Watching Myself Watching Birds

Abjection, Ecological Thinking, and Posthuman Design

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ABSTRACT

In recent years, Sustainable HCI researchers have begun to investigate "noticing" as a design research method useful in efforts to decenter the human in design. Through an autoethnographic bird watching practice combining field observation, journaling, and making practices, we examine how noticing affects us and our way of relating to birds. We found that bird watching surfaces a feeling of abjection, or a simultaneous repulsion and fascination with a part of oneself one rejects in pursuit of personal growth. Along the way, we honed a practice of attunement through deep listening and field recording, which enabled immersive "ecological" experiences. We offer (1) an account of our method and process, (2) the framework of abjection as an approach to designing amongst the complexity of human/non-human interaction, and (3) reflections on how to design for ecological thinking in the push towards a posthuman design.

CCS CONCEPTS

• **Post-human-centered computing**; • **Human computer interaction (HCI)**; • **HCI theory, concepts and methods**;

KEYWORDS

Designing to decenter the human, Abjection, Bird Watching, Autoethnography, research through making, sustainable HCI, posthumanism

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1 INTRODUCTION

In 2017, although there were precursors to this thought, Light, Shklovski and Powell crystallized a collective angst in their paper *Design for Existential Crisis,* which addressed concerns around, amongst other things, increasing ecological disrepair [55]. Their paper joined a moment of global concern as a 2018 global climate report acknowledged more severe climate change was approaching faster than anticipated [97] and activist Greta Thunberg performatively sailed across the Atlantic Ocean to protest climate complacency in 2019 [85]. Light et al. suggested, *"There is increasing indifference to the ecology of the world in important places at the same time as predictions for sustainability are at their bleakest . . . ultimately there is a growing sense that, without fast action at every level of society, we cannot outrun crisis. In the Anthropocene age, shocks of all kinds are raising questions about the future and value of humankind"* [55:723]. The Anthropocene age is the name for the current geological epoch where humans are the leading cause of changes to earth's climate and geology. The name conveys that climate change is both the fault of humans and that our fates are intertwined with that of the earth. The naming of this era has catalyzed many scholars, Light et al. included, to wonder if human-centered-ness and the ontological division of human from non-human has driven a model of production and consumption that is changing the earth faster than conditions for our own survival can be maintained. Light et al. argue that as design researchers and technology designers, we are implicated in problems like climate change because, *"we have claimed a stake in the production of futures,"* while also suggesting we might course correct by, "*choos[ing] to have a role in producing alternative narratives for present generations of humans and those who depend on them, such as other species and unborn children"* [55:723]. While this charge is hopeful, the question remains: *what are these narratives* and *how do we enact them in material ways?* One pathway that Light et al. offer, citing posthuman scholars, is to, *"design to unseat humans from the center of the universe and support a more equitable gaze"* [55:728]. If human-centered-ness has caused the blatant disregard for other life and degraded conditions of earth, de-centering the human offers new paths forward in kinship networks [39] and more collaborative relationships [91] with non-humans.

The HCI community has answered the call to examine the possibilities of posthuman design and its implications by designing for collaborative survival [57], symbiotic encounters in agriculture [59], tangible awareness of climate change [7], using photography as a method to examine naturecultures [58] and designing for cohabitations between humans and non-humans [87]. HCI researchers have also imagined the need for new methods to explore posthuman design framings like involving non-humans in participatory design [17] or *arts of noticing* as a method (a concept borrowed from feminist new materialist scholar Anna Tsing) [63].

Exploring arts of noticing as a method was a departure point for the present work and was an idea our research lab had been

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investigating [60, 63]. Serendipitously, the First Author (from here out: FA) had just moved to Bloomington, IN from the Pacific Northwest and was out walking when she saw two birds—a cardinal and a bluejay—on a branch, birds she never saw in her prior home. Still processing the arts of noticing in ecological posthumanist theory, she became aware that she was, in that moment, *noticing* that she had entered into a new relationship with a local ecology. What a better 'noticing' project than to try to better understand and notice the birds around her all the time? However, instead of watching them from a predominantly scientific point of view (learning to classify them by their appearances or calls), she wondered what it would be like to learn about them from an ecologically posthuman point of view, asking, what ways of noticing could she enact or perform that would decenter her, or create new posthuman ways to connect with birds? Initially, she explored these connections to help her engage with the theory in an embodied way. Yet the exploration seemed to take on a life of its own, and as she reported back to the research team, she proposed to conduct an autoethnographic study of herself, as an HCI researcher investigating posthumanist approaches to sustainable interaction design using birdwatching as a practice of noticing. Working with the team, she created an autoethnographic protocol to watch the birds, and as a design researcher with a background in writing, FA also incorporated making practices and journaling into her autoethnography as tools to synthesize observations about how she and the bird's interactions and intimacies shifted over time.

This paper reports on the autoethnography itself as well as how the research team, including the FA, advanced their understanding of the art of noticing as a sustainable HCI [SHCI] research methodology with emphasis on decentering the human in design. In addition, the paper draws heavily from FA's reflection through writing and making as knowledge production devices. Both writing and making were critical to understanding and iterating on the performative practice of autoethnographic birdwatching. One early discovery—more phenomenologically felt than analytically understood—was when FA started to notice resistance in herself to the birds, finding the practice tedious, the birds loud, overwhelming, alien, mechanical and at times even monstrous. As she tried to put these experiences into words, the research team turned to the psychoanalytic concept of *abjection* to understand FA's experience. The abject is a concept concerned with the horror and fascination we experience when confronted with a breakdown between the self as a subjective, and separate from objects. Although often associated with substances such as pus, sweat, excrement, spit, menses, and corpses, substances that are both part of one's body and also external objects, the abject is primarily concerned with how subjects relate to themselves. Abjection has also been used to reflect on societal phenomenon of 'othering' in many cases, such as anti-blackness [45] and animals in art and literature [21], where abjection is positioned as a more insidious or latent resistance/rejection that happens at the borders of an individual or collective idea of a self. Ultimately abjection is an observation that part of constituting one's 'self' requires a person to reject parts of themselves that are ambiguously connected to an 'other'. Applying abjection to the birds, or non-humans, therefore shifts the subject/object binary of human/non-human to a subject/abject relationship, effectively recognizing that non-humans are not separate from humans, but that creating the binary has helped humans constitute themselves.

We began to see FA's resistant experiences with the birds as abject, and perhaps one of the 'others' that she was rejecting was her connections to or awareness of ecology. This led to one of the central insights of this paper: to 'decenter the human in design' is hard psychological work—it entails reworking relationships of self and other that threaten the boundaries of both and produce experiences of repulsion—of the abject. We contend that trying to use posthuman philosophy without consideration of the labor and experiences attendant upon the dissolution of the subject/object binary implicated by the human/non-human divide is, perhaps, impossible. However, through iterative attempts, we did find ways to build intimacy with birds and 'lose our edges' in ecological experiences. Using FA's autoethnographic experiences as a material with which to probe the effects of challenging the human/non-human boundary, we contribute (1) an account of FA's autoethnographic practice, which also included journaling and making activities, (2) an analysis of how abjection can help explain new ways forward in decentering the human in design, and (3) discussion about the roles of HCI research in supporting designers' grappling with decentering the human, as well as contributing to the potential for technologies to help the public become attuned to ecologies differently.

If we are right in positioning "decentering the human in design" as a project that focuses on subjects and subjectivities, then the FA's subjectivity is not something to be bracketed aside in the name of objectivity, but actually the heart of the project. Accordingly, the central parts of this paper feature the FA's first-person experiences, including observations, emotional responses, metaphors, doubts and reflections, and her efforts to connect her own experiences to those of others through acts of writing and making practices. The result—this paper—is an *essay* in the humanities sense of the term, that is, in content and rhetorical style it *"enacts the struggle for truth in full view"* [5]. As such, it is "*as concentrated on the character of an individual response as on any generalizable knowledge claims,*" and it assumes of its readers that they *"have an interest in the colour and temper of that response [which] goes well beyond conveying knowledge"* [86:26]. This essay also explores the type of knowledge produced through creative making, which helped the FA synthesize information and experiences that were bound up in non-verbal reflections on birdwatching. This essay is not about watching birds; it is about the formation of a certain kind of subject, one that HCI research is calling for: a designer and HCI researcher learning to notice the consequences of "decentering the human in design," which in this instance is achieved by watching birds.

2 BACKGROUND

2.1 Sustainable HCI: De-Futuring and the Anthropocene Era

This paper fits into a lineage of Sustainable HCI (SHCI) arguments and ensuant design research responses, of which we see two major through lines: the material implications of designed objects for sustainability and an emergent discourse about how SHCI should function in light of The Anthropocene era, or a time in history

where humans are the leading cause of geological change on the planet [15].

