Media-N | The Journal of the New Media Caucus
Spring 2023: Volume 19, Issue 1, Pages 100–119
ISSN: 1942-017X

Smellscaping Guiyu

TINGHAO ZHOU
Ph.D. Student, University of California, Santa Barbara

ABSTRACT

Once the largest e-waste recycling and processing town in the world, Guiyu, China, was characterized by a pungent, penetrating smell of burning chemicals and plastics, commonly referred to as *Guiyu Wei* by both locals and officials. Shrouded in the environmental terror of unidentified toxins and chemicals, breathing had become a precarious bodily (re)action that constantly put people's lives at risk. Taking Guiyu as its center case, this essay documents two "smell walks" in Guiyu conducted by the local community and me, respectively. It presents a prolonged material afterlife of data that is intimately intertwined with the life and livelihood of the local workforce and community and tracks the production of desensitized subjects. How do we represent a particular kind of smell or a specific form of olfactory experience? How can we communicate this message with a larger public that has little knowledge of what life is like within a chemically polluted environment? This project seeks to think about these questions in artistic terms, conceiving research-creation as an integral methodology. Through the Guiyu-inspired art series, "Synesthesia (unfinished)," I explore various possibilities of olfactory representation and the emergent relationships among smell, the environment, and our sensorium. As the centerpiece of this project, I envision "Smellscaping Guiyu" as an immersive installation that takes visitors beyond their intimate sensory knowledge and immerses them in the unfamiliar olfactory milieu fabricated by chemicals and elements from Guiyu, one of the "shadow places" at the corner of the world.

INTRODUCTION

I settled myself on the outskirts of Guiyu (贵屿 guìyǔ) in a hotel with my teammate, Zikang He, preparing for our first visit to this small, inconspicuous town in Shantou, Guangdong, China. Hidden away in the scattered farmlands, factory buildings, and traditional Chaoshan-style houses, roads to Guiyu were nowhere to be found on the local map we bought. We had to resort to digital navigation. Yet it was surprising to find that unlike us clumsy visitors, people who lived here were habituated to an alternative form of dwelling that didn't demand digital technologies but instead adopted a body technique, a technique of breathing: people sniff, heavily.

On the morning of the second day, Aunt Hu, a staff member of the sanitization department of the hotel, alerted us when I asked her which direction could lead us to Guiyu. Our plan, I told her, was to go there on foot. But we were confused, and the itinerary on the navigation app was disorienting. She took us out of the hotel and sniffed heavily without saying a word. What silenced her? I remember thinking that to myself. A few seconds later, she pointed her finger to a country lane

beside the hotel and said, "There, you can smell it." While still baffled by her gesture, I noticed myself starting to sniff around as well. I breathed in as much air as possible, assuming the existence of an atmospheric commons on which we could share a form of olfactory experience through mimetic breathing. I was startled by how intensely I tried, but mostly I was just really eager to know. "What smell?" I asked Aunt Hu. It had just rained, and the air was thick with water vapor, so I couldn't quite tell. "It's the smell of Guiyu (*Guiyu Wei*)," she answered, her hand drawing a trajectory of airflow in the sky, "coming all the way from there."

The term *Guiyu Wei* was not unfamiliar to me. It was, in fact, the investigative locus of our two-day field trip. Once the largest e-waste recycling and processing town in the world, Guiyu was characterized by a pungent, penetrating smell of burning chemicals and plastics, commonly referred to as *Guiyu Wei* by both locals and officials. Shrouded in the environmental terror of unidentified toxins and chemicals, breathing had become a precarious bodily (re)action that constantly put people's lives at risk. However, for the people inhabiting the fringe of Guiyu and adjacent towns, sniffing and smelling were an active form of breathing and living that granted them orientation and anchored their existence. Independent of smart digital devices, they practiced a traditional way of navigating the world that conjured the very basic instinct for survival. By smelling, people developed something like a language system specific to the local community. It not only communicated threats and risks in the environment but also better tuned people to a form of communal affectivity that in turn shaped the local laboring bodies. It was constitutive of their lifeworld to sense where the wind blew, to identify the indexical trace of bad smells, and to point out the deictic "there."

Everyday life in Guiyu involves various attempts at smell walking. Initially, the smell walking is an activist practice the smell scholar Kate McLean promotes in the process of smellscape mapping to contest the incommunicability of olfactory experience.[1] A prototypical smell walk always engages both remote sensors and researchers' bodies as instruments for measuring the deviant smell, a form of "ephemeral and sensed invisibles."[2] However, I will expand the concept of smell walking in this paper by arguing that smell walking is not only a creative research methodology for humanists in dealing with recalcitrant social matters but also a fundamental way of living for people in Guiyu. Henceforth, my paper engages the two different forms of smell walking—taken by the local community and by me, respectively—in a rigorous discussion on the relationship between olfactory mediation and environmental (in)justice in the age of the global media economy.

In a smell walk, the human body and the remote sensor become two major sites where we can examine evidentiary signs of environmental turbulence. Smelling inscribes human bodies with chemical traces of the breathing environment, while air detectors measure the atmosphere and index the elemental constituents on their screens. They proffer two different semiotic systems that both engage with the sign of *index*. Charles Sanders Peirce's semiology explicates that the index is an effect (the signifier) of a material cause (the signified).[3] When applying Peirce's index to understand the breathing body that expresses chronic pathological symptoms, the body becomes a canvas for indexical signs of atmospheric chemicals and toxins. However, film theorist Mary Ann Doane reminds us of the often-ignored *deictic* quality of Peirce's index that grants orientation to its reader.[4] Repurposing her reading of Peirce's semiotics, I argue that a smell is an indexical sign that points, establishing a relation with its material past while offering orientational guidance. But who has the capability to perceive the indexical sign of smell? Who has the strength to detect olfactory

variations? How can one attune one's olfactory sense to the environment? These questions remind us that smelling is not as "natural" as we imagined but always already a political action.

I will start this paper with Aunt Hu's personal story. With learning how to smell as her first lesson, her journey as a migrant worker exemplifies how local people tuned in to a site-specific semiotic system that recruited olfactory faculties, and how the later provincial project on pollution control subsequently affected this system.[5] Both the chemical pollution and the pollution control transformed the parameters of the environmental affordance for people's dwelling bodies and sensory organs, as they invested in reconfiguring the medium of perception—often constituted by atmosphere, water, soil, chemicals, etc.—in which sensory and embodied (particularly olfactory in this case) experience takes place. Rendering insufficient the language-based semiotic system, they prompted the development of the human body as a signifying apparatus. However, the body's ability to detect danger and provide instructive feedback wanes when a long time is spent in the olfactorily dynamic environment. If we consider subject formation as an operation of *making sense*, both making sensible and making comprehensible the index of smell, Aunt Hu's personal trajectory from being hypersensitive to being almost anosmatic encapsulates how the global media economy creates a desensitized subject in a neocolonial and neoliberal context.

I devote the second part of this essay to a detailed record of my smell walk in Guiyu with my teammate, during which I gathered environmental data and information with portable air-sensing devices while taking notes of our phenomenological experience with the smell of Guiyu.[6] The parallel recording in the smell walk occasioned an immediate comparison between technological sensing and body sensing. It was evident that often environmental indices would fail to translate perceived olfactory risks into indicative messages. I propose the smell episteme to address an *emergent* form of knowledge. As a paradigm of thought, it models how nonlinear causality can manifest in a non-visual regime, and it challenges the linear logic that environmental governance adopts to evaluate the containment of pollution. Then how do we represent a particular kind of smell or an emergent form of olfactory experience? How can we communicate this message with a larger public that has little knowledge of what life is like within a chemically polluted environment?

