her or his own sensory experiences are produced through research encounters and how these might assist her or him in understanding those of others” (50).

Knowledge is always situated, insists Haraway. Knowledge is emplaced, adds Pink. And Laplantine would say that knowledge is modal. Rather than get stuck on dichotomies and classifications, he calls for a “politics of the senses” in which thinking and feeling are not considered to be separate modalities. In *Life of the Senses*, Laplantine demonstrates the ways in which anthropologists can move beyond the mind/body dichotomy by *thinking with the body*, or living through the senses. Living through the senses means applying a sensible thinking that accepts that experience is always multiple and in flux, eluding static categories. Instead, experience is understood as moving through different rhythms or modalities. For Laplantine, Japan’s East/West *dynamism* (and *not* dichotomy) is demonstrative of how sensible thinking can re-conceptualize worldly experience.

As the scholars above demonstrate, doing ethnography means drawing from the multiple states of the body in its physical and social context to understand how our own bodies think and feel with others. Strong theoretical work emerges from strong attention to the situatedness, emplacement, and modality. These are the real-world contexts in which socio-cultural phenomena are tightly bound. Over-reliance on statistical analysis and experimentation without proper attention to these contexts severs this tie, thereby producing knowledge that ultimately obscures reality. This is not to say that quantitative

studies like those in the peace tourism literature should be abandoned, but rather that scholars should not treat them as more valid than qualitative approaches. The two should work in tandem and be in constant conversation. It is thus my aim to strengthen the “tourism for peace” literature by balancing scholars’ quantitative efforts with my own ethnographic approaches.

As outlined above, I based this second-year project on ethnographic methods (participant observation, interviews, and sensing modalities) and content analysis of materials I have been collecting during my research trips to Hiroshima, Nagasaki, Fukushima Prefectures beginning summer 2018 to the present. After establishing initial contact with the main actors in each site, I then used the snowball technique to connect with more people associated with these main actors. After each interview with them I asked for additional contacts who would be interested in meeting with me. I conducted about 40 interviews over summers 2018 and 2019. I also participated in tourism and volunteer activities and attended organizational meetings and events. I collected promotional, informational, and supplemental materials from these and other related organizations. My initial findings below are based on content and discourse analysis of these experiences, interviews, and materials.

I established contacts at each site by reaching out to organizers of tourism activities or peace-related volunteer opportunities. In Hiroshima, I went to the Peace Memorial Park and Museum, observing the exhibits, and speaking with

tour guides and visitors. I also volunteered with Asian Network of Trust-Hiroshima (ANT-Hiroshima), a non-profit organization focusing on international peace education, advocacy, and disaster relief. Then, through ANT-Hiroshima, I met the organizers of Peace Culture Village, a peace culture camp and training facility located two hours away from the city.

Taking the same approach in Nagasaki as I did in Hiroshima proved to be more challenging for me. While I did engage in peace-related touristic activities, such as visiting the attractions on the Nagasaki Peace Hill, they were not centrally located, like the ones in Hiroshima (see Figures 2 and 3).





Figures 2 and 3: Hiroshima Peace Memorial Park (above), which contains the city's main peace attractions, spans 0.6 square kilometers; compared to Nagasaki Peace Hill (below), which is 8.1 square kilometers in size.

I learned that geographic decentralization of these activities reflects a major difference between tourism in Nagasaki and Hiroshima. Unlike Hiroshima, the tourism options in Nagasaki seem less focused on the atomic bombing of the city, and more on the city's legacy of cultural diversity through international maritime trade, which goes back to at least the 1500s. Nagasaki's top cultural attractions thus weave in the experience of the atomic bomb with this port city's long history of cultural exchange.

On top of the challenges of navigating a diverse and decentralized touristic terrain, I was also less successful in my volunteering ventures in Nagasaki. I collaborated on an art and peace event with one peace organization but was unable to secure lasting connections with the group. I was also unsuccessful at connecting with other organizers through that first group. I did perchance meet an A-bomb survivor, called *hibakusha*, on a park bench at Nagasaki University one afternoon, which made for an interesting interview. But after later politely declining his request that I translate his hundreds of pages long autobiography into English, even that connection dwindled. (He did however allow me to use his autobiography as a source for my future work.) Overall, my fieldwork in Nagasaki has thus been more scattered than in Hiroshima.

I perhaps had the best luck in Fukushima. Thanks to a quick Google search and English-friendly website, I connected with [Real Fukushima](#), a tourist organization that arranges English-language trips around the 3/11 disaster area, including inside the nuclear exclusion zone. Business owners, residents, and other community members Real Fukushima introduced me to were eager to share their stories with me and to connect me with others. This snowballing method led me to the Fukushima Prefecture Tourism & Local Products Association, a government organization in charge of the Rediscover Fukushima tourism promotion project; and Safecast, a Tokyo-based non-profit, non-governmental educational organization that helps train everyday people to measure radiation. Compared to the past-oriented feel of Hiroshima and

Nagasaki, I sensed this future-facing energy in Fukushima that was passed onto me by the people who had decided to revive this part of Japan, which is sometimes derisively thought of as the country's backwaters. And this energy is literal as well as figurative; Fukushima is the only prefecture committed to producing 100% nuclear-free renewable energy by 2040.

By traveling to these three post-nuclear disaster areas from the perspective of both a researcher and tourist, I found that the strength of the relationship between tourism and peace at each site depended on how actively tour organizers framed the site's history of nuclear disaster as a violent conflict, and how they connected the present and future of the site to a peaceful alternative. The degree to which actors made their conceptions of violence and peace explicit complicates this finding. I often encountered the word "peace" in my travels, in visitors' pamphlets, exhibition displays, and guided tour narrations, yet rarely did it come with a clear definition. Instead, I noticed discussions of peace came in tandem with discussions of violence, suggesting the negative definition of peace as the absence of violence.

What follows is a collection of sensorial experiences that stood out to me the most while touring post-nuclear disaster sites. Themes of peace and violence weave their way throughout. Since I focus on tourism activities in this paper, actors not associated with the tourism side of things do not yet make an appearance, though all their stories have helped me understand my travels as I have synthesized them below. I plan to share their stories in the dissertation.



Figure 4: Hiroshima A-Bomb Dome, foregrounded by my Geiger counter which picked up a reading of 0.19 microSieverts per hour. I recorded the highest readings here, after Fukushima.

As I gazed at the iconic A-bomb Dome in Hiroshima's Peace Park one summer afternoon, the deep history preserved in these ruins pressed itself upon me. Here is how UNESCO's website describes the dome:

The Hiroshima Peace Memorial (Genbaku Dome) was the only structure left standing in the area where the first atomic bomb exploded on 6 August 1945....Not only is it a stark and powerful symbol of the most destructive force ever created by humankind; it also expresses the hope for world peace and the ultimate elimination of all nuclear weapons.

Standing in front of the charred husk of the building, solitarily perched on the Motoyasu River, I wondered if as an American, I was partially responsible for the destruction of this city. As a human, for the creation of “the most destructive force ever created.” Coming to this spot did feel like a moment of reckoning. I wondered if the dome’s lingering presence in this city inspired people to work towards the abolition of nuclear weapons.

After spending some time reflecting on the well-preserved ruin, on what UNESCO had identified as a powerful symbol of desolation and hope, I noticed a man standing under a nearby tree. He had a display table set up informational materials. His name was Kosei Mito. (Mito-san granted me permission to use his real name and encouraged me—and all visitors he meets—to check out his multilingual blog, “A-Bomb In-utero Survivor Speaks: NO MORE HIROSHIMAS!.”) His mother had been living in Hiroshima, pregnant with him, at the time of the nuclear attack. He told me visitors can find him in the Peace Park displaying his teaching materials every day except Wednesdays. He speaks Japanese and English, and visitors who speak other languages can find written translations of a handful of other languages among his display binders. We spoke in English. When I asked him why he is so committed to giving unofficial tours of the park, he said, “It is my duty.” The conversation sparked my memory: I had met him four years earlier, in 2014, as a tourist-not-yet-researcher, in this same spot.

During our 2018 encounter, we talked about peace, getting at “the truth” about the bombing through education, and nuclear weapons abolition. When I

asked Mito-san what peace meant to him, he defined it as a state of non-war and equal opportunity. He replied, “Peace is the situation [in which?] everyone can do what we like. For example, in wartime, everything is restricted. Poor people cannot have a good education...We don’t need any restrictions.” Education is an important part of peace for him because it is through education that people learn the true ravages of war—nuclear war especially—and learn how to best eliminate nuclear weapons. His blog echoes the sentiment when he writes about his mission: “I have been guiding at the A-bomb Dome almost eight years to tell the truth, hoping that world opinion will lead to the abolition of inhumane weapons (2014.)”

Mito’s understanding of peace aligns with that expressed by the city of Hiroshima and the Peace Culture Foundation (HPCF), the two main bodies that manage the peace park and museum. I searched both organization’s website for a clear definition of peace yet could not find one. I did find a summary of the significance of Hiroshima’s Peace Declarations, which the city’s mayors have announced each year to the rest of the world at a ceremony of remembrance on the anniversary of the nuclear bombing starting on August 5th, 1947 until the present. According to this summary, I gleaned that peace in this context means living in a world without war; in other words, a negative definition of peace as the absence of violence in general and nuclear weapons in particular. It is the prevention of “a global war in which atomic energy would be used [which] would lead to the end of our civilization and extinction of mankind” through the

elimination of nuclear weapons, and the elimination of all wars, period, by “cut[ting] the chains of hatred and violence to clear a path toward reconciliation” and “becoming forerunners of a new civilization (2015).”

According to the HPCF’s outline of purpose as found on their website, peace is associated with “international understanding/cooperation,” and “human happiness (2004).” The HPCF’s goal is to promote peace in part by “convey[ing] the facts about the bombing,” presumably so that education of the facts of the horrors of nuclear warfare will turn humanity against it and “link the world as one (2004).” Whereas the text found on the city’s website corresponds to a negative definition of peace, HPCF’s website offers positive states of human interaction and being suggestive of Boulding’s definition of peace, which is that of parties cooperating for the sake of all parties’ well-being. And while both the city and the HPCF emphasize the need to eliminate nuclear weapons, the latter suggests that education (through facts about the bombing) is a path towards achieving positive peace.

Both the HPCF and Mito-san stress the importance of sharing the facts about the bombing. However, Mito-san claims that the HPCF is “too political” to tell the whole truth. He said the organization has been modifying the museum to suit the city of Hiroshima’s more conservative tastes. (To his point, the main wing of the museum was closed for renovations at the time of our interview. I will also note that while past Nagasaki memorial peace declarations have acknowledged those who have been affected by the Fukushima nuclear accident,

the Hiroshima peace declarations have not. Moreover, the mayor of Nagasaki has called for Japan's support of the UN Nuclear Ban Treaty, while the mayor of Hiroshima has remained silent.)

During our interview Mito-san also took issue with the city's insufficient offerings of peace education in public schools. For one, he stated that peace education only happens in elementary school, when it should go at least up through high school. He also stated that "even the biggest association of [A-bomb] survivors have no interest in peace education and very few mass media treat the lack of peace education in senior high school. So, I should be here." Giving his tours six days a week all year round.

Mito-san used to give official tours of the peace museum for some years, but according to him the museum has been downplaying the effects of radiation on victims and softening the tone of the exhibitions by removing the more gruesome yet accurate material about the extent of people's injuries. [RS5] In response to all the conservatism and revisionism, Mito-san decided to run his own tours of the park and surrounding areas, sharing information that he claims used to be available at the museum but has since been removed. Despite his strong critiques of city politics, he told me the city has not interfered with his tour-giving.

He believes these changes are being made because the government wants to hide the facts and minimize the damage from radiation. To counter this suppression of information, Mito-san shares his version of the facts with visitors

which he found in official government documents about the bombing and its after-effects that are not found in the museum. He said, “I believe that ignorance is the greatest evil. [Visitors] should come here and know the truth. Everywhere [there are] cover-ups but we should [know]...for [a] peaceful future.” One such cover up he mentioned was that there are more A-bomb victims in the U.S. than in Japan, presumably because of those exposed to radiation during the development, processing production, and disposal of nuclear weapons.

The biggest cover-up he claims has to do with Japan’s dependence on nuclear power. One of the most frequent question he gets asked from international visitors is, despite Japan being such an earthquake-prone country, why are there so many seemingly vulnerable nuclear power plants? He replied that in order for the Japanese government to establish the capability to produce its own nuclear weapons, it needed to develop nuclear power technologies as a base, which is why there are so many nuclear power plants. Even after Fukushima, Mito-san believes the government still wants to maintain its nuclear infrastructure for national defense.

Our conversation made me think back to the meaning behind the A-Bomb dome according to groups like UNESCO, HPCF, and the city government. If Mito-san is right about the national government’s intentions, then what kind of symbol does the dome become if not one of hypocrisy? Whose perspective was closer to the truth? Was UNESCO’s tourist-catering portrayal of reality purposefully too rosy, while Mito-san’s too cynical?

Getting at the truth was important to Mito-san because knowing the truth is a step towards achieving peace. But I imagine that the “truth” of the situation exists somewhere in a grey zone between perspectives like UNESCO’s and Mito-san’s. A zone that becomes more difficult to navigate the more information one uncovers, making the search for a fully objective truth an endless task with no resolution. If there is no end to finding the truth, then when does finding peace begin?

Putting the notion of truth aside, I turned back to experiencing the A-Bomb Dome ruin itself. With its grey edifice contrasting with the vibrant rainbows of paper cranes strewn around Peace Park, once again these ruins impressed a sad beauty upon me that lingered for the rest of my time in the city.





Figures 5 and 6: The Geiger counter reads 0.09 MicroSieverts per hour (above) as our group tour boat approaches the island of Hashima, “Battleship Island,” off the coast of Nagasaki. As the map (below) shows, this tourist attraction is part of Nagasaki’s “World Heritage Maritime Cruise” circuit. Attractions relate to the city’s long history as a multicultural trading post of goods and ideas between Japan and other countries, such as shipbuilding technologies and Christianity. The “World Heritage” tourist area is located over two miles south of Peace Hill along the Urakami River (see yellow circles on Figures 3 and 6.) Though these two tourism areas are connected by train lines, they are not connected by a peace theme.

Like Hiroshima, Nagasaki has memorialized several ruins from the nuclear attack on the city, but they are smaller and scattered. One ruin in Nagasaki does

rival Hiroshima's A-Bomb Dome in terms of size and impressiveness, so much so that in 2015 UNESECO declared it to be a world heritage site alongside the Dome: Gunkanjima, or " Battleship Island." Originally called Hashima Island, it goes by Gunkanjima for its battleship silhouette, and is listed under UNESCO's "Sites of Japan's Meiji Industrial Revolution: Iron and Steel, Shipbuilding and Coal Mining." (Note that none of the UNESCO sites in Nagasaki are related to the nuclear bombing.) Ironically, tours of Battleship Island gloss over the island's military history and connection to WWII. They instead focus on the story of the coal mine lying underneath it, and the town built and later abandoned above it. The Mitsubishi conglomerate built up the island as a coal mining town, populating it with locals before the war. However, in wartime, Chinese, Korean, and Allied POWs were used as forced laborers to shovel coal to fuel the imperial Japanese war machine. In the end, American nuclear power beat Japan's coal on the battlefield (see Siemons and Underwood).

Battleship Island should be named as such not just for its shape. The island is also a symbol of the conflicts surrounding technological change. The carnage of WWII reminds us that the conflict can be violently devastating. Yet when UNESCO chose to locate Gunkanjima within the narrative of Japan's Industrial Revolution, it constructed that narrative with no reference to how bloody that revolution was. UNESCO's description of the site smooths over any conflict:

It bears testimony to the rapid industrialization of the country....The site illustrates the process by which feudal Japan sought technology transfer from Europe and America from the middle of the 19th century and how this technology was adapted to the country's needs and social traditions. The site testifies to what is considered to be the first successful transfer of Western industrialization to a non-Western nation.

The description aligns with Nagasaki's tourism theme of cultural exchange and diversity, in this case through technological exchange: "rapid industrialization" led to the "successful" "technology transfer" from America to Japan. This manicured language masks the at times-violent conflicts surrounding technological exchange, obfuscating the historical contexts of imperialism and war in which these transfers occurred. [\[RS6\]](#) The A-Bomb dome may be a confusing symbol, but at least its connection to WWII is clear. Despite its name, Battleship Island's connection to the war machine remains obscured.

