Disobedient Robots

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Abstract

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Disobedient Robots interrogates how robots can disobey their categorization as mere extensions of the human body to become bodies with agency themselves. Rooted in the notion of *desobediencia tecnológica* [technological disobedience], a term coined by Ernesto Oroza, the project responds to the productive and surveillance imperatives that drive most mainstream robotics, opening space for alternative forms of making, experimentation, and collaboration. It operates as both a research platform and a theoretical framework that has inspired the artworks I have created and will continue to develop.

Two works, the Dispositivo de Realidad Mutada (DRM) and the AGNS Collective, serve as central expressions of this research. Emerging through recursive processes of building, failing, and reconfiguring, they explore the idea of a robotic "voice" as it unfolds through sound, movement, and collective behavior rather than anthropomorphic imitation.

The project further extends into collective practices, including the Disobedient Robots Online Platform and the II Encuentro Internacional de Robótica Artística / Desobediencias Robóticas. Taken together, these dimensions affirm robotic art as an open-ended practice for reimagining our relationships with machines.

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Dedication

A Valeria, mi chinita, con mucho amor.

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Introduction

Over the past four years in the Digital Arts and Experimental Media (DXARTS) program at the University of Washington (UW), I have dedicated my studies to developing my expansive long-term project and Ph.D. dissertation, Disobedient Robots. More than a single research output or artistic installation, the title reflects an attitude, a critical stance, and a sustained focus on robotics within contemporary art. Throughout my research, I have come to understand that rather than pursuing fixed definitions, it is more aligned with my goals to embrace an open-ended exploration of meaning that unfolds through the artworks I create and the artistic and theoretical references I encounter along the way. In this sense, the pages that follow offer an initial articulation of Disobedient Robots as it stands, with the understanding that its core ideas and definitions will continue to evolve over time.

As a starting point, Disobedient Robots interrogates how robots can disobey their categorization as mere extensions of the human body to become bodies with agency themselves. Rooted in the notion of *desobediencia tecnológica* [technological disobedience], a term coined by Ernesto Oroza (Oroza & Bozzi, 2002; Oroza et al., 2024), the project responds to the productive and surveillance imperatives that drive most mainstream robotics, opening up space for alternative forms of making, experimentation, and collaboration. It operates as both a research platform and a theoretical framework that has inspired the artworks I have created and will continue to develop. This evolving platform encapsulates the artistic possibilities and challenges that emerge from working with robotics while also serving as a foundation for future dialogues with artists exploring related ideas. These concepts are deeply rooted in personal intentions and experiences,

shaped by the work of artists and scholars primarily from or based in Latin America, and it is through these lenses that Disobedient Robots has taken shape in multiple forms.

Two artworks emerged as the most visible expressions of my research: *AGNS Collective* and *Dispositivo de Realidad Mutada (DRM)* [Mutated Reality Device]. Together, they initiated what I refer to as a family, or a constellation, of robots—works that share a conceptual and methodological lineage within my exploration of robotics. These projects converged in an experimental and interactive installation presented for one week in June 2025 at Galería de Arte Binario, located in the Centro Nacional de las Artes (CENART) in Mexico City. This exhibition was not a conclusion, but rather a public manifestation, a way to present the current state of my research and to experiment with these works in a live environment. Moving forward, I intend to continue developing these existing robots while introducing new ones and further exploring the questions that drive my interest in robotics.

In parallel with the installation, I organized a month-long event in Mexico City titled "Desobediencias Robóticas: II Encuentro Internacional de Robótica Artística[1]." I will, from now on, refer to this event simply as an *Encuentro*, rather than using terms like "symposium" or "conference," emphasizing the spirit of gathering, dialogue, and mutual learning that shaped it. I consider this *Encuentro* to be equally central to my praxis, as it expanded the project beyond individual artistic production and into a shared space for critical conversation and collaboration. Organized within the context of my Fulbright study/research grant in Mexico, this *Encuentro* marked the beginning of what I envision as an ongoing methodology. I intend to continue

[1] The title of the event includes "II" (second) in recognition of a previous *Encuentro Internacional de Robótica Artística* held at CENART approximately ten years earlier. Although I was not involved in that initial gathering, we chose to acknowledge its historical importance and the foundational efforts it represented in initiating conversations around robotics and art.

organizing events within this framework, whether as future compact editions or as scattered, context-specific gatherings, as the logic of the *Encuentro* remains a vital component of my artistic and research methodology.

As general coordinator of the event, I worked closely with Cristina Brambila, a fellow DXARTS Ph.D. student, who took the role of the curator of the event and helped organize the month-long exhibition. Organized in collaboration with the Department of Arts and Humanities at UAM Lerma and the Centro Multimedia at CENART, the *Encuentro* took place over four weeks through an exhibition, workshops, guided visits, performances, and public dialogues. In addition to the activities at CENART, we held a *jornada académica* at UAM Lerma, which included a series of talks and a hands-on workshop designed to further deepen engagement with critical and creative approaches to robotics. Participants included artists, educators, and researchers, who work to interrogate dominant technological imaginaries through indigenous knowledge, speculative design, and community-driven practices. The event featured a multi-format colloquium, inviting the public to actively participate in generating a collective and plural reimagining of what disobedient robotics can be. In parallel to these physical and collaborative formats, I initiated a digital platform to extend the reach and continuity of Disobedient Robots as a shared research and learning space.

In 2024, I launched the Disobedient Robots Online Platform[2]. This bilingual website hosts a growing public archive of interviews, articles, and other materials relevant to the project's critical and artistic interests. In addition to the public-facing content, the platform includes a community section accessible by login, designed to support peer-to-peer knowledge sharing

[2] Online, Disobedient Robots / Desobediencia Robótica can be found at www.disobedientrobots.org / www.desobedienciarobotica.org.

around the collaborative construction of robots. This section serves as a living wiki where contributors can document technical processes, share resources, and reflect on the challenges and improvisations that often arise in experimental robotics practices. Like the installation and the *Encuentro*, the platform extends the project's emphasis on openness, dialogue, and the collective reimagining of robotics as an experimental practice.

The platform has already supported concrete outcomes, including the formation of the Disobedient Robots Research Group, a collaboration with undergraduate students from the UW Department of Electrical and Computer Engineering (ECE), and a series of interviews, one of which, with Leo Núñez, has already been published, with others featuring Doreen Ríos and Nicole L'Huillier currently in progress. It will also include documentation of the *Encuentro*, focusing on sharing the events, participants, and program structure as a way to record what took place and make it accessible to others.

Taken together, these artistic works, collaborative events, and shared platforms form the foundation of a practice that is collaborative, experimental, and critically engaged. These qualities influence both the content and structure of the chapters that follow. In them, I explore these interconnected aspects of the Disobedient Robots project, progressing from theoretical foundations to practical implementations and collective methodologies. In each chapter, I build on the previous one while maintaining its focus, reflecting the recursive and iterative nature of my research.

In Chapter 1, "Background and Context," I establish the conceptual landscape from which Disobedient Robots emerges. Drawing on Ernesto Oroza's concept of technological disobedience, Bruno Latour's critique of the Great Divide, and Eduardo Viveiros de Castro's

perspectivism, I weave together theoretical frameworks with artistic precedents. I connect my practice to a constellation of artists, including Gilberto Esparza, Paula Gaetano Adi, Leo Núñez, Fernando Palma, and Daris Rubio, whose work challenges dominant technological imaginaries.

In Chapter 2, "Artistic Works and Robotic Prototypes," I document the evolution of my artistic practice from early sonic experiments to the creation of my interconnected robotic systems. I trace the development of key works, including the *Modular Rhythm Machine*, *Dispositivo de Realidad Mutada*, and *AGNS Collective*. I examine how each iteration revealed new possibilities for robotic voice, movement, and agency. I conclude the chapter with the presentation of these works at Galería de Arte Binario, where my constellation of robots came together as an evolving, responsive system engaged in continuous dialogue with the space and the audience.

In Chapter 3, "Collective Research Practices," I shift the focus from individual artistic production to collaborative methodologies. I detail the development of the Disobedient Robots online platform, the formation of the Disobedient Robots Research Group with UW Engineering students, and the organization of the *Encuentro*. These collective dimensions reveal how the project extends beyond personal artistic practice to become a framework for shared learning, documentation, and community building around experimental robotics.

In the Conclusion, I reflect on the trajectory of this research, reviewing initial questions about machine agency and disobedience while acknowledging what remains unresolved. Rather than offering definitive answers, I embrace the project's ongoing nature, recognizing incompleteness as a method, aligned with Rodolfo Kusch's concept of *estar siendo* and Silvia Rivera Cusicanqui's *ch'ixi*. I close my dissertation by affirming Disobedient Robots as a space that remains deliberately open to transformation, contradiction, and continued experimentation.

Chapter 1: **Background and Context**

The ideas behind Disobedient Robots did not emerge all at once, nor did they originate from a single discipline, reference, or moment. Instead, they formed gradually through artistic encounters, theoretical influences, personal experiences, and collaborative conversations. This chapter gathers these connections to outline the background and context of the project as it currently stands. Rather than offering a linear story or a fixed background, what follows is a constellation of ideas and references that continue to shape how I work with and think about robotics as both a material and conceptual medium. Instead of dividing theory and artistic references into separate sections, I aim to weave them together, showing how conceptual frameworks and creative practices have evolved in dialogue throughout the project's development.

To begin, it is worth noting that one of the earliest known uses of the phrase "disobedient robot" appears in a 1956 animated short by Yugoslavian director Dušan Vukotić, titled *Nestašni Robot* [The Disobedient Robot] (1956). In the film, a scientist's cleaning robot stops following instructions and creates chaos and mischief while the inventor sleeps. It's a simple, almost cartoonish take on robotic rebellion. This is what we might call a basic version of disobedience: refusing to do what you were built to do. While that idea offers a starting point, Disobedient Robots aims to move beyond a binary of obedience versus refusal. Rather than focusing solely on rejection, my interest lies in how robots might express themselves differently through their behavior, their construction, or the ways they relate to others. These shifts might take the form of collaborative gestures, experimental responses, or even subtle forms of cultural resistance. That line of thinking led me to the work of Cuban artist and theorist Ernesto Oroza, and especially to his idea of technological disobedience.

The concept of technological disobedience, as Oroza frames it, encapsulates the necessity-driven ingenuity and creativity used to subvert, assemble, repair, and imagine technology outside the mainstream (Oroza & Bozzi, 2002; Oroza et al., 2024). That said, there is no point in romanticizing these conditions or aestheticizing the strategies that emerge from them. The reality that Oroza depicts is often harsh, marked by scarcity, political constraint, and structural crisis. Technological disobedience in Cuba is not a stylistic choice but a response to necessity, to broken infrastructures, closed borders, and economic embargo. However, at the same time, the spirit of this approach resonates beyond Cuba and its harshness.

Figure 1
Technological disobedience in Cuba. Outdoor bench made with repurposed TV enclosures, single chairs, wood, metal, and wires. Modified from Technological Disobedience Archive (Mesías & Oroza, 2025).

Many Latin American countries, including my own, Peru, share a history of adaptation under challenging circumstances, which gives way to similar practices and forms of ingenuity. In Brazil, this might be called *gambiarra*; in Chile, *hechizo*; in Peru, we speak of *criollo* creativity or *tecnología chicha*. Each of these terms represents a unique cultural approach to tackling problems with the resources at hand, often in an informal, creative, and resourceful way that's driven by a spirit of challenge and innovation.

In my work, I don't necessarily follow these strategies in a literal or material sense, but the logic behind them deeply informs my approach to making. I often work with standardized components and digital fabrication tools, but I approach them as open systems, subject to reconfiguration, reprogramming, and misuse. In this way, designing and building, for me, is about creating conditions for unpredictability, reinterpretation, and unexpected results. The robots I make are not final objects, but evolving processes that are part of continuously unfinished projects, adapting as ideas in constantly shifting contexts. The spirit of technological disobedience shapes, thus, how I design and engage with my robots: as open systems that speak, adapt, and sometimes disobey in ways I cannot predict.

In a conversation I had with Argentine artist Leo Núñez (Kisic Aguirre, 2024), he mentioned the philosopher Rodolfo Kusch and his concept of *estar siendo* (Kusch, 1976, p. 649), a way of understanding *being* not as a fixed state, but as an ongoing process of becoming. Kusch observed that in much of Latin America, we are rarely afforded the illusion of completion. Instead, we continually adapt, negotiate, and transform. This idea resonated with Leo's practice and then with mine, where robots are not finished artifacts but evolving systems, open to failure and change. Making, in this sense, becomes less about resolution and more about staying in motion.

This sensibility is not limited to individual practices. Across the region, everyday examples of technological disobedience constantly emerge, crafted by makeshift artisans who anonymously shape artifacts, tools, and devices driven by necessity. In the arts scene, these strategies often carry over into works that intentionally use low-tech solutions, not just because of limited resources, but also as a way to question the obsession with high-end technology and the dominance of tech narratives coming from more privileged parts of the world. This kind of artistic positioning is at the heart of what Rodrigo Alonso explores in his book *Elogio de la Low-Tech* (2015), specifically in the context of electronic arts.

Rodrigo Alonso examines how artists across Latin America have adopted low-tech and improvised strategies as a form of aesthetic and conceptual resistance. In *Elogio de la Low-Tech*, he argues that using basic tools, recycled parts, and technological leftovers is not just about scarcity, but about making something intentional and situated. For Alonso, these constraints serve as a trigger rather than a limitation for critical creativity, which questions global narratives of progress and innovation.