I conceive research-creation as an integral methodology of my project, that is, to think about these questions in artistic terms.[7] In collaboration with artist Shengjie Dai and architect Yijun Wu, I began to work on the Guiyu-inspired art series, "Synesthesia (unfinished)." I tried to explore various possibilities of olfactory representation and the emergent relationships among smell, the environment, and our sensorium. As the centerpiece of this project, "Smellscaping Guiyu" will be an immersive installation that takes visitors beyond their intimate sensory knowledge and, following the environmental philosopher Val Plumwood's call, immerses them in the unfamiliar olfactory milieu fabricated by chemicals and elements from Guiyu, one of the "shadow places" at the corner of the world.[8] Here in Guiyu, people have a diverse sense of what the global means to them and have cultivated a social habit with media that is drastically different from the one shaped by the mainstream user culture and community. I conceive this paper as an indispensable addition to the traditional narrative about media afterlife that often ends on a dumping site in the global North. Attentive to both material and affective dimensions, this research practices a form of "creative mediation," to take media scholars Sarah Kember and Joanna Zylinska's term,[9] and presents a prolonged afterlife of media that is intimately intertwined with the life and livelihood of the local workforce and community. To practice Rancière's idea of "the redistribution of the sensible," I designed the installation to produce a particular form of olfactory experience at every encounter,[10] and invited visitors to ponder and reevaluate the taken-for-granted-ness in both our material life and our deep thought.

SMELL WALK IN GUIYU I: THE DESENSITIZED SUBJECT IN THE AGE OF THE GLOBAL MEDIA ECONOMY

***Figure 1**. Workers at an e-waste disassembly workshop in the Phase IV Disassembly Buildings in the Industrial Park. Photo taken by the author.*

A migrant worker in Guiyu for over eight years, Aunt Hu revealed to me how people there spoke to each other in the language of smell. She had been trained to smell since she first moved here. In a harrowing environmental report, "Exporting Harm: The High-Tech Trashing in Asia," Basel Action Network (BAN) reminds us that Guiyu had lands tinged coal-dark and air imbued with deep gray from almost ten years of wire and plastic burning as part of the daily operation of e-waste processing before China's first revision of the 1989 Environmental Protection Law in 2015 (hereafter referred to as the Revised Law).[11] As a life-supporting system, breathing is ambivalent, as it exposes our interior bodies to the exterior environment without a defense program, putting our lives under chronic and persistent threats. Human bodies became susceptible to elements swirling in the air, but filtering—the effect of masks, helmets, and chimneys—was a costly and thus rare form of mediation at that time. It was luxurious to breathe in a carefree manner. Unable to distinguish life-sustaining oxygen from lethal chemicals, people lived on. As in every capitalist tale, the more risks you are willing to take, the more money you earn to save your life. In other words, you earn your life by risking it.

This conundrum loomed large as we started paying attention to the vernacular stories and embodied experiences of the townspeople. Mr. Li, a senior resident of Huamei village in Guiyu, moaned about the trail of destruction left by the storm of the e-waste business in his hometown: "For money, people have made a mess of this good farming village. After they have dismantled the computers, they burn the useless parts. Every day villagers inhale this dirty air; their bodies have become weak. Many people have developed respiratory and skin problems. Some people wash vegetables and dishes with the polluted water, and they get stomach sickness."[12] To dwell in this town called for another set of life skills. You didn't just breathe. You had to actively smell. Many e-waste workers, migrating from north China just like Aunt Hu, gradually learned to fine-tune their sensory faculties to the transformed milieu that was perceivable by more than visual and auditory organs. Hazards

and risks produced smells and people expected their nose to be the first to tell. Historian Joy Parr reminds us that "smell has a history as warning of contamination linked to self-preservation."[13] Along with her observation, I contend that smelling in Guiyu is not a stand-alone event but a cultural and political practice shared by numerous communities making life in similar environmental conditions across the globe.[14]

A product of the provincial environmental project, the Guiyu Circular Economy Industrial Park (hereafter referred to as the Industrial Park) was a closely monitored and carefully designed space. It presented a transformed landscape of the local circular economy, previously characterized by a chaotic configuration of small family workshops in the town. The earlier inchoate market structure was composed of loose spatial connections, direct contacts between small workshop owners and e-waste collectors and dealers, and unregulated modes of distribution and production. Changes occurred after 2015: the assemblage and centralization of working spaces, the spatial planning of specialized industrial activities, and a multilevel trading system connecting various links, subjects, and entities. The infrastructure of the circular economy started to shape and orient the practice of e-waste recycling and repurposing, to manage the scale and model of transaction, production, and distribution, and ultimately to regulate forms of life of the local workforce and the local community.

Informed by the planned obsolescence of electronic devices at the industry level, the material life cycle of our personal data is a profit-generating yet insufficiently regulated journey. The provincial project including the construction of the Industrial Park and the infrastructure of circular economy is firstly an attempt to respond to the dominant model of the "global media economy" that, as defined by media scholar Lisa Parks, has promoted a new stream of material, capital, and labor exchange and elevated many e-waste "salvaging" businesses to large-scale multinational corporations.[15] In the name of environment-friendly e-waste circulation, these corporations, most of which originated in developed countries, have been able to manipulate the public discourses around e-waste circulation. They have deliberately obscured the longer and crueler passage of how "toxic e-waste flows from Western postindustrial to Asian developing countries."[16] In fact, they have been exploiting the loopholes in the environmental legal systems of these developing countries, camouflaging their capitalist and neocolonial logic as an ideal of globalization. A classic narrative about e-waste trade and recycling as such often ends with a critique of the wrongdoing of politically and economically powerful corporations and the public disregard in the West for the affected underdeveloped places. However, the course of media afterlife is even more extensive and complicated than what this narrative reveals. The material afterlife of media, I argue, should be more than a story of what happens when personal digital devices and electronic machines reach the end of their designed life cycles. It should also be about human lives after the relocation, redistribution, and recycling of these "dead" electronic materials, about how life itself is being restructured, reorganized, and reconstituted.

It is no news that e-waste materials travel from dump sites in developed countries to recycling workshops in the small towns of developing countries. It is yet another manifestation of a haunting history, a history being shaped by a process of the global industrial metabolism. American sociologist Hannah Landecker inspires us to take seriously "the interconnected sequences of mostly enzyme-catalyzed chemical reactions by which a cell, tissue, organ, and animal, plant, microbe sustain energy production and life."[17] She promotes a form of metabolic thinking that cannot just probe into the secret of a biological body but also proffer a symptomatic reading of every facet of society. The global collaborations and trades among different industrial entities summon an example for this kind of metabolic understanding. To ensure healthy development, a neoliberal

industry must absorb raw materials, labor, and capital into its production from all over the world, a process catalyzed by the internal logic of globalization. However, metabolic thinking is not just a utopian argument that everything is metabolizable, is eaten, digested, used, and worked through. There are also residual elements that are not part of the chemical equations but still leave traces, for instance, the large amount of unprocessed e-waste and "undigested" chemicals. The remainder of the metabolic formula, often waste materials and used products created during the course of global industrialization, has been transported away from the production center to what Plumwood calls the "shadow places" of the world, like Guiyu.[18] Material residuals of digital media and information technologies, when dismantled, burned, and degraded into simpler metallic elements and chemical forms, will in turn over-saturate and destructively transform the local ecology, taking critical part in the individual metabolism of workers and towners in and near underdeveloped recycling centers. In this sense, the global industrial metabolism is a trans-scalar operation: (digital) rubbish on this side of the world could possibly emerge as a constitutive element of the breathing atmosphere and olfactory experience on the other side.