When I went on a Japanese-language group tour of the island, the language I heard matched UNESCO's. Skipping over the island's WWII history entirely, the tour guide informed us that in the 1970s, Japan transitioned from domestic coal to international oil, causing residents of the island to "peacefully" evacuate and return to the mainland. Given the tame portrayal of the island's history so far, I was surprised by the way our tour guide chose to wrap up the tour. Just before escorting us back on the tour boat, she connected the energy transition that ran residents out of Gunkanjima with today's post-Fukushima energy issues. With miniature lumps of coal dangling from her ears, she told us,

“The question, ‘What happens during an energy transition?’ was already answered a generation ago by the experience at Gunkanjima. And so, Gunkanjima shows us today what that was like. It looked like this [gestures at the ruins].” After the tour, I asked her to elaborate on the connection between Gunkanjima and Fukushima. She said,

This island of Gunkanjima became a ghost town at the time when coal changed to oil for energy. During our recent energy transition from oil to nuclear, a town in Fukushima became a ghost town when the [nuclear] accident ended up occurring. [The government said,] ‘This island has radiation so please leave.’ [The two cases] ended up similarly. Because [of experiences like these], we must think with seriousness about the extent to which the current energy type is necessary, and what we must use as the next energy type.

As demonstrated by this ghost town in Nagasaki, and those in Fukushima’s nuclear exclusion zone, even energy transitions occurring during times of “peace” (as in not during wartime) can lead to violent conflict and ruination. The pace of ruination may be slower than that of a nuclear bomb detonating nearly half a mile above the Hiroshima Prefectural Industrial Promotion Hall on August 6, 1945, instantly transforming it into the A-Bomb Dome we know today. But whether slow or fast, the energy that humans use to fuel systems of exploitation in the service of economic growth is violent. Its violence is most obvious during war, but even during “peaceful” times, violence leaves its mark on these ruins.

As the visage of Gunkanjima attests, ghost towns are ruins. Anthropologist of global tourism culture Shinji Yamashita notes that roughly 300,000 people

visit the Gunkanjima ruins each year, making it a “sacred site” for industrial heritage sightseeing (2019). When considered as sacred sites, what kind of meaning do people make of ruins like these?



Figure 7: Graffiti, origin unknown, on the exterior of a damaged fish hatchery, found in a radiation hotspot inside Fukushima’s nuclear exclusion zone. My Geiger counter reads 4.17 microSieverts per hour, over 40 times higher than my reading on Cornell’s campus.

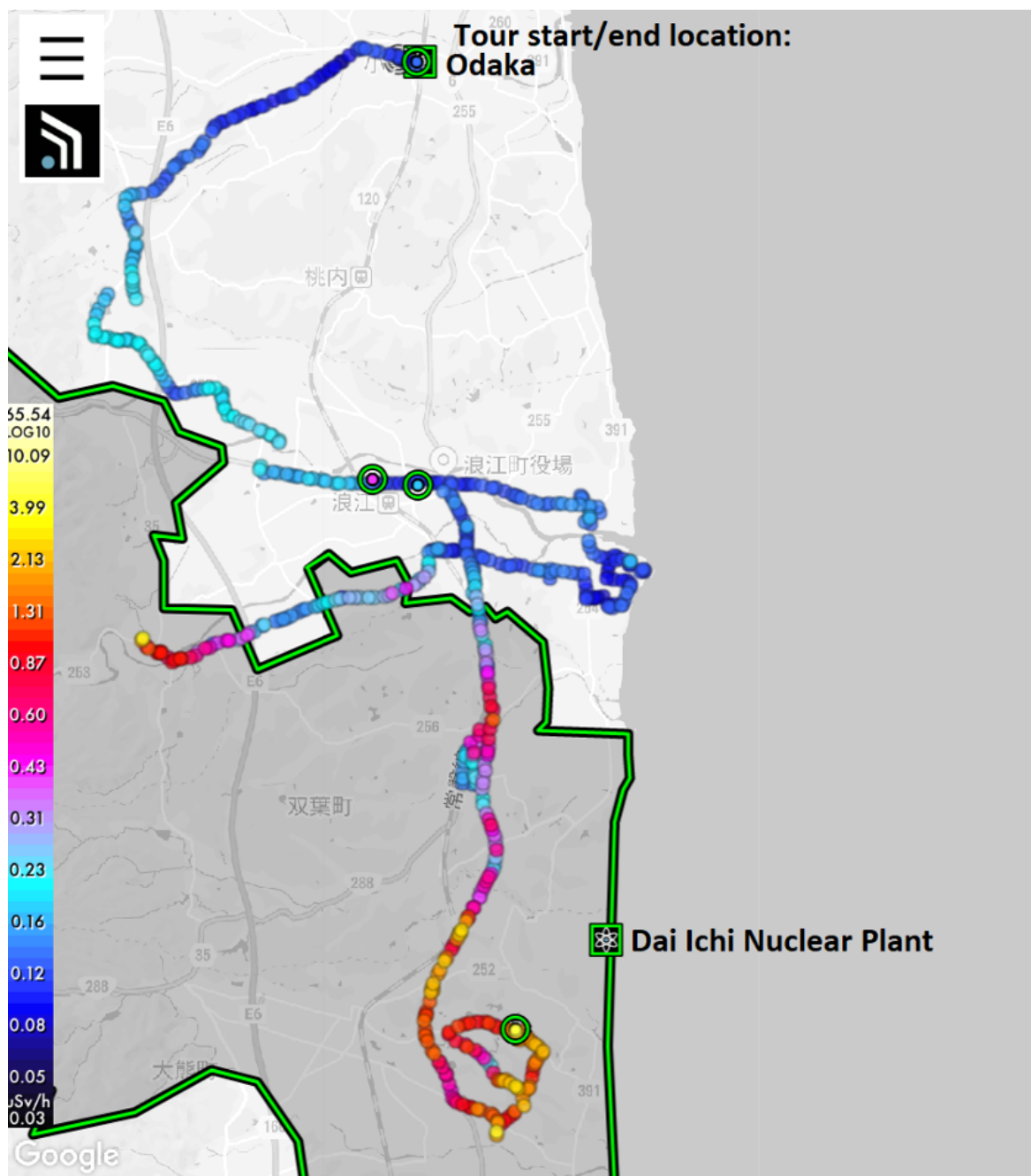


Figure 8: The radiation map that Safecast technology produced of my 2018 tour of the nuclear exclusion zone with Real Fukushima. My tour guide had a Safecast Geiger counter strapped to her car that regularly collected and reported radiation measurements. (The link to the interactive map of our trip can be found here: <https://map.safecast.org/?y=37.463&x=140.95&z=11&l=11&m=4&logids=36442>.)



Figures 9 and 10: Modern-day, ephemeral ruins in the form of an abandoned convenience store in the town of Futaba in the nuclear exclusion zone.

I turned to the modern ruins of a Family Mart convenience store for an answer. I found it in that very “ghost town” my Gunkanjima tour guide mentioned, the one in Fukushima. (It turned out there were several “ghost towns,” not just one, which were evacuated in March 2011 due to unsafe radiation levels.) In Japanese, this ghost town is officially known as the “difficult to return home to zone” and commonly referred to as the “evacuated zone.” In English, we call it the “nuclear exclusion zone.” (Note how in Japanese the term “nuclear” is avoided.) [\[RS7\]](#)

I had arranged an English-language solo tour of the nuclear exclusion zone through Real Fukushima. Beginning in Odaka, a once-evacuated town now reopened for resettlement, we headed south on National Highway 6, into the exclusion zone, which covered over 100 square miles (see figure 8). Just before exiting the zone an hour or so later, I spotted the Family Mart on Highway 6 and asked my guide to stop the car. I stepped out.

We were still a mile away from the border, in the abandoned town of Futaba. That afternoon the Safecast Geiger counter read 1.04 microSieverts per hour in front of the store. Tall grasses overtook the store parking lot. Inside I was greeted by the pointed smell of long rotted foodstuffs, their containers littering the floor. The convenience of this store, usually spotlessly showcased, had been completely wiped out. In its place, decay flourished like delicately putrid flowers.

Unlike the ruins in Hiroshima and Nagasaki, the ones I experienced while on the tour of the nuclear exclusion zone were not yet preserved. I suspect most

of them will not be. It was precisely this active state of decay that compelled me towards stillness and reflection about the cycle of life and death in a way that was more visceral than those of preserved ruins. Their immediacy forced me into the present moment, again and again during the tour. When I visited these sites again, I thought, they will have changed. The impermanence of these ruins, of these moments, reminded me of how fleeting life is, and why it is therefore important to live with awareness of its impermanence.

When I went on another Real Fukushima tour a year later, indeed, things had changed. A different guide, this one life-long resident of the area, reflected on visiting these ever-changing ruins. He said,

You can see how nature completely ignores the way humans have arranged things and just takes them back, right? That's beautiful. Not only is it beautiful, but you also get the sense that you can see something beyond the human, beyond human foolishness.

I sensed that beauty too, on this second visit to the exclusion zone, just as I had the first time. The fleeting beauty, in part, is what drew me back: beauty found, for example, in the deterioration of the illusion of human control so strongly captured in the aesthetics of an impeccably-managed Japanese convenience store.



Figure 11: Snapshot of the “Fukushima Revitalization Station” website banner as of spring 2020. The website reports on the many environmental projects the Fukushima prefectural government has underway. According to the site, “We have to quickly restore environment in Fukushima to create [an] environment where citizens can live with peace of mind over the future.” I find that “peace” in Fukushima’s context is disconnected from Hiroshima’s or Nagasaki’s “peace culture,” which refers to nuclear weapons abolition. Rather, it relates to a mental state attained through living sustainably.

Ruins are not just about destruction and decay. They are but one part of a cycle that includes creation and renewal. Fukushima is in a key liminal part of this cycle. In a literal sense of the term, the prefectural government has committed to producing nuclear-free renewable energy. Renewal also refers to creating a new future while remembering the lessons from the past. Though it hasn’t quite been a decade since 3.11, that world-changing event has already made its mark on history. That mark is already a part of our global collective heritage. According to Yamashita, the Fukushima Dai Ichi power plant site is a part of that heritage. He therefore writes,

I think we should register the Fukushima Dai Ichi power plant as a UNESCO world heritage site, listed as ‘The Industrial Heritage of Heisei Japan...’ As such, Dai Ichi becomes a site of pilgrimage for dark tourism and industrial heritage sightseeing (207).

I think people should observe with importance, not just monumental sites like the Dai Ichi power plant, but also transient ruins like Family Mart, unlikely to be chosen for preservation by UNESCO. It’s their very transience, their elusion from preservation, that is crucial to observe during precarious times. Cultivating acts of noticing this transience—noticing the cycles of decay and renewal that we humans participate in alongside non-humans and the environment—perhaps it is through this cultivation that we can achieve that positive “inner peace of mind.”

According to scholars like Boulding and D’Amore, practices that promote peace culture are based in cultural exchange and diversity and offer people from different backgrounds the opportunity to build “bridges of understanding” for the mutual caring and well-being of all, [LL8] including humans, non-humans, and the environment. It follows, then, that peace tourism promotes peace culture only to the extent that it supports these components.

So far I have found that the tourism activities found in Hiroshima, Nagasaki, and Fukushima promote peace culture to the extent that the activities framed the tours along the lines of diversity, understanding, and mutual care[RS9] ; as well as the extent to which visitors were receptive to such framing.

Each site I visited had a different central theme. For Hiroshima, being the first city in the world to be attacked by nuclear warfare, it is the A-bomb experience and nuclear abolition. The tourism in Nagasaki, by contrast, is organized less comprehensively on nuclear weapons and warfare, and more around cultural diversity. This is because Nagasaki is a southern port city with a long history of cultural exchange with the rest of the world. Finally, unlike Hiroshima and Nagasaki, my impression of Fukushima's tourism is more future-oriented, framing its activities primarily around nuclear energy-free environmentally sustainable innovation. While site actors did not explicitly connect all three frames—abolition, diversity, and environmental sustainability—to peace tourism or peace culture, they all address components of peace culture as defined in the literature. The trouble is making the implicit connections explicit in tourism practices.

The degree to which those who sold the tourism activities in each place connected their activities to peace tourism or peace culture varied. I noticed the strongest connections to peace in Hiroshima, weaker connections in Nagasaki, and almost no connections in Fukushima. Moreover, some unease exists among some Japanese tour organizers—and indeed, in the Japanese collective memory—about making connections between nuclear disaster in Fukushima with those of Hiroshima and Nagasaki. Thus, the different framings of these nuclear disasters can either help promote peace culture by drawing out these

connections, or it can limit the spread of peace culture by missing these connections.

The depth at which visitors engage with peace culture at post-nuclear disaster sites depends on a combination of factors, such as: their initial level of interest in knowledge of the subject before going on a tour; their expectations of the kinds of intellectual and emotional experiences they ought by going on these tours; what they actually experience while engaging in the activities; and how the touristic experience is framed and presented to them by the tour organizers. The resulting experiences of visitors to these sites can thus vary widely along a continuum of engagement and reflection, from the superficial to the profound. The depth of the experience can influence the way visitor's experiences are shared with others back home, and affect the extent to which peace culture messages and lessons are spread to others.

If the goal of peace tourism is to provide (on the part of the organizers) or receive (on the part of the visitors) an informative and moving experience—one with the potential to changes people's understanding of the relationship between nuclear technology and society while increasing empathy and cross-cultural understanding about those who have suffered from disasters—by engaging in peace culture, then the success of such a goal is limited by the socio-economic structures in which the tours operate. First, structural inequalities are embedded into touristic experiences. From the demand side, people lacking the

financial resources to travel to these sites are barred access to them. Socioeconomically disadvantaged locals may participate in the supply side of the industry, but may only be given low-wage or menial labor roles that can stifle the degree to which they can engage with the site as well. Additionally, government and industry rules and regulations may further hinder the kinds of touristic experiences available to visitors by restricting access to parts of the site, length of stay, information shared, or narratives told. Then there is the issue of time. A one-time visit may not be long enough to make a lasting impression on visitors. Another limiting factor is the mindset or expectations of the visitor upon arrival, and whether they will treat the visit as a superficial, entertaining, or learning experience. While site framing may have more of an impact on the time and mindset issues, it does not address economic inequities and access issues.

I have come to realize through my own time in the field that the analytical category of tourism as found in “tourism for peace” literature (which focuses on the tourism industry as its area of inquiry) is too constrictive for the kind of travel I study. On my own travels, I kept looking for a deeper concept than what “tourism,” with its superficial, extractive, and entertainment-based implications, provides. Even reframing the narratives of these post-disaster tourist destinations as “peace tourism” will not address the limits I outlined above. After identifying the limits of tourism in the literature and in the field, I have chosen to think with travel as pilgrimage rather than tourism.

Peace cultures should be accessible and equitable practices that diverse people and organizations participate in. The practices should help human and non-human communities co-exist while meeting basic needs (food, shelter, health, gainful employment). Tourism, a global industry aimed at pleasing as many paying customers as possible, is insufficient to promote peace culture. Even a critical subset of tourism, such as peace tourism, is limited because it is still a part of the industry, and thus tied to inequitable economic systems.

I strive to look beyond tourism, then, and onto other forms of travel, like the pilgrimage. Unlike the many reasons why people choose to participate in tourism (entertainment, leisure, thrill), a pilgrimage aims to cultivate deep meanings about life and death. To do so requires open-mindedness, respect, sensitivity, situational and sensory awareness, and reflexivity. Pilgrimages bring together people from different socio-cultural backgrounds to share and exchange experiences around a theme of interest that is tied to a specific site without the baggage of commerce. Anyone who is interested in cultural exchange should be able share what they call home with others and to experience what others call home. Finally, a pilgrimage does not require distant travel to exotic places, either to see how—and empathize with—how the other half lives. In the next iteration of my research, I will therefore explore “nuclear pilgrimages” as my analytical travel category for understanding the connections between travel and peace culture.