Low-tech practices become a language through which artists speak from their contexts, using bricolage, appropriation, and adaptation as deliberate tactics. This resonates with the spirit of technological disobedience as both approaches challenge the idea of tools as fixed or neutral, and instead open up ways to intervene, hybridize, and rethink technology from the margins. In Latin America, this approach has become central to the practice of many artists and collectives, including Leonello Zambon, Leo Núñez, Fernando Palma, Javier Bustos, Colectivo Gambiologia, Constanza Piña, Francesco Mariotti, Mariela Yeregui, Guillermo de Orbegoso, and Daris Rubio, among others.

While Alonso frames low-tech practice as a situated aesthetic strategy, other artists and curators expand the notion of disobedience toward more explicitly political terrain. Doreen A. Ríos offers a more explicitly political reading of technological disobedience. In “Reclaiming technical objects” (2025), Ríos presents it as a conscious, rebellious act that resists extractivist, capitalist, and imperial logics embedded in technological production and consumption. She describes how artists

> cannibalize these perfect black boxes to reveal their insides and extract bits and pieces of their machinery to build something new. After exorcizing technology’s predetermined uses and infusing this other object with a new discourse, they give life to a different kind of product: an artwork. (Ríos, 2025, p. 5)

This kind of disobedience is, then, both practical and political. It challenges dominant narratives of innovation, reconfigures relationships between humans, machines, and nature, and affirms a tradition of subversion and critique that speaks from the margins rather than to them.

José Carlos Mariátegui’s research and curatorial practice further develop this line of contextual technology. In his article “Cybernetic and systems art in Latin America” (2022), he highlights how early systems-based projects prioritized relationality, feedback loops, and material openness over formal purity. A recent exhibition he curated, *ARTEŌNICA* (MOLAA, 2024), highlights how experimental, interdisciplinary engagements with technology continue within the region’s media arts ecosystem. Mariátegui’s research reinforces the assertion that media technologies in Latin America are best understood as situated processes shaped by their contexts and collective imaginations, rather than as polished products.

Furthermore, the language of disobedience is often employed to describe artistic and technological practices that resist dominant systems, ranging from material constraints to ideological ones. In 1997, the Electronic Disturbance Theater (EDT), co-founded by Ricardo Dominguez, introduced the concept of "electronic civil disobedience" (Dominguez, 2009) as a means to integrate digital experimentation with political action. More recently, the Mexico-based project *Desobediencia Electrónica* (2019), led by Gargamel Estudio and Elisa Navarro Chinchilla, brought Oroza's concept of technological disobedience into schools and cultural spaces, treating repair and reuse as tools for critique.

Figure 2
Desobediencia electrónica. Fan system/sculpture created with discarded computer fans (Estudio Gárgamel, 2019).

While these initiatives are rooted in specific contexts, the spirit of disobedience also resonates globally, appearing in artistic communities that challenge technological norms through critical and subversive forms of making. For example, the publication *Disobedient Electronics: Protest*, curated by Garnet Hertz (2018), brings together a broader international community of artists, including Naomi Wu, Annina Rüst, Janet Hansen, and Jen Liu, who use low-tech, DIY, and hacked electronics to question power structures and challenge dominant narratives. Hertz uses the term "critical making," which coincides in many ways with Alonso's notion of low-tech as a form of resistance. Like their Latin American counterparts, these artists often work with accessible materials, improvisation, and repurposed technology to address issues such as gender inequality, exclusion, and surveillance, showing how technological disobedience can act as a tool for critique and creative empowerment across different contexts.

These artistic and theoretical frameworks have helped me clarify the position of Disobedient Robots in broader conversations about technology and resistance. But long before I encountered these texts, my understanding of technology was shaped by lived experiences growing up in Lima, Peru. In many ways, the attitudes I explore now were first formed through daily encounters with machines, material limitations, and improvisation.

As a child, I was fascinated by makeshift machines and DIY creations. My grandfather and I often fabricated toys for me together in his workshop. Living in a country in crisis, we didn't always have access to technology in the ways the modern world did. Instead, we had to imagine and envision different ways of using and making artifacts essential to our everyday lives. Like Oroza's disobedient objects, we imagined, created, and repaired our devices by reinventing older parts and assembling unrelated pieces.

Today, instead, it often feels like we've grown accustomed to consuming technology as something sealed, finished, and opaque. These already-packaged artifacts create a divide between us and the things around us, making devices feel like alien objects instead of extensions of our own environment, driven by creativity and necessity. From a theoretical perspective, I now understand this divide through the lens of Bruno Latour's critique of modernity, as described in *We Have Never Been Modern* (1993).

Latour critiques modernity's attempt to separate culture from nature, emphasizing the illusory essence of this division, which he terms the "Great Divide." In his book *Techgnosis*, Erik Davis (2015) effectively summarizes Latour's perspective and connects it to technology:

> The Great Divide [...] disenchants the world, enthroning man as the sole active agent of the cosmos. From within the paradigm of the Great Divide, technology is simply a tool, a passive extension of man. It does not have its own autonomy; it simply acts upon, but does not change, the world of nature. (Davis, 2015, p. 2)

Conditioned by continuous crises in the 1980s and 1990s in Peru, I believe my grandfather and I were not fully immersed in this Great Divide. Instead, we embraced and were absorbed by the alchemical idea that everything was possible with anything, in closer connection with the machines and things surrounding us. This different type of awareness is closer to what Latour describes as the "anthropological matrix," succinctly explained by Erik Davis as a "webwork" in which nothing "can be neatly divided between nature and culture. Instead, this matrix is composed of "hybrids"—"speaking things" that are both natural and cultural, real and imagined, subject and object" (Davis, 2015, p. 2).

The notion of “speaking things” offers a helpful way to understand how Disobedient Robots approaches machine agency. “Speaking things” are not defined, in Latour’s terms, by their ability to replicate human language, but by how they participate in networks of meaning through action, material behavior, and relational dynamics. From this perspective, agency is not located in consciousness or intent, but in the capacity to affect and be affected. In my work, robots that process language imperfectly, generate unexpected sounds, or move in unpredictable ways are not performing arbitrarily. Instead, they are responding through their own internal logic and constraints. These responses emerge within systems I have conceived, shaped by the sounds I record and the algorithms I write, but the way these elements unfold often escapes direct control. This reframes robotic agency as a form of expression shaped by context and dynamic relations, instead of being seen as imitation, replacement, or mere extension of human action.

This view aligns with Latour’s broader argument that we have never truly been modern. The supposed divide between nature and culture, the Great Divide, is, in his terms, a persistent illusion. What it disguises is the reality of entangled hybrids and “speaking things” composed of systems, beings, and artifacts that blur those distinctions. Disobedient Robots seeks to serve from this space. It calls for a transgression of the Great Divide as a method, recognizing the agency and hybridity of the machines and systems around us, and building with that recognition as an essential principle.

In recognizing agency and hybridity of subjects-objects, I take distance from the techno-positivist fantasy of singularity, machine consciousness, and sentience. The latest developments in Large Language Models (LLMs) and Large Reasoning Models (LRMs) are correlated with increasing questions and hopes that machines will become conscious (Huckins, 2023). Artifacts equipped with LLM-powered verbal articulation and LRM-powered reasoning

proliferate. But these “voices” are far from approaching the idea of hybrid subjects-objects and “speaking things.” On the one hand, LLMs are impressive models specialized in generating “statistically likely continuations of word sequences” (Shanahan, 2022). By doing so, they have become outstanding mimickers of human language, thus creating the impression that they are human-like. Moreover, in a recent article titled “The illusion of thinking” (Shojaee et al., 2025), researchers show that LRM reasoning is more of an engineered illusion than real agency or consciousness. These illusions create a temptation to anthropomorphize algorithms, regardless of their embodiment in objects or robots.

On the other hand, oversimplified[3] anthropomorphism can be problematic because it reinforces the Great Divide. When objects are merely seen as mimicking human characteristics without recognizing their agency and unique perspectives, anthropomorphism perpetuates the idea that humans are the “sole active agents of the cosmos” (Davis, 2015, p. 2). To go beyond this risk, Eduardo Viveiros de Castro's “perspectivism” (2004) defines an ontological framework that helps revise oversimplified anthropomorphism. Perspectivism, a way of understanding Amazonian indigenous cosmologies, highlights the existence of different beings, human and non-human, while they retain their perspectives and agency within the world they inhabit. Disobedient Robots embraces indigenous perspectivism, as described by Viveiros de Castro, as a philosophy for learning from and contributing to from the viewpoint of artistic robotics. In this regard, I embrace the influence of César Calvo’s *Las tres mitades de Ino Moxo y otros brujos de la Amazonía* (2011), a book that contains and communicates teachings on Amazonian perspectivism.

[3] I emphasize “oversimplified” because Viveiros de Castro specifically challenges Western anthropomorphism without denying the same concept to Amerindian societies.

This interest in indigenous ways of knowing also resonates with the work of Bolivian sociologist and activist Silvia Rivera Cusicanqui. In *Ch'ixinakax utxiwa. Una reflexión sobre prácticas y discursos descolonizadores* (2010), Rivera Cusicanqui draws from Aymara thought and decolonial critique. Rivera Cusicanqui challenges the imposition of Western ways of knowing and demonstrates how knowledge, language, and power continue to be shaped by imposed perspectives. Her concept of *ch'ixi*, a state of coexistence between opposing elements that do not fuse but remain in tension, offers a robust framework for thinking about hybridity without resolution. Rather than seeking to purify or synthesize, *ch'ixi* embraces contradiction as a generative space. This reflects my approach to robotics as a space where tensions between art and technology, as well as between humans and machines, remain deliberately unresolved. In this view, Disobedient Robots inhabits a space of simultaneity: engineered and unpredictable, precise and unstable, and neither entirely within nor fully outside the systems they are meant to critique.

This framework also reflects on the language I use. The word *robot* carries with it a history shaped by industrial modernity, labor control, and a Western imaginary of mechanized bodies built to serve[4]. In my writing, I sometimes cross out the word ~~robot~~[5] as a way to mark this tension, to interrupt its automatic use and make visible the contradictions embedded in the term itself. Rather than rejecting the word entirely, this gesture suggests that it might become a *ch'ixi* term, holding together opposing meanings without agreement. Instead of abandoning *robot*, I re-signify it through practice by building machines that do not obey the logic the word once

[4] In the theater play Rossum's Universal Robots (R.U.R.) by Karel Čapek (1920), Čapek is credited with introducing the term 'robot' into the world's vocabulary. Derived from the Czech words 'robota', and 'robotnik' (which relate to forced labor or servitude), this word first appeared in his play in 1920.

[5] While strike-through text is not a standard format in academic writing, I have used it in informal notes and presentations as a poetic and visual gesture. It serves as a way to mark the tension within the term "robot" itself, signaling both its contested origins and the possibility of reimagining its meaning.

signified. Like other terms that have been reappropriated (*queer* being one example), *robot* might also carry the weight of its past while pointing toward something else, still in the making.

Approaches like *chi'xi* and similar perspectives highlight the shift that indigenous ontologies offer by imagining machines as hybrid entities with their subjectivities rather than mere objects. For example, from the Amerindian ontological viewpoint, LLMs could be perceived as a "cannibal spirit, as an intelligent weapon, as a data-hungry machine" (Bonaldo & Pereira, 2023). While this view gives agency and subjectivity to hybrid subject-objects like Artificial Intelligence (AI) and LLMs, it also suggests a predatory relationship between humans and AI. To achieve one of the Disobedient Robot's goals of understanding our relationship with robots as collaborative, instead, I believe it is necessary to move beyond the imposition of human language and communication on machines.

In *Language and Symbolic Power*, Pierre Bourdieu (1991) explored the role of language in social structures and power dynamics. Bourdieu argues that language is a form of "social capital" that can be wielded, for example, in colonial domination. Through linguistic domination, colonizers were determined to undergo a process of erasure, essentially silencing the voice of the colonized population. Drawing a parallel with LLMs and robotics, I believe that by imposing human language, primarily English, we may be missing an opportunity to help robots find their own voice. In this sense, dominant languages shape what kinds of voices we're able, or willing, to recognize, even when it comes to machines.

In this task, Disobedient Robots shares similar perspectives with others addressing robotics in contemporary art. For example, I admire the work produced by Gilberto Esparza. Specifically, his *Urban Parasites* (2006) and *Nomadic Plant* (2008) projects suggest symbiotic relationships

between machines and our urban and natural environments, enabling robotic species “whose metabolic cycle has the potential to repair [...] ecological damage” (Esparza, n.d.-b).