Smell, I contend, is an indexical sign of the exploitative trajectory of the global media economy. But, to be more specific, it is an indexical sign of the energy and chemical exchange that happens during e-waste processing. I associate the concept of index here with Peirce's semiotic tradition. A common (mis)reading of Peirce stresses that an index is a material trace of the uninterrupted contact between the referent and the medium.[19] It holds that an index is fixed and objective and doesn't require a human mind to validate its very existence. In this framework, the smell, a product of material change through e-waste processing, is a chemical aftermath that delineates a chain of cause and effect. It preserves in itself the chemical substances of the objects that produced it. Just like the bullet hole of a gunshot or the smoke of a burning cigarette, the smell is an index, trying to testify that the materiality of data is not just a technological problem but also a problem for our environments and bodies.

In Guiyu, the material evidence of environmental disruptions often hides in the chemical relations between people and the environment that "alter life," to use Michelle Murphy's term here, without observable manifestations.[20] Two activities generated most of the chemical relations—the production activity of e-waste circulation and the basic human activity of breathing. Factories and workshops in the Industrial Park inherited the two major modes of e-waste circulation in the pre-centralization years: *shaoban* (烧板) and *suanxi* (酸洗) in the local language. Literally translated as "cooking the board" and "washing with acid," these two modes are actually dominant chemical processes of the e-waste circulation industry—circuit board burning and chemical pickling, respectively. The Guiyu traditions of *shaoban* and *suanxi* refer to several procedures of extracting valuable substances from the e-waste. The first fifteen years of the local e-waste circulation industry witnessed how the local people turned their homes into makeshift e-waste processing workshops, burned wire piles in the open air to retrieve metals, heated computer casings to remove combustible plastics and isolate metals, de-soldered circuit boards over coal grills to release chips, bathed those chips with acid to retrieve gold and copper, and eventually disposed or burned the residual plastics in fields and dumped the used acid water into rivers.

Shaoban and *suanxi* have never been merely generative ways of metallic extraction but also forms of intensive extraction of the environment and laboring bodies. With the disorganized and unregulated e-waste disassembly, chemicals were no longer something concentrated within media artifacts. Instead, a mixture of toxins and metals was constantly leaked into the dwelling

environment. Through respiratory interactions with the enveloping milieu, toxic chemicals were being widely distributed as substances that also ran through water, mothers' milk, and children's blood, eventually becoming constituents of the environment and the body.[21] Just like water and air, blood and milk are essential parts of the lifeline infrastructure that sustains how we give birth and sustain life. In the neoextractivist era, however, blood and milk have become the reservoir of chemical burdens. In her investigative response to the community struggles over environmental disruptions and mineral leakage in Peru, anthropologist Stefanie Graeter argues that the human body is the "corporeal storage of heavy metals [that] constitutes a key human infrastructure of contemporary extractive capitalism."[22] To think of not just the heavy metals stored in the body but the smell the body detects as an indexical sign is to call for a re-examination of the status of our interior body in relation to the surrounding environment. When Stacy Alaimo defines the body-environment relation through the concept of "trans-corporeality," she reminds us that the boundary of interiority and exteriority is always misty and that the porous body has always been a site for environmental politics.[23]

However, the indexicality of smell is not just a material trace of chemical relations. In "The Indexical and the Concept of Medium Specificity," film and media scholar Mary Ann Doane reminds us that "the index as material trace" is only one genre of Peirce's conceptualization of the indexical sign.[24] The second genre, she maintains, excavates the deictic quality of the index. Pronouns in language and "the pointing finger" are two prominent examples she proposes to understand an index in this manner: "the pointing finger, instantiated in the 'this' of language, incarnated the very ideal of indexicality, its purest form. The word 'this' can only be defined … in relation to a specific and unique situation of discourse, the here and now of speech."[25] Even though Doane conceives a deictic index as "a hollowed-out sign … evacuated of content,"[26] to interpret an indexical sign of this sort commands much more—one's capability to read the sign, the reference system to measure spatiotemporal relationships, and the perceptual context when the encounter with the sign takes place. Eventually, Doane helps to reformulate a reading of the index as a sign that not only points and directs attention toward its material past but also provides an orientation.

An indexical sign grants orientation, but one needs to acquire a sense of orientation by understanding one's own positionality, temporality, or even identity. The local community around Guiyu has actively developed their olfactory sensing into a form of environmental detection. Aunt Hu furnished an illuminating example of how people were able to identify the direction of Guiyu, where the smell came from. Literary scholar Hsuan L. Hsu diagnoses the sense of smell as "a tool of citizen science,"[27] emphasizing the capability of a biological body to detect perceptual variances and changes in its environmental conditions. The implication is that there exists a default atmosphere—unpolluted, clear air—that sets the conceptual benchmark for our olfactory experience. Aunt Hu's "there" is a smell that materializes as a deictic index that points to a worrying atmospheric future to come. In this manner, I wonder, how different is a body from a calibrated detector?[28]

Aunt Hu's words gave an even more depressing twist to the narrative. Dependence on the body's sense of smell is actually a precarious relationship. "Not too long ago, when people still burned wires and plastics night and day, it was very easy to smell it from here," Aunt Hu told me. She said she moved out of Guiyu after one year of working in an e-waste processing workshop. "I was very sensitive to all kinds of acrid chemical smells in the first couple of weeks and that was a torturing time," she began, recalling her days in Guiyu. "But sooner than I expected, I was inured to my workspace. I couldn't quite smell it anymore," she breathed. Not until that moment did I realize

that to be able to rely on the body as a signifying machine or a danger detector was not so much a body technique as a social privilege. Aunt Hu was yet another figure subjugated to the "super-saturation" of intruding environmental and social factors. Film and media scholar Bhaskar Sarkar conceives the process of super-saturation as a "southern problematic,"[29] through which political discussions on the colonial and neocolonial history of global South societies could possibly unravel.

The super-saturation in Guiyu was both a spatial and a temporal event, as it pointed to not only the overload of constantly multiplying toxic elements and evolving chemical relations but also the durational process of environmental habituation. To habituate to an environment, I argue, entails three steps: to be physically present in the environment, to sensorially attune to its environmental variations, and finally to lose the sense of unfamiliarity and strangeness. Thus, we can consider Aunt Hu's anosmatic experience as a symptom of her environmental habituation in Guiyu. On the surface level, the olfactory deprivation seemed like a purely biological process, but in fact, the desensitization was very much a political operation, reflecting class and labor struggles. This form of habituation was a passive condition for migrant workers and local people like Aunt Hu, who had no alternative option for seeking a livelihood. They needed to feel nothing in order to make a living. From hypersensitivity to anosmia, we should understand how contemporary enslavement functions in a process of creating desensitized subjects. This process took away not just the sensitive faculty that once identified the source and the direction of chemical signals and harm to the body but also, and more importantly, the reference system that human perception and comprehension were dependent upon. The index of smell was no longer making sense. The vicious olfactory milieu replaced the normative symbolic ground on which their sensory experience took form so that an encounter with a smelly chemical would fail to provoke an offended reaction. The desensitization of the subject, then, is essentially the desymbolization of the senses.