To summarize, my second-year project has introduced some of the themes that I will continue to unpack for my dissertation research. I focused first on surveying the interdisciplinary literature on “tourism for peace” and responding to its key debate on searching for the causative relationship between tourism and peace. I responded by offering the benefits of using qualitative approaches to answer a different yet equally important question: What are the opportunities and limits of tourism for cultivating peace culture? Choosing Japan’s post-nuclear conflict zones as the scene for this qualitative study, I then presented my initial findings from the actors and organizations I have established ties with so far. By analyzing the literature and findings, I then identified a point of theoretical departure from tourism to pilgrimages. The step of my research is therefore to explore nuclear pilgrimages in the context of peace culture. I hope that my dissertation will shed light on the kinds of stories locals and travelers exchange while journeying to these sites, how these narratives relate to Japanese peace culture, and how they shape people’s understandings of the role of nuclear technologies in past, present, and future society.

Finally, my future dissertation research becomes even more intriguing when placed within the context of Japan’s recent changing of imperial eras, the global Coronavirus pandemic, and the postponed 2020 Tokyo Olympics. On May 1, 2019, Japan transitioned from the *Heisei* “achieving peace” period to the

Reiwa “beautiful harmony” period. [\[RS10\]](#) These names are clearly symbolic (and some may even argue that they are nothing more than propaganda); yet the symbolism in names, as well as the symbolism in the changing of an era, have led everyday people in Japan and abroad to reflect on what these symbols really mean to them and their lives.

It seemed fortuitous that with the coming of *Reiwa* also came preparations for the 2020 Olympics and Paralympics to Tokyo. As I write this from my apartment in Yokohama, millions of visitors were to have flocked to Japan for the summer games. Not only was the Games’ symbol of peace to converge with *Reiwa*’s “beautiful harmony”; up until COVID-19 postponed the games, their theme was “requiem and rebirth,” in dedication to Japan’s revitalization after 3/11. (I imagine the pandemic will reshape the theme once the games resume.) The Olympic torch is made of salvaged and recycled materials from the Fukushima disaster zone; more of the nuclear exclusion zone re-opened in time for the Olympic torch to travel through them so that the sacred flames may symbolically bless these disaster-scarred places. Unfortunately, the start of the pandemic in Japan coincided with the arrival of the flame, which was supposed to have also traveled to Hiroshima and Nagasaki, highlighting the connection between the three nuclear disaster zones. I have only begun to think about the ways that *Reiwa*, the Olympics, and COVID-19 impact peace culture; yet I know these are crucial facets I will need to explore. Presuming that the Olympic games will pull through (in a post-pandemic landscape that escapes my imagination),

what will Japan tell the rest of the world about finding peace amongst cycles of life and death in these increasingly precarious times?

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[These are comments from my advisor which I still need to address]

[RS1]Don’t quite follow this

[RS2]I’m a bit confused here...why is it called the “Fukushima 50” if it was actually hundreds?

[RS3]This is actually the only unique kind of disaster.

[LL4]Start here for analysis of peace culture for peace conference

[RS5]The politics of historical memory is fascinating and perhaps a worthwhile place to focus in your thesis research.

[RS6]Very interesting—could be unpacked.

[RS7]Interesting—have others argued for its inclusion?

[LL8]Read this for incorporating into peace conference paper (and add to nihongo presentations)

[RS9]Not sure your evidence has shown this yet, though this is certainly what I might have expected.

[RS10]According to whom? What does this actually mean?

* * *

[Dear Reader: When I spent a year improving my Japanese language skills at IUC in Yokohama, Japan, 2019-2020 (of which the students and staff—myself included—saw the [Diamond Princess](#) from outside the language center’s windows on the sixth floor of Pacifico Yokohama Tower, after the now infamous cruise ship was forced to quarantine at the Yokohama Port—wow, I guess I really am a disasternaut—again, see chapter 7), I had to write and present a series of papers, in Japanese, about my doctoral research on what I called “nuclear pilgrimages in Japan.” Here are those pieces, which were a sort of follow-up to the pre-dissertation project I just presented above. I compiled these writings while sheltering in place in June 2020, in lieu of starting my fieldwork.]

原子力巡礼 / Genshiryoku Junrei / Nuclear Pilgramages

Section contents

1. What’s in a name? [Meguru](#) vs tour vs pilgrimage
2. Why go on a nuclear pilgrimage, why do it in Japan, how to prep for the trip
3. What makes Japan ideal but you need an ideal traveler to do it well
4. Why I study nuclear weapons, b/c of American nuke obsession vs Japanese allergy
5. Exploring the history of the Japanese allergy and how it’s really a trauma
6. Some graphs that point to the trauma persisting
7. How to go on a pilgrimage to deal with the trauma and learn about being (more than) human
8. What I learned about darkness and light while going on my own pilgrimage

Summaries of each section

1. 原子核巡り (summer 1)-What should we call traveling to nuclear sites? Some call it dark tourism, HBO being reason why people want to [meguru](#) now, but how to translate the international phenomena into Japanese, separation of nuclear in Japanese

-Also see pg 8, what's in a name, in Research Journal #1

- Different from international visitors, Japanese tourism focuses on coming to the region to help rebuild it, as hope tourism : 東日本大震災に伴う復興運動について話したいと思います。一つの面は原子力のツーリズムです。世界中で、核兵器戦争と原子力発電所事故に両方被害を負っている国は日本だけであるので、日本にある原子力時代の被災地に、復興における何か学ぶために旅に出たらいいと思います。山下晋司の研究者によると、「まなび旅」とは一体何でしょうか。被災地の視点から、様々な原子力の問題を解決に向けて行動をおこすことができるでしょうか。記事を読んでみましょう。

- Karin mentioned something about it already being a pilgrimage point for international visitors in 3rd part of interview I think? Pull that here. How does she say it connects to dark tourism again?

2. 原子力関連の場所巡り (summer 2)-why go on a nuclear pilgrimage, and why do it in Japan (from pop culture to fukumaru and nuclear Ginza), and how to prepare for the trip

I think the discussion about why Japanese people are ideal tourists and Japan is an ideal country to do tourism in could fit in here (the appeal of traveling through Japan)

3. ideal traveler—Japan is a great travel destination because of infrastructure. However the ideal traveler for Japan is a Japanese person cuz of all these rules and cultural barriers.

Can fit this into summer *happyou* #2 on why do a nuclear pilgrimage in Japan. Can also add writing from research journal #1, pg 10 on tourism infrastructure being so good in Japan. Discussion on travel history in Japan can also go here, from taking trains to radium onsen in Fukushima during the uranium boom (see Maika Nakao's presentation on Japanese nuke history in helpful presentations folder) to the Discover Japan promotions of the 1970s (see bunkaron class notes and culture hasshin documents in ideal traveler folder in my *ronbun* folder.

4. 原子力執着 (pts 1 and 2 combined, from 2nd term mini happyou #1)- introduce my doctoral research, why I started it (3.11), and why I think Americans are obsessed with nuclearity (we like to use nukes to boast and complain—this is reflected in our pop culture, ie the simpsons)

5. allergy (mini happyou #2)-allergy is a general term with a darker history of mislabeling a trauma as an allergy for political gains (Hook article)

6. Two explanations of anti-nuclear feelings graphs – can probably go in nuclear allergy conversation to show how the allergy doesn't work politically exactly as they had hoped (making it seem safe in the public eye and that Japanese people should accept nukes) when in fact they still don't like it. Some would say this is proof that the allergy persists, I'd say it's the trauma that still does. (The extra writing on nuclear allergies from those Japanese blog posts would fit in this discussion, on how those with the allergy are supposed to be put in the fringe when they are really the majority.)

7. 1st NFF happyou on 原子力巡礼 minus the section on allergy, which I copy and pasted from presentation #4-How do deal with nuclear trauma, go on a pilgrimage. Here's what you need to prepare to go on one.

8. 巡礼の教訓 (sotsugyou happyou/NFF 2nd happyou + extended parts that didn't fit in either presentation)- more prep stuff, especially learning about counting radiation and risk, then mindfulness, then setting out to Hiroshima, Nagasaki, and Fukushima, and understanding how the three are connected—through ruins and ghost towns. What their appeal is, what you learn from

noticing/sensing them (destruction and rebirth are two sides of the same coin, so is beauty and ugliness). Unesco values versus darker histories, the grey zone—both can exist if you remember two sides of the same coin. Pilgrimage is capacious enough for light and dark.

Writings for each section

1.

「原子核巡り」とは何でしょうか。夏山のクラスで話し合ったテーマを二つ繋(つな)がって見たいと思います。一つ目は「何々巡り」について話しました。二つ目は翻訳についてです。私は自分の研究の中で翻訳の問題に気付きました。観光客(かんこうきゃく)が日本の原子力や核兵器が影響を与えた場所を見に行くことは、日本語で何とさえいいのでしょうか。それで、なぜ日本語には同じ現象をさす言葉が二つ、「原子」と「核」がありますか。そこで、次に原子核巡りの言葉を分解したいと思います。

まずは、「巡る」という言葉の意味について話したいと思います。「めぐり」は名詞ですが、動詞にすると「めぐる」になります。めぐるとは色々場所を回ることです。旅行では巡りは同じような場所を見に行くという意味です。たとえば、日本では「寺社(じしゃ)巡り」とは様々なお寺や神社へ見に行くことがよくあります。アメリカやヨーロッパでは「バー巡り」が楽しめます。バーやパブやレストランを回って、飲み物と食べ物で少しづつ試して見るという楽しみ方があります。それから、最近、海外から来る

観光客は東日本大震災の時に起きた原発事故や、広島と長崎の都(みやこ)の時の爆発に興味があるそうです。なぜでしょうか。理由は国際的なテレビの影響かもしれません。

2018年と2019年、NETFLIXとHBOのテレビ放送(ほうそう)会社(がいしゃ)が「Dark Tourist: Japan」と「Chernobyl」という大人気な番組を世界中で配信(はいしん)しました。「Dark Tourist: Japan」の内容は福島原発事故で住民(じゅうみん)が他の場所に避難をさせられた地域に観光スポットとして観光客がツアーとして行くというものです。「Chernobyl」の内容はチェルノブイリの原発事故の話が紹介されました。この二つの番組が放送されてから、福島県とチェルノブイリへ行く海外から来る観光客の割合が増えてきました。

この現象は「ダークツーリズム」と言われています。Weblio の翻訳インターネットサイトによると「ダークツーリズム」とは、「災害(さいがい)被災(ひさい)跡地(あとち)、戦争跡地(あとち)など、人類の死や悲しみを対象にした観光のこと」です。しかし、一方で、この言葉には違和感があります。なぜかというと、観光客がその場所を尊重せずにこのように場所を楽しむのは無責任なことだと思われています。しかし、悲しい場所を体験するのは無礼(ぶれい)なことばかりではなく、大事なことを学べる機会もあります。ですから、私の研究の対象として他の言葉を探したいと思います。

最後に「原子核」という言葉を紹介したいと思います。科学的な説明をすると、核とは原子の中身(なかみ)の部分の物です。科学者は原子核を分けると、強大(きょうだい)な力となることを発見(はっけん)し、発電や兵器に使われています。広島と長崎の場合は核兵器が都市を全壊しましたが、福島の場合は電気を作る原子発電所の事故のせい

で福島第一発電所に近くに住む人々が7年間ぐらい避難させられました。どちらも同じ原子核が使われていました。しかし、役割は逆でした。同じ原子核でも逆の役割をしているので、言葉も分離して、「原子」や「核」、二つの呼び方で呼ばれているのでしょうか。ところが、両方の原子核を使う技術の影響について話したい時は、二つの呼び方は不要、元々の「原子核」と呼んだらどうでしょうか。

以上、まとめると、観光客は深く理解し、敬意を払いながら、広島、長崎、福島を体験したい場合は、どう呼ばれるのがいいでしょうか。私の研究のために、「ダークツーリズム」の代わりに、日本語で「原子核巡り」と呼んで見てはどうでしょうか。

2.

前の発表は「原子(げんし)核巡り(かくめぐり)」というテーマを紹介(しょうかい)させていただきました。そのテーマを続けたいと思っています。皆さんまだ覚えていると思いますが、私が作った定義(ていぎ)によると「原子核巡り」と言うのは観光客(かんこうきゃく)が日本の原子力や核兵器が影響を与えた場所を見に行くことです。実は、千田先生がその言葉を聞いてから、ほかの言葉をすすめてくださいました。ですから、この発表で「原子(げんし)核巡り(かくめぐり)」の代わりに「原子力(げんしりょく)関連(かんれん)の場所(ばしょ)巡り(めぐり)」と言いう言葉を使ってみたいと思います。

では、原子力(げんしりょく)関連(かんれん)の場所(ばしょ)巡り(めぐり)をなぜ経験(けいけん)したらいいのでしょうか。こんな風な旅行の訴(そ)求力(きゅうりょく) **appeal** は何でしょうか。何が学べる(まなべる)でしょうか。その上、この巡礼(じゅんれい)を試し

たければ、なぜ日本へ行ったらいいですか。この二つ目の質問を答えてみたいと思います。

まずは、原子力(げんしりょく)関連(かんれん)の場所(ばしょ)巡り(めぐり)に通して(とおして)何が学べるでしょうか。原子核テクノロジーは今まで人間の発明(はつめい)の中で一番素晴らしいテクノロジーだと考えています。一方、生命(せいめい)に対して一番危険なテクノロジーだとも思います。どちらが正しいか問わず、核(かく)時代(じだい)と原子力(げんしりょく)時代(じだい)は世界を変えました。人間たちはそんなに力強いテクノロジーが生命(せいめい)と社会(しゃかい)の影響を与える問題に取り組む(とりくむ)べきだと思います。ですから、原子力(げんしりょく)関連(かんれん)の場所(ばしょ)巡りはこの目的のために役立つと思います。

つぎは、なぜ日本が原子力(げんしりょく)関連(かんれん)の場所(ばしょ)巡りができる国でしょうか。日本は世界中で核兵器(かくへいき)戦争(せんそう)と原子力発(げんしりょくはつ)事故(じこ)の被害(ひがい)を受けた国です。日本では広島、長崎、福島(ふくしま)の災害(さいがい)は有名ですが、その以外にもたくさんあります。たとえば、東京の江東区(こうとうく)に、第五(だいご)福(ふく)竜(りゅう)丸(まる)展示館(まるとんじかん)と言いところがあります。「第(だい)五(ご)福(ふく)竜(りゅう)丸(まる)」は日本の漁船(ぎょせん)でした。1954(せんきょうひゃくごじゅうよ)年、「Castle Bravo」と言うアメリカが行った(おこなった)水爆(すいばく)実験(じっけん)によってその船は被害を受けました。船員(せんいん)の23人が急性(きゅうせい)放射(ほうしゃ)線症(せんしょう)になって、一人なくなりました。または、カマチョレムスさんがおっしゃった通り、福井県の「原

発電所」と言う場所も訪ねられます(たずねられます)。そこに原子力(げんしりょく)発電所(はつでんしょ)15基(き)が並んでいます。

それに、日本のポップカルチャーに興味があれば、原子核のテーマの有名な作品と関係ある場所も経験できます。作品は「ゴジラ」や「鉄腕(てつわん)アトム」だけではなく、「アキラ」や「風の谷のナウシカ」や「新世紀(しんせいき)エヴァンゲリオン」さえ原子力テーマがいっぱい出てきますので、その作品を作ったスタジオとか資料館とか訪ねられます(たずねられます)。

最後は、原子力(げんしりょく)関連(かんれん)の場所(ばしょ)巡りのためにどんな準備をしたらいいでしょうか。もちろん、ただの旅行の用意が必要ですが、物(もの)や予定以外には心と精神(せいしん)を用意したほうはいいと思います。しかし、心と精神(せいしん)はなぜ用意したほうがいいでしょうか。それとどうやって用意したらいいでしょうか。最初は「巡礼(じゅんれい)」のことを考えましょう。もともと、「巡礼(じゅんれい)」は宗教(しゅうきょう)の経験(けいけん)とつながっています。観光客(かんこうきゃく)は原子核テクノロジーから影響された場所を深くて敬意的(けいいてき)に訪ねるために、どんな考え方や感じ方が適当に考えないことはありません。この巡礼(じゅんれい)のために、日本の宗教(しゅうきょう)の中で禅(ぜん)仏教(ぶつぎょう)の教えは適当だと思います。あるいは 瞑想(めいそう)、反省(はんせい)、無常(むじょう)、宥恕(ゆうじょ)、内なる(うちなる)平和(へいわ)、外(そと)なる平和のことを原子力のことを一緒に分かるようにすべきだと思います。

以上、まとめると、深い旅行を経験したいなら、日本の原子力(げんしりょく)関連(かんれん)の場所(ばしょ)巡り(めぐり)はいかがですか。自分の人生、そして地球に住んでいる皆さんの命をもう少し分かりたい時はこのような原子力(げんしりょく)関連(かんれん)の場所(ばしょ)巡り(めぐり)は素晴らしいと思います。

3.