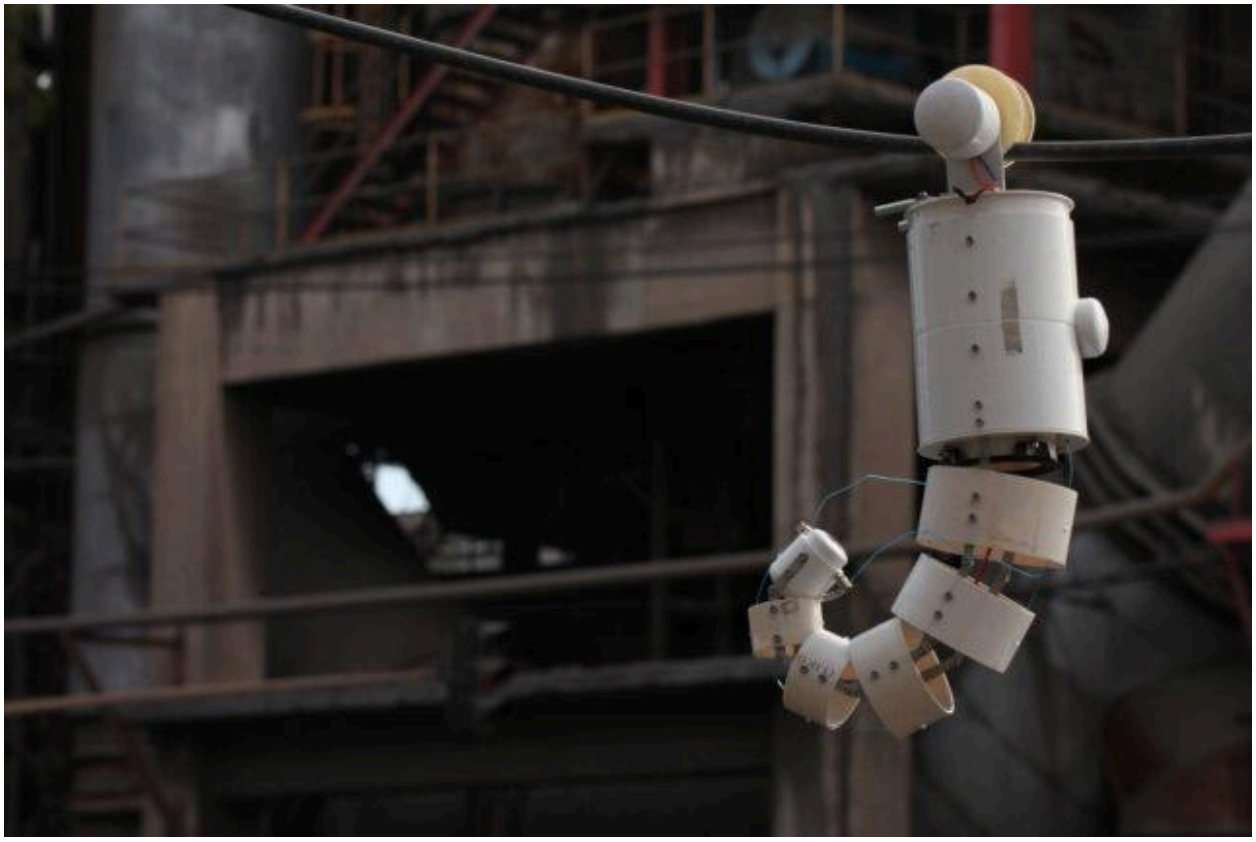

Figure 3
Urban Parasites, by Gilberto Esparza (Esparza, n.d.-a).

Artist and researcher Ricardo Iglesias, in his book *Arte y robótica* (2016), cites Esparza’s work as an important example of how robotic art can challenge dominant narratives. He describes these machines, built from recycled industrial waste, as “formas de vida que dependen de su entorno para poder sobrevivir” [forms of life that depend on their environment to survive] (Iglesias García, 2016, p. 291). Instead of pursuing efficiency or profit, these projects suggest other ways of living with and through technology, where machines adapt, repurpose, and respond to their surroundings. In this sense, they act more like organisms than tools, finding new roles through

what Iglesias calls “parásitos energéticos” [energetic parasites] and “nutrición simbiótica” [symbiotic nutrition].

I would like to take a moment to recognize Ricardo Iglesias’s contributions to the field of artistic robotics. In *Arte y robótica* (2016), he outlines a comprehensive and thoughtful history of the intersection of art and robotics. From early automata to contemporary installations, Iglesias traces how this evolving relationship has shaped both creative experimentation and critical thinking. What stands out is the way he frames robotic art as a space for asking more profound questions about perception, agency, aesthetics, and the role of machines in society. By bringing together key works and movements across decades, *Arte y robótica* builds an expanded timeline that helps situate current practices, including my own, within a broader and more complex history.

Beyond his writing, Iglesias is also a practicing artist whose work resonates with the spirit of Disobedient Robots. His recent projects often explore themes such as surveillance and the social implications of technological systems. In documenting and participating in the field, Iglesias creates a bridge between critical analysis and hands-on exploration. In his book, some of the projects and artists he highlights have certainly informed my own thinking. However, in what follows, I will focus more closely on a few Latin American artists whose influence on my work has been especially strong, particularly Paula Gaetano Adi, Leo Núñez, Fernando Palma, and Daris Rubio.

Among those artists, Paula Gaetano Adi’s work has been greatly influential in shaping how I think about artistic robotics. Her robotic work proposes a radical reconfiguration of the human-machine relationship through an aesthetic, poetic, and decolonial practice, aiming to

imagine alternative ways of making and knowing with technology (Gaetano Adi, n.d.-c). Gaetano Adi's works span from her initial *Mestizo Robotics* (Gaetano Adi, n.d.-b) to the *Robocalyptic Manifesto* (Gaetano Adi, n.d.-a), and extend to *Guanaquerx* (Gaetano Adi, 2024), her latest project. In her manifesto, Gaetano Adi emphasizes the need for "an urgent call to endorse a robot general strike to overthrow the instrumental definition of both technology and humans [...] to think of robots as comrades in the fight for repairing our planet" (Gaetano Adi, n.d.-a).

Figure 4
Guanaquerx, by Paula Gaetano Adi (Gaetano Adi, 2024).

Paula Gaetano Adi's work invites us to rethink robots as collective, situated beings tied to local practices and relationships. With *Guanaquerx*, she reflects this vision through the creation of a hybrid guanaco-robot, co-designed with local communities and engineers, which retraces the

path of San Martín's army across the Andes. Paula Gaetano Adi describes her work as a decolonial practice that weaves together invention, repair, and ancestral knowledge with land, memory, and nonhuman cosmologies. Rather than reinforcing dominant narratives of technological progress, Gaetano Adi imagines robots as companions in resistance and as machines that open up space for other ways of being, sensing, and knowing.

In her presentation at the *Encuentro* in Mexico City (Gaetano Adi, 2025), she described these efforts as attempts to "repair destructive and futureless practices of Western robotics" and to imagine technological modes that are "irreparably embodied, collective, and affective." This vision resonates with the concerns of Disobedient Robots, particularly the search for forms of making that are not about building different kinds of relationships with machines.

Also from Argentina, Leo Núñez presents work that is aligned and inspires many of the ideas behind Disobedient Robots. When we spoke during his visit to DXARTS (Kisic Aguirre, 2024), our conversation touched on the subjects of discomfort, disobedience, and the potential of the messy expression of making robotic art. What resonates from Leo's practice is his insistence on making himself, and in enduring whole processes of making that can be insightful. Or to put it another way, his critique of acquiring already-produced artifacts to make art, hence avoiding a messy process from which questions, ideas, and direction for the whole project arise. For Núñez, showing complexity and labor, while an aesthetic choice, is a way of pushing back against the black-boxed logic of contemporary technology. In my view, an effective way to undo the illusion of the Great Divide. These ideas are tangible in most of his works, although one that highlights the process of making the work in itself is *Lo recuerdo* [I remember] (Núñez, 2016).

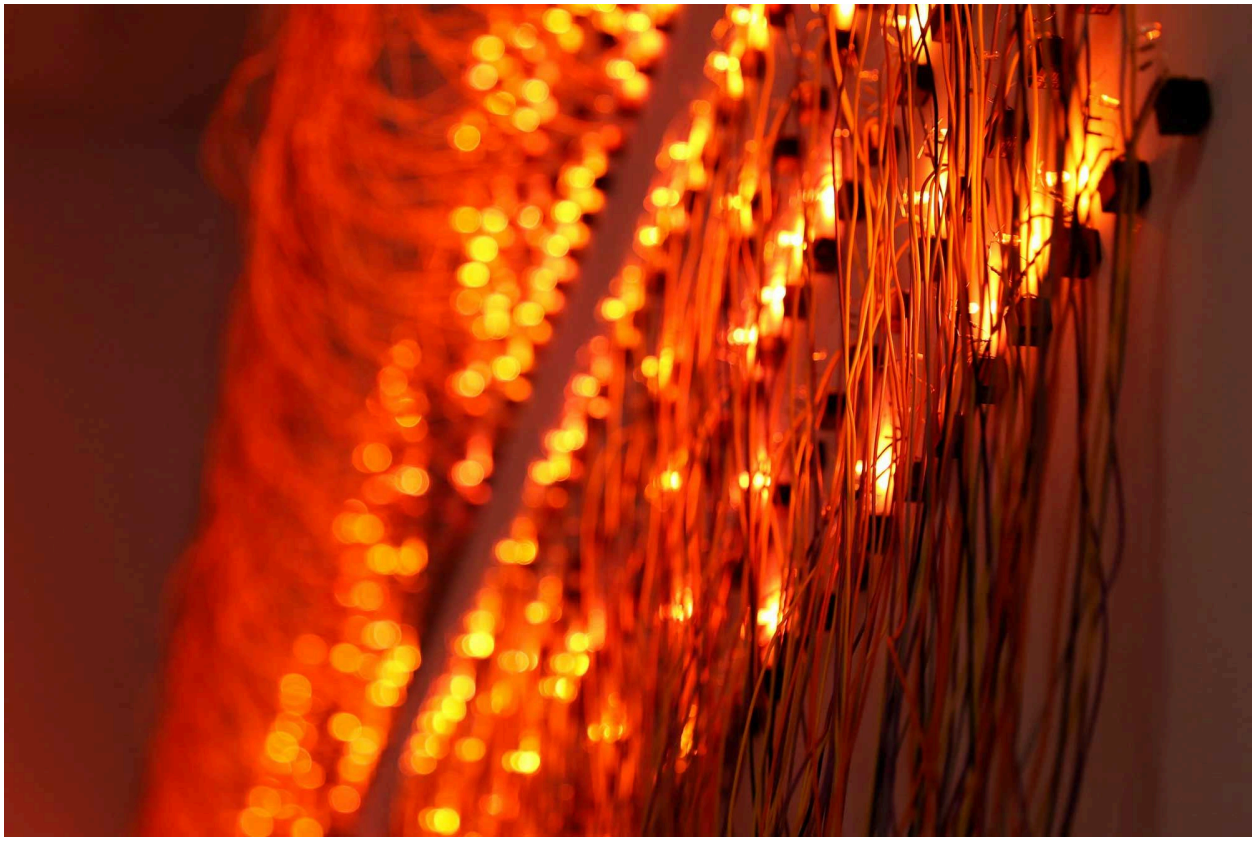

Figure 5
Lo recuerdo, by Leo Nuñez (Leo Nuñez, n.d.)

During our conversation, Leo mentioned that in one of his works, *Entes Indóciles* [Unruly Entities] (Núñez, 2008), his guiding concept was to identify the minimal additional component or modification that would turn a simple DC motor into a robot or an entity: attaching a nut was his shift, and it gave way to exploring the behavior of a system of DC motors with nuts attached that would explore cybernetic relationships and interactions with the public. By multiplying the motor with a nut attached, he achieved a level of complexity that is perhaps an expression of simple, collective behaviors, which, once multiplied, attain this complexity. Leo mentioned:

> I feel more comfortable in complexity. I feel weaker in singularity. I like things when they're complex and situations emerge from that complexity. I enjoy that. I also like it

> when my work shows traces of labor—the artist's hand behind the creation. (Kisic Aguirre, 2024)

Entes Indóciles is also the title of a book published by Leo Núñez (Núñez, 2021). In his book, Núñez makes an effort to distinguish between works of art that focus on robotics, are interested in robotics, or are created by robots, all of which are not necessarily works of "robotic art". In his view, robotic art differs from these other forms of expression primarily because it possesses two unique qualities: communication and behavior. For Núñez, only when communication and behavior are—sometimes central—features of the work can it be truly considered robotic art, setting it apart from other forms that simply use robots as tools or performing objects.

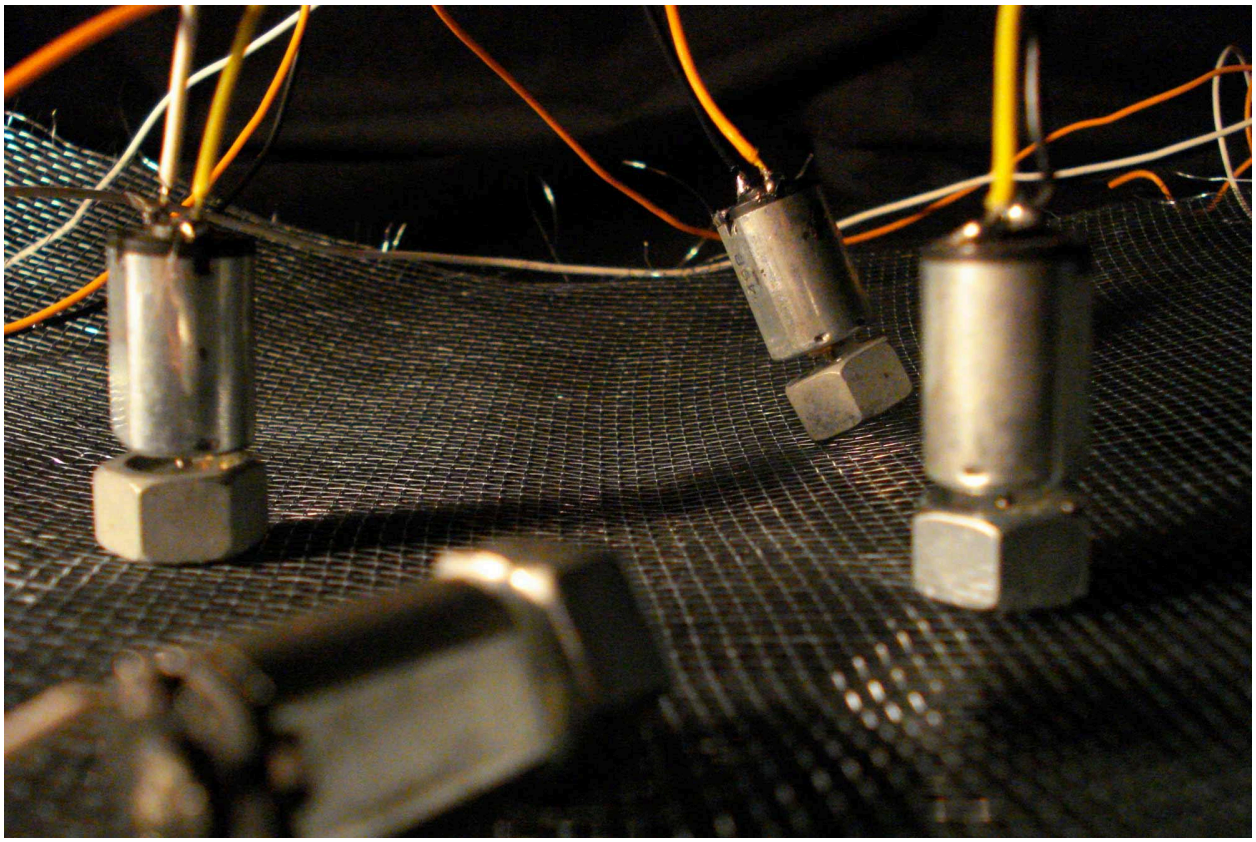

Figure 6
Entes indóciles, by Leo Núñez (Núñez, n.d.)