SMELL WALK IN GUIYU II: THE PRECARIOUS INDEXICALITY OF EMERGENT SMELL

Our smell walk began with the very idea that the human sensorium was no less powerful than a technological sensor. They told the same story from different angles. I logged the data shown on the sensor. But I also evaluated and took notes of what we thought we were smelling and what the smell reminded us of. The smell log I created aimed at documenting both the technological and the perceptual data. By putting them in adjacent columns, I wished to draw a comparison and maybe come up with a new way to examine the local experience in the age of environmental control. By focusing on perceptual data, the smell walk was rendered a practice of "creative mediation." The personal visit to the site and the close observation of the infrastructure together furnished a form of affective proximity. In reflecting upon her own fieldwork at a media transmission site, media infrastructure theorist Lisa Parks writes that "rather than a massive system that could be seen from above, the infrastructure became something that could be sensed, felt, and mediated by my own body."[30]

Location # (marked on the globe)	Description of Location	PM 2.5	TVOC	AQI	Weather Condition	Description of Olfactory Experience
1.	Centralized Trading, Loading, and Unloading Yard (集中交易装卸场)	005	230-250	44	After raining/ Cloudy	Wax/Chemicals melting under the sun mixed with the smell of humid soil
2.	Disassembly Building No.2 (拆解楼 2 号)	004	163-200	23-30	After raining/ Windy	Nail polish remover
3.	Disassembly Building No.2, Burning Area (拆解楼烧板区)	006	300-500	45-50	After raining/ Cloudy	A strong smell of plastics/rubber burning
4.	Plastic Processing Area (塑料作业区)	013	300-400	45-50	After raining/ Cloudy	A strong smell of plastics/rubber burning; Sulfur
5.	Centralized Disassembly Yard (集中拆解场)	008	500-800	80-95	After raining/ Sunny	An even stronger, more complicated smell of plastics burning mixed with unknown chemicals melting. It was difficult for us to relate to any familiar scents I'd experienced before.
6.	E-Waste Dumping Site (废弃电子垃圾堆放处)	008	250-280	45-48	After raining/ Sunny	A smell of vinegar mixed with the musty smell of warehouse
7.	Jiehui Highway between the Centralized Area and the government-owned TCL Circulation Company (揭惠高速)	004	150-200	21-28	After raining/ Sunny	Diesel; A weak smell of plastics burning mixed with the smell of humid soil and grass
8.	Chen's Ancestral Hall at the Center of the Guiyu Town (陈氏宗祠)	003	635	62	After raining/ Sunny	Faint rotten egg; A rusty smell of dead fish mixed with humid soil
9.	E-Waste Trading Market (电子垃圾交易市场)	004	277	43	After raining/ Sunny	Humid soil and grass
10.	Beilin Community (北林社区)	007	328	61	After raining/ Sunny	Diesel/Automobile oil and exhaust mixed with humid soil
11.	An Old House with Blue Covers (蓝房子)	010	430	53	Rainy	Moldy woods mixed with humid soil
12.	The Guiyu Town Government (贵屿镇政府)	003	180-190	31	After raining/ Sunny	Automobile exhaust

Figure 2. The Smell Log of My Guiyu Smell Walk

In this visit, I carefully selected ten specific locations across the Industrial Park and other parts of the town as the spots for smelling. The Centralized Trading, Loading, and Unloading Yard in the Industrial Park was my first stop, followed by several stops at various Disassembly Buildings and Plastic Processing Areas. Even though the Industrial Park project achieved some preliminary results, chemical smells persisted. In large part, *shaoban* and *suanxi* were still dominating practices in the Industrial Park, and these processes were responsible for the pungent, toxic smells that saturated the air. Regulations on operation time and items to be processed were indeed imposed and even printed out in large posters on the first floor of almost every Disassembly Building in the Industrial Park. However, the production activities within factories and workshops were loosely monitored and supervised. Whenever I smelled the acrid wind, which my N95 mask failed to shut out, I was pretty sure that someone was operating the burning or pickling process. Most of the workers I encountered, however, were not equipped with any basic protective gear, not even a simple mask. Nevertheless, they didn't seem very uncomfortable or anxious about the dangerous atmosphere that enveloped everyone. Could they have developed chemical anosmia just like Aunt Hu? How, then, do the workers detect dangers in the air? Is self-care ever possible with the anosmatic condition? Future environmental projects, at whatever levels, should take these questions into account.

The second half of my walk took place outside the Industrial Park, along the Beigang River that ran across Guiyu. Ten years ago, this river had been completely polluted, with dark water and unbearable smells. What I observed was instead a river with better conditions, deep green and not as smelly. I walked down the river toward the living center of Guiyu, getting close to the villages of Beilin and Huamei, once the largest communities in the area, with more than six hundred family workshops for e-waste processing. There was not a single trace of any family workshop; houses in the two villages had their doors shut. Only some small grocery stores and restaurants were open. What filled the air was instead the exhaust emitted by trucks and self-modified motorbikes—which carried tons of e-waste and constituted the traffic to the Industrial Park. The detectors I used could hardly tell the difference between the vehicle exhaust and the pollution caused by the burning of plastic, as what they showed was a kind of "purified" data, divested of any perceptual variance. Suffice it to say, technological sensing and body sensing generate two completely different sets of narratives in relation to the living world. The different chemical smells estranged me from the cognitive ground upon which my normative sensory experience took form. And the moments of estrangement would always send a signal of concern to my body. Environmental sensors are not always accessible, especially for the low-income working community. The available ones are unfortunately limited to trivial tasks. People had to depend upon their affected sensorium as a compass in an olfactorily turbulent environment. Hence, what concerns us is not just that smell is a material trace of global economic exploitation or eco-destructive production, but also that smell, as an index of olfactory risks, fails to be captured and detected by our bodies. Smell drifts.

Diffusive in milieus and conducted through the elements, a smell manifests itself as an energetic form in a state of constant movement and circulation. Intrinsic to the modality of smell and olfaction, energetic processes like inhalation and exhalation, physical compositions and chemical reactions, and environmental transmission and conduction, delineate how olfactory disparities are generated across different bodies, temporalities, spaces, and cultures. A universal discourse on how a smell exists, affects, or is perceived is impossible, since the perceptual experience of it essentially furnishes an *emergent* form of knowledge that takes shelter in sensory politics distinct from visual and auditory cultures. A smell, unfolding in time and space with perceptual variance under a multiplicity of bodily and environmental conditions, ultimately defies precise descriptions and a shared referent.

Smell performs as a complexity of parameters engaged in a convoluted chemical relationship between the environment and our body, rather than a singular result calculated through a concise mathematical or physics equation. To borrow the words of British philosopher John Stuart Mill, we could conceive a smell as "the joint effect of several causes," but never as "the sum of their separate effects.…The chemical combination of two substances produces … a third substance with properties different from those of either of the two substances separately, or both of them taken together."[31] Even if the environmental investigation manages to trace the aberrant element floating in the air, it is difficult to delineate the actual reactive process that yields the particular olfactory effect. There exists an inherent challenge of explaining the "what" (the identity of the particular chemicals involved) and the "how" (the required intensity of the involved chemicals and the catalytic conditions). The ambiguity of the chemical manifestation exposes a deficit of the explanatory power of an epistemological model that hinges upon linear causality. That is, the model fails to distinguish what role each chemical or environmental cause plays in the process and fails to identify the threshold of elemental intensity for a phase change.[32] Philosopher of science Manuel DeLanda critiques linear causality exactly by pinpointing its failure to take into account the identity

and the intensity of causes. He then promotes nonlinear causality as better suited for explicating some of the environmental phenomena that defy fundamental generalization, and which are always *emerging*, virtual, and full of potentialities.[33]

Smell is *emergence*. It is an effect or a phenomenon that takes form only at the encounter between the sensing environment and our sensory organs. None of the agencies involved can confirm their stable contributions to the process: not the enveloping atmosphere, not the sensing body, and certainly not the contingent moment or the site of the encounter. "Which stimulus reaches threshold level, and at what concentration," Barwich explains, "is contingent upon receptor expression and sensitivity. People have individually variable patterns of receptor expression in their noses. … Besides, there are diverging sensitivities to smell. It thus stands to reason that an odorant … could be perceived differently in people with a distinct receptor repertoire."[34] In making the phenomenological record of our olfactory experiences, I focused closely on several conditions that might cause sensory discrepancies—the body, the time, and the weather. Most prominently, I often described the smell in a very different fashion from my teammate. While I tended to use metaphorical expressions—"this smells *like* nail polish mixed with wet soil"—my teammate often tried to pinpoint the smell source—"this must be the smell of formaldehyde." It showcased the different encoding systems that we associated with smells and that limited our abilities to describe our olfactory experiences. The disparity between our sensibilities also resulted in two distinct acceptable levels of bad smells. Carefully attending to the olfactory settings, I was more sensitive than my teammate and quicker to detect the smell that was unpleasant to me.