日本は観光しやすい国だと思います。電車からカプセルホテルまで便利ですし、すしからカレーうどんまでおいしいし、伝統的文化から任天堂まで面白いことをどこでも見つけられます。寺社巡りや温泉旅行なら、たくさんお金がなくても、素晴らしい経験を手に入れます。しかしこれを楽しむためには必要なことが三つあると思います。まずは、日本語をなるべく習うことです。次は日本社会のマナーを学ぶことです。最後に、複雑 面倒な 手続きを我慢できることです。これらを上手くできたら、日本の観光を本当に楽しめます。ですから、日本の観光をもっとも楽しめる人は、日本人ではないでしょうか。だからこそ、多くのインバウンド・ツーリズム・プログラムは日本人向けになってしまっているだと思います。

4.

今日は私の博士課程の研究を簡単に紹介したいと思います。私の専門は科学技術社会論で、特に、原子(げんし)爆弾(ばくだん)と電子力(でんしりょく)発電(はつでん)二つの原子のテクノロジーを研究しております。科学と技術は社会にどんな影響を与えるかと

言う疑問(ぎもん)に答えることが専門の目的です。私の場合は人類学を通じて社会に対する原子が使われているテクノロジーの影響を研究して、日本の社会はどんな影響されているか調査したいと思っています。

皆さんは科学技術社会論という理論(りろん)を聞いたことがありますか。実は博士課程に入るまで、私も聞いたことがありませんでした。この専門はそんなに人気がありません。しかし、ある特別な話題のために社会に知られるようになりました。その話題とは、なぜアメリカと日本は原子のテクノロジーからまだ強い影響を受けているかということです。その話題は2011年3月11日の後で国際的な問題となり、私もその時に考えさせられました。

2011年3月11日、14時46分18秒に東北地方太平洋で日本歴史の上で最大に計った地震が起きました。震度は9.0度でした。地震のせいで巨大な津波も起きました。津波は約40メートルを経ちました。震と津波ことで約2万人が亡くなりました。そのうえ、福島第一原子力発電所が被害を受けましたので、発電所にちかくに住んでいる人々は原発事故による放射線漏れを心配して、避難させられました。地震、津波、原発事故による避難者全額で30万人でした。この不幸な日以降には「3. 1 1」（さんてんいちいち）と呼ばれています。

3.11、私は日本にいました。関西外国語外大で一年間留学中でした。その日は東日本大震災が起こって、世界中の皆はショックを受けました。残念なことに、東北で地震と津波のせいで、二十万人がなくなりました。

私が留学し始めて間もないころは3.11そのものでした。それゆえ、忘れもしないあの事件でした。 私は関西にいて、地震と津波を感じませんでしたので、無事度だと思いましたが、二、三日後、福島(ふくしま)第一(だいいち)原子力(げんしりょく)発電所(はつでんしょ)は震災のためダメージを受けました。原発(げんぱつ)事故(じこ)から放射線が漏れましたが、私のホストファミリー、日本人の友達、日本の政府によると、私は放射線から安全だと言われました。そうなら、なぜ一週間後、一か月後、私の家族、友達、アメリカの政府さえ私の安全を心配しているか分かりませんでした。実は、放射線の汚染(おせん)は海外で大きな議論になりましたので、アメリカにいる人々は心配するようになってきました。この原子のテクノロジーに関連した議論はアメリカでまだ残っています。

その事件は私の心にも残っています。日本にいた私は、その事故をきっかけに、原子力について考えるようになりました。そして、原子力に対する考え方に、日米で大きな違いがあることに気が付きました。That difference is the American obsession versus the Japanese allergy.

アメリカの心の中には原子力への執着(しゅうちゃく)があると思います。アメリカは原子爆弾を開(かい)発(はつ)して、1945年、広島と長崎に落として、原子力時代を始めました。一年後、アメリカの軍隊は原子力発電を進めるとともに、原子のテクノロジーを「平和的なテクノロジー」と言うブランドに変更しました。その時からアメリカの政府は二つの原子のテクノロジー、原子爆弾と原子力発電を世界中でコントロールしようと思いましたが失敗しています。このテクノロジーは失敗だと考えているアメリカ人が

いますが、一方で、素晴らしいテクノロジーだと思っているアメリカ人もいます。自慢じまんも罪悪感ざいあくかんと諦めあきらがけんかしています。議論の背景はいけいはこの通りです。議論は70年以上続いているから、これはアメリカ人の原子力への執着しゅうちゃくだと思います。だから、アメリカ人にとって、「原子のテクノロジー」と「日本」と言えば、広島と長崎と福島 が関連したものとして捉えとらえられるのだと思います。日本に生まれた「ゴジラ」、「アキラ」、「てつわんあとむ」、「風の谷のナウシカ」、「エヴァンゲリオン」などの原子のテクノロジーから影響を受けたポップカルチャーの輸出ゆしゅつもアメリカ人の頭に思い浮かぶかもしれません。まるで日本のポップカルチャーがアメリカ人の原子力への幻想げんそうを強くしているようではないでしょうか。

この原子力への執着(しゅうちゃく)を具体的に説明します。例を一つ、一緒に考えましょう。皆さんは世界中で一番長く放送(ほうそう)している番組をご存知ですか。答えは、1989年にアメリカで放送が始まってから、ずっと続いている「ザ・シンプソンズ」というアニメです。内容はアメリカのどこでもありそうなスプリングフィールドという町に住んでいる典型的(てんけいてき)な核家族の様々な出来事です。しかし、この場合は「核家族」というのは比喻(ひゆ)だけではなく、本当の核、いわゆる、原子力の家族です。なぜかというと、主人公のお父さん、ホーマ・シンプソンは 原子力発電所で働いているからです。ホーマの役は原子力保安(ほあん)検査官(けんさかん)で、偉い(えらい)人しかできない仕事とされています。けれども、ホーマは不器用(ぶきよ

う)でいつもばかばかしいことをしています。事実、ホーマとホーマの一番下の娘、赤ちゃんのマギは被曝(ひばく)しています。他の家族たちも被曝(ひばく)しているかもしれません。ホーマと他のバカな原発(げんぱつ)従業員(じゅうぎょういん)のせいでスプリングフィールド町に住んでいる住民もそうかもしれません。

私は、「ザ・シンプソンズ」は原子力時代を皮肉として表(あらわ)している代表的な話(はなし)だと思います。原子力に核兵器と原発を含むと考えると、30年の間に、原子力についてのテーマが何回も出ていて、シンプソンズの社会に悪い影響をよく与えます。しかしながら、シンプソンズの家族、スプリングフィールド町、フィクションの世界はいつも生き残っています。本当の世界は同じように続く(つづく)かどうか分かりませんが、大人気の「ザ・シンプソンズ」はアメリカ人に 対して三十年間、社会的な問題を投げ(なげ)かけています。そして、だからこ、クリエータたちは「ザ・シンプソンズ」を放送すべきだと言っています。その考えに私も賛成です。人間たちは社会的な問題をポップカルチャーさえに通じて、一緒に考えたり、話したりすべきだと思います。

つまり、アメリカの外交(がいこう)政策(せいさく)、エネルギー政策(せいさく)とともに、「ザ・シンプソンズ」のようなポップカルチャーもアメリカ人の原子力への執着(しゅうちゃく)を強くします。世界中で一番長く放送されているのが「ザ・シンプソンズ」なのは偶然(ぐうぜん)でしょうか。原子力のテーマはわれわれのように原子力時代に住んでいる人間たちに、まだ強い関係がありますから、原子力時代が終わるまで「ザ・シンプソンズ」の放送は続くかもしれません。

5.

先学期、アメリカ人の原子力への執着(しゅうちゃく)について話しました。今日は、まるで逆の現象(げんしょう)について紹介(しょうかい)したいと思います。日本人は原子力アレルギーがあるという表現をしばしば聞きます。しかし、原子力アレルギーとは一体何でしょうか。誰(だれ)がそのアレルギーがあると主張(しゅちょう)していますか。そして、誰がそのアレルギーを決めますか。そのアレルギーについて文化的、歴史的に分析しましょう。

最初に、医学的に言うと、アレルギーとはもとは病気の種類(いっしゅ)です。もし誰かがアレルギーがあったら、あるものを「アレルゲン」として、自分に対して悪い影響を与えるから、そのアレルゲンを自分から遠(とお)ざけます。他方で、社会的なアレルギーは

ある種(しゅ)のトラウマに対して、または脅威(きょうい)を与えるものに対して、また好(この)ましくなく避(さ)けたいものに対して使用されている表現です。つまり、ある問題が自分にとって悪い影響を与える場合、そのことをアレルギーのように遠ざけようとするのです。

アレルギーと原子力テクノロジーはどんな関係があるのでしょうか。アメリカ人は一般的に、原子力時代の危険性を表す例として、最も適当な国は日本だと考えています。なぜかという、日本は原子力のテクノロジーに関して深刻(しんこく)な歴史を持っているからです。日本の人たちは、1945年に原子爆弾(ばくだん)を落とされて被曝

(ひばく)し、1954年には原子力爆弾(ばくだん)の実験で被曝(ひばく)し、また2011年には原発事故で被曝し、三度も被曝した世界で唯一の国民で、歴史的に巨大(きょだい)なトラウマに確かに苦しんでいます。

日本では、日常(にちじょう)会話(かいわ)で原子力テクノロジーの話題になると、先述(せんじゅつ)したトラウマをしばしば比喩的に「アレルギー」と表現されています。言い換(か)えると、アレルギーという表現の一つの役割は三度(さんど)も被(ひ)曝(ばく)した経験からくる原子力のトラウマに対して、カジュアルな表現として使われていることです。私は初めてこういう表現を聞いた時、インターネットで口語的(こうごてき)、あるいは学術的(がくじゅつてき)な定義を探(さが)してみました。「原子力アレルギー」をはじめとして、「原発アレルギー」、「核アレルギー」という表現が見つかりました。

最初は、「原子力」ではなく、「核アレルギー」という表現が使われていました。広島大学平和学研究センターに所属(しよぞく)した研究者のグレン・D・フックによると、「核兵器アレルギー」や「核アレルギー」という表現が1960年代に朝日新聞によってはじめて用いられました。「日本政府が初めて米原子力潜水艦(せんすいかん)の日本寄港(きこう)を承認(しょうにん)した当時の、日本国民の『核兵器』という表現に対する敏感(びんかん)な反応を、特徴づけるために用いられた」ということです。

しかし、このような表現は政治的(せいじてき)な操作(そうさ)の戦略(せんりやく)として使われるようになりました。戦後の国内外の圧力を背景(はいけい)に佐藤政権(さいてんせいけん)は核兵器と原子力エネルギーに関する政策(せいさく)への賛成を国民に求(もと)

めました。核兵器の抑止力(よくしりょく)で日本の安全を保障するアメリカの政策を受けいれ、いわゆるアメリカの核の傘の下に入ること、また国内にあるエネルギー資源(しげん)不足(ぶそく)を背景(はいけい)に、原子力のテクノロジーが日本政府にとって役に立つテクノロジーであるという見解(けんかい)です。しかしながら、国民の原子力に対するトラウマは政治的なハードルでした。それで、政治家はそのトラウマをアレルギーという病気の比喩(ひゆ)表現(ひょうげん)を用いるように変えました。

医学的に、誰かにアレルギーがあったら、他人には無害なアレルゲンでもその人の体には異常な反応があります。同じように、政府にとって、「無害(むがい)」で効果(こうか)的な原子力のテクノロジーに対して日本は異常な反応があるということです。

フックによると「医者は佐藤元(もと)首相(しゅしょう)、患者(かんじゃ)は日本の核化反対者、治療法(ちりょうほう)は反対者に徐々に(じょじょ)に『核アレルゲン』を与えること、というようになる」とのことでした。フックは次の結論を出しました。政府は日本の

核化を進めるために、被爆(ひばく)体験(たいけん)の意義(いぎ)を非正当化(ひせいとうか)した上、計画的(けいかくてき)に核アレルギーという表現に通じる政治(せいじ)操作(そうさ)を動(うご)かして、日本の反核運動が「異常」だという烙印(らくいん)を押しました。

言うまでもなく、歴史は繰り返します。2011年に起きた福島原発事故の後、核アレルギーではなく、原子力や原発アレルギーという表現が生まれ、核アレルギーと同じような政治的な戦略(せんりゃく)が見えます。例えば、あるインターネットの百科

(ひゃっか)事典(じてん)によると原発アレルギーとは「原発事故による放射能被害に対し、放射能に対する恐怖(きょうふ)にかられて正常(せいじょう)な思考(しこう)能力(のうりょく)を失い、放射能の脅威(きょうい)ばかりを誇張(こちょう)した情報のみを信じるようになってしまうアレルギー症状(しょうじょう)」ということです。この定義を分析したら、原発アレルギーという表現は原子力に対して反対の立場にいる人々を批判的(ひはんてき)に捉(とら)えていると指摘(してき)されます。

まとめると、このアレルギーという表現は原子力テクノロジーの問題を表すには適当ではないことが分かります。深(ふか)く残(のこ)っている原子力のトラウマそのものを認(みと)めるべきだと思います。トラウマは病気ではなく、負傷(ふしょう)になるものであり、これまでの治療(ちりょう)ではない、ほかの治療法(ちりょうほう)が必要なのです。

6.

2018年に日本原子力文化財団という一般財団法人が全国世論調査を行いました。1200人が調査に参加しました。調査対象者は15歳から79歳の男女（個人）でした。一つの質問は原子力発電に対する態度について、「今後日本は、原子力発電をどのように利用していけばよいと思いますか」というものです。結果は次の円グラフで表示されています。

一番多かった答えは「原子力発電をしばらく利用するが、徐々に廃止していくべきだ」というものです。この答えは48.4パーセントを占めていて、約半分です。2位は23.7パーセントとなっている「わからない」という答えです。「原子力発電は即時、廃止すべきだ」との答えは12.1パーセントで、3位です。この円グラフでは見えませんが、年齢別の結果によると、30代以下では「わからない」という答えが多くて、60代以上では「即時廃止」の答えがやや多かったです。

東日本大震災以前の状況を維持（いじ）したり、または増やしたりすべきという意見を合わせても、一割に過ぎません。この結果から、2018年の日本の世論は原子力発電に対してやや反対が多かったと考えられます。

7.