While my robots communicate and behave through sonic expressions, autonomous navigation, and collective choreographies, what resonates most with Leo Núñez's framework is his implicit distinction between making robots and merely using them as performative tools. My practice, like his, centers on the sustained process of building, programming, and continuously modifying robotic systems rather than acquiring pre-fabricated machines for artistic demonstrations. This commitment to making extends beyond technical construction to include the development of behavioral systems, sonic voices, and forms of agency that emerge through iterative experimentation.

In other aspects, however, I see myself somewhere in between. I build everything myself, yet I also incorporate high-tech components and pre-made parts. Most of my time is spent designing, assembling, and testing with my own hands. This is a slow process that becomes a way of thinking, where each step reveals something unexpected. Here I relate to Leo's emphasis on making as a way of knowing, even if our contexts differ. He often speaks of working within the constraints of Argentina's ongoing crisis, where scarcity influences every decision. While I am no longer fully defined by such material limitations, some of that spirit remains with me, sustaining my commitment to process, self-reliance, and learning through the act of making.

This focus on process resonates with other artists in this field who similarly challenge dominant technological paradigms. Mexican artist Fernando Palma contributes with his perspective, making a critique of the narrow, utilitarian frameworks that often dominate modern engineering and art education. During his keynote lecture at the *Encuentro* (Palma, 2025), he shared his views on how these models prioritize function and extraction over relationship and responsibility. Drawing from Nahua traditions and communal knowledge systems, Palma advocates for the integration of indigenous epistemologies and ways of knowing that are deeply

embedded in land, language, and care. Practices like the *milpa*, a traditional polyculture system, exemplify forms of technology that are adaptive, collaborative, and sustainable. For Palma, the goal is not to idealize the past, but to acknowledge that other rationalities exist that can guide us toward more meaningful and reciprocal ways of living.

Palma reflects on the role of language, particularly Nahuatl, as a lens for rethinking our relationship to the environment and technology. As an agglutinative language, Nahuatl allows for fluid, relational understandings of the world, where everything is viewed not as a static object but as a person, an entity capable of interaction and response. This perspective challenges the objectifying tendencies of Western technoscience by foregrounding interconnectedness and dialogue. For Palma, embracing these indigenous cosmotechnical views is essential to building technologies that do not separate us from our surroundings but deepen our participation in them. Recently, Palma's work was featured in Canal Projects, New York, as a solo exhibition titled "Āmantēcayōtl: And When it Disappears, it is Said, the Moon has Died." His work was presented as a staged *milpa*:

> En su conjunto, las entidades mecanizadas hacen evidente la relación sagrada que existe entre las cosmologías Nahuas y sus lazos con el cultivo del maíz, el frijol y la calabaza, que se siembran juntos en la Milpa. En el centro de la exposición, la serpiente Cincoatl se desliza a través de un campo de maíz, mientras que el Huehuecoyotl (Coyote Viejo) y Tezcatlipoca (Señor Jaguar) interactúan con los espectadores, encarnando las complejas relaciones entre cosmología, tecnología y la tierra.
>
> [Taken together, the mechanized entities reveal the sacred relationship between Nahua cosmologies and their ties to the cultivation of maize, beans, and squash—traditionally

grown together in the milpa. At the center of the exhibition, the serpent Cincoatl slithers through a cornfield, while Huehuecoyotl (Old Coyote) and Tezcatlipoca (Jaguar Lord) interact with viewers, embodying the complex relationships between cosmology, technology, and the land.] (Artishock, 2024)

Figure 7
"Āmantēcayōtl: And When it Disappears, it is Said, the Moon has Died" at Canal Projects, New York (Artishock, 2024).

In high resonance with Fernando Palma's practice and ideas is the work of Mexican artist Daris Rubio, whose practice explores robotics with the intersection of land and territory. Rubio, who is a *hñähñu* artist, often refers to her projects as inseparable from her community in the state of Hidalgo, Mexico. During the first week of the *Encuentro*, in the Galería de Arte Binario, Daris installed two of her projects to present an interaction both between them and with the attending

public. The two works were *El maguey dador de vida* (Rubio, 2024) and *Earth Machine* (Rubio, 2016). Together, they staged a dialogue between ancestral knowledge and ecological care.

El maguey dador de vida is a robotic installation that emulates the living presence of the maguey plant, a vital organism in Indigenous life, used for everything from housing and textiles to the extraction of *aguamiel*. Through movement and sound, the sculpture evokes both the plant's functional and spiritual dimensions, reanimating a botanical figure that holds deep cultural significance. *Earth Machine*, by contrast, is an autonomous robot that navigates environments, collecting organic waste and transforming it into compost. As it moves, it deposits nutrient-rich soil, offering a slow, symbolic countergesture to the logics of extraction and displacement.

I would like to take a moment to reflect, especially on *Earth Machine*, as it symbolizes beautifully how a project can represent the ideas behind Disobedient Robots. If we take a clear example of an "obedient" robot, we could think of the famous iRobot Roomba. This autonomous vacuum cleaner navigates every corner of the domestic space to ensure it is free of germs and dirt. *Earth Machine*, instead, is a robot that distributes "earth"; in reality, dirt, germs, and other forms of soil that within the trenches of the Great Divide we have been accustomed to consider as pollutants, "dirty" and unwanted. *Earth Machine* poetically rewilds spaces that have become lifeless, reintroducing an ecological relationship with our living spaces and inviting us to consider how dirt, germs, and soil are forms of life that belong in spaces, including gallery spaces, all the time.

Figure 8
Maguey dador de vida (right) and *Earth Machine* (left), by Daris Rubio, at the Galería de Arte Binario during the Encuentro. Photo by Janice Bryson, 2025. Used with permission.

Mary Douglas wrote in *Purity and Danger* (2005), “As we know it, dirt is essentially disorder. There is no such thing as absolute dirt. [...] Dirt offends against order.” Daris Rubio’s work reminds us that Disobedient Robots has a mission against order, and that a robot can be reimagined to invite us to live again with dirt. In fact, Esparza, Iglesias, Núñez, and Palma all share this in common: we can rethink robotics from an artistic perspective to explore different ways of relating to our environments. Ways that try to bring down the “order” of the Great Divide, and that allow us to think in more entangled ways. Like robots, we are not only part of culture but also nature, and everything surrounding us can be understood as a living entity. Learning from these practices, Disobedient Robots is a project that challenges our understanding

as “sole active agents of the cosmos” (Davis, 2015, p. 2) to, instead, unlearn these ways and bring us back to the “anthropological matrix.”

In the next chapter, I will present my artistic work. I would like to emphasize that this work doesn’t seek to replicate any of these strategies directly, nor does it position itself as fully within any single one of these traditions. Instead, I often move between them, sometimes drawing cues from low-tech aesthetics, at other times learning from Indigenous cosmotechnics or critical theory. I don’t try to be bound to a single lineage, but instead informed by the convergence of multiple forces: my own experiences growing up in Lima, encounters with the artists and ideas mentioned here, and the ongoing process of building machines that relate, suggest, and resist, rather than solely function.

In this sense, I present my work as shaped by multiple places: grounded in my experiences growing up in Peru, informed by my architectural training in Lima, further developed through the lens of research institutions in the United States, and re-contextualized in Mexico City, where I now reside and work. These places and experiences have profoundly influenced my practice, while also sustaining an ongoing search for an identity that remains unresolved. I resist the expectation to resolve this search by performing or representing identity—visually or acoustically—as a marker of locality. Rather than dismissing context, I stay grounded in lived experience while refusing to be defined by it. My projects emerge from these specific places, but they do not aim to explain them; instead, they remain experimental encounters between place, machines, histories, and those who interact with them. The next chapter turns toward the works themselves: the robots I have built, the systems I have designed, and the behaviors I have developed. They reveal, indirectly, how the ideas in this chapter shape my ways of making and exhibiting art.

Chapter 2: **Artistic Works and Robotic Prototypes**

Before coming to the Digital Arts and Experimental Media (DXARTS) program at the University of Washington (UW), I had focused my artwork on the acoustic space as one that contains the voice. At the center of my practice, I created artistic projects that imagined new technologies to claim the sonic space. I understood this sonic space as a "battleground" that could sometimes only be accessed depending on the tools employed to claim it. These sound technologies were developed historically to concentrate ideological, economic, military, or political power; however, public or cultural approaches evolved unevenly. As a conceptual and existential point of departure, I focused my practice on creating innovative sonic devices to claim the sonic space from a public perspective. Titled "Instruments of Protest," I conducted a series of events, workshops, and projects investigating DIY strategies to experiment with composition and sound machines in public spaces.

The experience of developing Instruments of Protest marked a turning point in how I began to frame my artistic practice in relation to place and voice. It provided a helpful entry point for reflecting on the spaces and experiences that have shaped my approach. At the time, I was still carrying with me many of the ideas I had developed during my training as an architect in Lima. Architecture taught me to pay attention to public space as a space where voices can be amplified, heard, and negotiated. In Lima, these spaces feel alive; they are charged with improvisation and contestation, often messy but vital. They differ from the more regulated public spaces I later encountered in the United States, and in some ways resonate more closely with those I have experienced in Mexico.

As I began exploring new possibilities for Instruments of Protest, I became interested in how robots might carry our voices into public space, especially in situations where the human body might be at risk, or where distance or appearance could render a human presence impossible or unsafe. At first, I saw robots as surrogates or carriers for voices that could not otherwise be heard. However, as I began building prototypes, I realized that robots could express a voice of their own, rather than simply serving as a container for human speech. These ideas developed further during my time in the United States, where I encountered a different understanding of public space: less porous, often harder to access, and shaped in part by different climatic circumstances. This prompted me to rethink where dialogue could happen. Public space began to extend beyond plazas or streets to include any space where people could gather and exchange, and where voices, human and non-human, could be heard. Although most of these remained ideas without execution, they shaped the conceptual foundations for what would later become Disobedient Robots.

In 2018, before my proposal for Disobedient Robots, I presented a performance titled "Experiments with Noise Robots and Other Sound Machines." This piece brought together three robots and a range of sonic artifacts in an experimental investigation into the nature of "noise," drawing from Mary Douglas's description of dirt [noise] as "matter out of place." The interplay of sound sources created an acoustic landscape that challenged the listener's sense of balance and invited moments of unexpected harmony. The three robots in this performance were modeled after three distinct disobedient objects: the Afro-Peruvian cajón, Luigi Russolo's Intonarumori, and the megaphone. In hindsight, this performance served as an early seed, both philosophically and technically, for the devices and approaches I would later develop under the umbrella of Disobedient Robots.