An established line of SHCI thinking looks at the production and consumption of and personal relationships with designed objects and technologies. In his seminal paper on sustainable interaction design, Blevis advocated for re-thinking sustainability from the perspective of production and—importantly—reuse and disposal cycles [9]. We can see reverberances of Belvis' call to consider renewal, re-use and disposal in the work of HCI researchers who examined personal attachment to heirloom [48] and digital artifacts [73], advocated for multi-lifespan interaction with technologies [32], and asked how technology could be designed in ways that build slow and meaningful attachments (counteracting obsolescence) [48, 71, 72, 74] . More recently HCI researchers have continued to ask how traditional wisdom can teach us about reuse and care [10], or how engaging with end-states of products can increase sustainable consciousness through designing with waste [27], and imagining ways design can un-make [56] and un-design [78]. One guiding philosophy in this line of SHCI research is contributed by theorist Tony Fry, who argues that without acknowledging the ethical concerns of sustainability, we are essentially engaging in 'defuturing' practices, or, erasing a possibility for a future [33]. Noticing trends of technological obsolescence, excess and disposability, HCI researchers asked how design of digital artifacts or modes of their production could be shifted by slowing down interactions [36, 71, 74, 79] or designing to un-design [56, 78]. We see promise in this general line of thinking as it foregrounds how design can intervene in how people perceive and relate to technological objects in reflective and sustainable ways. We aim to reorient ways of relating to non-humans similarly, seeking ways to shift relationships between humans and non-humans through design of technologies.

Blevis' call to examine renewal and reuse was diversified when Carl DiSalvo et al. [28] wrote about the need to expand the construction of *sustainable* systems into the structural roles of policy, economics, and other social factors. This led to a variety of explorations including but not limited to energy infrastructures for computing [11, 80] and research into sustainable food systems and small farms [16, 40, 41, 64, 70, 89]. As was mentioned in the introduction, the implications of relating to ecologies and non-humans differently have a global scope of impact that could affect policy, infrastructures and economics as well.

In recent years, post-anthropocentric or ecologically posthuman design agendas have emerged in SHCI in response to the Anthropocene era [15], the name given to the contemporary geological era where humans (through natural resource extraction, terraforming, and climate change) are the greatest contributor to shifts in earth's environmental and geological condition. Post-anthropocentric and posthuman research agendas have been deeply investigated by feminist STS scholars Donna Haraway, who first used the cyborg as a metaphor for a feminist, posthuman, networked model of relationality [38] and has since gone on to explore human-non-human relations and naturecultures [37, 39], and Rosi Braidotti who discusses posthumanism's relation to technology, climate change, and bio-politics [13]. SCHI scholars have recently begun exploring posthumanism in light of the Anthropocene era. Light et al., engaging with a litany of feminist new materialist and object oriented ontologist philosophers who are concerned with ecological awareness and knowing, called for the HCI community to, *"design to unseat humans from the center of the universe and support a more equitable gaze"* [55:728]. This is a radical but necessary call for HCI and design researchers, who as a field have fought for and just, in the last few decades, begun to feel the success and fruits of design that is human-centered.

Design researchers in HCI have taken this call and used ecological posthuman theory to attempt to find ways to decenter the human in design. Some research has used feminist new materialism as a theoretical lens which rejects individualism and views humans as radically interconnected between self and others (including non-humans) [30]. SHCI researchers have used feminist new materialist concepts to guide a litany of research agendas such as exploring Donna Haraway's concept of natureculture (the blending of nature and culture) through photography [58], designing for cohabitation [87] and symbiotic encounters in agriculture [59]. Others have been inspired to design in response to Anna Tsing's concepts of collaborative survival [57]. Still others have been drawn to Object Oriented Ontologist [OOO] approaches, which suggest 'flat' ontologies—an erasure of subject/object hierarchies in order to notice the liveliness and interconnectedness of life forms. While some researchers have applied OOO to understanding agency in things [75, 92, 93], new research veers towards ecological applications of OOO, using philosopher Timothy Morton's concept *hyperobjects* [66] to design to understand climate change [7]. HCI researchers are also interested in *methods* for posthuman design, recent researchers have asked how non-humans can be involved in participatory design by suggesting we are *'always-participating-with-many'* [2] or how noticing can be used as a method for ecologically posthuman design [63].

Both OOO and feminist new materialist philosophies call for a re-organization of human subject and non-human (object) relationships into more 'flat' (non-hierarchical) kinship networks or object to object relationships. SHCI researchers argue that acknowledging these flatter ways of relating are critical for designing technologies which support ecological/non-human care. In the present work, we argue that these posthuman philosophers have skipped a vital step of examining what has vehemently held the subject/object organization of the human/non-human relationship in place so successfully for so long. While we agree that there is promise in constructing different, more entangled and horizontal relationships to 'nature' and non-humans, we leverage psychoanalytic theory of Julia Kristeva to examine what holds the subject/object relationship in place, or what can be found at the murky border of this division. We explore *the abject* and its inherent ambiguity in order to ask what is difficult about decentering the human in design. Our work examines the potentials of noticing as a method for posthuman research agendas and connect noticing to autoethnographic research practices. Through this method and framing, we suggest new strategies and theoretical underpinnings for untangling the human/non-human binary. While these methods are exploratory and theory driven, we come away with concrete insights about how technology helped us attend to birds differently and implications for how technologies can be designed to tune attention to more-than-humans.

2.2 Birds in HCI

Although we primarily situate this work in relation to the broader SHCI agenda, insofar as it also addresses human encounters with birds, we also draw from and contribute to this literature. In particular, we were interested in HCI research that supports understanding and imagining birds' lives. For example, HCI research delves into how technologies might assist experts and beginners, often with emphasis on learning and interpreting bird calls. Some research supports beginning birding through use of IoT [84] and VR [46] to help novice birdwatchers build skills. Other research supports avian biodiversity research by working with expert bird watchers and citizen scientists to identify bird diversity via their calls [19, 20]. Other researchers imagine being like birds or communication with birds in playful ways like a game where participants Live Action Role Play (LARP) as common park birds, putting on bird head-dresses and communicating with each other via bird sounds piped through their cellphone speakers [77]. Other researchers have imagined how birds can have a stake in participatory design by designing performative artifacts which animate relationships between the elderly and birds [47].

While the present research is not instrumental—that is, we do not contribute any new technology that would support birding, for example—the present work not only reflects on what it means when humans encounter birds and vice-versa, but it also seeks to leverage such encounters to support HCI's posthuman design research agendas by critically and empirically interrogating the boundaries between the human and the non-human.

3 RESEARCH LOCATION AND METHODOLOGY

The present work draws from, is informed by and extends our long-term fieldwork, documented in [58, 60–63, 87] where our group has researched sustainable HCI and ecological posthumanism in agriculture in the US and Asia since 2017. In the context of this paper, we foregrounded the autoethnographic field research conducted by the first author between March 2020 and May 2020 in Bloomington, IN in the US. Bird watching, as mentioned in the introduction seemed like a way to practice arts of noticing, as suggested by Anna Tsing as an approach to understand relationships to non-humans. We hoped that the act of observing ourselves while watching birds and seeking ways to interact with them in a de-centered or post-anthropocentric way would generate new insights for HCI researchers about designing to de-center the human.

3.1 Research Site

Our site for research was Bloomington, IN, and much of the field work was done behind FA's apartment where there is a thick stand of trees. The focus on a specific place was intentional, inspired by the book *What the Robin Knows* by John Young, who writes that, *"returning to the same habitat day after day builds slow sense. Previously random observations begin to fall into place and come together as a coherent picture. The birds step forward. The intimidating surface of their world begins to yield to our awareness, revealing the hidden recesses and truths"* [94:loc.1178]. As a newcomer to Indiana, FA had no prior knowledge of how ecologies of Indiana really fit together and could be relatively fresh in observing them.

3.2 Autoethnographic Design

In order to capture nuanced, embodied, anecdotal and critical reflections on human/non-human interactions, FA used an autoethnographic methodology. Autoethnography is *"the creation of an ethnography focused on the self; the author is both informant and investigator"* [22:2]. Autoethnographic (also sometimes referred to as first-person) research was introduced to HCI as a way to design for oneself and refine through personal use [68], has also been advocated as a powerful a method for developing somatic or embodied design [6, 26–28] as well as a point of departure for critical reflection on the design process [26]. In particular, we were inspired by Höök's autobiographical accounts of horseback riding, which offered implications for embodied design [42] and Desjardin's reflections on shaping and being shaped by a DIY camper van [26]. The team situated FA's autoethnographic approach within emergent concerns in HCI about how to decenter the human in design through 'noticing' as a method [59, 63] .