Affected by both temporal and environmental conditions, the olfactory experience of Guiyu was "non-continuous, fragmentary in space and episodic in time."[35] The pungent smell could be more easily detected during the operation hours of the Industrial Park. The rain could wash away toxic chemicals in the air; a strong wind could blow away concentrated smelly odorants. What I smell is not the same as what you might smell. What I smell at one moment is not the same as what I smelled a moment before. The instability of smell is attributed to its infinite possible manifestations, and that is, as DeLanda suggests, a capacity problem. "Capacities are potentially infinite in number because they depend not only on the power of an entity to affect but also on that of innumerable other entities to be affected by it."[36] The volatile air expresses different capacities to affect us at different moments, and everyone owns a different organic structure and a different body history that together shape their capacity to be affected by it. Therefore, the encounter between the smelly milieu and our sniffing noses becomes so recalcitrant that no prediction can be made and no definite answer can be given. The smell, in this case, is *a* status on a particular occasion rather than *the* finalized adjudication of the perceptual process. It appears as the contingent materialization of spatiotemporality.

As a form of emergent knowledge, a smell is only one of the many manifestations in the reservoir of possibilities created by our contingent interactions with the breathable environment. Dominated by potentialities rather than by calculations and reasoning, the reservoir of possibilities is often misty; we can observe the multifarious possible causes (including perceptual sensibility, bodily condition, the constitution of the produced gas, the environmental medium that conducts the smell, etc.) but can hardly puzzle out the essence of their variations. The equivocal process of how a specific olfactory effect actually comes into form speaks to the virtual property of olfaction. Following Gilles Deleuze, I see that this moment of our living, breathing, and sniffing actualizes part of the virtual of the smell, and that the next moment will immediately witness a refreshing form of actualization.[37] The smell is the real object, and we should understand the virtual of the

smell as a repertoire of potential expressions of the body-environment interactions. The theorization of olfactory perception should challenge linear explanation of the cause and effect of an incident. In actualizing part of its virtuality, the smell situates itself in a pool of causes and effects corresponding to a nonlinear form of speculation. It fundamentally opposes linear causality, which limits the route from the virtual to the actual to only one arbitrary option.

SMELLSCAPING GUIYU

The emergent quality of smell also invites us to rethink the artistic potentiality of olfactory mediation. My project on Guiyu embraces research-creation as one of its central methodologies. According to Natalie Loveless, research-creation "allows for more creative, sensually attuned modes of inhabiting the university as a vibrant location of pedagogical *mattering*."[38] The argument holds true, as I see it, when removed from the university context. The polysemy of artistic practices is perfect for research on lived experiences. After my trip to Guiyu, I began to work with artist Shengjie Dai and architect Yijun Wu to create a series of artworks titled "Synesthesia (unfinished)." In this essay, I hope to present the centerpiece of the project, "Smellscaping Guiyu," with a modified form of smellscape mapping that tries to recreate the emergent experience of *Guiyu Wei* for visitors. At first glance, smells can easily defy the cartographic impulse, as they are always episodic, unstable, and emergent.[39] However, social geographer and map historian John Brian Harley proffers a deconstructivist reading of the history of cartography and aptly reminds us of the significance of disenchantment with any cartographic claim of the sort.[40] One of the difficulties of "representing" smells is their turbulent temporalities—the question of how to represent smells is essentially a question of how to represent temporal factors. With Harley's critique in mind, McLean advocates that we should approach mapping not as "representative" but instead as "performative" and "artistic."[41] Regarding "the map as an abstract concept, and the smellscape as a moment in time," she contends that the practice of smell mapping "no longer seeks objectivity or fixity," but "link[s] individual users with their lived experiences of a particular place, and to consider how everyday immersion in a smellscape may feel instead of merely identifying 'what is where.'"[42]

"Smellscaping Guiyu" is performative, not only because it could be a form of artistic mapping in McLean's sense, but more importantly because we design it to be a "stage" on which every visitor is invited to take part, interact, and perform. To achieve interactivity, we first try to challenge the two-dimensionality of most smellscape maps by adopting the globe as our artistic medium. The globe, as a medium, calls for a new way of imagining and perceiving the world. It can replace the linear perspective normally inherent in a two-dimensional map with open possibilities, liberal access, and nonlinear interactions. On top of that, we cover the globe with the map of Guiyu, on which we carefully mark up the locations where my olfactory experience and my active sniffing took place. A *globalized* Guiyu as such prompts every visitor to imagine what the global means to the local people. With few means or opportunities to get out of the town or to access the internet, the local community could hardly distinguish the sense of here from the sense of a larger world. For them the local *is* the global. The only way to get in contact with the global is in a neoliberal sense through processing the e-waste in their hands. Coming from different user centers of the world, the discarded computers, routers, monitors are stacked all over the Industrial Park, constituting a microcosm of the global media economy, showcasing various life cycles and life routes of what we think of as dead media. The global is thus situated in the local.

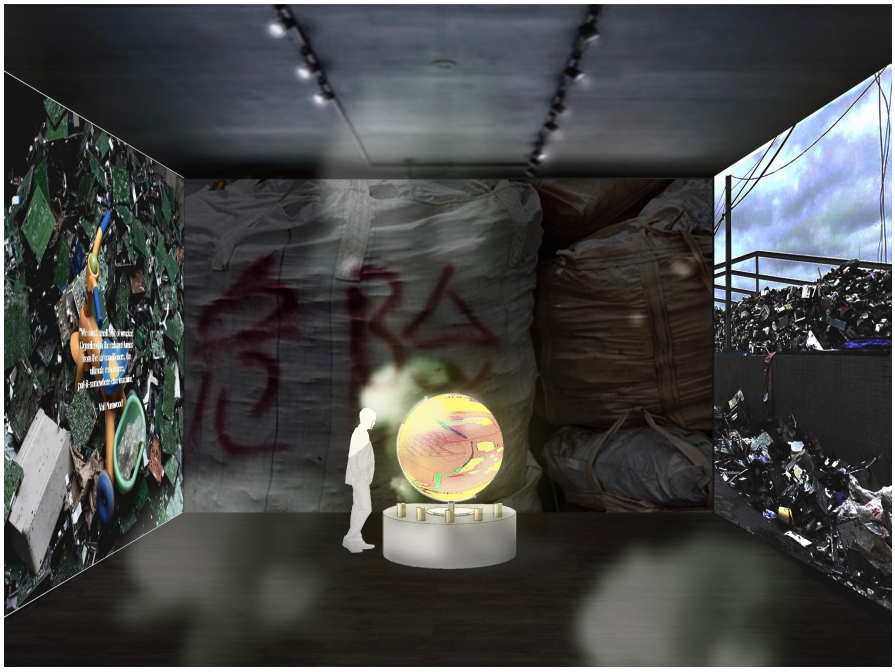

Figure 3*. Smellscaping Guiyu #1, *2022, Tinghao Zhou, Shengjie Dai, Yijun Wu, illustration © Tinghao Zhou & Shengjie Dai