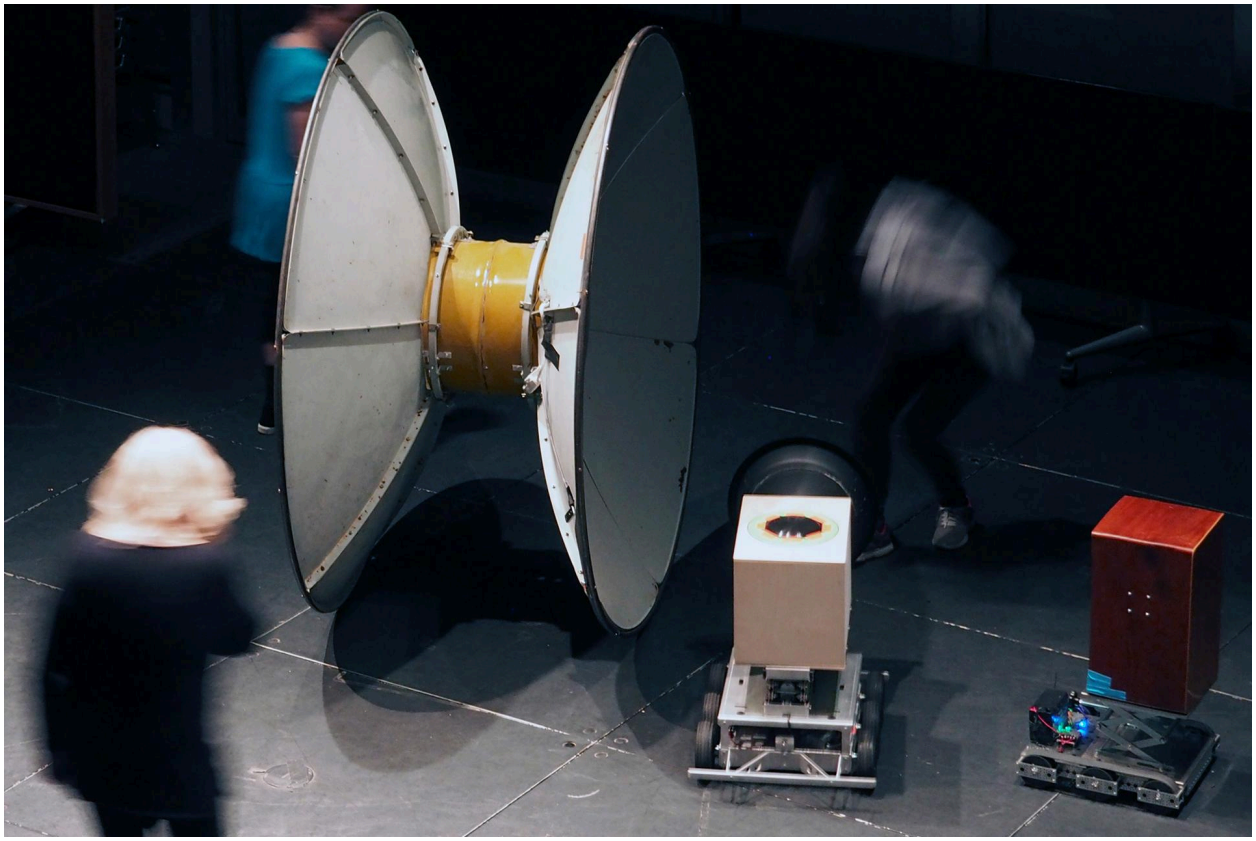

Figure 9
Experiments with Noise Robots and Other Sound Machines, performance by the author. Photo by Ostin Zarse, 2018. Used with permission.

Once in the DXARTS program, I was pleased to develop my first projects focusing on language, or Natural Language Processing (NLP), as AI would understand it. At this point, NLP was essential to my project because it helps robots understand, process, and elaborate language similarly to humans. This way, NLP can act as a communications bridge between humans and machines. Despite departing from the idea of imposing a specific language on devices, with NLP, I was able to speculate about what they could sound like. For my *Modular Rhythm Machine* (MRM), I gathered a dataset composed of sound poetry. This type of poetry prioritizes the phonetic dimension of speech and the rhythmic capacity of the alphabet to explore, often in non-sensical but meaningful pieces. I created a Small Language Model (SLM) using this dataset that generated sound poetry. I then connected this generated speech to my MRM to experience a

rhythmic transcription of these invented utterances. While challenging the human-mimicking speech-to-text models and conceptions, this experiment brought new questions to explore. For example, how could ideas of linguistic disobedience inform the search for a robotic voice? And what would it mean to strip away all references to human speech from the sounds robots produce? I explored these questions further in the projects that followed my experiments with the MRM.

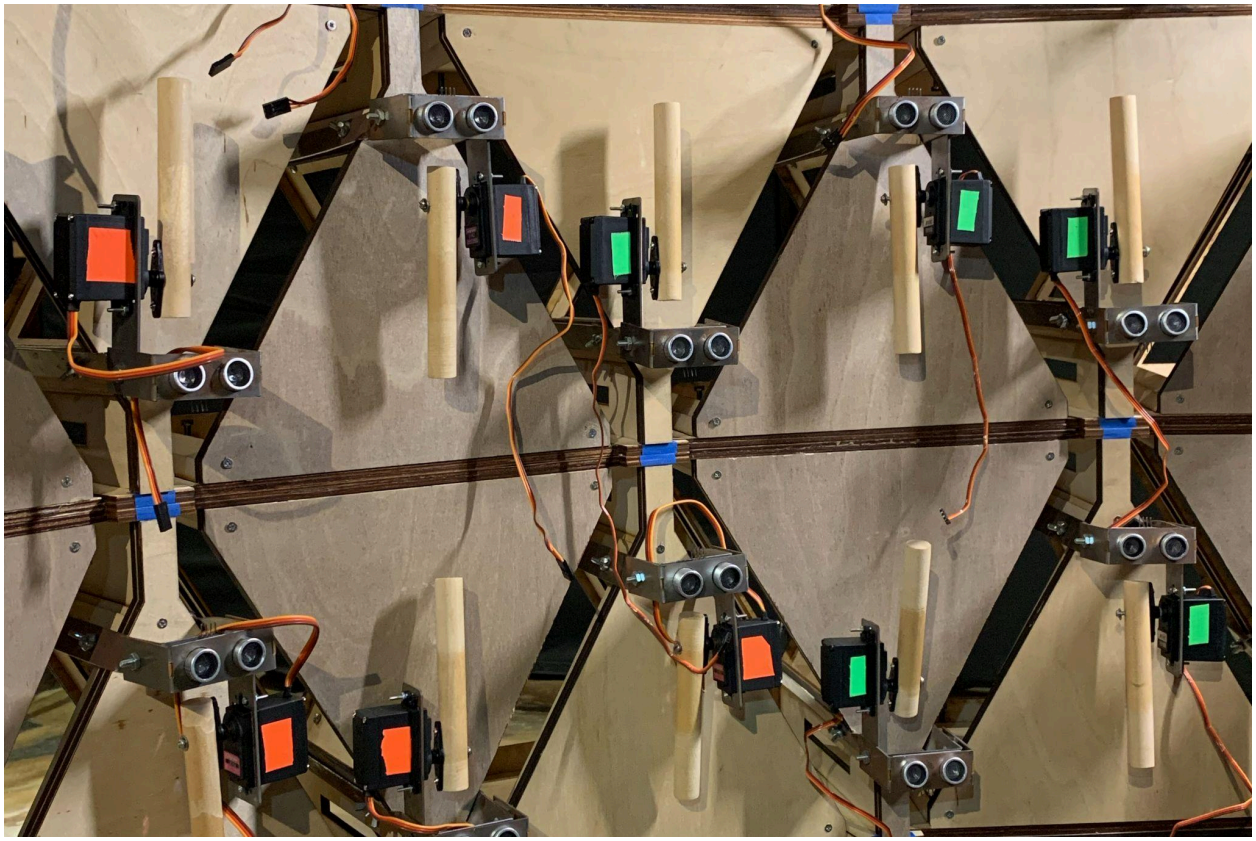

Figure 10
Detail of the *Modular Rhythm Machine (MRM)* installed in the DXARTS McMahon Fab Lab. Photo and work by the author.

I pursued these explorations shortly afterward with Professor Tivon Rice in a Directed Research Group (DRG) we formed under his guidance to research and propose creative disobedience to Anglocentric AI. In this context, I used Spanish as my starting point to resist the predominance of English-speaking AI while experimenting with other NLP models to explore the concept of a

robotic voice. This time, the gesture was to help my robots find a voice by deconstructing Spanish. This was an attempt to understand linguistic disobedience and mutation, and how these ideas could simultaneously generate a vision of a mutated reality. This brought me to create a new project, *Realidad Mutada* [Mutated Reality]—the genesis of an alternative world.

This alternative world resulted from experiments in linguistic disobedience employing a "Machine Unlearning" process I followed to render language mutations. Using NLP, I decided to create a dataset with a collection of works of literature that poetically distort Spanish. I first included César Calvo's *Las tres mitades de Ino Moxo y otros brujos de la Amazonía* (2011) because it highlights the poetic "distortions" of the Peruvian Amazonian dialect. At the same time, Calvo narrated a magical realist story set in the Amazon, heavily influenced by the sacred experience of Ayahuasca. In this world, the Indigenous cosmovision of the Amazonian People additionally teaches us about the possibility of an ontological shift to "Amerindian Perspectivism." The resulting model cultivated new, often invented words and meanings by reconfiguring speech frequently unrecognized by the "official" European Spanish Royal Academy. Consequently, language appeared mutated, and the reality it reflected mutated too.

The material counterpart in *Realidad Mutada* was a hybrid, part-human, part-machine, multidimensional sculpture. With this artifact, I invited participants to become one with the *Dispositivo de Realidad Mutada* [Mutated Reality Device] (DRM) by inhabiting the artifact while surrendering sensorial perception. On the outside, the public witnessed the human-machine hybrid as they interacted with and expressed the interior experience. Inside, the narrow borders of the micro-capsule were counterbalanced with an ambisonic acoustic experience that rendered the illusion of an alternative world based on the Peruvian Amazon. This way, *Realidad Mutada* created a real-time symbiotic imaginary outside while rendering an alternative reality inside.

Figure 11
Dispositivo de Realidad Mutada at the DXARTS Gallery. Photo and work by the author.

Throughout the *Realidad Mutada* process, I was a conduit. I mediated and interpreted invented and mutated realities represented by previously inexistent words like "orpuso." "Orpuso" and similar concepts/words/compositions could be experienced inside the *Dispositivo de Realidad Mutada*. I created the experience of "orpuso" by composing an ambisonics piece, stitching together and overlaying sound captured directly in the Peruvian Amazon. Using ambisonic microphones, I received the blessing and guidance of my friend, Shipibo-Conibo artist Rawa Muñoz, to capture the acoustic reality surrounding his native community, San Francisco de Yarinacocha. Rawa also gifted *Realidad Mutada* with the magic of his sacred song, the icaro.

I first presented the *Dispositivo de Realidad Mutada* at the DXARTS Gallery in the McMahon Building at the UW Campus. Later, I had the opportunity to show the work at two international

venues. The first was during the International Symposium on Electronic Arts (ISEA) 2023 in Paris, where the DRM shared space in an exhibit titled *psych.e*, organized by French curators and producers 36 Degrés in partnership with Galerie Charlot. The second was at CURRENTS 2023, an international new media festival held annually in Santa Fe, NM. In both instances, I was fortunate to have an unknown public interact with my work, and through observation and dialogue, turn these interactions into valuable lessons for a future iteration of the *Dispositivo de Realidad Mutada*.

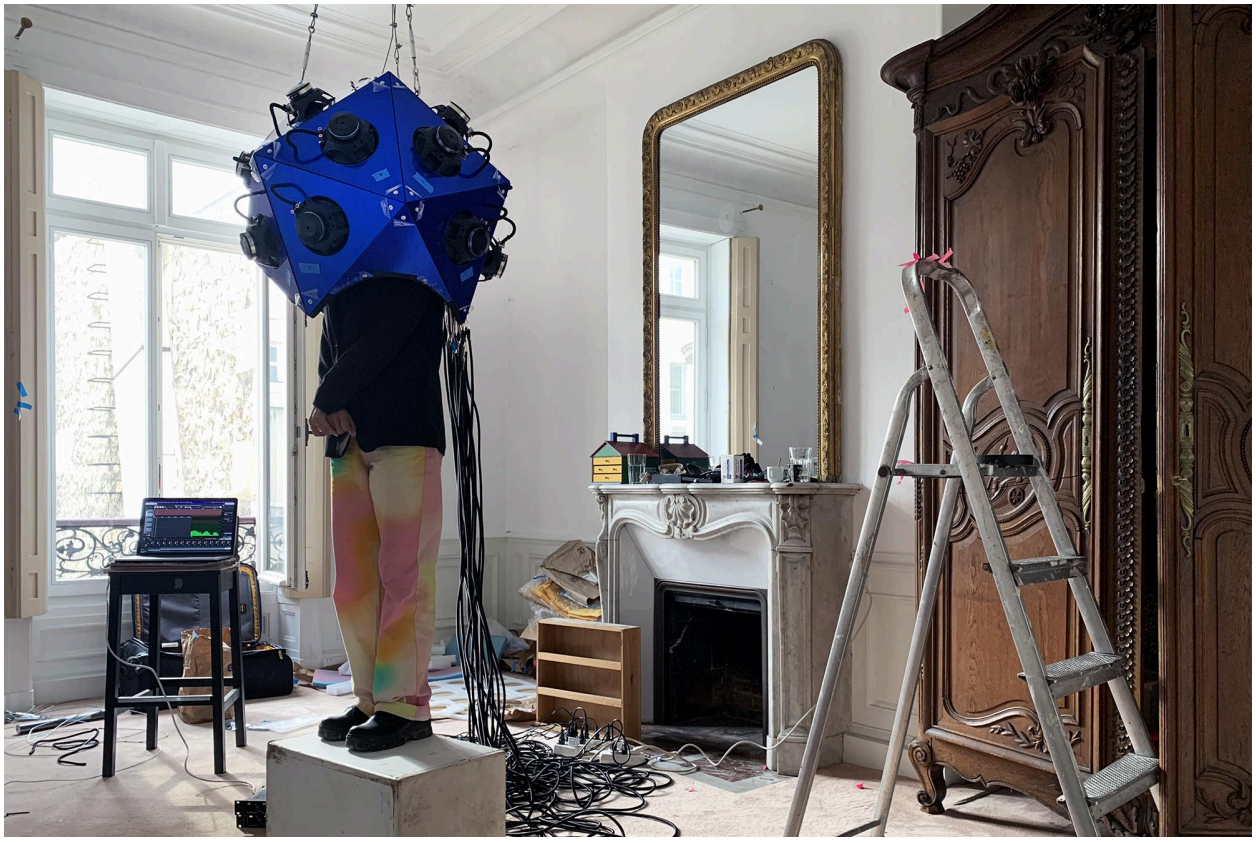

Figure 12
Dispositivo de Realidad Mutada at ISEA 2023 in Paris. Photo and work by the artist.