To watch the birds, FA developed a protocol from bird-watching guides [88, 94] and assembled a 'minimum viable' birdwatching toolkit (figure 1). She got a Sibley's field guide to eastern birds, a set of binoculars from ebay, a notebook and used her cellphone to record bird sounds. She was inspired to record bird sounds after learning about the importance of bird calls to bird watching and reading about the practices of experienced ornithologist Donald Kroodsma who is famous for his research on bird song and regional dialects [51]. She watched and recorded birds on around 30 separate instances between February 2020 and May 2020. Each session of bird watching lasted around 10-15 minutes. She had a set of information she always collected: the date, time of day, visibility, temperature, any notable recent or current weather events and then general observations of the birds on that day. She would also always conduct a field recording with her cell phone every time that she went out to watch birds.

3.3 Autoethnographic Forms of Writing and Creating.

FA used writing and making as autoethographic research tools. Ellis advocates novel autoethnographic writing, such as mixed genres, as part of performing autoethnography [29]. Artful autoethnography is another effective way for autoethnographers to experiment with intimate self-expression and present their work as embodied inquiry. As Ellis articulates, *"arts-based (autoethnographic) inquiry experiments with alternative ways to transform what is in our consciousness into a public form that others can take in and understand"* [29:215].

In that spirit, FA conducted several 'making' experiments as part of the autoethnographic practice, using found sound, found video, and field recordings to create reflective audio and visual explorations of her own personal experiences of birdwatching. The composite videos, housed in a private YouTube channel, totaling 5 and on average two minutes long, are used as "objects to think with" by the first author and with the rest of the research team. When working with a more-than-human counterpart (birds) one doesn't have the benefit of shared language to base understanding or new knowledge on, and the creation of edited field recording tracks, overdubbed videos, sketches for design ideas having to

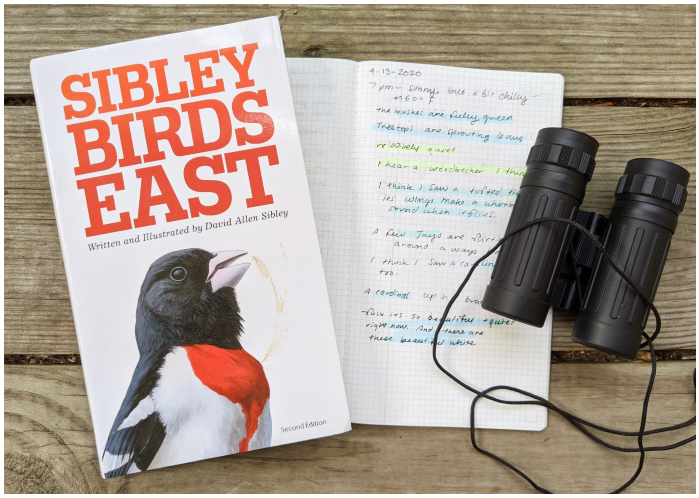

Figure 1: Minimum Viable Birdwatching Kit—A Field Guide, field notebook and binoculars.

do with sound, and re-creations of sounds from a sandhill crane migration all allowed FA to synthesize her experiences birdwatching, which were often sensory in nature, through more sensory or expressive mediums. While there has been much attention paid to the knowledge held in design objects [6, 34, 95], we don't see artifacts made in this project as Research through Design (RtD) artifacts. Instead, we position our sound and media experiments as an autoethnographic mode of self-exploration and expression through making; there is no intention to produce extensible design patterns or design portfolio-type pieces, for example. This autoethnographic framing follows notions developed by HCI researchers who reflect on making to know such as sketching to synthesize ethnographic findings [25, 49], annotation of iteration and critique of artifacts in a RtD process [83], the importance of making to imagine and know in a design process [8], how making 'magic' artifacts uncovers latent concerns and desires in participatory design [3, 12], how prototypes perform [23] as well as ways that sketches offer self-generated back-talk [14, 35]. We show and tell about knowledge production through making: showing several images of our making explorations as well as pointing to sections in the FA's autoethnographic writing which reflect on the making process.

Following Ellis' recommendation on autoethnographic writing [29], the FA also used journaling (blog posts in this case) to document reflections, personal stories, and related ethnographic narratives, weaving environmental and ecological theories she was reading. These journal entries thus capture the embodied experience and allow for emotional recall. Additionally, the FA wrote reflective essays connecting the artifacts she made (be it recording or video) to the theory the research team was reading and her own personal experiences. The writing is very much an autoethographical inquiry in the Ellis sense [29] and inspired by Barthes' notion of textuality which continues to open possibilities of readings, *"the work does not stop, does not close. It is henceforth less a question of explaining or even describing, than of entering into the play of the signifiers; of enumerating them, perhaps (if the text allows), but not hierarchizing them. Textual analysis is pluralist."* [18:25]. Following Barthes [18], writing was used as a way not only to reflect on experiences but also interpret artifacts made throughout the research process.

3.4 Other Field Study Activities

In addition to autoethnography and experimental and creative making, the FA also connected with members of the local birdwatching community through attending a Flying Wild workshops run by Indiana Department of Natural Resources. In spring of 2020, the FA also shadowed Dr. Alex Jahn, an interdisciplinary ecologist working on tracking robin populations as Lyme disease vectors. FA went into the field and helped Jahn collect blood samples from birds, band their legs, and then create blood samples for testing in a university lab. She also joined the Indiana Bird Watching Facebook group where members post on the timeline about birds they have seen recently, asking for advice and confirmation of species and to share events. Through this Facebook group, the FA began to engage with an interlocutor who subsequently shared more experiences about bird watching and bird sightings.

3.5 Interpretation and Analysis

Many of the FA's autoethnographic practices, most notably making explorations and journaling, doubled as methods of reflection and analysis. FA also constructed a timeline of significant quotes and themes from her field notes, media sketches, and journal entries in order to map the ways in which her understanding grew over time. This timeline was coded thematically using color and placement to see how different pieces of the data collection, experimentation and observation aligned. All these materials were then shared with the entire research team where the team came together for analysis and interpretive activities, following a procedure known as *explication de texte* [31], or close reading, an analytical method originating in the humanities [76, 81]. It followed an iterative, dialogic process, alternating between reading alone and reading together, and between reading theory and analyzing textual and media data—mutually

informing one another until a picture emerged that seems to resonate with our inquiry goals, theoretical resources, and our field experiences. Abjection emerged as a concept through our iterative analysis and the findings have been reflectively analyzed through the lens of abjection; while the experiences reported in our findings happened in situ and mostly chronologically, abjection was used as a reflexive framework for sensemaking after the fieldwork and journaling were complete.

4 THEORETICAL FRAMINGS: WEIRD THICK ECOLOGY AND ABJECTION

The following section describes the experiences of the FA which we discussed and refined dialogically as a research team leading to two theoretical lenses: (1) how deep listening practices can foster ecological becoming, and (2) how FA's attunement to birds made us all more aware of our own relation to non-human others through the lens of *abjection.* These interpretive and analytical framings were generated as a research team, so we quote FA, but refer to our thinking collectively.

4.1 Deep Weird Ecological Sound

In the beginning of her birdwatching practice, FA dutifully attempted to learn species of birds and their calls. Based on her reading of *What the Robin Knows* [94], which promised by visiting a sit-spot, a slow sense of the local ecology would emerge, day after day she went to her back steps, looking out onto the same stand of trees, and noting the bird demographics change as spring took hold of Indiana and new species like red-winged blackbirds and robins arrived, thick as locusts. She was an overwhelmed beginner, working on gaining the type of skills other HCI designers have sought to encourage in beginning bird watchers like identifying species and their calls [46, 84].

She reports having a hard time identifying bird calls: mnemonics, like 'tea kettle' for a Carolina wren didn't stick in her head and after listening to a recording of a cardinal call on Cornell Ornithology's website she wrote in her field journal, *"I listened to cardinal recording last night . . . and it's weird . . . I know I had heard that song before but didn't know it was them, and today, I kinda couldn't remember if it was them or not . . . a dreamy half-memory sound."* Listening to a bird call was like recalling a dream, these sounds were so foreign and familiar at the same time. However, she was inspired by ornithologist Donald Kroodsma to understand birds through deep listening practices, stating: *"as you listen to birds in that kind of detail—what I call "deep listening"—one after one you come to know that species and the variation within it. You come to listen at a different level, one bird at a time, and identifying the "species" comes easy"* [53]. Here Kroodsma demonstrates the kind of expert knowledge other HCI researchers reported when working with birding experts on conservation technologies [19, 20].