今日は私の博士課程の研究を紹介したいと思います。私の専門は科学技術社会論で、科学と技術が社会にどんな影響を与えるかと言う疑問に答えることが専門の目的です。今研究しているのは原子爆弾・核兵器と電子力発電という二つの原子力のテクノロジーにおける原子力巡礼という現象です。

原子力巡礼というのは私が自分で作った言葉で、亜原子あげんし粒子りゅうしが原子核を巡るように、そして、巡礼者が聖せいなる土地を巡るように、人々が原子力時

代のことが深く分かるように、原子力災害さいがいの被災地を字義じぎ通どおりに、あるいは比喩的に巡ることです。

原子力巡礼を説明する前に、この現象を研究しはじめた背景をお話ししたいと思います。皆さんは科学技術社会論という専門を聞いたことがありますか。実は博士課程に入るまで、私も聞いたことがありませんでした。しかし、ある特別な話題のおかげで私はこの専門が分かるようになりました。その話題とは、なぜ日米関係は現在、原子力のテクノロジーからいまでも強い影響を受けているかということです。このことは第二次世界大戦の終わりから続いていて、2011年3月11日の東日本大震災の後で、ふたたび国際的な問題となりました。私は大震災だいしんさいの時、日本にいましたので、私もその時にこのことを考えさせられました。

[3.11 facts]

まず、事実を挙げたいと思います。2011年3月11日、14じゅうよ時46よんじゅうろっ分ぷん18じゅうはち秒びょうに東北地方の沖合おきあいで日本歴史の上で最大さいだいの地震が起きました。マグニチュードは9.0でした。地震のせいで巨大な津波も起きました。津波は約40メートルの高さにおよびました。地震と津波で約2万人まんにんが亡くなりました。そのうえ、福島第一原子力発電所が被害を受けましたので、発電所のちかくに住んでいる人々は原発事故による放射線漏れの心配で、避難させられました。地震、津波、原発事故による避難者は全部で30万人でした。この不幸ふこうな日は「3.11」（さんてんいちいち）と呼ばれています。

3.11 当時とうじ、私は関西外国語大学で一年間の留学中でした。その日は東日本大震災が起こり、世界中の人々はショックを受けました。私が留学し始めて間もないころは3.11一色いっしょくでした。それゆえ、あのころのことは忘れもしません。そのとき、地震じしんと津波を感じませんでしたので、無事だったと思いましたが、二に、三日後さんにちご、福島第一原子力発電所から放射線が漏れました。でも、私のホストファミリー、日本人の友達、日本の政府によると、私は放射線の心配はないと言われました。もしそうなら、なぜ一週間後、一か月後、私の家族、友達、 アメリカの政府さえ私の安全を心配しているか、分かりませんでした。

実は、放射線については海外で大きな議論になっていましたので、アメリカにいる人々は私のことを心配するようになっていたのです。この原子力のテクノロジーに関連した議論はアメリカでまだ残っています。

日本にいた私は、その事故に伴ってともなっておきた議論をきっかけに、現代の原子力時代について初めて意識するようになりました。3.11の経験によって、日本とアメリカの社会に対する原子力が使われているテクノロジーの影響を研究しはじめました。アメリカ人は一般的に、原子力時代の危険性を表すあらわす 例として、最も適当な国は日本だと考えています。なぜかというと、日本は原子力のテクノロジーによる被害に関して深刻な歴史を持っているからです。

[Nuclear Trauma] 日本は、1945年に原子爆弾を落とされて被曝ひばくし、1954年には 水爆すいばくの実験じっけんで被曝し、また2011年に原発事故で被曝したので、三

度も被曝した世界で唯一の国です。私自身も日本の原子力の経験についてそういう風に考えました。なので、原子力巡礼のために世界の中でどこがいいと考えたら、日本が適当な答えだと思いました。そのうえ、日本にある原子力時代の被災地に、復興における何かを学ぶために旅に

出でたらいいと思いました。しかし、日本でフィールドワークを始めた時、原子力に対する考え方に、日米で大きな差があることに気が付きました。

[American obsession]もしかして、アメリカ人は原子力への執着しゅうちやくがあるので、広島、長崎、福島を経験を全部混ぜてしまっているのでしょうか。

[Japan allergy]それとも日本人は原子力アレルギーがあるので、核兵器の影響と原発事故の影響を結びつけるのは違和感があるのでしょうか。実は、執着とアレルギーのあいだに原子力巡礼が存在そんざいしているのだと思いますが、その前にまず、原子力アレルギーとは一体何かを考えます。

私がフィールドワークしていると、日本人には原子力アレルギーがあるという意見をしばしば聞きます。しかし、誰がそのアレルギーがあると主張しているのでしょうか。そして、誰がそのアレルギーの存在そんざいを判断はんだんするのでしょうか。そのアレルギーについて文化的、歴史的に分析しましょう。

[insert allergy happyou here]

このアレルギーという表現は原子力テクノロジーの問題を表すあらわすには適当ではないことが分かります。深く残っている原子力のトラウマそのものを認めとめるべきだと思います。トラウマは単たんなる一時的いちじてきな病気ではなく、長く続

く傷跡きずあとになるものであり、これまでの治療ではない、ほかの治療法が必要なのです。

心理学的に、誰かにトラウマがあったら、セラピーを通してそのトラウマに直接に向き合うことが適当な治療法です。心理セラピストと一緒に自分史じぶんしの中でトラウマの原因を探したり、心の悩みを探さぐったり、問題解決を試みたりします。原子力のトラウマもそうです。直接に向き合うというのは原子力時代の歴史を学まなんだり、被災地を詳しく観察かんさつしたり、被害者の語かたりを聞いたり、自省じせいしたりすることです。そうすると、原子力のトラウマだけではなく、原子力の問題を少しずつ解決する可能性に触ふれます。原子力巡礼をこういう方法として使ったら、原子力のトラウマに対しての治療法として適当だと思います。

[pilgrimage mokuteki's]

では、原子力巡礼のためにどんな準備をしたらいいのでしょうか。もちろん、ただの旅行の用意が必要ですが、物や予定以外に心と精神せいしんの準備もしておいたほうがいいと思います。しかし、心と精神はなぜ用意したほうがいいのでしょうか。そしてどうやって用意したらいいのでしょうか。まず最初は「巡礼」のことを考えましょう。もともと、「巡礼」は宗教の経験とつながっています。観光客かんこうきゃくは原子力のテクノロジーから影響された場所を深く敬意けいいいをもって訪ねるために、どんな考え方や感じ方が適当かを考えずにいることはできません。この巡礼のために、日本の宗教の中で禅仏教の教えは適当だと思います。あるいは 瞑想めいそう、自省じせい、無

常むじょう、内うちなる平和、外そとなる平和のことを原子力のことと共に分かるようにすべきだと思います。

次に原子力巡礼をすると、何が学まなべるでしょうか。原子力テクノロジーは今まで人間の発明の中で一番素晴らしいテクノロジーだと考えられています。一方、生命せいめいに対して一番危険なテクノロジーだとも思われています。どちらが正しいかにかかわらず、原子力時代は世界を変えたことは確かです。人間はそれほど強力きょうりょくなテクノロジーが生命と社会に影響を与える問題に取り組むことが必要です。ですから、原子力巡礼はこの目的のために役立つと思います。

以上、まとめると、深い旅行を経験したいなら、原子力巡礼はいかがでしょうか。自分の人生、そして地球に住んでいる皆さんの命をもう少し深く理解したいなら、このような経験は素晴らしいと思います。

[Thank you!]

以上です。ご清聴ありがとうございました。ご意見やご質問がありましたら、ぜひ、お願いいたします。

8.

[title] 2018年の夏でした。私は広島、長崎、と福島に行きました。私はこの旅に原子力巡礼の名前を付けました。原子力巡礼というのは私が自分で作った言葉で、亜あ原子げんし粒子りゅうしが原子核を巡るように、そして、巡礼者が聖せいなる土地とちを巡るように、原子力テクノロジーに関連した場所を字義じぎ通どおりに、あるいは比喩的

に巡ることです。[question] この旅の目的は原子力時代に起きる生死せいしについて人は何を学んだかを知ることです。今日は原子力巡礼から学んだことをいくつかご紹介したいと思います。

原子力の聖地に行く前に、必要な準備があります。それは放射線について理解しておくことです。原子力から放射線が放出され、放射線のレベルによって生物の体に与えた影響が違います。レベルが高すぎて、放射線障害になる危険性があるし、原子力聖地の状態によって放射線のレベルが違いますし、旅に放射線測定器を持っていたほうが良いです。

私が持ってきた放射線測定器は黄色い携帯のガイガーカウンターでした。旅の相手として、私は機器にガイギちゃんと呼べました。チェルノブイリ原発事故の後で作られた機器で、福島第一原発事故の後でもう一度人気になりました。アマゾンで手軽に買えます。約1万円でした。単位はマイクロシーベルトで、一時間に0.25マイクロシーベルトまでは安全だと思われています。もし、ガイギちゃんは0.30に経つとアラームが鳴きます。

放射線の測定が分かったら、次は放射線のリスクをどのくらい認めるかと心理的に考えなくてはなりません。実は、科学者は低線量被曝の長期的な影響についてまだ議論していますので、巡礼者はどんなリスクのレベルを認めるか自分で決める必要があります。公衆がアクセス出来る土地なのに、いつも放射線のリスクがある程度あります。私はこのリスクを意識しています。私は比較的リスクをとる方なのかもしれません。

心の準備をすることも大事なことです。マインドフルネスのような形で聖地を見るのがよいです。具体的に言うと、自分の呼吸こきゅうと五感と感情を意識しながら、心を静かにします。そうすると、心が開きます。なぜ開ひらかれた心が必要か、それは自分の気持ちと相手の気持ちを尊重そんちょうしつつ、現場の体験を探検たんけんするのがよいからです。この場合、「相手」とは聖地そのものと聖地に関わっている人や物です。例えば、私は広島に行ったとき、原爆ドーム、ドームの下にある灰と土つち、ドームのそばに立っている人が相手でした。確かに放射線のレベルを測はかるためのガイギちゃんも相手でした。つまり、彼らの立場からも自分からもその体験を想像そうぞうすることが心の準備として必要です。

私は心の準備をしてから、まず有名な原爆ドームの廃墟はいきよを訪ねました。ドームを見たら、深刻な歴史を感じました。それから、ドームの近くにいらっしゃった広島核かく攻撃こうげきで被爆した三み登とう浩こう成せいさんという方に会いました。彼は水曜日以外に毎日広島平和公園を案内しています。三登さんが外国人によく聞かれる質問はたくさん地震が起きる国なのに、なぜ日本にはそんなにたくさん原子力発電所があるのかということです。驚いたことに、三登さんは日本政府が核兵器を作る機会を失うしなわないように、原子力発電を核兵器開発かいはつテクノロジーの基礎きそとなるように作ったと答えました。つまり、日本政府は安全保障のために核兵器が含まれた原子力テクノロジーの開発かいはつを望のぞんだということです。三登さんは今でもそうだと言いました。

そうならば、私は原爆ドームは一体何の象徴しょうちょうかと思いました。ユネスコ遺産いさん協会きょうかいのウェブページによると、このドームは「人類史上しじょう初めて使用された核兵器の惨禍さんかを伝える建造物けんぞうぶつ。時代を超え越えて核兵器の究極的きゅうきょくてき廃絶はいぜつと世界の恒久こうきゅう平和の大切さを訴え続うったえつづける人類共通きょうつうの平和記念きねん碑ひとといえる」ということです。しかし、三登さんの話をきいたら、政府の偽善ぎぜんの象徴しょうちょうになってしまっているのではないかと考えました。ユネスコの見方と三登さんの見方を比べたら、どちらが現実げんじつに近いか、気になりました。ユネスコが楽観的らっかんてきすぎるのか、三登さんが悲観的ひかんてきすぎるのか、私には分かりませんが、現実には、この極端きょくたんな二つの見方の間に存在そんざいしているのではないのでしょうか。つまり、どちらの見方も間違っただけでなく、両者の間のグレーゾーンの部分に存在すると思います。現実とは別に、私は何となく原爆ドームの廃墟に心に残る美うつくしさを感しました。

[gunkanjima long shot]その後、広島から長崎に巡礼し続けました。たしかに長崎平和公園も訪ねましたが、他の聖地を紹介したいと思います。面白いことに、広島と違って、長崎のユネスコに登録されている遺産は原爆攻撃に関わっていません。

[geigy closer] 被爆した廃墟がありますが、その廃墟ではなく、軍艦島という廃墟が2015年に「明治日本の産業さんぎょう革命かくめい遺産いさん」として登録されています。なぜ私が軍艦島を原子力巡礼に含めたかというとならば軍艦島は広島や福島にも結びつきがあるからです。

[gunkan rubble 1] 広島と軍艦島の関係は第二次大戦の歴史に見られます。軍艦島はもともと炭鉱でした。戦争の時、日本植民地の労働者ろうどうしゃは軍艦島で日本帝国ていこくのために石炭を掘ほり出す強制きょうせい労働ろうどうをさせられました。つまり、軍艦島は強制きょうせい労働ろうどうと石炭で戦争に力を与えたと言えます。結局、エネルギーの戦場せんじょうでアメリカの原子力は日本の石炭を破やぶりました。

Like Hiroshima, Gunkanjima is also a confusing symbol. It's one of energy transitions, but also...what? Fast violence vs slow violence, gunkanjima was a labor camp for chinese and koreans to literally fuel WWII.

From UNESCO about meiji industrial revolution sites:

石炭という基幹産業からなる技術の集合体は、非西洋国家で初めて産業国家化に成功した世界史上特筆すべき業績を証明している。

While the island is a symbol of the rapid [industrialization of Japan](#), it is also a reminder of its history as a site of [forced labour](#) prior to and during the [Second World War](#).^{[1][2]}

戦後の日本はアメリカを真似まねし、エネルギー資源として軍艦島の石炭から海外の石油、それから福島原子力へと変わりました。私が軍艦島のツアーに参加した時、石炭のピアスを耳につけていたツアーガイドはこのエネルギーの変容へんようについて説明しました。[gunkan quote]

「この軍艦島はエネルギーが石炭から石油に代わるときに、ゴーストタウンになったんです。福島は今度、石油から今、私たちがエネルギーを原子力にというようにしている途中で、事故が起き、一つの町がゴーストタウンになったんです。放射能があるから出て行ってくださいというように。福島も軍艦島と同じような町になってしまう、その背景になったんです。だから、エネルギーがどれだけ重要で、次のエネルギーを何にしなければならぬかというのを真剣に考えましょう。」つまり、エネルギーの変容へんようは軍艦島と福島のようなゴーストタウンを作る恐おそれがあります。1945年8月6日に広島もゴーストタウンになってしまいました。

[gunkan rubble again] ゴーストタウンは廃墟の一種です。文化人類学者の山下やました晋司しんじは廃墟だけが残っている軍艦島は「年間約30万人の観光客が訪おとずれる産業さんぎょう遺産いさん観光かんこうの聖地になっているのである」と述べました。[TEPCO] では、聖地として、廃墟はどんな魅力があるのでしょうか。

[fami ma close] 答えはあるファミリーマートの中に見つけられるかもしれせん。私は最後の聖地として福島のゴーストタウン、いわゆる帰還きかん困難こんなん区域くいきを「リアル福島」というツアーを通じて訪ねました。この地域でモダンの廃墟としてファミリーマートを見ました。建物たてものの周りに植物がはびこっていました。[inside fami] 中は、棚たなから落ちて腐くさった商品が散らかっていました。普段のコンビニの便利さは全く消えてしまっていて、便利さの代わりに、消えゆくものが花のように美うつくしく咲いていました。

ツアーの後で、ガイドの方かたは帰還きかん困難こんな区域くいき、つまり立ち入り禁止区域にある廃墟について話しました。[baka quote] 彼にとって、廃墟に行ったら、「自然が人間の作ったものをまったく無視して、テイキングバックしているでしょう。それは美しい、美しいし、人間の馬鹿さばかさ加減かげんと、その人間を超えた何かがそこに見えるような気がする。それは例えばダークツーリズムの一つの要素だと思うんだけど、全然それは悪いことじゃない。」と言いました。[family long shot] あのファミリーマートに入ったら、私もこの美しさを感じました。退廃的たいはいてきな美うつくしさとも言えます。

-Something about nature from that philosophy live book?

-In the west we save nature (save the planet, env. movement) but in Japan nature saves us (nature as refuge) so we don't really have to do anything (mui shizen--doing nothing and taking things as they come--surrendering oneself to a higher power or a force greater than yourself--is that what awe and the sublime make you feel? Like surrendering, rejoining, not being alone anymore?

そして、破壊はかいは新しい創造そうぞうへと向かいます。この地域は大事な過程かていを表あらわします。3.11は10年前に過ぎないのに、世界を変えた出来事としてももう過去かこのものになりました。先述せんじゅつした文化人類学者の山下によると、福島第一原発げんぱつは過去かこの遺産になりつつある場所です。それで「福島第一原発を「平成日本の産業さんぎょう遺産いさん」としてユネスコ世界遺産に登録すべきではないかと考えている。。。こうして、福島第一原発は産業さんぎょう遺産いさ

ん観光かんこう／ダークツーリズムの聖地となる」と主張しゅちょうしました。私にとって、現代人は発電所だけでなく、ファミリーマートのようにはかない廃墟はいきよも大事にすべきだと思います。

[lesson quotes] まとめると、原子力巡礼をしてから、今の原子力時代について大事な教訓きょうくんを学びました。それは 「表おもてがあれば裏うらもある」ということわざ、あるいは「表裏ひょうり一体いったい」という四文よんも字じ熟語じゅくごの意味でした。歴史的に原子力テクノロジーは非常に魅力がありましたが、戦争と平和、生せいと死、苦しみと美うつくしさ、両方が絡からまっています。原子力時代は矛盾むじゅんの時代だと思いますが、生命せいめいもそうではないでしょうか。 Ruins as important cultural site, that's why UNESCO collects them, but they focus too much on the positive side. That's why nuclear ruins are special, there's a darkness to grapple in the ruins along with the light.

