



# How to Get to the End of the World

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*To reach the End of the World, you turn down a side street near the fancy wine bar and past the newly built condos. There is a set of train tracks to cross, and you stop to help someone carry their cart over the railroad ties. You're now in a large asphalt lot, and you can smell the water. Today, there is a bit of a sweet chemical odor. Continue past the abandoned gas station and the remnants of a decommissioned naval base. Walk through the gap in the chain-link fence and follow the well-trod path up a small hill. Here is the End of the World, a levee where the Industrial Canal meets the Mississippi River in New Orleans. The End of the World is not so bad, you think, as you watch a tugboat float by on the muddy water.*

What do we mean when we conjure up the end of the world? In this article, I discuss the end of the world as a concept that is often evoked when talking about the climate crisis. I pair this with the End of the World as a place—many places actually—in south Louisiana. In doing so, I consider how, as researchers and practitioners

in human-computer interaction shift focus to addressing climate change issues, we must recognize the longer-term inequities inextricably tied to these issues.

I arrived in Louisiana in October 2020. My partner had taken a job in New Orleans and was teaching three university classes in person despite rising Covid-19 cases and the unavailability of vaccines. I was the lucky one, as my semester had shifted online, so I decided to join him as moral support. Before I made the 21-hour drive from upstate New York, I joked to a friend, “At least if the world ends, I will be warm and drinking a daquiri.”

Three days later, I crossed Lake Pontchartrain via the I-10 and watched a city emerge from the watery horizon. Three days after that, Hurricane Zeta made landfall, and we lost power around dinnertime. The Category 3 storm had taken out electricity for more than 2 million residents across the southeastern U.S. Our power was out for the next four days. While my work turning remote

## Insights

- Responding to climate change in computing and HCI requires attuning to overlapping legacies of environmental and digital inequality.
- The impact of climate change on digital infrastructures is already happening in coastal regions, raising questions about how “always on” technologies are being designed and developed.

had given me the flexibility to relocate, without power and, consequently, the Internet, I was facing challenges in completing work while my colleagues back in New York remained online.

I experienced firsthand a version of what I had imagined to be a future scenario of living with climate change. As a researcher studying climate change and computing, I was deeply humbled by this revelation. These scenarios are happening now. The 2020 Atlantic hurricane season was the most active season on record (the 2021 season ends on November 30, so we shall see whether that record holds). According to scientists, the

sustainability, the SHCI community has often struggled over cohesion and shared terminology, goals, and metrics of success [2].

Recently, many researchers have called for a shift to considering climate change as a core and unifying issue in HCI. For example, Knowles et al. suggest a reframing of SHCI to align it with the climate justice movement, as the lack of cohesion “prevents us from recognizing the commonalities that we could make progress towards together now, *urgently* [3].”

*Urgently.* This sense of urgency is understandable. Every few weeks, there will be an article that announces



increase in storm activity is linked to warming oceans associated with climate change. Many people rely on computing infrastructures in their everyday lives, and even more so during the pandemic, which shifted many activities online. Climate change reveals the vulnerability of digital infrastructures that will only become more vulnerable. What does this entail for HCI research?

For over a decade, sustainable HCI (SHCI) has grown as a field, allowing us new means to address questions between the environment and computing. Early researchers were motivated by issues like waste, pollution, and overconsumption. This initial work included a framework that categorizes research under SHCI as sustainability *in design* or *through design* [1]. Sustainability in design pertains to material or energy use in the design of HCI products, while sustainability through design considers how HCI can support sustainable decision making. While this work has pushed HCI as a whole to consider questions of environmental

the mounting uncertainty and despair in relation to climate change. Supply chain jams, fuel shortages, biodiversity loss. The end of the world here is chaos, an apocalypse, an ending to the world we once knew. Urgency forces us to reprioritize and reorganize to work toward the world we want to live in.