FA started recording her birdwatching sessions, and over time she realized her listening practice was a triadic experience built between herself, her phone audio recorder, and the birds. After a month or so of bird watching and recording, she realized her recordings were 'imperfect' and had the sound of, for example, a FedEx delivery person climbing the stairs behind her. In her journal she records an experience where she recognized she was beginning to imagine how her recording device might hear things, *"I imagine how the microphone of my phone will be recording mostly the sound of wind and a few distant bird calls."* While human ears are directional and focused, microphones are less selective and record everything. Imagining the perspective of the microphone helped her realize sound is everywhere and inescapable and perhaps, sound, as heard by her recording device, was akin to the thick, weirdness of ecology. She became interested in how sound denies a human/non-human binary by expressing 100% of possible sound (within the limits of a recording device) in one, full, bundle. According to Morton, ecology denies the very question of an inside or an outside, *"the very question of inside and outside is what ecology undermines or makes thick and weird"* and suggests that the inside and outside, or the borders of ecologies are made by, *"thoughts, wishes, fantasies (seemingly "inside" our human heads)"* [67:72]. Sound and deep listening, while related to bird watching, also offer a metaphor for ecological becoming, a concept we will continue to develop.

4.2 Abjection → An unexpected feeling

Throughout the FA's birdwatching process, FA oscillated between feeling like the birds were an alien other and finding creative/imaginative ways to be 'inside' ecology with them where she and the birds inhabited a shared space with fuzzy boundaries. We explain this oscillation through Julia Kristeva's psychoanalytic concept of abjection, which explores the feeling of being both repulsed and fascinated by a part of oneself that one rejects to constitute one's identity. In the following, we use this theoretical framing to examine a chronology of explorations which eventually led to greater attunement towards birds and implications and considerations for designing for decentering the human via alternate ways of being with ecology. This process of iterative, performative exploration produced insights about the potential for designing for decentering the human instead of artifacts that crystalize ideas about decentering the human (e.g., creating wearable devices [2, 29]).

As mentioned earlier, the turn to the notion of abjection was not immediate for the FA and the rest of the research team. Yet as we analyzed FA's fieldwork, the concept seemed to help us understand an unexpected feeling that had crept into FA's birdwatching: at times she found herself overwhelmed by birds, or frustrated. She was overwhelmed by bird sound, sometimes birdwatching felt tedious, and she wished to escape the ubiquity of birds, now seemingly everywhere. American artist and educator Jenny Odell notes in her own practice of bird watching, *"at first I just noticed birdsong more. Of course, it had been there all along, but now that I was paying attention to it, I realized that it was almost everywhere, all day, all the time"* [69:8]. FA felt similarly, as if she had punctured a scrim and was now overwhelmed by the noise coming through. Excerpts from her journal from different days show as much:

> *"I now hear bird sounds all the time, mixed in with traffic, the beeping of cars backing up, the wind, people talking . . . sometimes the world of birds feels impenetrable . . . There is a way to be in the world that is confusing and frustrating but tries to see more actors and they wake you up in the morning and grow into your home*

> *either literally or metaphorically. Is it like having a sibling? Someone you can love and hate simultaneously? Is that ok?"* [FA online field journal]

It was with some relief, then, when she was reading Dark Ecology and came across a passage titled, *"Ecognosis is Abjection"* where Timothy Morton describes *egognosis*, or coming to know one's interrelationship with ecology, as a form of *abjection*, or a kind of nausea of being overwhelmed. This immediately resonated with some of her feelings of being permeated: *"sometimes I wish I could go back to a time when it did not permeate everything. When I meditate I hear birds, when I am asleep I hear birds, everywhere I ride my bike I am looking at the fat robins peeping around."* [FA online field journal]

Morton asserts that part of the process of coming to awareness of our own imbrication in ecology is a state of abjection, stating ecognosis first appears to the knower, *"as an awareness of things I can't shake off, a distressing passivity commonly called abjection. A depressing nausea . . . is abjection, the feeling of being surrounded and penetrated by entities that I can't peel off"* [67:123]. In this passage, Morton describes the thing FA had been feeling exactly: permeation and exhaustion and being overwhelmed by the inescapability of birds.

Abjection is a concept coined by Julia Kristeva, a psychoanalytic theorist whose work extends and critiques that of Freud and Lacan. Abjection, according to Kristeva, is a primal and visceral rejection of things that are (or have been) actually part of the self, a rejection that is made by the self, for the purpose of establishing that self. It is a subject looking at their own nail clippings or urine or vomit and saying, "that is not me," asserting a boundary between the dirty other and the clean self. However, this repulsion is also accompanied by a comingling of fascination and desire, Kristeva offers the example of pus or a dead body, which the living person is both fascinated by and repulsed by because it represents the border they hold against death. One of the most primal examples of abjection is divorcing oneself from the mother, as one comes from inside the mother, and is part of the mother's own body for a time; it is important for the development for a person to reject and define a boundary between oneself and their mother. But, important for our research, abjection also confronts humans *"with those fragile states where man strays on the territories of animal"* [50:12]. Ultimately, because the abject is connected to one's self, the abject is something the subject can never completely be rid of, and the boundary between the subject and the abject is a border that haunts the subject and must constantly be policed.

In this work, we use abjection, and the oscillation between that fascination with the pseudo-monstrous 'other' of the bird to reflect on FA's experience of birdwatching practice. We found, and will show, that while not so repulsive as a dead body, there was an alienness to birds when FA paid more attention to them. In suggesting ecognosis is abjection, Morton suggests that knowing ourselves means coming to terms, maybe in an unpleasant way (at first) with how we are part of this collection of non-human 'others'. The FA's relationships to birds and her perception of their otherness slowly shifted through listening practices and self-reflection-through-making on her experiences of bird watching. While there have been calls for decentering the human in HCI, and objects created which begin to seek collaborative survival [57] and greater ecological awareness of futures with climate change [7], the present work examines the psychic borders of the nature/culture divide and finds ways to design for easing the tendencies toward abjection that police the boundaries between human and non-human, exposing the boundaries as more imagined than actual.

5 FINDINGS: ATTUNING TO BIRDS AND MOVING FROM AN ECOLOGICAL OUTSIDER TO INSIDER

In this section, we report our findings which both describe an in-depth process of exploring noticing as a method for design research and also reflect on the posthuman shifts in FA's awareness gained through noticing practices. FA not only had direct experiences of birdwatching, e.g., in the moments she stood on her back step looking to the trees, but she also had experiences reflecting on her birdwatching, both as a birdwatcher and as an HCI researcher through autoethnographic journaling and making. Unsurprisingly, this resulted in the layering of experiences—some intensely personal, others matter for conversation among the research group, and all of the above subject to introspection. Among them one finds significant moments in which FA, the subject of these diverse thoughts, saw as turning points in her thinking. In general, they follow a progression within the framework of abjection from birds as a strange/alien 'other' to finding a way to share a less contentious space with birds where FA felt herself inside an ecological experience, her boundaries becoming fuzzy with the things around her, echoing sentiments of Morton when he states, *"a human being is an ecosystem of non-humans, a fuzzy set like a meadow, or the biosphere, a climate, a frog, a eukaryotic cell, a DNA strand"* [67:71].

Since this portion of the paper relies heavily on the FA's autoethnographic fieldwork of bird-watching (including reflexive journaling and creative video and soundscape making), we use the first person singular "I" perspective most of the time to communicate a sense of "being there" and to make visible FA's reflexive practice. We switch back to a plural "we" in the discussion to give voice to the entire research team. These rhetorical moves are somewhat complicated by FA's participation both as a member of the research team and the only one of us who had first-person experiences of her autoethnography. We will make a note of the change when appropriate to better orient the reading.

5.1 Feeling Abjection: The Other and Outsider

For the majority of section 5, I, the FA will be speaking in first person. The following subsection (5.1) tracks the feelings of birds being other, alien and even somewhat monstrous, all signs that point to them as being part of an abject 'animal' non-human. However, even within these examples of early experiences birdwatching, I started to feel drawn toward methodologies for seeking a way to the 'inside' of an experience with birds. I was looking for ways to understand birds more ecologically and ways towards the feeling of losing my boundaries. I also was mindful that this project was ultimately intended as HCI research, and so my thoughts also reached back to HCI—to my research team, fellow posthumanist travelers in HCI research and beyond—as I tried to respond to the question of how

Figure 2: Stills from the cardinal video showing the subtitles.

my autoethnography might eventually add up to an HCI research contribution.