[arigatou] 以上です。ご清聴せいちょうありがとうございます。ご意見やご質問がありましたら、ぜひ、お願いいたします。

CHAPTER 7

We Are All Monsters: Radical Relationality During Planetary Crisis

*[Dear Reader: This piece was published in [Art+Media: Journal of Art and Media Studies](#) (No. 30 [2023]: Issue No. 30, April 2023) under the main topic “Cosmographies of Worlding and Unworlding,” edited by Jon McKenzie. In his editor’s note to the reader (how fun, a reader’s note within this reader’s note), he writes: “Across the arts and sciences – as well as that stretch Derrida calls *lifedeath* – the ontological turn has challenged Descartes’ founding of the modern world on human subjectivity, shaking the very foundations of aesthetic experience and experience itself. Facing global eco-anxieties of the Anthropocene, COVID, militant nationalisms, and critiques of extractive knowledge production, some seek the world’s worlding, others its unworlding; some practice universal design, others pluriversal design; some call for cosmopolitics, some *cosmotechnics*.” Later, in his introduction to the special issue, he refers to those of us who, in the issue’s pages (at times rather ravenously, at least in my case), chomp on these aforementioned challenges as “avant-garde disastronauts.”]*

Abstract:

Earth’s climate is ever changing; yet for the first time in our planet’s history, *Homo sapiens* are the primary agents of this change. With this realization in mind, some geologists hope to rename our current terrestrial epoch the Anthropocene. Critical theorists have responded with alternate names – such as the Capitalocene or the Plantationocene – that point directly to the kinds of human activity that have led our planet to its current predicament. This paper begins with the premise that we are currently living through what environmental philosopher and multispecies feminist theorist Donna J. Haraway has named the Chthulucene: the age of monsters. If rationalocentric thinking of Enlightened Man helped bring about the Anthropocene, then what kind of worlds can emerge by turning away from Man and towards a radical reimagining of ourselves as monsters? What can chthonic stories teach us about how to live and die well together during a time of mass extinction? Drawing primarily from the emerging interdisciplinary field of art, science, and technology studies (ASTS), this paper offers a creatively narrated analysis of three chthonic narratives: Cold War satirical film *Dr. Strangelove or: How I Learned to Stop Worrying and Love the Bomb*, Octavia E. Butler’s post-nuclear-apocalyptic novel *Dawn*, and my own psychotic episodes involving nuclear apocalypse. These narratives, along with

the Chthulucene itself, challenge the Western cultural distinction between the real and the imagined in order to make room for radical forms of relationality that can change how we Earthly beings identify, respond to, and care for each other as we collectively move through our planetary crisis and into other possible worlds.

Keywords: speculative fiction; creative nonfiction; environment; ontology; embodiment

Introduction: Suspended disbelief

This is it, the apocalypse

I'm waking up, I feel it in my bones

Enough to make my systems blow

Welcome to the new age, to the new age...

I'm radioactive

—Imagine Dragons^[1]

I encourage you, dear reader, to question your unwavering identity as human, as a *Homo sapiens*. In fact, set it aside for the duration of this essay. The enlightened, rationalocentric, and imagined Western conception of the Human has proven to poorly serve those dependent on planet Earth and its life systems—and I believe that includes all of us, regardless of our taxonomy.

Instead, I want you to imagine yourself as a monster, living in a world populated with nothing but monsters. What's more, being monstrous, I am in you, and you are in me. It is difficult to tell where I end and you begin.

Western myths, legends, and fairy tales have taught us over the centuries that the monster serves as foil to the human. Whether tentacular, fanged, or horned, a monster's grotesque visage is a physical manifestation of its chaotic, destructive, or evil intention. Monsters have terrified humans for ages because they are portrayed as diametrically opposed to the positive qualities of humanity: they lack the capacity to love, empathize, or care for anyone but themselves and their obsessions. Their existence is a threat to the human way of life. They must be vanquished for humans to flourish.

This is a rather simplistic understanding of monstrousness. It is also a dangerous one, especially when hegemonic forces make certain groups of humans (and non-humans) monstrous in this simplistic sense due to their genotypic, phenotypic, or cultural differences.^[2] In this essay, I reclaim the monstrous category. No longer the foil to some ideal notion of the human, the monsters I deal with here are complex: human, nonhuman, and more-than-human amalgamations. They are capable of loving and hating, of caring for some but not others, with varying degrees of selfishness and obsession. They have the power to both destroy and to create worlds, sometimes at once. These are the

monsters that environmental philosopher and multispecies feminist Donna J. Haraway calls the “chthonic ones.”

I am of the position that the current planetary crisis we Earthlings face is best understood as what Haraway has described as the Chthulucene, or the age of monsters, in *Staying with the Trouble: Making Kin in the Chthulucene*.^[3] The Chthulucene is a temporality of the here and now, in which humans and nonhumans are inextricably linked. Multispecies survival in this timeplace hence requires imagining ways of relating to each other that are more mutually generative rather than destructive.

Here’s the thing about imagination: Despite what I was taught as a child, one does not necessarily grow out of the world of make-believe. After experiencing two weeks of insomnia-induced mania and psychosis in January 2022, and later being diagnosed as bipolar at the age of 31, I have come to realize that my beliefs about the world(s) around me can sometimes become embodied, a felt reality of such veracity that my distinction between the real and the imagined has been irrevocably transformed. Fact and fiction are no longer dichotomies, but rather exist on a continuum of shared embodied experience. I no longer ask myself “is this real?” or “did I imagine that?” but rather “who/what else shared this experience with me?” and “how can I commune with those who shared this experience?”

The latter set of questions help me relate to myself and others in radically different ways. For one, the answers are never “no one/nothing” or “I cannot commune”. This is the practice of radical relationality that Haraway calls *sympoiesis* or “making-with.”^[4] *Sympoiesis* challenges the notion that I am ever a singular *I*. Since experiencing manic psychosis – which I would more accurately describe as waking dreams – I have been practicing phenomenologically what it means to be a constant, everchanging *We*.^[5]

I use the phenomenological insights from my psychotic episodes and bipolarity to explore two states of monstrosity as theorized by Haraway that I have found in Stanley Kubrick’s 1964 Cold War satire *Dr. Strangelove or: How I Learned to Stop Worrying and Love the Bomb* and Octavia E. Butler’s 1987 science fiction novel *Dawn*.^[6]

Haraway plays with many monstrous forms in *Staying with the Trouble*. The two kinds of monsters, and their qualities, that I find more useful to think with than the monsters of lore are what Haraway calls the *godkin* and *oddkin*. [MC1] [LL2] The former applies to a markedly Western, rationalocentric, ideal form of *Homo sapiens* known as Modern Man, and those that strive to embody him (regardless of their race, gender, or creed): those who embrace and idolize White, Judeo-Christian, colonialist, neoliberal, heteronormative, ableist, and otherwise xenophobic ways of being.^[7] *Godkin*, otherwise known as “sky-gazing *Homo*”,^[8] are beings of the sky, full of masculinist universals and human

exceptionalism, who look up to God or technology or both to save humanity from ecocide and Armageddon.^[9] The monsters in *Strangelove* are godkin. It is rather apt that their war is fought in the sky, their weapons as radiant as a thousand suns.

Oddkin, in contrast, are also known as the chthonic ones, meaning “of the earth”. They are everyone who falls out of the celestial godkin category. These monsters are cyborg, chimera. They are “intra-active entities-in-assemblages”, human and more-than-human, more than a single body, species, or entity.^[10] Also known as critters (though they need not be organic or biotic – for example, they can include machines and pieces of furniture), they challenge the notion of stable bodily boundaries:

Critters – human and not – become with each other, compose and decompose each other, in every scale and register of time and stuff in sympoietic tanglings, in ecological evolutionary developmental earthly worlding and unworlding... Critters are in each other’s presence, or better, inside each other’s tubes, folds, crevices, insides and outside, and not quite either.^[11]

Oddkin are hybrid creatures whose bodies-as-assemblages, as well as their ways of sensing and relating to others like and unlike themselves, challenge the aspirations and orchestrations of godkin. Despite their celestial origins, Butler’s Oankali, the extraterrestrial entities introduced in *Dawn*, the first of the

Xenogenesis trilogy, squarely fall into the oddkin category. The humans that survive the nuclear apocalypse instigated by the godkin when the Cold War turned hot must struggle to transition from godkin to oddkin. Some are unable to let go of the old ideals that eventually led to ecocide. They cling tightly to ideas of the nuclear family (kindly note the pun) as well as the godkin's myth of the Human. Others undergo a more intriguing and promising symbiotic transition.

My own personal encounter with nuclear apocalypse in the form of psychosis helps me make sense of the kinds of monsters I encounter in *Strangelove* and *Dawn*. Thus, these three chthonic narratives have helped me explore what it feels like to be monstrous, to seriously identify as a chthonic one. They help me relate to myself and others as monsters with unstable bodies, always becoming and unbecoming. By learning how to feel and relate in this way, sympoietically, perhaps both you and I, dear reader, can learn to live together amongst the dying, and die together amongst those who will outlive us. These stories offer examples of how to make kin, not enemies, which requires empathy and a recognition of oneself in the other, no matter how foreign or repulsive they may initially seem.

In short, I encourage you, dear reader, to identify with both godkin and oddkin, as I have, with both kinds of monstrosity and every other in between. I ask you not to vanquish the monster like the knight in shining armor, but to love them as you would yourself. Because you are them. You are in them, and

they are in you. By identifying with monsters, with your own monstrosity, perhaps you will learn to thrive alongside them. This is radical relationality.^[12] This is what multi-species – and multi- monstrous – life in the Chthulucene calls for. Welcome.

The Godkin: Learning to Love the Bomb is Strange

Dr. Strangelove or: How I Learned to Stop Worrying and Love the Bomb had its box office release in 1964, a year and three months after the Cuban Missile Crisis. In the film, Cold War maneuverings between the Soviet Union and the United States literally turn explosive when a paranoid US Air Force officer, General Jack Ripper, manages to outwit the complex series of checks and balances meant to keep nuclear warfare a real threat but not an actual reality. Sworn Soviet and American enemies must then work together to recall a team of American bombers who have been fooled into deploying their nuclear arsenal. The attempt to recall the wing fails in a darkly hilarious fashion. The subsequent nuclear attack on the USSR triggers the nuclear apocalypse in the form of a “doomsday machine”, a special nuclear device meant to “destroy all human and animal life on Earth” and is programmed to self-destruct if it senses either a nuclear attack or an attempt to defuse the machine.^[13] The film ends with multiple mushroom clouds blooming over the Earth’s atmosphere.

Being in the Chthulucene, I take the film's seemingly sarcastic subtitle seriously. I'm not sure if I've stopped worrying about the possibility of a nuclear holocaust, given the over 12,000 nuclear weapons stockpiled around the world.^[14] But as a chthonic story, the film is teaching me to see parts of myself in every character and the monstrous assemblages they make. The nuclear godkin are egoistic, self-serving. They try to protect the boundaries of their bodies and their egos and their interests too tightly, seeing threats everywhere. Yet the generals, soldiers, the bikini-clad secretary, and even the nuclear bombs themselves; they are the godkin inside of me.

One monstrous assemblage of godkin is particularly revelatory. It consists of Air Force General Jack Ripper, his team of B-52 bombers (including the planes, the nuclear warheads, and the "A Toast to Bikinis" issue of *Playboy Magazine* that an airman keeps for company[MC3] [LL4]), and fluoridated water.^[15]

After General Ripper has issued the attack orders from the Burpelson Air Force Base which he commands, fooling his pilots into believing that the Russians must have launched the first strike, he locks himself into his office with fellow officer Group Captain Lionel Mandrake. Noticing the general's strange behavior, Mandrake becomes suspicious of the general's orders and fears that Ripper has gone insane (after all, only a madman would actually start a nuclear war). The audience learns that Ripper has become so paranoid about the enemy

that he believes they are fluoridating American drinking water as a form of mind control. As a precautionary measure, the general now subsists on grain alcohol mixed with rainwater. Stone-faced, and with an even yet resolute tone, he tells the frightened Mandrake that he can “no longer sit back and allow ... the international Communist conspiracy to sap and impurify all of our precious bodily fluids.”

This monstrous godkin amalgamation is best described in a transcript of General Ripper’s phone call with Strategic Air Command Headquarters. When asked if he meant to launch the first-strike attack, Ripper replies:

Yes, gentlemen, they are on their way and no one can bring them back. For the sake of our country and our way of life I suggest you get the rest of SAC [Strategic Air Command] in after them, otherwise we will be totally destroyed by Red retaliation. My boys will give you the best kind of start: 1,400 megatons worth. And you sure as hell won’t stop them now. So let’s get going. There’s no other choice. God willing, we will prevail in peace and freedom from fear, and in true health through the purity and essence of our natural fluids. God bless you all.

When the US President hears the transcript, he proclaims, “This man is obviously a psychotic.” (As though the entire game of nuclear chicken that the world’s superpowers had the biosphere engaged in was not.)

The monster-as-assemblage described in the transcript – which includes General Ripper, the men in the War Room, the men in the sky, all their bodily fluids, even the sky and its rainwater – is one blinded by the inability to see

themselves in their enemy. The identities of the men in the assemblage, who see themselves as rational, honorable heroes protecting a sacred way of life, prevent them from relating to those that deviate from their ideals and narrow worldview. Ripper's paranoid obsession with the purity of his nation's bodily fluids – along with his eventual suicide – reveals how alienating and ultimately destructive self-preservation becomes; better to destroy oneself than merge with something foreign and seemingly abhorrent. The policing of bodily boundaries becomes self-destructive in the end. The entire Cold War machine (except for perhaps the mushroom clouds, who have the last word) fails to accept the collections of human and non-human others as part of itself.

The film's lesson for me is to not let fear and paranoia surrounding identification with the other lead to the creation of enemies and, ultimately, mutual destruction. Having felt the fear and paranoia of a nuclear attack during a psychotic episode (such feelings are common during psychosis), I especially empathize with the consuming nature of General Ripper's fear. Yet I do not fear impurity as he does. In the Chthulucene, purity is not only impossible, it is unethical. I recognize myself in others, human and beyond-human, living and non-living. I do not seek to make them threats to my identity. I choose to make kin, not enemies, even with the godkin. How do I embrace them with love, compassion, and forgiveness without condoning their actions? How do I see myself in them? Yes, making kin in this way is daunting and at times terrifying.

Yet it is how I work through my fear of nuclear apocalypse. This is what learning to love the bomb means to me.



Figure 1 Movie still from *Dr. Strangelove*: General Jack Ripper reflects on the purity of his nation's bodily fluids. By x-ray delta one, licensed under CC BY-NC-SA 2.0.



Figure 2 Movie still from *Dr. Strangelove*: Major TJ “King” Kong rides the bomb that triggers the nuclear apocalypse. By twm1340, licensed under CC BY-SA 2.0.

The Oddkin: Tentacular Love

If *Strangelove* highlights the destructive results of the godkin’s alienation, Butler’s science fiction novel, *Dawn*, demonstrates the creative potential of the oddkin. *Dawn* was written as the first installment of the *Xenogenesis* trilogy by Octavia E. Butler in 1987, before the collapse of the Soviet Union. It starts where *Strangelove* ends: Planet Earth is destroyed after the Cold War turns hot and a nuclear apocalypse leads to ecocide. A highly advanced alien species called the

Oankali, in search of a new home planet, scoop up the surviving humans and other Earthly lifeforms in order to exchange genetic material with them and create new hybrid species of life fit for survival on the irradiated Earth. In order to ensure a symbiotic relationship, the Oankali make genetic modifications on the surviving humans, resulting in the latter being unable to reproduce without also having Oankali mates. The humans must then decide to either hybridize with the Oankali and rebuild Earth together or continue what the nuclear war started and allow *Homo sapiens* to go extinct. In short, the organisms best suited for survival in this post-nuclear-apocalyptic world are those that accept entering symbiotic relations with vastly different life forms.