With *Realidad Mutada*, I started exploring an idea of the world that my robots could begin to imagine for themselves. I was also pleased to experiment with construction and fabrication systems to create artifacts and machines with similar material languages. The triangular module

that helped me build the icosahedron for the *Dispositivo de Realidad Mutada*, during the process of building, showed itself as a flexible and an interesting option to pursue multiple shapes based on the same module. This process revealed the potential of understanding the construction language as flexible and generative, providing a material strategy that would allow for multiple body forms and structures while using the same "ingredients." The process of building the *Dispositivo de Realidad Mutada*, then, was an insightful instance to not only pursue the "world" I was creating with my robots within its content, but also through the creation of their containers.

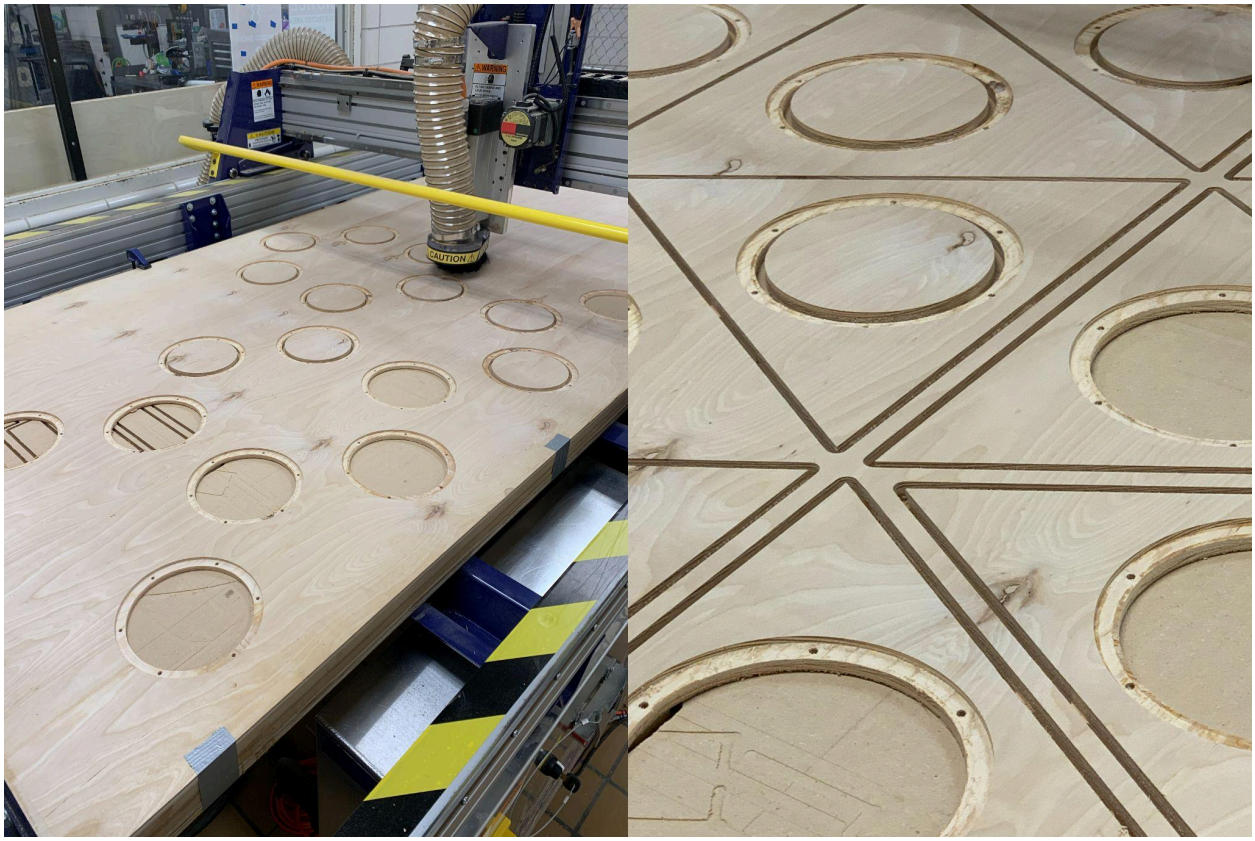

Figure 13
The process of fabricating my modular system. Work and photos by the author.

I utilized digital fabrication techniques that I have refined over time through iteration and trial and error. One of many advantages of digital fabrication is that the process and knowledge produced during fabrication can be easily archived and shared. This capacity for documentation

and replication became especially valuable as I began thinking about scaling my practice; moving from singular pieces toward systems that could be assembled, adapted, and reimagined, even collectively. At this point, and in part because of the generative process of producing modular pieces, I started to see the future of my work as a "constellation" of works that could interact with each other and the public, that could coordinate behaviors and expressions of agency, and that could all be understood as the same body in different parts, or the same expression in a distributed body.

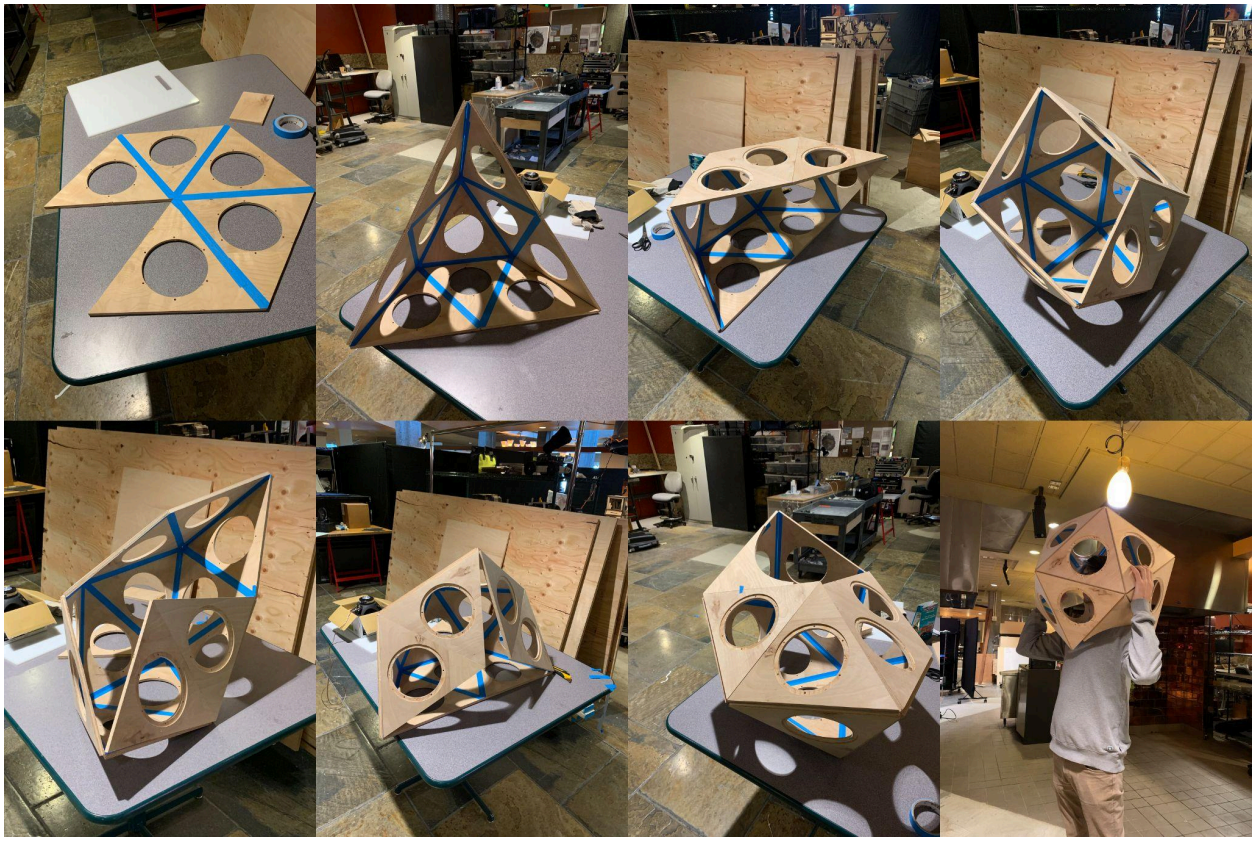

Figure 14
The process of joining the modules into their final icosahedron shape revealed multiple possibilities and the potential of a modular system. Photo and work by the artist.

My modular construction method, with time, became more sophisticated. First, it consisted of triangles that could house a specific loudspeaker—a speaker driver I already had with me, and I knew worked well within the full-range frequency response of loudspeaker drivers. I quickly

realized that I needed a method to join these modules together to form shapes. What began as the most rudimentary union method, using tape, prompted me to produce union parts made of wood, all the way to the current state of the project, where I use 3D-printed parts that serve as unions. Together with these 3D-printed parts, I developed additional triangular pieces that could be adapted to other electronics, such as a subwoofer module. Additionally, I created some pieces that would adapt to the "crevices" that resulted from joining modules on the inside, leaving the outside as a potential space to adapt devices as these projects grew. These pieces now form a catalog of possibilities that can easily adapt to future constructions, new robots I make, or collective projects I participate in.

In March 2023, using the same modular approach I designed for the *Dispositivo de Realidad Mutada*, I fabricated three robotic bodies to explore additional questions about language, movement, and expression. My robots made their debut performance at The Chapel, a performance space located at the Good Shepherd Center in Seattle. During this performance, they were controlled remotely from the lights control cabin on the second level of the space. I collaborated with Umut Gunduz, a fellow DXARTS Ph.D. student, to create a multimedia experience that combined Umut's visuals and audio with my robots in motion.

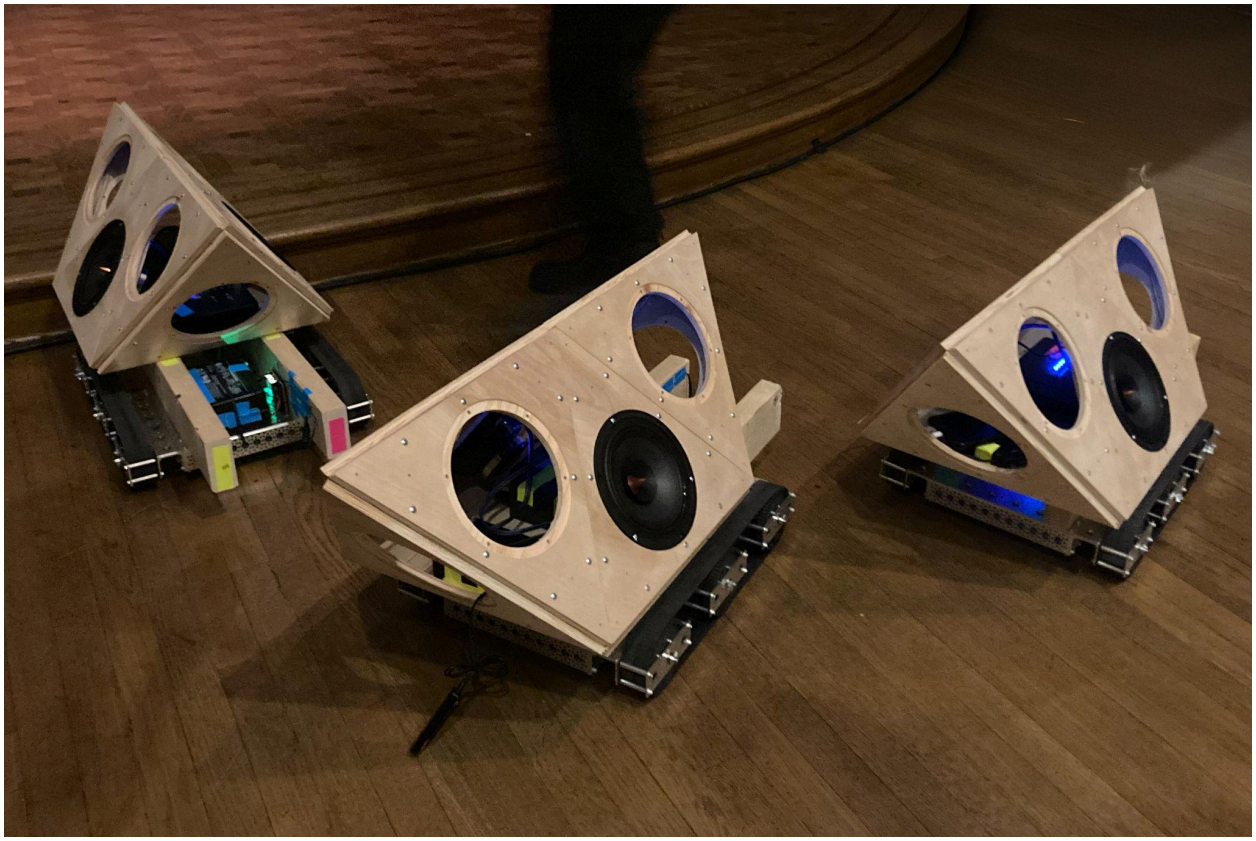

Figure 15
The three robots at The Chapel after the performance. Photo and work by the artist.