5.1.1 The Cardinal and Defamiliarization. In the middle of winter, towards the beginning of my bird watching exploration, on one very cold winter day when almost no birds were visible but one lone cardinal, I gave up the expectation of seeing much birdlife and ended up just staring for a long time at the lone cardinal perched on a branch. In my field journal, I reflect on how boring this cardinal's life seemed—how 'other': *"I looked at this Cardinal for a long time and was like, "wow, your life is so boring." And it had its little feathers puffed out and it was really sitting still. And I was like. This is part of your lifestyle. Sitting on a branch. Puffed. For long-ish periods of time. Oof"* [FA online field journal]. However, acknowledging the difference in realities, the unimaginable reality of sitting on a branch being cold for unknown lengths of time, made the cardinal all of a sudden more real. As in, it has its own life. One I could not fully access or be a part of. This experience had something of the quality of staring at a word for too long where the letters start to become shapes and the sound and meaning lose definition—staring at this cardinal for a long time made him seem very 'other' and alien.

In response to this experience, I created a video using 'found' sound and video. I collected YouTube footage of a female cardinal singing on a branch with subtitles that reflect what the videographer is thinking (these subtitles read: "the bird has seen me and considers flying away. Thank you for staying and singing") and overdubbed this video with free sound effects from an audio effects library (figure 2). I matched the sound effects to the bird's vocalization movements through a careful process of closely matching the sounds to the subtle movements of the bird's body and beak. I used two different overdubbing tracks, the sound of a Geiger counter (a nod to mass extinction of birds [82]) and an eerie laugh track of children laughing together. Part of this process sought to defamiliarize the cardinal, removing them from the context of being cute, pure and natural:

> *"I created videos from found footage of a female cardinal singing and found sound effects and combined them to create a defamiliarized subject of a female cardinal. In my experience, there is such an effort to make birds beautiful and pristine, I wanted to shatter that for myself and explore the kinds of new ways of seeing a bird that could arise from coupling them with mechanical and human sounds."* [FA online field journal]

So, a first step in my effort of coming closer to birds was to denaturalize them. Somehow, for birds to be seen as beautiful and natural preserves them from having an effect, to become closer to birds requires that they somehow become *strange*, not neutral and *affecting*, not powerless. They need to somehow become strange to become 'themselves' and become 'real' as I mentioned earlier. This also points to a kind of tool of synesthesia of understanding, that to see is to hear, to hear is to see, and to ask how seeing something and hearing another thing might begin to decouple the mind from stereotypes and give space for reflecting on birds differently. Ultimately this video became a tool for reflection:

> *"I am fascinated by the meanings that came up for me, I like the juxtaposition of the text that is like, 'thank you for singing' and the sound of a Geiger counter coming from of the bird's mouth ([reflecting on] environmental health) as well as just being strange and mechanical. The human laugher is even weirder and less clear to me. I think the idea that a bird is laughing at us watching it is funny . . . Something I have been thinking about and wrote down several times in the beginning of the bird watching journals, is the alien nature of bird sounds, the mechanical nature, and the trippiness of their sounds and the tools I use to watch them, like I found binoculars to be rather trippy in the beginning. These videos are also hopefully, a little trippy."* [FA online field journal]

In these videos I was also exploring a kind of sensory blending I was noticing in the theory I was reading about natural history observation where researchers were using strategies of sensory inversions or blurring the senses to make new kinds of sense or to notice in detail. As environmental and forest biology scholar Robin Wall Kimmerer explains, *"Learning to see mosses is more like listening than looking."* And American ornithologist Donald Kroodsma comments on how he uses vision to listen to birds, stating for him listening: *"[is] all in the eyes." Seeing bird sounds as we hear them greatly helps us appreciate the details in the sounds and the differences among them"* [51:1] For this reason, I reflected on how, "*it is interesting that how we hear something might help us see it differently or how we see something helps us hear it. So. I created this abnormal sounds experiment to help me disconnect myself from the image of birds as like, 'natural and so beautiful'"* [FA online field journal]. Sensory blending helped me see birds in a different light.

I started to recognize the abject through making the cardinal more strange and 'other'. By making the cardinal less innocent,

there was suddenly something at stake between us, I could feel a tension—a boundary to police, perhaps. This was the first instance where I was really looking differently at a bird. Part of that looking differently was to make a representation of what I experienced feeling: alienation from the bird, an inability to connect to the bird's lifeworld, a real strange and alien other. This video exploration also alluded to the fact that alternate states of reality, sensory blurring, and trippiness might be part of breaking through the otherness. Interestingly, Kristeva herself alludes to this ambiguous borderland: *"on the edge of nonexistence and hallucination, of a reality that, if I acknowledge it, annihilates me. There, abject and abjection are my safeguards. The primers of my culture"* [50:2]. Is there some potential lurking at the slightly trippy, sensory-blending, boundaries of understanding the other for designing to decenter the human? What does the ambiguity of abjection feel like to come close to?

This experience helped me reflect on possible implications for HCI such as how decentering the human might be accomplished, paradoxically, by making the non-human more strange. In this experience, I translated the strangeness of the cardinal on the branch into a sensory-bending exploration of strangeness in a video. Allowing the cardinal to be 'weird' or 'other' gave the cardinal agency and was a step toward acknowledging how it leads a life that I cannot easily access, but also made the bird more distinct and agentic to me. Perhaps strategies of defamiliarization, especially using sensory blending are a primary step for HCI researchers seeking strategies to develop technologies which decenter the human.

5.1.2 The Sandhill Crane Migration and a Call to Attention. Not long after I saw the cardinal, one afternoon in March, I was working at my desk at home and was caught off guard by sounds of a sandhill crane migration—a sound so strange that I'd never heard anything like it before in my life and had no idea what it was. Not knowing what I was hearing and not actively trying to notice any bird activity, I almost ignored the sound completely. Once I recognized something weird was happening, however I ran outside to try to see the birds flying overhead, but they were out of sight. Afterward, I was so enamored and fascinated by the sound, I decided to reconstruct the event. This event marked both a growing fascination with the strange and alien sounds birds make in groups, and a desire to design a way to be inside of that sound (not outside looking in).

It's hard to explain how phenomenal the sound was, and why I would try to recreate it. Sandhill cranes are huge birds that migrate in flocks of hundreds, and each bird itself can project its call over a mile. The sound generated by their migration is monstrous, goose bumps inducing, bordering on the sublime. In my journal I tried to find words for it, *"the best I can describe is like the feeling of a fuzzy ball of sound. . . a multi-directional puff ball . . . an amazing band of cooing purring outside."* At the time they passed by, I didn't even know what bird had caused the sound, or if it was a bird at all. In fact, in both my field and reflective journals, I note how the sound reminds me of an extraterrestrial named Proginoskes, a beast featured in *A Wind in the Door* [52] (a young adult fantasy novel), who is essentially a flying conglomeration of wings and eyes. The connection to Proginoskes, monstrous and sublime, again, acknowledged the alien 'other' of birds.

I was both unsure what I had experienced and really excited about what I had experienced, so out of a kind of grief for not having reacted quickly enough in the moment, I reconstructed the sound. First, I verified what I had heard by trawling online resources like ebird.com and Facebook groups. In my journal I explain how I discovered via, *"ebird.com, that 314 sandhill cranes had passed over Lake Lemon that afternoon"* I also saw a YouTube video of a crane on Indiana Birdwatching's Facebook group feed and remarked how the bird's call, *"like a purring honk—seemed like if multiplied it could produce such a purring orb of sound, miles wide."* Someone on the same Facebook group mentioned sandhill cranes had passed over that afternoon.

I then decided to reconstruct the sound of a sandhill crane migration from memory. I recreated the sound by using three separate mp3 files scraped from 3 different YouTube videos of sandhill cranes. While watching the YouTube videos, I was struck by how strange the birds were, like dinosaurs (which, it turns out they basically are: their earliest fossil is estimated to be 2.5 million years old [96]). This contributed to my general feeling that these birds are fascinating, but strange and alien others. I edited and combined the mp3s to create the depth and texture of the hundreds of calls of sandhill cranes flocking in a large group. I used different audio tracks for the left and right speaker to create a sense of space in an attempt to recreate the kind of 'roundness' of sound I experienced. I then used the third audio track to be a kind of textural underlayer that I put some reverb on to create more feeling of fullness, repetition, and continuity (making the group feel bigger and also adding some distortion and softness to their sound, which represented the distance at which I heard them). Finally, I tapered the volume at the beginning and end to create a sense of 'flying over' or 'flying through'. Through creating this audio experience, I was trying to both recreate the sandhill crane migration as a reconstituted memory, but also, as I imagined the stereo effects an speaker placements, the audio design became a way to sound-designing myself into the middle of the flock of cranes. It was the beginning of my curiosity as to what it would be like to be *inside* the sonic world of a bird.