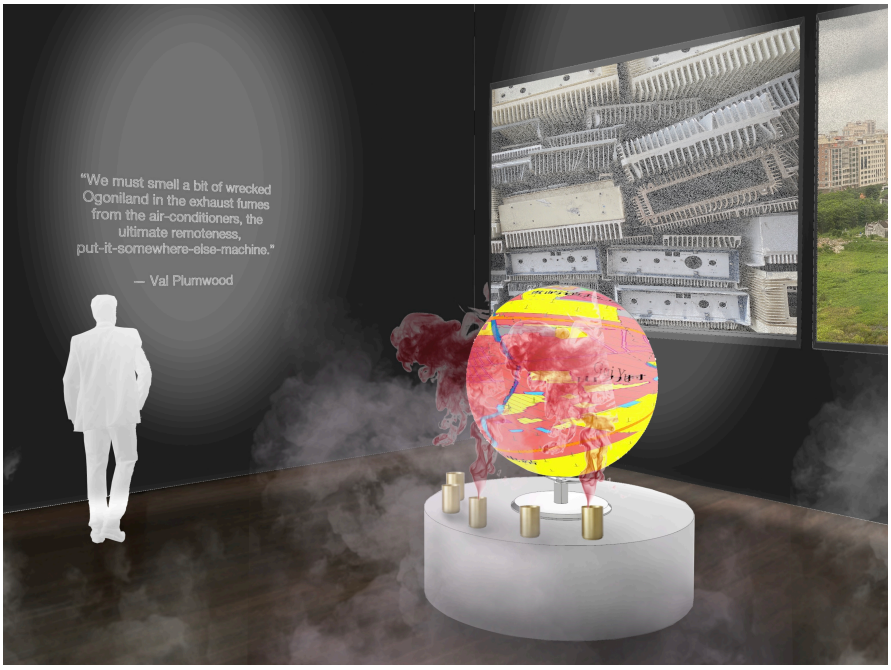

Figure 4*. Smellscaping Guiyu #2, *2022, Tinghao Zhou, Shengjie Dai, Yijun Wu, illustration © Tinghao Zhou & Shengjie Dai

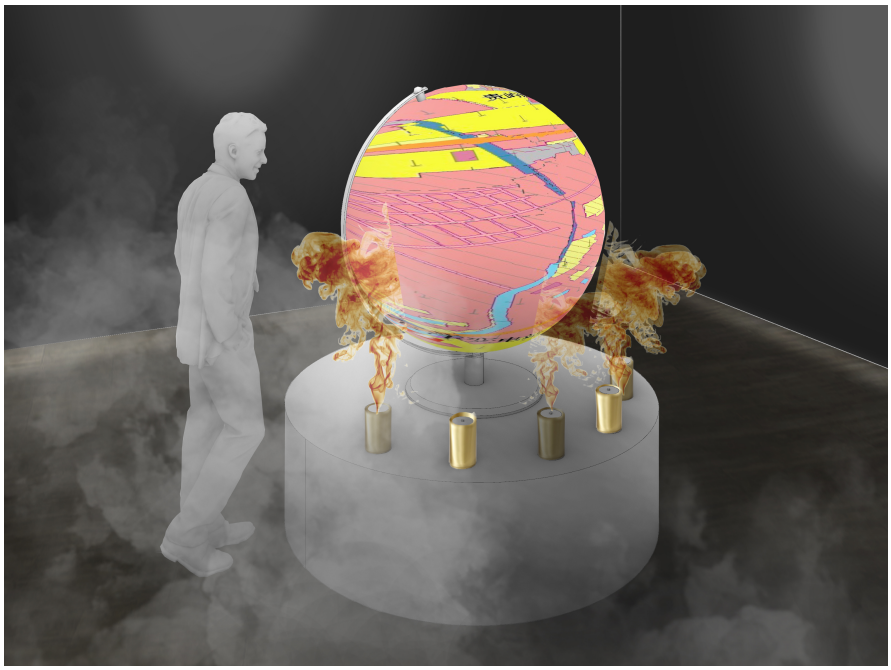

Figure 5*. Smellscaping Guiyu #3, *2022, Tinghao Zhou, Shengjie Dai, Yijun Wu, illustration © Tinghao Zhou & Shengjie Dai

We will put the globe, as a piece of interactive installation, into an enclosed space where visitors can move around and interact with it. We will equip the small room with multiple nebulizers containing different chemicals, each producing a distinct smell. The smells that these chemicals simulate fall into two categories: the relatively general smell of the environmental setting of my smell walk, e.g., the smell of soil, grass, and rain, and the personally rendered smell of e-waste pollution, e.g., the smell of nail polish remover, vinegar, and burnt hair. Every time a visitor spins the globe, a random selection of the nebulizers will emit a random amount of the contained chemicals, composing a distinct mixture. The goal is to represent the uncertain identity and intensity of the causes of smells, inviting visitors to imagine the precarious milieu for olfaction and the body in Guiyu. Every spin is a simulation of how the emergent smell takes effect. On one of the interior walls, a screen displays the still photographs of different e-waste materials while the other shows a short video log of my Guiyu field trip. On the way out, visitors can record their own perceptions of the smell either digitally or with a pen. We hope that the piece can furnish a form of emergent experience.

Written on another interior wall of the room is an important quote from Plumwood: "We must smell a bit of wrecked Ogoniland in the exhaust fumes from the air-conditioner, the ultimate remoteness, put-it-somewhere-else-machine."[43] I follow her call to recognize and experience the "shadow places" of the world, places "remote from self, that we don't have to know about but whose degradation we as commodity consumers are indirectly responsible for," places that "take our pollution and dangerous waste, exhaust their fertility or destroy their indigenous or nonhuman populations in producing our food."[44] In conventional film studies, we always associate the index with an obsession with light, a material bond that connects our eyes to the photosensitive plate and

ensures our uninterrupted perception of a true moment of life. The epistemological model of indexicality then establishes a form of sensory politics that is ocularcentric and tied back into the long history of human colonization.[45] It has long shaped our sensory habits to focus solely on the illuminated object. With a literal sense of "the redistribution of the sensible,"[46] the installation strives to break down the hierarchy of our five senses and undermine the dominance of visuality. By turning us away from the spotlight to the dimmed corners of the world, where an alternative maneuver of our sensorium becomes requisite for perception, Guiyu demands that we reexamine the indexical relation we establish as the indicator of life and harm, knowledge and reality. In the age of large-scale environmental disruptions and global exploitation, the index is fundamentally a precarious sign that can only speculate an unknowable future. To attend to the apocalyptic now, we should start to smell, taste, and touch, and ultimately excavate other potential forms of sensory politics and mediation.

ACKNOWLEDGEMENTS

This project would not exist in the first place without the sensitive companionship of my teammate Zikang He, Aunt Hu, and other local people I met in Guiyu. I would like to express my sincere gratitude to Janet Walker, Bishnupriya Ghosh, Bhaskar Sarkar, Lisa Parks, Alenda Chang, Melody Jue, Laila Shereen Sakr, and Christina Vagt for reading and giving invaluable feedback on multiple versions of this paper. This paper is also deeply indebted to the guidance of editors Kris Paulsen, Brian Michael Murphy, Johanna Gosse, and an anonymous reviewer. In addition, I want to extend my grateful thanks to Casey Coffee, Pujita Guha, Zijing Yu, and Yilun Li for their thoughtful comments. Finally, to my artistic partners Shengjie Dai and Yijun Wu: in arts we foster solidarity.