But urgency can also be flattening. As we consider what paths we might take toward addressing climate change, one approach follows the line that all efforts should go toward lowering carbon emissions, even if that comes at the expense of holding off on efforts toward social equality. This thinking is motivated by the framing that a livable planet is essential for human life and would achieve a greater good in comparison to targeted efforts at marginalized groups. In the case of computing, these efforts can often result in solutions that focus on curtailing computing usage. For example, in the case of Internet and energy usage, solutions have included putting limits on Internet use and using tiered payments for streaming—even making arguments against net neutrality.



This intentional delinking of environmental and social issues is troubling. Despite the blanket claim that all of humanity is on the line, the impact of climate change has not and will not be experienced equally. As Indigenous science-fiction authors often state, the end of the world is not a metaphor; colonialism already decimated lifeways and entire ecosystems [4]. Thus, while calls for urgent responses to the impacts of climate change are important, these responses must consider how questions of equity factor into these responses. How do we respond urgently... and also justly?

*About an hour drive southeast of New Orleans is another*



**Supply chain jams, fuel shortages, biodiversity loss. The end of the world here is chaos, an apocalypse, an ending to the world we once knew.**

*End of the World. Follow the Mississippi River on Highway 46 out of the city. At some point, the road will part ways with the river, the Mississippi making a sharp left while the road takes you east. Somewhere near the Last Stop Food Mart you will get on the Delacroix Highway, a one-lane highway that hugs a bayou. You're not sure what the name of this waterway is, but on a nice day you will pass people fishing on the side of the road. Make a mental note to find a fishing rod and return. Keep on going southbound until the highway ends. A guardrail topped with three yellow- and black-striped traffic signs mark the division between the road and the swamp. If you are lucky, the "End of the World" sign is still intact.*

"What does 'Land Back' even mean when our land is disappearing?" It was three weeks after my arrival. I was on a Zoom call, sitting at a makeshift desk in a corner of my apartment. The call featured members of the Bvlbancha Collective, an Indigenous mutual aid group (Bvlbancha is the Chahta name for the area now known as New Orleans). As a new, albeit temporary, resident

of the region, I felt obligated to familiarize myself with local histories. In this call, the collective discussed seed saving and language revitalization as essential parts of building Indigenous sovereignty, even more so in times of ecological uncertainty.

Coastal land in Louisiana is vanishing. In the past century, more than 2,000 square miles of land have eroded and sunk into the gulf. In a twist of irony, one of the main causes for this land loss stems from levees that are constructed along the river, which in principle protect coastal communities from floods and storms. Levees are designed to block water from where people

live, a design that also inadvertently prevents ecological processes that sustain delta wetlands. As a result, instead of sediment being deposited at the mouth of the river to replenish eroded land, it is jettisoned far into the gulf.

Levees are part of infrastructures that enable people to live in coastal regions, yet what we see in south Louisiana shows that they also make this region more vulnerable. In my research, I investigate a distinct yet interrelated facet of infrastructural vulnerability through studying the impact of climate change on networked infrastructures. In particular, I examine the intersections of environmental and digital inequalities. With this approach, I ask how situations came to be, allowing me to understand them from broader structural and institutional histories. How are legacies of extraction and environmental degradation reflected in current network infrastructures? Can these understandings help us build better pathways forward?

It is here in south Louisiana that the mouth of the Mississippi River

empties into the Gulf of Mexico, providing access from the Atlantic Ocean upriver to northern Minnesota. This positioning between the inland region and gulf has long made the region strategically valuable for trading and transportation within Indigenous communities in the region. Following French claim to the Louisiana Territory in the early 18th century, European settlers established slavery in the region, enslaving both Indigenous peoples and Africans for labor on newly formed indigo, cotton, and sugarcane plantations. Again, the geographic location of south Louisiana contributed to the prosperity of the slave trade, where both slaves and commodities from plantations could be conveniently sold and transported up north or across the Atlantic. After the abolishment of slavery during the American Civil War, Louisiana, like many southern states, faced a period of stagnant economic development due to the previous reliance on enslaved people for cheap labor.