This experience also revealed to me how I was paying attention to birds when I wasn't actively watching them. In my journal I reflect on how I felt my brain processed the sound of the cranes:

> *"When I heard the sound of sandhill cranes, I did not know what the sound was. It was eerie, I believe now my mind was trying to place it while my mind was trying to ignore it. I was sitting here, at my desk, daylight softly warmly coming in. There is never direct sun in my home, somehow. I remember the light as warm, I remember the sound as something unplaceable, mechanical, pervasive, moving, then round—full—like a dandelion head. The sound came over me and all the sudden the part of my mind holding the sound away from my mind trying to place the sound transitioned to my whole mind and I realized this sound was in the sky, moving past, loud and powerful. It was scary, it was surreal."* [FA online field journal]

Most interesting to me in retrospect, however, is how I talk about the sound being 'held away from my mind by my mind' and how I describe that, "my mind was trying to place it while my mind was trying to ignore it." In this way, I am showing there are two parts of my brain working on the same problem and I would like to distill

this description into a concept of 'front brain' and 'back brain—a concept I will return to again. Essentially, front brain/back brain reflects on how part of my brain is attuned to 'front' or 'forward' activities (work, human-centered concerns, and 'normal' noises) while there is another part of my brain working on 'background' problems, which was paying attention to the strange and unplaceable periphery. Through this research process, over time, I attuned more closely to my 'back brain' sensibilities and allowed my 'back brain' to drive more decisions and be more actively curious.

This exploration made me consider how HCI researchers might explore designing experiences which transport a human 'inside' the perspective of a non-human. Imagining from a non-human perspective expands human imaginations of non-human lives and increases fascination and engagement with the non-human. Capturing the 'inside' perspective of being in a sandhill crane migration could take a someone on an audio experience of being in the 'purring orb' of sound or on a long-distance physical journey over their migration path. Either way, looking and listening to these birds up close inspires wonder and awe, strangeness and fasciation at the same time, opening up sensitivities to different types of being in the world. Thus far, in my birdwatching, I was feeling a tension between seeing bird as strange and 'alien' and while still desiring to be closer and more attuned, exemplified by the sadness I felt of at first missing (and then recreating) the sandhill crane migration.

5.1.3 Red-Winged Black Birds and The Alien Other. As spring broke over Indiana, it brought an incredible influx of bird species, one being the red-winged blackbird which liked to congregate around the pond in the front of my apartment complex. Like the sandhill cranes, once I started to recognize the red-winged blackbirds (which took some time), I was totally fascinated by the strangeness of the noise they made in group. I was interested in the precision of bird voices and how mechanical they were. This was in part due to reading *The Genius of Birds* by Jen Ackerman, where she discusses an experiment comparing human speech accuracy with bird song accuracy, *"The precision of a bird's song is staggering . . . Compare the two spectrograms side by side and the results are clear: No matter how hard the diligent [human] student tries, his replications of his own syllables are wildly variable. The zebra finch's are nearly identical. In terms of his precision, says Mooney, "the bird is like a perfect machine"* [1:164]. I was also frequently listening to techno at the time the time I was captivated by this quote which compared a bird to a machine. One evening, riding my bike home, I stopped to record on my cell phone (although the recording turned out terrible) a kind of red-winged blackbird sonic congregation. I reflect on this in my journal:

> *"One of my favorite things about bird watching is the textural, dimensional quality of sound of birds in groups, or birds singing distributed through a space. Last night, when I was riding home, there was a red-winged blackbird convention in the trees by my house. Must have been 30+ birds. I started noticing them because some red-winged blackbirds were sitting on the cattails by the pond in front of my apartment complex. One bird took flight as a I rode by and I followed it to the trees where it was joining many other blackbirds. I stood under a tree and listened to their combined voices . . . I have been listening to a lot of techno lately, and the mechanical quality of the bird's song in mass reminds me of algorithmic or computational sound. But due to the organic nature . . . [the] variations of their songs and which direction the birds were pointing their heads created an undulating mass of semi-structured sound. The image in my head is like some undulating oil slick built of tiny mechanical parts."* [FA online field journal]

I conjured the image of this non-human machine, an oil slick of tiny mechanical parts, a being I will never be able to totally understand. After this experience and the sandhill cranes, I became interested in designing or performing a way *inside* the mass of voices. Here, below, are two different sketches (figure 3) where I was imagining installations or video projects to create the experience. In the first, you can see I was imagining a speaker-sound-forest or a sound vortex which I could stand inside of. In the second sketch, I proposed a kind of many-screen brady-bunch video performance, where I could edit together many panels of myself playing clarinet or yelling into a noisy flock (figure 3).

In stopping under the tree on my way to record the red-winged blackbirds, I was starting to honor my 'back brain' more and was pulled over to them to experience and document their calls. I was curious about the sounds of the birds, fascinated by their alien 'machine-like' precision—however, I still didn't know how to feel anything other than 'outside' the birds in these experiences. As HCI researchers, the concept of exploring spatial and performative ways to imagine being with non-human others, as shown by the sketches above, might be a way to slowly begin to attune to 'back brain' awareness—connecting to experiences of non-humans in playful and sensory ways.

5.2 Decentering the Human: Finding An 'In'

In this section I follow a 'turn' in my awareness as I begin to notice moments of my human-centered awarness blurring and I move towards decentering myself and softening the boundaries between myself and birds. The process leverages the accumulation of my bird watching practice to embrace becoming more susceptible to more-than-human influence while also honing my deep listening through field recording. These practices and attunements moved me into different sensory relations and fields of experience with more-than-humans and birds.

5.2.1 It Started with a Dream. Something I didn't expect about spring in Indiana and couldn't have anticipated was the eruption of life in springtime which includes the return of migratory birds. The recordings I made in April were full of birdsong, as compared to recordings from the end of February where I might record just a few cardinals singing. In my field journal, I noted a mutual excitement, *"for some reason when i woke up today I thought we (me + the birds) are all probably getting stoked on the potential of spring"* and toward the end of April, I reflect in my journal,

> *"I can't sleep in anymore because the birds are so loud that they wake me up every morning but I can't help but being happy for them because they are singing so exuberantly, and the dogwood trees are blooming, and the sun is soft still early in the morning, and its like*

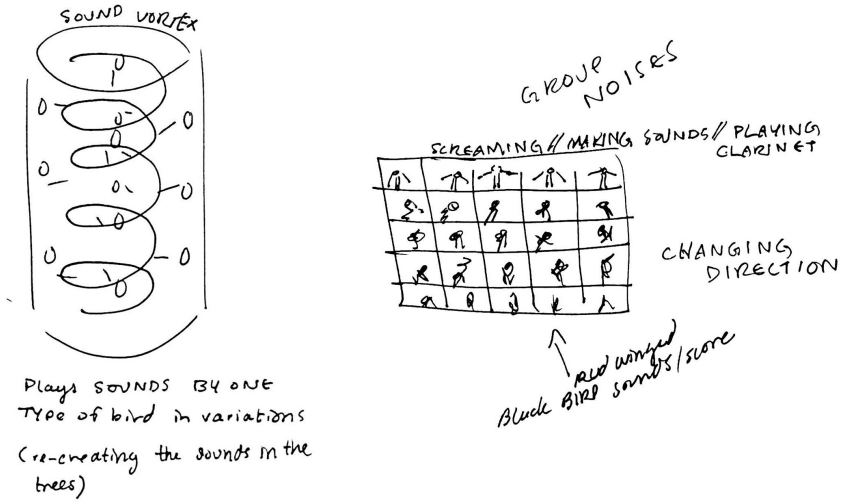

Figure 3: Sketches of ways 'inside' a bird flock: (left) concept for a sound vortex of speakers; (right) concept for performing a flock in a video

> *. . . the greenness of my backyard is growing into my reality more and more."*

But, in a turning point, one morning I had an experience of bird song blending into my dream:

> *"several days ago, I had a dream that integrated a cardinal song into it. I think I woke up and the cardinal song was almost a bridge between dream and reality. But all bird songs are weird in this way, I am never quite sure how I know the song, how to describe it, it becomes something known but only knowable through trying to know and then is only known inside the knower because . . . beyond recording (which is also still hard) it is hard to tell people what a bird song sounds like. It is so alien, perfect, strange."* [FA online field journal]

This quote is important to me because it comments on the general dreaminess of bird calls while observing the potential of a bridge between dream and reality as a place birds and I could meet in a pre-conscious mode. The dreamy quality of bird sound harkens back to the very beginning of my learning process, where I reflected on how listening to a recorded cardinal call and trying to associate it with a real cardinal was like hearing a dreamy half memory. Weirdly, humans and birds share a kind of general notion of language. In *The Genius of Birds*, Ackerman writes that birdsong and human language use similar brain circuits to produce sound. Somewhere in the evolution of language, Ackerman suggests, *"the expressiveness of language may somehow incorporate or reflect the melody of birdsong."* I was charmed by the notion that in a dreamy half-memory, birds and humans could understand each other's sentiments in a pre-lingual, expressive mode of communication.