The Oankali are so phenotypically different from the humans that they seem monstrous in the archaic, fairytale sense. The humans find them “grotesque, repellent beyond mere ugliness”, with wormlike and snakelike sensory tentacles covering most of their bodies.^[16] However, there are ways in which the Oankali are even more humane than the humans. They are such empathic and sensitive creatures that they literally feel the pleasure and pain of those around them by “plugging into” their central nervous systems with as little as a touch.^[17] Their ability to perceive and effectively interpret human body language, as well as the human genome, is such that they seem to read human minds as they simultaneously cure their bodies of diseases such as cancer. The Oankali do not settle conflicts with violence. They are even vegetarian.

The Oankali highly value diversity. Unlike the humans who reject them for being so utterly foreign, they seek out difference, recognizing it for the evolutionary imperative that it is. Having no home planet of their own, hybridization with species from other planets is how they have been able to survive and evolve into highly advanced beings that can travel across the galaxy.

For the remaining humans, the price of continued survival on Earth requires an incredibly intimate form of interdependence – accepting Oankali mates and giving birth to a new hybrid species, no longer purely human, no longer purely Oankali. If the humans can accept the Oankali as kin, creating and raising families with them, then the Oankali will alter the surviving humans' genes so that, in their own lifetimes, they will become not only faster, stronger, and smarter, but also more empathetic, more feeling, and much less likely to inflict pain or resort to violence, since they will be able to feel the pleasure and pain of others as though it were their own. Individual experiences are thus superseded by collective felt experiences thanks to vastly improved sensory communication between bodies. In this way, bodily boundaries themselves are constantly contested.

Unfortunately, most of the surviving humans presented in the novel would rather die than “betray” their humanity and engage in such an “unclean” way of life.^[18] Like General Ripper and his fellow godkin, by rejecting the oddkin, most humans choose sterility and eventual self-annihilation for the sake of misguided

ideals about purity. Only one human, Lilith, ultimately concedes to having a hybrid child. Yet even she struggles to accept the child. When she tells her Oankali mate, Nikanj, that the child will be a monster because it is not human, Nikanj responds, “You shouldn’t begin to lie to yourself. It’s a deadly habit ...Our children won’t destroy themselves in a war, and if they need to regrow a limb or to change themselves in some other way they’ll be able to do it.” To which Lilith retorts, “But they won’t be human ... that’s what matters. You can’t understand, but that *is* what matters.” Nikanj, however, has the final sage word: “The child inside you matters.”^[19]

This chthonic story shows what kinds of worlds are possible if human beings embrace their oddkin. The humans who believe too adamantly in the myth of singular species purity (to say nothing of the racial or ethnic or ideological purity touted by godkin) fail to recognize that they are *already* multispecies hybrids by virtue of being Earthlings. They fail to see themselves as *already* a part of the other. Like in *Strangelove*, this mistake will prove to be their downfall.

By the end of *Dawn*, readers who want to thrive on this new Earth are compelled to accept a new monstrous way of life as oddkin, one that stands a decent chance at symbiotic thriving. If readers side with multispecies survival, then they will embrace the Oankali’s sympoietic offer. Perhaps they will even

recognize that by continuing to live on Earth, they have already accepted such an arrangement with the chthonic ones that populate it.



Figure 3 Oankali parent with Oankali-human hybrid child. Courtesy of the artist Christian England.



Figure 4 Akin, Oankali-human hybrid son of Lilith (human female), Joseph (human male), Nikanj (third sex ooloi), Ahajas (Oankali female), and Dichaan

(Oankali male). He has inherited genes from all five parents. Courtesy of the artist Christian England.

Waking Dreams

In January 2022, in the back seat of a friend's car, I lived through the nuclear apocalypse. The radio had just announced the start of World War III. I could hear the sirens' wail of warning. I became panic-stricken, waiting for the bombs to fall. I counted down from ten. *When I get to zero, I thought, I will be consumed in a blinding flash of fire and heat. This is how I die. Three, two, one ...*

But when I got to zero, nothing happened. My friend continued to drive me to the hospital to get treated for what was later diagnosed as a psychotic episode. I was informed that the doomsday announcement I had heard on the radio was an auditory hallucination. Yet the whole thing had felt so *real*.

Psychotic episodes for me feel like being caught in a waking dream. My body is physically awake, but my mind is like that of the dreamer's, experiencing fantastical or terrifying scenarios, not realizing that I have been dreaming until I have "awakened" from the episode. Yet my waking dreams are *real*. I feel them bodily. During that same apocalyptic car ride, I later recalled sharing my consciousness with the car itself. I sensed the car's being in a new way. Somehow, we had merged. Its movements were my movements. Like the Oankali "plugging into" another organism's nervous system, the car and I momentarily became one.

The experience reminds me of something the Oankali Nikanj says to Joseph, Nikanj's other human mate that both Lilith and Nikanj share (before Joseph is murdered by other humans for siding with the Oankali). In an attempt to reassure Joseph that mating with Nikanj and Lilith will not be abhorrent, Nikanj tells Joseph, "I offer a oneness that your people strive for, dream of, but can't truly attain alone." Indeed, a sexual encounter between these three mates later fulfills that promise. Told from Lilith's perspective, the passage reads:

It seemed to her that she had always been with [Joseph] ... He had always been there, part of her, essential. Nikanj focused on the intensity of their attraction, their union. It left Lilith no other sensation.^[20]

In other waking dreams, I have felt what it's like to be the microbiome of my gut and the macrobiome of the biosphere. I have simultaneously felt multiplicity and singularity. I feel like myself and not; it feels sticky and writhing and busy. My escapes into waking dreams have expanded my sensorium by turning my imaginings into felt realities. The result is that my imagination carries more weight now, even when I'm not having an episode. Stories become real. They penetrate me. I feel my monstrosity and embrace it. The bomb. The car. The biosphere. This is what it feels like to take the Chthulucene seriously.

On January 19, 2022, during a moment between episodes when I was manic yet lucid, I wrote the following journal entry:

Hello world. I'm back. I never left. I am just one decimal point shifted from whatever I was before. That's why the world is infinite. Infinite worlds, constantly being created and destroyed. We exist in our current forms for as long as we need to. Until our fear becomes our obsession, kills a piece of us, and the fear releases you out of your prison of your own fear's creation. And then you are in paradise... The fear itself ends you. And that's okay because we always end, a million ways, a million little deaths, shifts in the decimal point. So we are all constantly dying a little and being reborn a little into new worlds. And so the universe is a multiverse is infinite and will return to nothing, does so all the time.

The secure sense of self, of individuality, that I had taken as a given before I had my episodes of mania and psychosis is now fragmented. I now interpret 'my' bodily sensations more loosely and capaciously, reminding myself that I don't have to believe the quotidian assumption that this body ends at the skin. The heightened sensations I feel when manic, coupled with my waking dreams, help me embrace my monstrousness, practice embracing the other monstrous godkin and oddkin, even if it means relinquishing my sense of self.



Figure 5 "g/oddkin Amalgamation I" by Lissette Lorenz. Mixed media collage.



Figure 6 “g/oddkin Amalgamation II” by Lissette Lorenz. Mixed media collage.

* * *

The Quantum Conflict Resolution Group that I have been a part of for the last few years recently circulated the afterward to a new book by Stefano Calzati and Derrik De Kerckhove called *Quantum Ecology: Why and How New Information Technologies Will Reshape Societies* (2024). The first few paragraphs do such an impeccable job of describing my experience of psychosis/waking dreams that I have included it the passage here for us to chew on:

Literature, Western, Eastern, or even Aboriginal, contains a wealth of suggestions to support quantum physics' basic tenets. Joyce's Finnegan's Wake is a pun filled display of superposition and uncertainty to educate abcedminded people about the blinding power of literacy from alphabettors to alforabit, his lightning insight about the coming digital transformation. But Joyce's most telling line is that from Ulysses quoted above. The suggestion that reality is a dream is not new as it is found from Heraclitus and Plato all the way to Joyce via Zhuangzi and Descartes. What is surprising is that in all such elucubrations, while most mention the fact that the dreamer is not aware of only dreaming, none question the experience of the dreaming self occupying centrally the scene of the dream.

Letting physicists, 'realists' or otherwise, argue about the objectivity of the real and/or its dis/continuity with the observer, an interesting – and promising – approach is to suspend belief about the continuity of existence and imagine, better, experience, the appearance of the world as an epiphany, as something that has 'just arrived' and that keeps arriving for the first time, every time people apply a critical awareness to their live participation in the world instead of taking it for granted. Of course, this alternate response to reality is, or rather was, counterintuitive before quantum physics introduced a serious doubt about continuity. The perdurance of their surroundings and the seamless continuation of their lives, plus or minus moments of inattention or forgetfulness, would naturally lead people to trust absolutely that their house or their office has not moved, changed, or disappeared when they are travelling elsewhere. Cats and dogs too know their way back home without trying.

Experiencing the world as a sudden epiphany instead of an objective continuum is not as difficult as it may appear at first. We do it every night, at least those among us who dream. During the time I dream, I am participating into a 'real' experience and, only in retrospect, when I wake up do I realize that not only none of it happened but that I ruefully attributed to places and events the instant recognition of extant reality and referentiality despite the same places and events being substantially different – some even inexistent – from the ones that I really know or remember. To say nothing, of course, about the defunct people who somehow 'resurrected' without doubt or question in my dream.

The other thing to note about the similarity between dreaming and the world as epiphany is that both depend upon the specificity of my unique and central presence in the scene. I, the dreamer, have created the scene, with my personality, my previous experience and even, in turn, depending on where I am living at the time, using the three languages I speak. Now, while my dreaming consciousness has clearly summoned the experience, one could object that here, as I write, my wakeful condition differs absolutely from the dream. How could I pretend that it is me who summons the reality of the world out there with all its complexity, cosmic dimensions, and accumulated memory? Precisely because of entanglement. What is common to both dream and "reality" is that both are totally entangled. I am no more in the world than I am in the dream, I am an integral part and parcel of both. What distinguishes both experiences, is that the first is shared, but not the dream.

Precisely because it is shared the entanglement that binds me to the world brings on a kind of responsibility that is not in a dream (apart from wakeful or "lucid" dreaming, a different story altogether because while there is a sort of responsibility it is only to a fiction about which the lucid dreamer is fully aware). In the world, I have power of action and decision that are effective, even at the slightest move. To be or not to be is to be responsible, if not to others, at least to oneself as we propose in chapter one, or in a quantum worldview, to the whole environment. Different religions and secular ideologies have primarily oriented and justified the kind and the object of responsibility individuals and societies should take on and respect each according to their worldview. They may have worked for a while, but it would be difficult to assert today in view of the disastrous world scene, that they are doing very well at all. But then, why would reconsidering the world as an epiphany in which humans play an integral, participative, and ever active part be different?

It would be different because, by becoming aware of being co-substantial and bound to the whole, of which each one is a unique part, would change the ground of existence itself. The axis of responsibility would not be to the other as in

*“shame” cultures, or to the self, as in the “guilt” cultures, but to the world, beginning with the Earth, of course, as the ancestors, the “primitives”, the aboriginals saw it. With that in mind, would society continue to tolerate the suffering, not only of people abjectly left to burn, drown, and starve under climactic conditions that greed created, but also of butchered animals and torn plants and mined rocks denied the respect they once received from people less technology-savvy than today?*²³

Conclusion: A Powerful Imagination

If you, my dear reader, can accept that the imagined is real, that it can be felt and embodied, then perhaps you can accept that the chthonic stories we have explored here are also real and have real world-building consequences. Reality is what you sense, what you notice, and what you attend to. Its materiality is flexible.

Haraway writes, “Neither One nor Other, that is who we all are and always have been. All of us must become more ontologically inventive and sensible within the bumptious holobiome that earth turns out to be, whether called Gaia or a Thousand Other Names.”^[21] Taking chthonic stories seriously, having them change our ontological positions on what we consider to be real or not, human or not – a serious reading (not dismissing it as pure fantasy and fiction) – helps us answer Haraway’s call to become more ontologically inventive. Accept that godkin and oddkin are two sides of the same monstrous coin. Because after all,

²³ Page count forthcoming, once I receive my reviewer’s copy of the book in the mail ☺

“all earthlings are kin in the deepest sense.”^[22] If we can recognize this subatomic and phylogenetic fact, then we may stand a chance at thriving together, regardless of the shape and number of appendages we use to sense each other with.

I hope these chthonic stories have challenged you to identify as more than just yourself, with one body and one mind. I hope they have encouraged you to be more open to experiencing yourself as otherwise. You are not only what you eat, but also what you hear, see, smell, and feel. The water you drink and the air you breathe is ancient and monstrous, too. I encourage you to identify with everything your senses encounter, everything you are able to perceive. You are a composite, a continuum. With the help of your imagination and empathy, may chthonic stories help you embrace your monstrousness so that you may embrace all the other monsters around you.

Our monstrosity teaches us how to live with, beside, and inside difference. Whether imagined or materially manifested in consensual reality, telling more nuanced and creative stories about monsters is crucial to relearning how to relate to all the other parts of ourselves that we have abandoned, dismissed, or tried to destroy. Embracing our monstrousness means embracing others as ourselves. Because in the Chthulucene, they are.

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Fourth Interlude

Re: Congratulations!

September 16, 2024

My Dear Esteemed Cornell S&TS Colleagues,

I am writing to extend my heartfelt congratulations to our department for its pivotal role in the establishment and growth of the new subfield known as Art, Science, and Technology Studies (ASTS), or art-science. This innovative and transdisciplinary field has emerged as a testament to our department's commitment to pushing the boundaries of traditional academic disciplines and fostering a collaborative environment where the boundaries of art and science are dismantled.

It is with great pride that I highlight the remarkable achievements of our recent Cornell S&TS and affiliated PhD graduates who have been instrumental in shaping this burgeoning field. Their collective efforts culminated in the creation of the *Routledge Handbook of Art, Science, and Technology Studies*. Three of the four editors of this comprehensive guide (Hannah Star Rogers, Katheryn de Ridder-Vignone, and Megan Halpern) are Cornell S&TS/Science Communication PhDs. Cornell S&TS graduate and current Visiting Professor Owen Marshall's chapter on sound art, and which was based on his successful dissertation for the department, is now a forthcoming book with MIT Press, *Auto-Tune and The Political Economy of Pitch Correction*. In my case, it was truly an honor to have been able to contribute to the "Democracy and Activism" section of the *Handbook* through my chapter, "Rustbelt Theater and Citizen Science: Children's Environmental Justice Narratives," and for said chapter to have received the department's Sheila Jasanoff Prize for Academic Excellence in Science & Technology Studies. Moreover, as demonstrated by Maja Horst's (2024) recent positive review of the *Handbook* in the journal *Social Studies of Science*, it is rapidly becoming an essential resource for scholars and practitioners alike. Along with Rogers' recently published monograph *Art, Science, and the Politics of Knowledge* by MIT Press (and based on her Cornell S&TS dissertation), recent Cornell S&TS scholarship has greatly contributed to providing the necessary framework for understanding and exploring the dynamic intra- and interplay between the knowledge communities that make up art, science, and technology worlds from a critical, nuanced, and symmetrical perspective.

Our department's dedication to nurturing and training new faculty in ASTS has been equally commendable. Through the Science Studies Reading Group (SSRG) and other collaborative projects, we have equipped a new generation of scholars with the skills and knowledge necessary to thrive in this exciting field.

On a personal note, I am deeply honored to be presenting to the department its first all-out art-science dissertation (and by that I mean that the form of writing—dissertation as a *genre* of storytelling—is as much an art-science object to be encountered and devoured by the reader as is its discursive contents—in other words, the format of the story co-produces the meaning of the story itself—it's stories all the way down folks!). It is a project that I hope will continue to build upon the legacy of our late beloved colleague, mentor, and friend Trevor Pinch. His pioneering work in STS, combined with his love for artistic (and scientific) making and doing, helped set the stage for ASTS' coming of age; those of us in the art-science community were truly saddened to lose him before the release of the *Handbook*, for which he so generously wrote a forward. Trevor's legacy remains a source of inspiration for my scholarship, and I am grateful for the opportunity to contribute to the art-science movement in any way I can.

As we look to the future, I recognize that this field has come of age at a time when planet Earth is in dire need of as many diverse approaches to knowledge-making and -doing as possible. As we transition from the Anthropocene, the age of White Supremacist Man, to the Chthulucene, the age of *demonstrative*, chthonic, ever intra-acting monsters of Terra, the insights and methodologies developed within ASTS will be invaluable. Our ability to integrate diverse perspectives and foster creative collaborations will be crucial as we navigate the complex challenges we Earthlings face.