When the first oil well was successfully struck in Louisiana in 1901, state policymakers, eager to

transform the state's slow economy, provided tax incentives for gas and oil companies. The rise of the oil and gas industry post-slavery in the U.S. can be seen as an attempt to replace an energy system derived from enslaved human labor with one derived from hydrocarbons [5]. To this day, the oil and gas industry still dominates the state's economy. According to one report, the oil and gas industry contributes to over a quarter of Louisiana's gross domestic product [6]. While in 2020 Louisiana state governor John Bel Edwards announced plans for Louisiana to become carbon neutral by 2050, investment and expansion of heavy carbon-

infrastructure but also other factors like cost.

The ongoing legacy of oil extraction and petrochemical production has led to uneven development and deep socioeconomic disparities in this region, while the increased intensity of storms and floods due to climate change have begun to impede and damage network infrastructure. How is the balance between maintaining existing networks while building additional infrastructures part of the "arts of living" within landscapes shaped by social and environmental degradation [10]?

*Another End of the World. This one is a nickname for*

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emitting petrochemical facilities continue in south Louisiana.

As a result of this increased investment in oil and gas extraction, many former plantations that lined the banks of the Mississippi River were transformed into oil refineries and related facilities. More than 150 of these facilities are currently located in an 85-mile stretch along the Mississippi River between Baton Rouge and New Orleans, an area that has been nicknamed Cancer Alley due to the high levels of toxic waste and emissions that come from the factories. This toxic environment affects mostly low-income rural Black residents in the region, many of whom are descendants of the formerly enslaved [7]. This inequality also extends to digital infrastructures. In St. James Parish, where a portion of Cancer Alley resides, data shows that while 100 percent of the residents supposedly have access to broadband, only 17 percent of residents actually have a subscription [8,9]. This difference speaks to broader issues of how barriers to broadband include not only physical

*Venice, the southernmost community of the Mississippi River. Head back on Delacroix Highway. At St. Bernard, you will head west until you meet up with the Mississippi again. Follow the river as it snakes south. Out the car window you see small patches of grass break up the expanse of the water. On the map on your phone, you see more blue than green. You wonder what counts as an island. Your phone loses reception but the route is still programmed in. Even on a clear day like today, parts of the road will be flooded. You wonder if this is normal. Drive slowly so as to not splash the wood stork hanging out in the waterlogged breakdown lane. You can tell it's a wood stork because of its football-shaped body and you imagine punting it into the bayou. You know that you are probably below sea level at this point, but you can't see past the stiff, tall grass that is growing on either side of the road. The road soon opens up and you find yourself in a small town made up of buildings lined along the water and perched on stilts. You have arrived.*

As I'm writing this in October 2021, almost a year after my arrival in Louisiana, residents across the state



are still dealing with the aftermath of Hurricane Ida, which landed in late August 2021. Roofs still need to be repaired, FEMA applications still need to be submitted, water and other essential supplies still need to be distributed. What about network infrastructures? While the Internet has been an essential part of recovery and distribution efforts, in many areas it has only recently been restored.

So what does all of this mean for HCI and interaction design? My honest response is that I have more questions than answers. Will increased access to technology resolve longstanding inequities? How will we have

from the effects of climate change and longer histories of land use. As fiber optics are buried underground and cell towers are constructed on sinking land, we need to cast an eye on how the digital becomes embedded into existing ecologies.

There is something bleak about having so many places called End of the World in one small nook of the world. I also find it revealing. In naming the places, there is a recognition that a world has already ended. A sense of finality, a sense of decisiveness, and a sense of closure. These places become points of departure. We must consider these “ends” as we work toward more just and equitable worlds.

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## ENDNOTES

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“always on” technologies when their underlying infrastructures are as fragile as they are? How will we stay connected amid a climate crisis?

What I do know from my time in south Louisiana so far is that addressing legacies of inequality driven by uneven development must be an essential part of any agenda for climate change mitigation and adaptation. In the case of digital and network infrastructures, this means acknowledging land and labor, which are crucial elements of computing. As described by Susan Leigh Star, infrastructures are “both relational and ecological,” where *relational* refers to how different groups understand and interact with infrastructures, while *ecological* refers to the inseparability of infrastructures from “actions, tools, and the built environment” [11]. We should expand Star’s meaning of *ecological* by looking beyond the built environment, which requires that we consider how digital infrastructures are inseparable