I was also delighted by the idea that birds were communicating with me in my dreams, the place of the unconscious, or our hidden desires and motivations. In this way, I imagined that birds and people might connect in the unconscious, a space that might be able to circumvent abjection through a proto-language common ground, a place of symbols and impressions where non-humans reflect and blend into understandings of self that are not 'other' but is instead recognized as integral.

This dreamy middle ground of a place to connect beyond language was also explored in the performative artifacts designed to infrastructure relations between elders and birds in other HCI research [47]. Dreams represent a place of departure from 'rational' and 'established' ways of being. They allow novel and strange relationships to form between the elements of the dream therefore, dreams, even as a concept or a metaphor, engage the possibility of designing for interaction or understanding between humans and non-humans which aren't divided by language or where we can meet on a different level of consciousness and new relationships can form.

5.2.2 Moved by Desire. Inspired by this dreamy experience, I began a practice of recording the birds whenever they woke me up. To me, this became symbolic of letting my 'back brain' lead, letting birds affect me, and capturing our interactions not as part of a field observation practice, but as a part of a new way of keeping track of times when birds began to break in to my consciousness or my sleeping, dreaming self. I began to let myself become more vulnerable to influence, which to me, was part of attuning my 'back brain'—or the brain that is attuned to the non-human or the non-forward or 'front' part of experiences. Ultimately, I sought to become more susceptible, as according to Morton, *"ecognosis means: letting become more susceptible"* [67:129].

Over the course of this bird watching practice, with ardor for the sound of birds, I became more invested and experimental with my recording practices, as can be observed in my attempt to record the red-winged blackbird 'mechanical oil slick' and practice of recording the birds that were waking me up in the morning. After I started recording the birds in the morning, I began purposefully recording outside of the scope of my bird watching field notes and observation practice, letting sounds call me to attention as well

as to location. I even purchased an enhanced recording device, a zoom H1n, which I was excited to take around with me to record things. I spent a week recording the sounds of Bloomington. I remember letting myself be pulled: instead of fighting the 'back brain' impulses to hear what was going on outside my window, I would stop what I was doing and jump up to record. I recorded birds in the rain, birds in a windstorm, and the birds that woke me up in the morning. I rode my bike to a creek I had visited in the winter to record the birds around the creek, capturing an epic duet between two robins accompanied by a bubbling stream. I recorded because I had been *moved* to record, both physically (around Bloomington) and emotionally. These recordings also became more engrossing. Allowing myself to be moved to listen, to record, was allowing myself to become more susceptible. A softening to the aesthetic call of the birds and the world.

5.2.3 The Swamp. The last experience I have to share is one where I was moved (literally), and explored field recording with a great deal of intention. This experience felt like a capstone of my explorations and a time where I finally came 'inside' and experience with birds and began to lose some of my human boundaries. Perhaps I didn't conquer abjection, but I had trained a new attunement, through my budding practice of field recording.

As the section title suggests, in late May, I rented a car and drove two and a half hours to the border of Indiana and Kentucky to visit a cypress swamp to do field recordings. Why a swamp? I had learned that over time, Indiana had lost up to 70 to 80% of its wetlands, and was now comprised of only 3-4% wetlands [90]. In my journal, I comment, "*I wanted to see proto-Indiana, proto-agriculture.*" So, I drove to the swamp. I should be clear—the swamp visit is rooted in my birdwatching practice, but becomes about more than birdwatching and the scope moved beyond my backyard. However, the trip was still focused on listening, birds and finding ways to actively experience an 'insider' relationship to ecology and also explore the ecology of an expanded 'backyard'.

When I got to the swamp, I was relatively alone and, wary of ticks and snakes, I walked out into the woods. *"I get out of the car. It is hot and humid. 89degF. It is green. The Midwest is so green, greener than any place I'd been before that I remember"* and I walked back along boardwalks to the cypress swamp, sweating in the humidity. I arrived at the swamp,

> *"A chartreuse oasis . . . there is a perfect patterned film of bright green growth covering the surface—some kind of algae, maybe. I record something—what? I don't know. Just the place. I hear one of the big slow bees buzzing around, there seem to be motorcycles in the distance or is that an animal (later learn it is a bullfrog) birds caw, wind rustles the trees. The humidity has all the sudden caught me, I have a little headache."* [FA online field journal]

Looking back on the experience I reflected,

> *"I spent 40 minutes at the cypress swamp, recording, and, I don't remember it, really. I was a bit absorbed in the scene. Time went faster. I was really reaching with my ears in all directions to find moments that might be of interest to record. Interspersed of course, with less structured open-ended recordings . . .trying to choose the thing that would be exciting to remember later, like opening a gift."* [FA online field journal]

In this experience, I really felt affected by the greenness of the swamp and the heat and the reaching of my ears in all directions. Recording asked me to imagine what the recording technology might hear which stretched my ears, a type of imagining I had been doing since fairly early on. I feel the experience of the swamp was affecting, engrossing, and I finally felt like, through the focus of listening, color, heat, humidity and lack of interruption, I had an experience that felt like 'losing my edges'. For lack of better words, I had found a way 'inside' of an ecological experience, without analysis, really, but more through the mechanisms of desire and letting myself become more susceptible—that quality Morton suggests is part of coming to know ones' self within an ecology.

In a kind of epilogue, after experiencing the swamp, I found connections between my experience and my attunement and some elements of neurodivergent descriptions of the field of experience offered by Brian Masumi and Erin Manning in *Thought in the Act*. Manning and Masumi recount how neurodivergent people might hear bird calls at the same volume as human voices, suggesting a different set of relationships is possible, and that 'neurotypicality' is based around a set of subtractive perceptual expectations that reinforce human-centered ways of attending to the world.

> *"we hear neither a rejection of the human, nor a turning away from relation. What we hear is an engagement with the more-than human: "I attend to everything the same way with no discrimination, so that the caw of the crow in the tree is as clear and important as the voice of the person I'm walking with" (Krumins in Miller 2003, 86). And an engagement with a more textured relating: "My world is organized around textures. [. . .] All emotions, perceptions, my whole world [. . .] [has] been influenced by textures" (Krumins in Miller 2003, 87)."* [65:4].

Massumi and Manning's work, which touches on knowing through artistic practice and challenging neurotypical epistemologies, helped me understand my experiences in the swamp. I felt organized around textures, which was the accumulation of efforts to re-adjust my attunement to non-human voices of birds such that they were given more space in my life and my 'field of experience'. Manning and Masumi suggest there are other ways to attend, which are less directed: *"we approach the field of experience as "pure," in William James's sense of being neither subjective nor objective — yet ready to be both or either, more and less, multiplicitously"* [65:19]. There is so much potential for posthuman relations in this idea of expanding neurotypical modes of experiencing reality. While I am not neurodivergent as far as I know, this doesn't preclude me from being inspired by these descriptions of alternative and pluralistic descriptions of experience and wondering if my brain, a plastic organ, could experience 'the field' in a less neurotypical way. This trip to the swamp, and potential ways 'inside' an ecological experience have implications for HCI on multiple levels. One is that I arrived here after many trials, and I was surprised by my arrival. As is the case with much of narrative building, I didn't know what had happened until later. However, the experience was less

about an artifact in particular, and more about building sensitivities around the triadic relationship among me, my recorder, and the birds. In addition, there is a general implication for the ability to affect attention through purposeful directing of awareness and attunement to non-humans in the field of experience. While it is clear some technologies demand direct and forward-facing attention, is there possibility for technologies that foster diffuse, 'back brain' or non-human kinds of sensitivities and attentions?

6 DISCUSSION

In this section, which offers synthesis of all that has transpired, we switch back to a collective voice as the research team and speak of FA in the third person.