Reflecting on my thoughts after experiencing their debut performance, I recall that I kept thinking about the movement of the robots. Given that the robots were remotely controlled from a lighting cabin, I kept reflecting on how present and how absent we were during that performance. I thought that it was time to explore “autonomous” movement instead. Taking into consideration the ideas of agency discussed in the previous chapter, autonomy was not the goal of the next phase; instead, it was a means to achieve new forms of movement, choreography, and expression that could facilitate various experiments in articulating robotic agency beyond direct control.

In technical terms, the three robots were equipped with a chassis, motors, 12V batteries, a motor controller, and a radio control receiver attached to the motor controller. With the remote

controller, I could transmit a signal that would then operate the robot to move in any direction. Additionally, each robot had a "body" built with the triangular modular system I had developed, and two loudspeakers each, connected to an amplifier that in turn was connected to a USB audio player. The robots, then, could move around by command and play pre-recorded sounds through the USB audio player. This in itself was a complex setup and a difficult task to achieve. Moreover, it led to important insight regarding the potential of expression in movement and sound through an early exploration of the robotic voice.

I want to pause here to reflect on this approach to making. What defines my process is a continuous feedback loop between prototype and idea. Each experiment changes the experience, which in turn transforms the concept, which then reshapes the next iteration. Rather than aiming for a final form or solution, I approach my work as one that is always in progress. Each prototype is a question, and each 'mise-en-scène' is an open-ended proposition. This recursive, responsive practice leads me to understand my work as part of an ongoing evolution, where change is a method for thinking, sensing, and building differently.

This feedback loop goes beyond my observations to include others' impressions, often gathered through conversation. For instance, during the performance at The Chapel, several people approached me to discuss how the robots were being controlled. These audience members wanted to know whether the robots were moving independently during the performance or if it was an illusion, and if they were directly controlled. To me, the answer to this question doesn't affect the outcome of the performance; however, these conversations made me wonder if the same, or something similar, could happen without direct control, with "autonomous" control instead. I started to think about what else might be possible using autonomous control altogether. At other times, I've received valuable feedback—such as from professors—that has stayed with

me until a situation arose where it became relevant. This was particularly evident in the feedback I received during my General Exam, which then became crucial for my final project. I added code to make the call-and-response behavior more straightforward, an aspect that was somewhat missing during my General Exam but more evident during my final (which I will discuss further later in the chapter).

Another aspect that characterizes my practice is a tension that I find constructive. I take a lot from the spirit of technological disobedience and low-tech aesthetics, as described by artists like Leo Núñez and writers like Rodrigo Alonso. At the same time, I develop my work within a high-tech context, using the tools and resources available to me as a student at the University of Washington. I have access to fabrication labs, precision sensors, and powerful computing, all of which are far from the conditions in which technological disobedience often emerges. However, instead of treating this as an impossible contradiction, I view these tools and high-tech approaches as coexisting with my experimental spirit, driving and reflecting low-tech invention.

My robots include Raspberry Pi computers, LiDAR sensors, and precise parts made with CNC machines, but the systems are still assembled through improvisation, trial and error, and reuse. They are not polished, and they do not follow a straight path from idea to result. In some settings, my work might appear high-tech. In others, especially compared to something like a Boston Dynamics or a NASA robot, it is undeniably low-tech. I see this hybridity as intentional and creative, both poetically and technically. Kusch's concept of *estar siendo* helps me see this incomplete quality as something essential: my robots are designed to stay open to change and evolution.

Because my robots are meant and designed to remain open to change, I equip them with as much as I can. It is not just about building a robot that navigates space efficiently, but one that can navigate in multiple ways, each configuration offering a new lens through which to rethink movement, spatial awareness, and agency. For example, a robot with a single LiDAR sensor has a different navigational logic than one with only ultrasonic sensors. A robot equipped with two LiDARs opens up even more possibilities for exploring how movement might express agency. The same applies to other instruments and components. A scissor lift, for instance, is not added to fulfill a pre-defined function. Instead, it increases the ways the robot can inhabit or respond to space, allowing me to explore unexpected directions.

With this in mind, I began to consider the evolution of my three robots into what they would become next. I called them the *AGNS Collective* because I was interested in exploring robotic agency through their collective nature. To better achieve this, I put in place a plan to overhaul them so they could navigate space in less controlled ways and express sound more directly linked to their movement. From an engineering perspective, they needed to become more autonomous. From the perspective of my artistic process, I aimed to conduct multiple experiments with sound, voice, movement, and navigation to continue exploring questions of agency in choreography and composition. Around this time, we established the Disobedient Robots Research Group (DRRG) in collaboration with UW Electrical and Computer Engineering (ECE) Professor Sep Makhsous and his ARC Lab. I will return to this collaboration in more detail in the following chapter.

Together with the DRRG, we established the goal of learning Robot Operating System 2 (ROS2), one of the most widely used open-source frameworks for robotic development, to enhance control, communication, and coordination across our robotic systems. In technical terms, instead

of connecting to the motor controller through radio control, we connected to it with a computer—a Raspberry Pi 5 with 8 GB of RAM (RPi). Since we were no longer using our own eyes as sensors, we added distance sensors: two LiDARs, one positioned at the top and one at the bottom, to measure distance in two different horizontal levels across the spaces the robots navigated. Additionally, we replaced the simple DC motors with motors equipped with encoders to estimate odometry. We reinforced the power systems with additional batteries and step-down converters, added a scissor lift with a distance sensor to introduce a new axis of vertical movement, and connected the audio system to a small sound card attached to the Raspberry Pi.

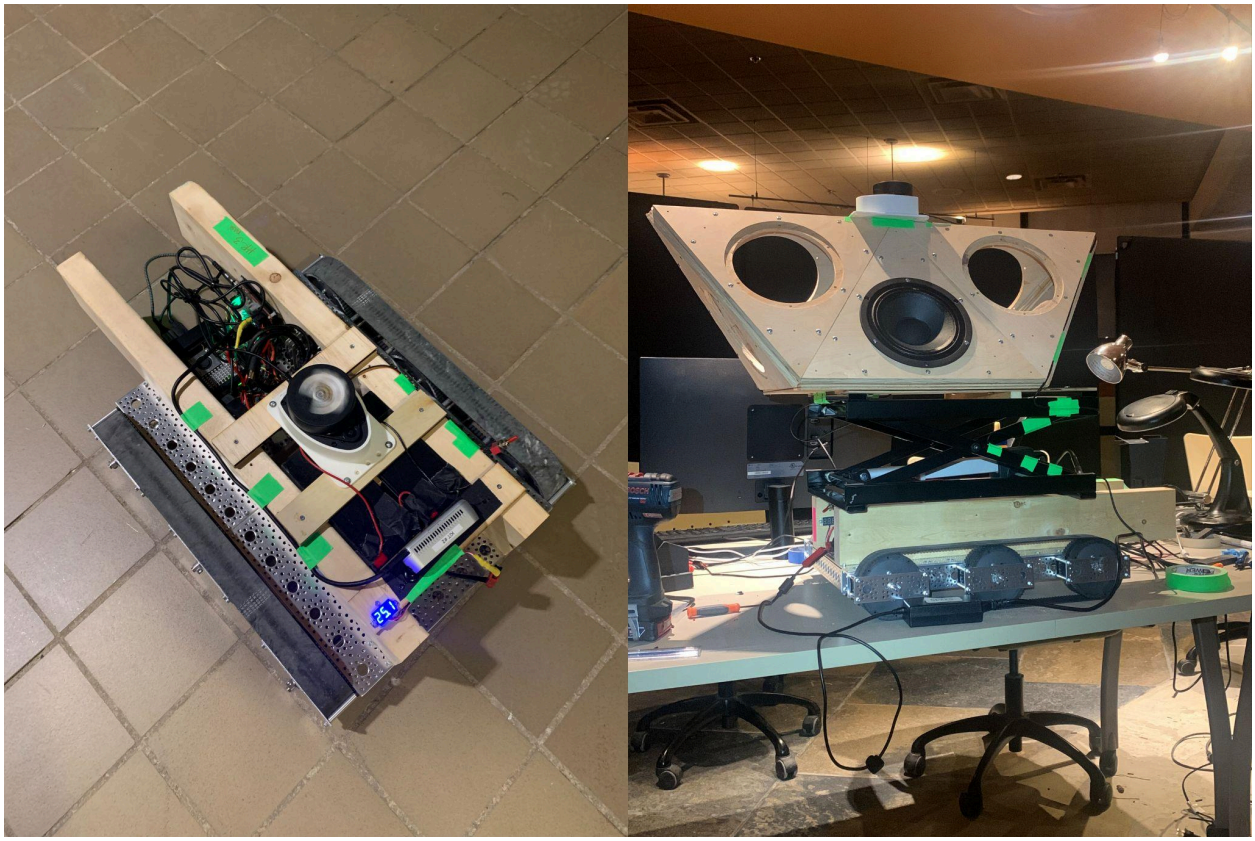

Figure 16
The process of converting the robots for autonomous navigation. Photos and work by the artist.

As the “brain” of the operation of each robot, what ROS2 allows for is described as a node-based approach. In this system, each function of the robot, such as reading a distance sensor, driving

motors, and timing choreographies, is managed by an independent process called a node. These nodes communicate with each other through topics, services, or actions, enabling modularity and distributed control. For example, a node publishing LiDAR data can be subscribed to by a navigation node that interprets the environment and sends movement commands to a motor controller node. This architecture enabled us to structure robot behavior in more flexible and scalable ways. It also facilitated the development of collective behaviors across robots, since nodes running on different machines can exchange data over a shared network. In this way, ROS2 provided a flexible architecture for implementing the technical components of autonomy, allowing us to test and iterate behaviors across different layers of perception, movement, and communication.

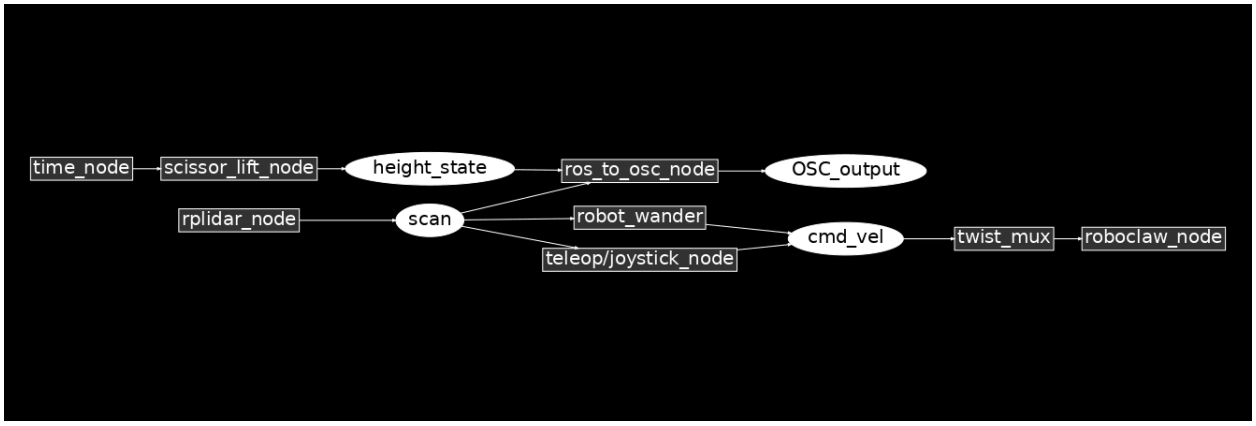

Figure 17
A schematic of the running nodes during a typical runtime. In a white background, the main ROS2 topics that communicate between nodes to guide robot movement are displayed.

Each node within ROS2 typically works within a “package”: these are the “apps” of the operating system. Each package, then, contains multiple files, ranging from configuration files to main algorithms and firmware connectors that interface with specific hardware components. In our setup, we used packages to control motor drivers, manage LiDAR data, coordinate the scissor lift mechanism, and process sensor readings. One particularly significant component was

a custom package that acted as a bridge between ROS2 topics and OSC (Open Sound Control) messages. This allowed us to send sensor or movement data to Supercollider[6] in real time, where we explored sonic behaviors and tested various approaches to the robotic voice. Through this setup, sound became both a mode of expression and a responsive layer in the robots' interaction with the environment, integrated into their systems rather than simply added onto them.