ENDNOTES

1. Dr. Kate McLean is an artist and researcher who works at the intersection of human-perceived smellscapes, cartography, and the communication of sensed data. For some of her design premises and principles, see Kate McLean, "Communicating and Mediating Smellscapes: The Design and Exposition of Olfactory Mappings," in *Designing with Smell: Practices, Techniques and Challenges*, eds. Victoria Henshaw, Kate McLean, Dominic Medway, Chris Perkins, and Gary Warnaby (New York: Routledge, 2018), 67–78.
2. Ibid., 67.
3. See Charles Sanders Peirce, *Collected Papers of Charles Sanders Peirce* eds. Charles Hartshorne and Paul Weiss, vol. 2, *Elements of Logic*, (Cambridge, MA: Harvard University Press, 1932).
4. See Mary Ann Doane, "The Indexical and the Concept of Medium Specificity," *Differences: A Journal of Feminist Cultural Studies* 18, no. 1 (2007): 128–52.
5. Following China's first revision of the 1989 Environmental Protection Law in 2015, the provincial government started to conceive the control of Guiyu's e-waste pollution as one of the central projects in the environmental governance scheme. The project involved regulations on production activities, eradication or transformation of family workshops, and investment in planning and constructing the Guiyu Circular Economy Industrial Park.
6. I gathered environmental data including PM2.5, HCHO, TVOC, and AQI (Air Quality Index) mainly with the portable sensing devices. The detectors were the air quality sensors for domestic use. These devices are small, portable, cheap, and easily accessible on China's largest online

shopping platform, Taobao. As an ordinary citizen, it's nearly impossible for me to have access to professional air sensors, as they are large, heavy, and expensive. Domestic air detectors often show deviant data and unstable data change, failing to reveal the overall air quality. The precarious relationship between domestic devices and citizens reflects the difficulty of self-monitoring and self-care in the age of large-scale environment pollution.
7. Natalie Loveless, *How to Make Art at the End of the World: A Manifesto for Research Creation* (Durham: Duke University Press, 2019).
8. Val Plumwood, "Shadow Places and the Politics of Dwelling," *Australian Humanities Review* 44 (March 2008): 139–50.
9. See Sarah Kember and Joanna Zylinska, *Life After New Media: Mediation as a Vital Process* (Cambridge, MA: MIT Press, 2012).
10. Jacques Rancière, *The Politics of Aesthetics: The Distribution of the Sensible*, trans. Gabriel Rockhill (New York: Continuum, 2004).
11. Basel Action Network, *Exporting Harm: The High-Tech Trash in Asia* (Seattle: Basel Action Network, 2002).
12. Ibid., 15.
13. Joy Parr, *Sensing Changes, Technologies, Environments, and the Everyday, 1953–2003* (Vancouver, BC: UBC Press, 2010), 138.
14. India and Ghana are two of the other major hubs for e-waste processing.
15. Lisa Parks, "Falling Apart: Electronics Salvaging and the Global Media Economy," in *Residual Media*, ed. Charles Acland (Minneapolis: University of Minnesota Press, 2007), 32–47.
16. Ibid., 38.
17. Hannah Landecker, "The Metabolism of Philosophy, in Three Parts," in *Dialectic and Paradox: Configurations of the Third in Modernity*, eds. Bernhard Malkmus and Ian Cooper (Oxford: Peter Lang, 2013), 193.
18. See Plumwood, 139–50.
19. Peirce famously categorizes signs into three specific types: the icon, the symbol, and the index. He uses a bullet hole and a gunshot to exemplify what an indexical relationship could look like. The index, he describes, "is a piece of mould with a bullet hole in it as a sign of a shot; for without the shot there would have been no hole; but there is a hole there, whether anyone has the sense to attribute it to shot or not." This short elaboration helps us to understand how the system of index operates. Peirce believes that the legibility of an index is materially and environmentally conditioned but perceptually independent. The material existence of the signified object ("the shot") is the prerequisite of an indexical sign ("a bullet hole"); a medium is required to give form to the index ("a piece of mould"). See Peirce, 104.
20. Michelle Murphy, "Alterlife and Decolonial Chemical Relations," *Cultural Anthropology* 32, no.4 (2017): 494–503.
21. When assessing the body burden in a damaged environment, environmental scientists always examine the contaminant level in human tissues and fluid, such as hair, human milk and placenta, and children's blood. See Janet Kit Yan Chan and Ming H. Wong, "A Review of Environmental Fate, Body Burdens, and Human Health Risk Assessment of PCDD/Fs at Two Typical Electronic Waste Recycling Sites in China," *Science of the Total Environment* 463–64 (October 2013): 1111–123; also see Xiang Zeng, Xijin Xu, Xiangbin Zheng, Tiina Reponen, Aimin Chen, and Xia Huo, "Heavy Metals in PM2.5 and in Blood, and Children's Respiratory Symptoms and Asthma from an E-Waste Recycling Area," *Environmental Pollution* 210 (2016): 346–53.
22. Stefanie Graeter, "Infrastructural Incorporations: Toxic Storage, Corporate Indemity, and Ethical Deferral in Peru's Neoextractive Era," *American Anthropologist* 122, no. 1 (2020): 21–36.

23. "Trans-corporeality" is famously proposed by environmental and feminist scholar Stacy Alaimo to challenge the Cartesian boundary between one's interior body and exterior environment. Essentially, bodies are porous, constantly interfacing with and operating in the situated milieu. In this paper, I argue that smelling, with its constant exchange with outside sensory data, is a bodily manifestation of how the "trans-corporeal" process happens. See Stacy Alaimo, *Bodily Natures: Science, Environment, and the Material Self* (Bloomington: Indiana University Press, 2010).
24. See Doane, 128–52.
25. Ibid., 136.
26. Ibid., 133.
27. Hsuan L. Hsu, *The Smell of Risk: Environmental Disparities and Olfactory Aesthetics* (New York: NYU Press, 2020), 5.
28. See Jennifer Gabrys, "Sensing Particulate Matter and Practicing Environmental Justice," in *Routledge Companion to Contemporary Art, Visual Culture, and Climate Change*, eds. T. J. Demos, Emily Scott, and Subhankar Banerjee (New York: Routledge, 2021), 219–29; see also Sachit Mahajan, Jennifer Gabrys, and Joanne Armitage, "AirKit: A Citizen-Sensing Toolkit for Monitoring Air Quality," *Sensors* 21, no. 12 (2021): 4044.
29. Bhaskar Sarkar, "Media Saturation and Southern Agencies," in *Saturation: An Elemental Politics*, eds. Melody Jue and Rafico Ruiz (Durham: Duke University Press, 2021), 248–49.
30. Lisa Parks, "Earth Observation and Signal Territories: Studying U.S. Broadcast Infrastructure through Historical Network Maps, Google Earth, and Fieldwork," *Canadian Journal of Communication* 38, no. 3 (2013): 301.
31. John Stuart Mill, *A System of Logic: Ratiocinative and Inductive* (Honolulu: University Press of the Pacific, 2002), 243.
32. I borrow Melody Jue and Rafico Ruiz's concepts of "threshold" and "phase change" here to evoke the processual quality of environmental changes.
33. Manuel DeLanda, "Emergence, Causality and Realism," *Architectural Theory Review* 17, no. 1 (2012): 3–16.
34. Barwich, 93.
35. J. D. Porteous, *Landscapes of the Mind: Worlds of Sense and Metaphor* (Toronto: University of Toronto Press, 1990), 25.
36. DeLanda, 13.
37. My use of "possibilities" in this paragraph needs to be contested. Deleuze believes that we should not understand the virtual merely as possibility, because possibility is not real but the virtual is "fully real." He argues: "The virtual is opposed not to the real but to the actual. *The virtual is fully real in so far as it is virtual.* Exactly what Proust said of states of resonance must be said of the virtual: 'Real without being actual, ideal without being abstract.'" See Gilles Deleuze, *Difference and Repetition*, trans. Paul Patton (London: Bloomsbury, 2014), 272; I use terms like possibility and potentiality here not to diminish the virtual as not real but to argue that the possible manifestation of a particular object is the real force that shapes the existence and the experience of the object. Thus, I want to contend that olfactory experience is not definite but milieu- and body-specific. Every encounter with a smell generates an olfactory experience specific to the subject's body in a specific time and space, and every olfactory experience is part of the virtuality of smell that is no less real than the one that has been actualized.
38. Loveless, 3.
39. Indeed, professional cartographers consider their own works and approaches "scientific" and "objective," and believe that they are involved in a rigorous process through which knowledge about the real world is produced.