This project set out to explore noticing as a method for SHCI in response to calls by Light et al. [54] and Liu et al. [60, 63] to use noticing as a way to decenter the human in design [55, 57, 60]. Through our research practice of noticing and decentering, we discovered the lens of abjection as a way to understand nuances in designing to decenter the human. Ultimately, we seek to forward the SHCI agenda by inspiring directions for technology which might shift ways that humans *notice* non-humans in order to positively shift relationships between humans and non-humans through human susceptibility, attunement and blending with ecology.

We suggest FA's personal, autoethnographic exploration of bird watching was a long foray into finding ways to establish intimacy with birds and seek posthuman connections with larger ecologies. In this exploration, we uncover a kind of resistance to kinship with birds, which we see as abjection, where ecological ways of knowing live at the ambiguous boundary between parts human and non-human. Using abjection as a framework actually creates a radical intimacy between human and non-human, suggesting we are actually enmeshed in ecologies at the level of our 'selves' and any difference between human and non-human is simply an attempt to constitute the human through 'othering' the non-human. To better understand this concept, we unpacked abjection as developed by Julia Kristeva, as the rejection and 'othering' of parts of the self to constitute one's self. The abject is often observed with disgust and repulsion but also fascination–and we find it productive to use abjection as an interpretive framework to unpack FA's feelings of otherness, alien-ness, and strangeness of birds, as well as exhaustion and being overwhelmed by her birdwatching practice. Over time, however, we observed how FA attuned herself to bird song in new ways that she believes made her more susceptible to non-humans and also allowed her, if but briefly, to lose her edges into an ecological experience. In the following we discuss implications for posthuman design including how knowing through autoethnographic and making practices led to unique ways of attuning to non-humans and the potential of designing technologies which help users imagine alternative ways of attending to non-humans and ecologies.

6.1 Alternative Ways of Watching Ourselves

We used autoethnography as a method to watch ourselves watch birds, as it allowed us to observe how we came to understand and how our understanding shifted. In this endeavor, we noticed two key strategies emerge. Channeling Ellis [29], the first strategy used performative autoethnographic strategies such as making and journaling to dive into the material dimensions of posthuman performativity. The second strategy utilized multiple approaches to psychology as well as research about neurodiversity to help us reconceptualize our experiences and interactions with birds and more-than-humans.

6.1.1 Making as a Posthuman Way of Knowing. FA's making practices helped bridge how 'performance' is discussed in autoethnography and posthumanism. There is an inherent conflict between posthuman philosophies, which are rooted in material performativity, and the textuality of performance in autoethnography. Norman Denzian explains, *"the subject matter of interpretive autoethnography is the life experiences and performances of a person"* [24:1] told in a kind of narrative form. Ecological posthumanist theorists like Karan Barad wonder how performativity is more like a model for how the world interacts and comes into being, *"the move toward performative alternatives to representationalism shifts the focus from questions of correspondence between descriptions and reality (do they mirror nature or culture?) to matters of practices/doings/actions"* [4:802]. We suggest that as is modeled in other design research with autoethnography, the stories told often revolve around how an 'other' like a horse or a camper van, come to co-create meaning with the designer.

However, in our attempts to build posthuman relationships with birds, we realized a need to perform beyond language, to find ways of making meaning that didn't rely on simply remember events, but feeling events and synthesizing experiences in a non-linguistic way to preserve some integrity of the thick, ecological weirdness of sound. Jönsson et al. [47] have considered the need for non-language-oriented ways to bring birds into a participatory design project as stakeholders, and in this case, we used making as a way to preserve the embodied, sensorial, and maybe, more material ways of knowing and feeling our performative interactions with birds. It was the act of watching on a regular basis, combined with the material conceptual synthesis through making and reflective writing that allowed FA to begin to understand her embodied, affective, and non-verbal experiences of birdwatching. Through iteratively observing, making and reflecting, she was able to shift, performatively, her relations to birds into a more posthuman, blurry, susceptible arrangement.

6.1.2 Alternative Ways of Knowing Concepts of the Self or the Mind. In questions as complex as 'how to decenter the human in design' we might need to consider supplementary models of the mind and the self as we become ever more psychically enmeshed in technologies. Through the iterative, co-creative 'performance' of watching ourselves watching birds, we were also able to feel new 'edges' of the problem as well as new was of experiencing the field of reality. The most prominent edge we discovered was that of the constitutive power of the human/non-human divide, and we were able to begin to examine it using psychoanalytic theory. Abjection helped us discover that perhaps, the human/non-human binary is a false dichotomy. There is just a human rejecting parts of itself that it must reject to construct a current concept of 'culture' in an anthropocentric world-view. What seems promising in this use of psychoanalytic theory is the ability to re-evaluate constructions of the self that affect constructions of technologies, or futuring agendas. We see

now that the problem is not so much in acknowledging the need for posthuman configurations, but in helping people reconfigure their concept of self so that it can once more include non-humans more comfortably. While technology scholars have a rich history of using cognitive psychology to understand use, usability, and the brain as a kind of model processor, perhaps we have work to do in understanding the unconscious urges that drive the organizations of self and re-imagine what a typical brain does, experiences, or attends to.

In addition, through the iterative process of striving towards ecological openness, FA experienced the feeling of being more boundless at the swamp. This feeling followed a process of learning to attune to bird sound differently and be affected or susceptible to desires to be affected which seemed similar to a neuro-diverse observation of 'the field of experience' discussed by Massumi and Manning [65]. To find such affinities between our feelings of listening very 'openly' in the swamp (a kind of mélange of senses: greenness, humidity, sound, foliage, etc.) and descriptions of how neurodivergent people experience parts of everyday life makes us wonder if there is potential in explore beyond the boundaries neurotypical experience (which Massumi and Manning argue is constructed). While we don't want to tokenize neurodiversity, there do seem to be ways to design for different ways of attending that begin to decenter the human in design by designing for attuning to the 'field of existence' differently.

6.1.3 Imagining Perception of Technologies. We noticed early on that FA was noticing the ways in which an audio recorder might 'hear'. A recorder cannot filter or point its hearing the same way ears can, and due to that, the recorder captures the field of audio available without discretion. This observation caused FA to imagine the connection between sound recording and the thick weirdness of ecology. She also experimented with sound and imagined how speakers could be used to surround herself with bird sound, approximating what it might be like to be inside the bird sounds that she was hearing from the outside. Ultimately, holding a recorder in her hand and imagining what it might hear caused her to drive to a swamp, to wake up early in the morning to record the birds that woke her up, and to start to attend differently to the background noises around her—or her 'back brain' impulses—in order to find moments she wanted to record. Both seeking the sounds and imagining how they would be recorded were ultimately part of her attunement to birds and ecologies in different ways. In this example, we can see how imagining the functioning of a technology began to open doors of the perceptual imagination and gave FA a new 'set of ears' that was more objective, heard more fully, paid more attention to birds and other nature sounds, and were curious and alive to non-human noises. This has implications in designing technologies which inspire people to attend differently by 'teaching' them new ways to perceive and widening their sensory attunement outward towards more-than-humans, but conversely draws attention to how technologies can detract attention from non-humans or narrow perceptions as well.

7 CONCLUSION

This project offers a response to the posthuman turn in HCI, in which researchers have advocated the need to decenter the human in design and better attend to non-human actors in HCI intervention. Through a process of autoethnographic bird watching, reflective making, and reflexive writing, we began to see the subject/object relationship between humans and non-humans might be better described as a subject/abject relationship. This relationship radically repositions the non-human other—in this case birds—as an extension of the human subject. As is often the case with the abject, the encounters with the birds was often frankly weird, leading to experiences that can best be described as uncomfortable.

This in turn suggests that decentering the human in design is not merely a theoretical stance and/or a methodological move. It is a personal and emotionally difficult journey to reconfigure one's self as a designer and researcher, a psychological labor that, while worth doing, is also part of the reason why this desired paradigm shift in design is so difficult to put into practice. It is not merely that as researchers we are still trying to translate theory into method; it is also that a part of our selves, sensing the threat of what all this means, finds the project at times repulsive. From encounters with (what are phenomenologically experienced as) aliens and monsters to experiences of sight and sound so potent they feel like assaults—and once you tune into them, you can't turn them off—the subject/abject relationship is intense. All of this helps us to see that whatever intellectual objections we might raise to Cartesian mind/body dualism, part of its stubborn endurance over the centuries might be attributable to the relative safety and comfort it provides us as subjects relating to the world, a relation that draws hard lines between what is *in me* and what is *out there*; and if the planet is in crisis, at least the designer's *ego* is safe in its walled off garden—at least until fires, storms, and pandemics breach those walls.

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