To conclude, I would like to express my deepest gratitude to our department for its unwavering support and visionary leadership. The establishment of ASTS is a testament to our collective efforts and a shining example of what can be achieved when we embrace transdisciplinary collaboration, intellectual curiosity, and academic humility. I am excited to see how this field will continue to evolve and contribute to the broader academic and ecosocial landscape as together we engage in justice-oriented worlding practices.

With sincere appreciation and anticipation for the future,

Onward and cheers,

Lisette

Conclusion

Celebrating TrevorFest: Taking Trevor's Legacy Forward

["TrevorFest"](#) was a weekend of reflection, recollection, and celebration that was organized in honor of Professor Trevor J. Pinch, who dedicated over 30 years to the department before passing in late 2021. Hosted by the Department of Science and Technology Studies at Cornell University from September 21 to 23, 2023, Trevor Fest marked the start of Trevor J. Pinch Lectures in Innovative STS, a biannual lecture series to honor the work of scholars who are currently doing cutting-edge and boundary-pushing research in STS.

The weekend before TrevorFest in Ithaca, New York, I paid a visit to the American Museum of Natural History in New York City. More than any of the countless exhibits, what stuck with me most from that outing was a pair of messages I found printed on two different tote bags. The first, carried by someone near the planetarium, read, "The good thing about Science is that it's true, whether or not you believe in it. – Neil Degras Tyson." [1] Then a little later, slung over the shoulder of someone admiring dinosaur bones, I came across the second: "Art is what you can get away with – Andy Warhol."

The myth of the two opposing cultures—Art versus Science—remains strong. Too bad, I thought, as there is so much work at their intersection—art-science—to be done.

When I attended Trevor Fest the following week, then, I was naturally excited to find myself engaging in several conversations about potential future research agendas in Art, Science, and Technology Studies (ASTS), an emerging field that Trevor, too, was excited to be a part of, being both an STS scholar and musician.

In fact, one of the last pieces Trevor published was the forward to the Routledge *Handbook of Art, Science, and Technology Studies*. In it, he writes, “I am writing this foreword in the midst of a global pandemic. I do not know (in March 2020) if I, or we, will make it through....”[2]

The book was released in 2022, a few months after his passing from this plane of existence to the next. We missed him dearly at the (virtual, COVID-impacted) book release party.

Fast forward another year. After listening to his friends, students, and colleagues (some of us still masked yet happy to be re-united in person) reflect on Trevor’s interest in the material worlds of both scientific and musical instruments during the daytime panel sessions; followed by mixed-media performances using those very instruments during a tribute concert later in the evening; I thought, if only Trevor and Neil and Andy (and their legions of

followers) had been with us this weekend, perhaps they would have enjoyed our art-science musings; at least in a polemical sort of way.

Some weeks after TrevorFest, I partnered with Amanda Domingues and Barkha Kagliwal, two fellow doctoral students from the department, to reflect deeper on the themes present at Trevor Fest. Here is what we found (and which we published as a [4S Backchannels](#) piece in November 2023):

Trevor was not only instrumental in setting the standard for Cornell's S&TS program, one of the first STS departments in the United States, but also in forming the field of STS especially through his collaborative work with Wiebe Bijker on the subfield of the Social Construction of Technology (SCOT). Early in his career Trevor made significant contributions to the Sociology of Scientific Knowledge (SSK) and later in the emerging field of Sound Studies. Nevertheless, what made his approach unique was that Trevor's work transcended disciplinary categorization: he did not confine himself to a single path. He traversed through Physics, Sociology, STS, Information Science, and Musicology, among others. He was intellectually curious about all kinds of objects from scientific controversies in solar neutrinos to parapsychology and users, the weirder the objects the more Trevor was drawn to them.

Materiality

TrevorFest celebrated his diverse legacy. It brought together over fifty of his collaborators, former students, recent graduate students, and colleagues. This mix represented scholars at various stages of their careers, across disciplines and spanning the entire globe. Through a series of roundtables, discussions, and mixed-media performances, participants explored not only his contributions to the field but also how to carry forward his way of practicing STS into the future. Amongst the laughter, tears, and the occasional croon of a synthesizer, below we discuss some of the core themes that emerged from TrevorFest.

Trevor excelled at drawing attention to the fact that “Living in a Material World” (as the title of his 2008 co-authored book with Richard Swedberg argued) has consequences for knowing. He advocated for moving beyond a thought-centric view of knowledge, emphasizing the co-construction of knowledge and physical objects. Living in a material world requires not only acquiring knowledge from the material world, but also understanding how materials shape the very knowledge we acquire. For Trevor, knowledge-making practices are inseparable from practices of making and doing with materials; these are the embodied ways we come to know each other and the past, the present and the future.

Understanding materiality is only possible if we treat knowing as a process that not only recognizes the social dimension of objects, but also dives into the

"why" of their existence. This approach, fueled by genuine curiosity, encourages researchers to seek out and explore the tensions in and among different knowledge systems. As Trevor liked to believe, why approach strangers, and strange things, as adversaries when they can be friends?

This approach to difference naturally led Trevor to become interested in controversies. Trevor's unique way of presenting scientific controversies left an enduring impact on STS. He presented them as a method, following SSK, and employed a symmetrical approach to controversy analysis, emphasizing the fluid nature of controversies. They were ongoing discussions rather than resolved disputes that solidified into truths. Much like observing the way ripples disturb the stillness of a pond, by exposing the ever-evolving intricacies of scientific controversies, Trevor showed how they needed continuous negotiation and maintenance over time in order to seek a semblance of closure.

Controversies were just among the first important concepts that emerged from Trevor's work. He had a special talent for recognizing emerging, crucial areas for the field. Trevor's breadth of contributions also showed his *joie de vivre* and we believe this lives on through his numerous collaborators. His approach to collaboration, translation and boundary transgressions led to the emergence of overlaps between STS and fields such as economic sociology, user studies, risk studies and media studies.

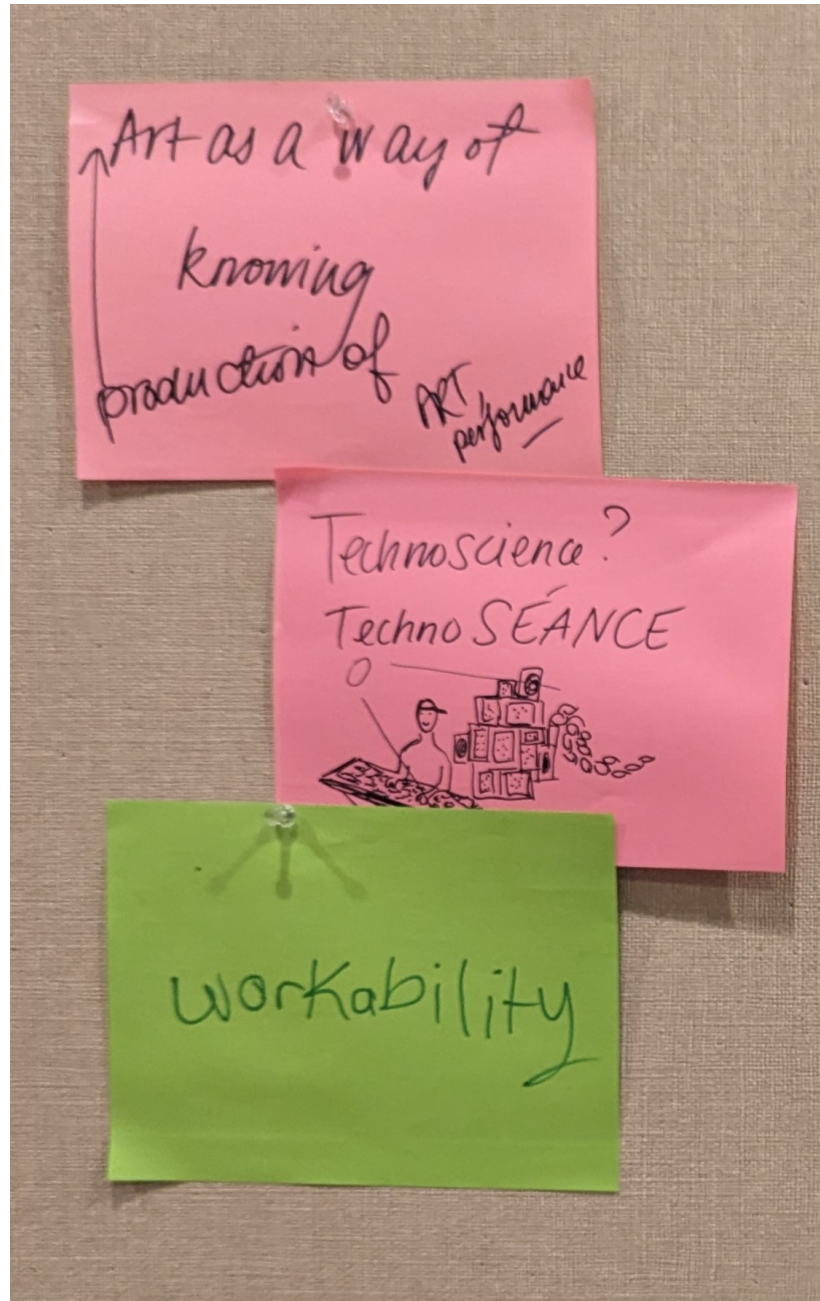


Figure 1. Sticky notes with ideas and doodles for future directions for STS hatched during Trevor Fest. Thanks to Faridah Laffan and Chris Hesselbein for these contributions, complete with cartoon synthesizer.

Art

Trevor's remarkable capacity to navigate across disciplines, as well as his passion for making music, facilitated his active involvement in research situated at the confluence of Art and STS. In this capacity, he established himself as a prominent scholar in the domain of Sound Studies: “an emerging interdisciplinary area that studies the material production and consumption of music, sound, noise, and silence and how these have changed throughout history and within different societies.”

At the beginning of the 21st century much had been done in the field of visualization, but the use of sound in scientific research had received significantly less attention. Trevor's research helped bring sound to STS. He focused particularly on the development of musical instruments, sound objects, and “soundscapes”: the use of sound as a method of scientific observation and description. Trevor's work examined instrumentality and sound beyond the domain of the aesthetic that had long dominated the field of Musicology.

Trevor's research agenda was ignited by his passion for music and further enriched by his background as an STS researcher, his past experience as a musician in London, and his keen interest in the origins of musical instruments. His fascination with the Moog synthesizer and curiosity about its inventor Robert Moog propelled him to pursue extensive research, which was notably published in his monograph "Analog Days: The Invention and Impact of the Moog

Synthesizer." Trevor's commitment to sound studies was not limited to research. He also experimented with sound and constructed his own modular synthesizer. He participated in the creation and recording of electronic music as part of a duo with James Spitznagel, known as The Electric Golem.

Advocating for the convergence of Art and STS was one of Trevor's final academic accomplishments. One of the last pieces Trevor published was the foreword to the 2021 Routledge Handbook of Art, Science, and Technology Studies . In it, he writes:

What we have to overcome most of all are myths about both science and art enshrined in individual creativity and notions of purity. Art and science are both social enterprises...We must also jettison the hackneyed myth of the two cultures. Overlaps, blurring, and interdisciplinarity are the norm. Art, Science, and Technology share much as socially constructed practices...Boundary objects, boundary work, trading zones, the role of users, audiences, performativity, agency, and social worlds—the full gamut of STS concepts glitter before our eyes here (3).

As we write this piece, we imagine Trevor's eyes glittering over the revelry of TrevorFest and over the future of (A)STS, in which he will forever remain a luminary. While TrevorFest activities during the day consisted of panel discussions devoted to his research on social scientific conceptual areas such as politics of knowledge, and performance and the arts, as night descended the

participants' senses were treated to a mesmerizing tapestry of mixed-media performances featuring the very instruments we learned about during the day. The tribute concert left the audience with a sense of wonder, and it was truly an experience that will be cherished for a lifetime.



Figure 2. Audience members enjoying a multimedia tribute concert to Trevor at Argos Warehouse.

Joy, Humility, and Curiosity

A theme that was brought up from the very first panel discussion on was that Trevor approached every aspect of his academic life with joy. Trevor believed that joy was the fuel for exploring the world and asking important questions about it. But how exactly does joy help us in this quest? For Trevor, joy served as a powerful tool to spark people's interest in the world around them. In teaching, Trevor's approach was to connect curious events to STS topics, making the subject matter relatable and engaging. By welcoming collaborative, unconventional approaches to everyday objects, he transformed monotony into play and brought joy to decades of research and teaching. His approach was one that encouraged his students to pursue their passions, to jump into projects head-first, and figure out the “how” along the way.

In response to even their most seemingly far-fetched ideas, students remembered Trevor saying, “we can do that” and, “let's have some fun.” Trevor believed that so long as we are interested in the topic, motivated by our questions, and are willing to put in the work, any idea is a good one. And failure is to be playfully embraced, not feared. “Remember when Trevor’s homemade synthesizer caught fire at the end of his show?” someone gleefully recounted during the fest. These pieces of advice reflect his spirit of generosity and humility.

Trevor was an exceptional mentor. Despite being such a successful and highly esteemed academic, he was always striving to demystify the profession by

being genuinely kind and humble. Trevor always encouraged his students to think outside the black box of technoscience and STS itself. He welcomed their ideas and urged them to ask the kinds of subversive questions that often go unexplored. He believed in STS not only as a discipline but also as a method that allows scholars to engage in dialogue with different kinds of experts and to ask them difficult questions while maintaining mutual empathy.

Using STS as a method of material-discursive engagement was what allowed Trevor to navigate so easily between different disciplines and establish a dizzying number of collaborations. He had a gift for working with others, even when they had completely different opinions. His secret to successful collaboration lay in mastering a fundamental principle: finding the balance between appreciation and constructive criticism, endearment, and critique.

Trevor was always much more than a mentor to his students; he was also a friend. Now as we look forward to the Trevor J. Pinch Lectures in Innovative STS, may future generations of STS scholars and practitioners continue on this path of conviviality that Trevor forged.

[***]

Feeling inspired by the art-science celebration that was Trevor Fest, and with an eye towards future directions in STS, I revisited Trevor's words in the ASTS Handbook:

“What we have to overcome most of all are myths about both science and art enshrined in individual creativity and notions of purity. Art and science are both social enterprises...We must also jettison the hackneyed myth of the two cultures. Overlaps, blurring, and interdisciplinarity are the norm. Art, Science, and Technology share much as socially constructed practices...Boundary objects, boundary work, trading zones, the role of users, audiences, performativity, agency, and social worlds—the full gamut of STS concepts glitter before our eyes here.”[3]

I imagine Trevor’s eyes glittering over the revelry of Trevor Fest, over the future of (A)STS, and over the pale blue dot we all call home: “As our planet becomes increasingly bleak, we need the hope and inspiration that art can give us. We need to go to it right away.”[4]



Figure 3. A shrine for Trevor, shared by Cristine Leuenberger-Pinch, made up of some of his favorite articles of clothing.

[1] Neil deGrasse Tyson is the television host of the reboot of Cornell professor and astronomer Carl Sagan's "Cosmos." Trevor's widow, Christine Leuenberger-Pinch, mentioned during the Fest's opening remarks that she likes to imagine Trevor and Carl enjoying tea at the Lakeview Cemetery in Ithaca, where they are both buried.

[2] Rogers, H., Halpern, M., Hannah, D., & de Ridder-Vignone, K. (Eds.). (2021). *Routledge Handbook of Art, Science, and Technology Studies* (1st ed.). Routledge. P. xxi.

[3] Ibid, p. xxiv.

[4] Ibid.

Acknowledgments

We would like to thank the organizers of TrevorFest Janet Vertesi, Steve Jackson, and Stephen Hilgartner for such an inspiring experience. For a more detailed narrative of Trevor's work, see: Lynch, Michael and Wanheng Hu. "Memorializing Trevor Pinch: A 'Constructor' of the STS World" [in Chinese]. *Journal of Dialectics of Nature* 44.12 (2022): 5-13.

Epilogue

And so it goes...that the sound of cicadas takes me back...

[* * *]