40. John Brian Harley, "Deconstructing the Map," in *Classics in Cartography: Reflections on Influential Articles from Cartographica*, ed. Martin Dodge (Hoboken, NJ: John Wiley & Sons, 2011), 273–94.
41. McLean, 67.
42. Ibid., 67.
43. Plumwood, 147. Ogoniland is a south-Nigerian kingdom that has long been suffering from severe environmental pollution brought by the oil industry. The oil-spilled land and water assume similar symptoms to Guiyu, with unbearable atmospheric olfaction.
44. Ibid., 147.
45. A colonial project always depends on the perceivable light that can expose exploitable places and objects.
46. Building upon ancient Greek political philosophies, Jacques Rancière concludes that the operation of modern politics is actually based on a process called "the distribution of the sensible." The "distribution of the sensible," I believe, is an essential mechanism that delimits the different extended spaces in which sensory perceptions can take form and assigns specific political roles to different social actors based on the distribution. "This apportionment of parts and positions," as Rancière explains, "is based on a distribution of spaces, times, and forms of activity that determines the very manner in which something in common lends itself to participation and in what way various individuals have a part in this distribution." To put it simply, in a political organization, access to particular forms of sensory experience and knowledge is determined by specific social roles, which in turn determine one's political position in the organization/community. The potential of politics, for Rancière, locates in the aesthetic regime of the art. For him, artistic practice is a "displaced form of visibility," which renders possible the "redistribution of the sensible" and thus the disruption of predetermined political order and hierarchies. See Jacques Rancière, *The Politics of Aesthetics: The Distribution of the Sensible*, trans. Gabriel Rockhill (New York: Continuum, 2004).

REFERENCES

Alaimo, Stacy. *Bodily Natures: Science, Environment, and the Material Self*. Bloomington: Indiana University Press, 2010.

Barwich, Ann-Sophie. *Smellosophy: What the Nose Tells the Mind*. Cambridge, MA: Harvard University Press, 2020.

Basel Action Network. *Exporting Harm: The High-Tech Trash in Asia*. Seattle: Basel Action Network, 2002.

Chan, Janet Kit Yan, and Ming H. Wong. "A Review of Environmental Fate, Body Burdens, and Human Health Risk Assessment of PCDD/Fs at Two Typical Electronic Waste Recycling Sites in China." *Science of the Total Environment* 463–64, (October 2013): 1111–23.

DeLanda, Manuel. "Emergence, Causality and Realism." *Architectural Theory Review* 17, no. 1 (2012): 3–16.

Deleuze, Gilles. *Difference and Repetition*. Translated by Paul Patton. London: Bloomsbury, 2014.

Doane, Mary Ann. "The Indexical and the Concept of Medium Specificity." *Differences: A Journal of Feminist Cultural Studies* 18, no. 1 (2007): 128–52.

Gabrys, Jennifer. "Sensing Particulate Matter and Practicing Environmental Justice." In *Routledge Companion to Contemporary Art, Visual Culture, and Climate Change*, edited by T. J. Demos, Emily Scott, and Subhankar Banerjee, 219–29. New York: Routledge, 2021.

Graeter, Stefanie. "Infrastructural Incorporations: Toxic Storage, Corporate Indemity, and Ethical Deferral in Peru's Neoextractive Era." *American Anthropologist* 122, no. 1 (2020): 21–36.

Harley, John Brian. "Deconstructing the Map." In *Classics in Cartography: Reflections on Influential Articles from Cartographica*, edited by Martin Dodge, 273–94. Hoboken, NJ: John Wiley & Sons, 2011.

Hsu, Hsuan L. *The Smell of Risk: Environmental Disparities and Olfactory Aesthetics*. New York: NYU Press, 2020.

Jue, Melody, and Rafico Ruiz. "Thinking with Saturation Beyond Water: Thresholds, Phase Change, and the Precipitate." In *Saturation: An Elemental Politics*, edited by Melody Jue and Rafico Ruiz, 1–26. Durham: Duke University Press, 2021.

Kember, Sarah, and Joanna Zylinska. *Life After New Media: Mediation as a Vital Process*. Cambridge, MA: MIT Press, 2012.

Landecker, Hannah. "The Metabolism of Philosophy, in Three Parts." In *Dialectic and Paradox: Configurations of the Third in Modernity*, edited by Bernhard Malkmus and Ian Cooper, 193–224. Oxford: Peter Lang, 2013.

Loveless, Natalie. *How to Make Art at the End of the World: A Manifesto for Research Creation*. Durham: Duke University Press, 2019.

Mahajan, Sachit, Jennifer Gabrys, and Joanne Armitage. "AirKit: A Citizen-Sensing Toolkit for Monitoring Air Quality." *Sensors* 21, no. 12 (2021): 4044.

McLean, Kate. "Communicating and Mediating Smellscapes: The Design and Exposition of Olfactory Mappings." In *Designing with Smell: Practices, Techniques and Challenges*, edited by Victoria Henshaw, Kate McLean, Dominic Medway, Chris Perkins, and Gary Warnaby, 67–78. New York: Routledge, 2018.

Mill, John Stuart. *A System of Logic: Ratiocinative and Inductive*. Honolulu: University Press of the Pacific, 2002. First published 1843 by J. W. Parker (London).

Murphy, Michelle. "Alterlife and Decolonial Chemical Relations." *Cultural Anthropology* 32, no.4 (2017): 494–503.

Parks, Lisa. “Earth Observation and Signal Territories: Studying U.S. Broadcast Infrastructure through Historical Network Maps, Google Earth, and Fieldwork.” *Canadian Journal of Communication* 38, no. 3 (2013): 285–307.

———. “Falling Apart: Electronics Salvaging and the Global Media Economy.” In *Residual Media*, edited by Charles Acland, 32–47. Minneapolis: University of Minnesota Press, 2007.

Parr, Joy. *Sensing Changes, Technologies, Environments, and the Everyday, 1953–2003*. Vancouver, BC: UBC Press, 2010.

Peirce, Charles Sanders. *Collected Papers of Charles Sanders Peirce,* edited by Charles Hartshorne and Paul Weiss. Vol. 2, *Elements of Logic*. Cambridge, MA: Harvard University Press, 1932.

Plumwood, Val. “Shadow Places and the Politics of Dwelling.” *Australian Humanities Review*, no. 44 (March 2008): 139–50.

Porteous, J. D. *Landscapes of the Mind: Worlds of Sense and Metaphor*. Toronto: University of Toronto Press, 1990.

Rancière, Jacques. *The Politics of Aesthetics: The Distribution of the Sensible*. Translated by Gabriel Rockhill. New York: Continuum, 2004.

Sarkar, Bhaskar. “Media Saturation and Southern Agencies.” In *Saturation: An Elemental Politics*, edited by Melody Jue and Rafico Ruiz, 243–63. Durham: Duke University Press, 2021.

AUTHOR BIO

Tinghao Zhou is a Ph.D. student in Film and Media Studies at the University of California, Santa Barbara. His current research interests include theories of media and environment, ocean humanities, critical infrastructure studies, sensory politics, and digital culture in East Asia and beyond.