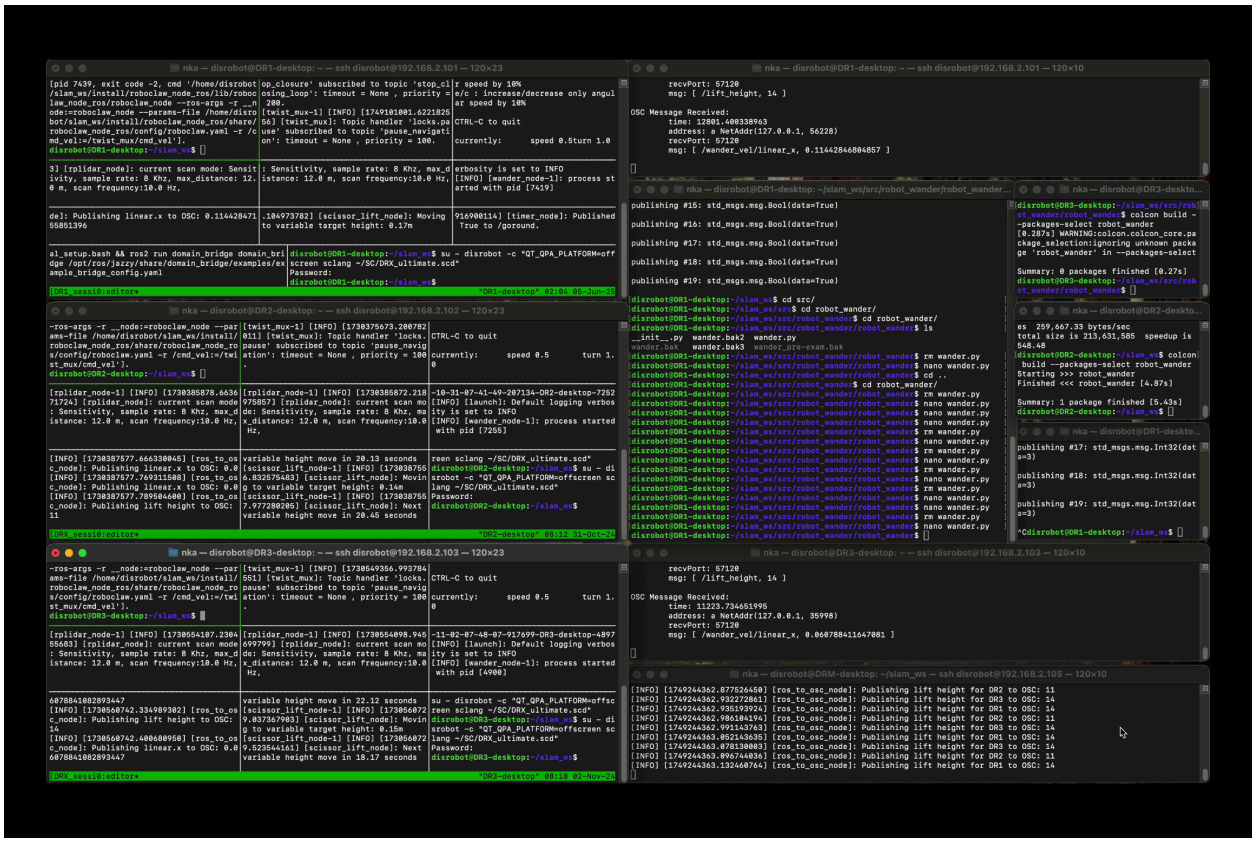

Figure 18
A screen capture of the nodes running on terminal windows. On the left, three windows, from top to bottom, represent each robot as it runs. Within each window, 9-10 nodes were actively running and informing other nodes. On the right, Supercollider and other nodes helped visualize the system's status.

The use of Supercollider, an audio-based programming language and software that I learned during several quarters at DXARTS, became essential for experimenting with the auditory dimension of robotic expression. Unlike traditional audio playback systems, Supercollider

[6] Supercollider is an open-source programming language and environment for real-time audio synthesis and algorithmic composition, used to create sound with code.

allowed for real-time synthesis and manipulation of sound based on incoming OSC messages. This meant that sensor readings, movement events, or interaction triggers from the robots could dynamically shape sound output, altering pitch, rhythm, spatialization, or texture in ways that felt responsive and performative. In this context, robotic “voice” was about generating sonic responses that reflected internal states, environmental conditions, or relational dynamics, rather than about speaking human language. The result was an open-ended system in which behavior, movement, and sound were closely interconnected, allowing for new forms of sonic choreography and expression to emerge.

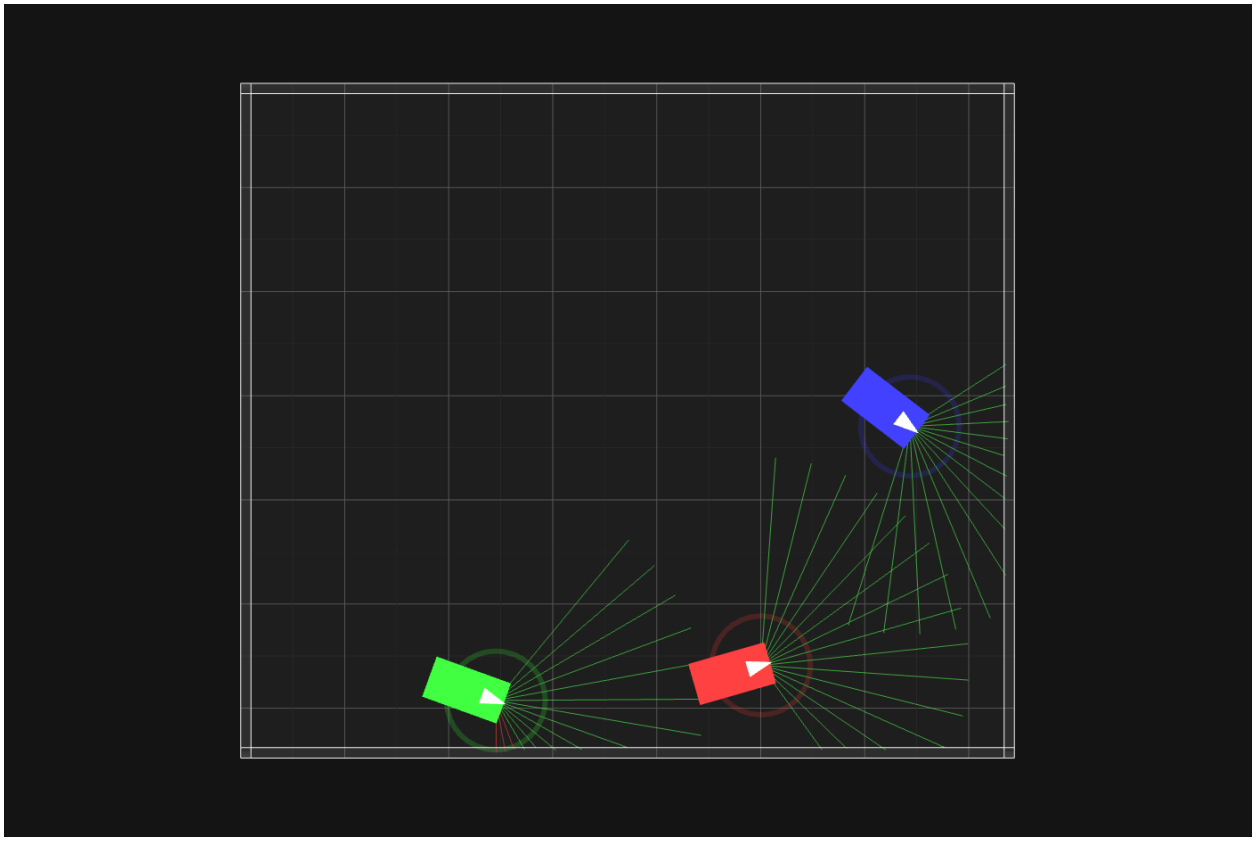

Figure 19
A schematic top view of the robots in the main space at the DXARTS Gallery (7.44m x 6.48m). Each square in the plan view represents 1m x 1m. Each robot is surrounded by a circle representing its avoidance area. Green rays represent LiDAR position and angle of sensing.

The first time this system was presented to the public was in November 2024 at the DXARTS Gallery, during my General Exam for candidacy. Figure 19 shows a schematic to understand the size and proportion of the robots in relation to the space. At that time, while I transformed the gallery space in subtle ways, such as reducing the height of the entrance, creating a small window to a "void," or switching the lights out and having a constant drone low-frequency sound in the background, the focus was mainly on the robots and the behaviour they could express in relation to themselves and potential interactions with the public. Each robot had a blue headlight that illuminated their direction while moving around the gallery space, and each would also transmit a texture of sound that shifted as their sensors reported spatial data.

Figure 20
The three robots at the DXARTS Gallery during the General Exam. Work by the artist. Photo by Eunsun Choi, 2024. Used with permission.

In this opportunity, I experimented with the robotic voice in a different way than I had before with the *Dispositivo de Realidad Mutada*. With the DRM, I attempted an approach that began with the Spanish language, using language models to explore the concept of linguistic disobedience. After that experience, I became interested in exploring the robotic voice from a place different than human language. As I had established, I was trying to avoid "imposing" human language into a machine; hence, a different experiment was due. Since robots were now equipped with sensors and a system that could translate sensor data into sound qualities, I explored how the robots' sound system could become an expression of the space they inhabited.

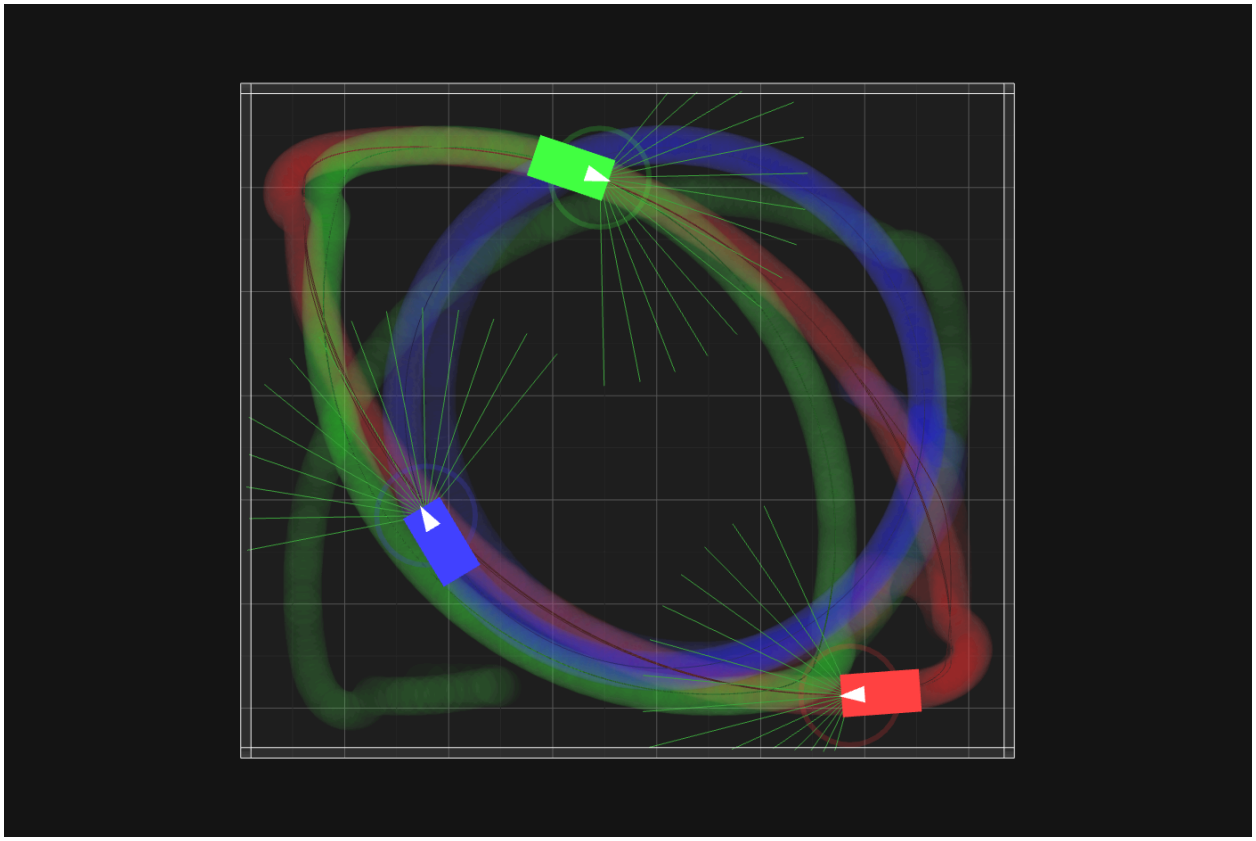

Figure 21
A schematic top view of the robots in the main space at the DXARTS Gallery (7.44m x 6.48m). Each square in the plan view represents 1m x 1m. This image consolidates a simulation of robot's trails as they move around in the gallery, assuming no other obstacles other than themselves.

I was interested in this approach because, while learning about ROS2 and programming in the DRRG, we came across the term SLAM: Simultaneous Localization and Mapping. SLAM allows a robot to map a space while continuously locating itself within the map it is making. With SLAM, robots become map-making tools, autonomously charting and updating their position relative to their surroundings in real-time. Consequently, instead of approaching mapping as a technical task aimed at spatial recognition or obstacle avoidance, I became interested in what it meant to treat mapping as an expressive act. If a robot continuously perceives and records its environment, could that perception also be translated into a sonic articulation of its experience? Could a map be heard rather than seen, centering the mapper into the experience instead of hiding it? Could this be a way to understand the robotic voice?

In this spirit, I began experimenting with converting spatial information such as distances to walls, changes in velocity, and obstacle detection into parameters for sound synthesis. Instead of producing a representational map in the traditional sense, the robots began to "sonify" their path, shaping sound in relation to the geometry, density, or navigational complexity of the space they inhabited. In this way, mapping became a performative act. The robotic voice became spatial, modulating in response to how a robot explored, paused, or encountered restrictions. This approach allowed me to shift the framework of the robotic voice away from anthropomorphic imitation and toward an acoustic presence tied to movement, perception, and space.

In technical terms, I had Supercollider run a series of synthesizers, all linked to a single buffer: an everyday recording I made at home, which is textural, minimal, and deliberately ambiguous. Rather than using composed tracks or synthesized tones, I chose this sound as an acoustic ingredient for sonic experimentation, allowing it to be shaped in real time by the robots' interaction with space. Incoming sensor data, such as distance to obstacles, movement speed,

turning angles, or vertical positioning, modulated various parameters like playback rate, filter resonance, amplitude, and spatial diffusion. As a result, the recording became a dynamic, reactive element stretching, splintering, and pulsing in response to the robots' behavior and surroundings. This process enabled the sound to transcend representation and into expression. The robotic voice was about generating presence through action and resonance.

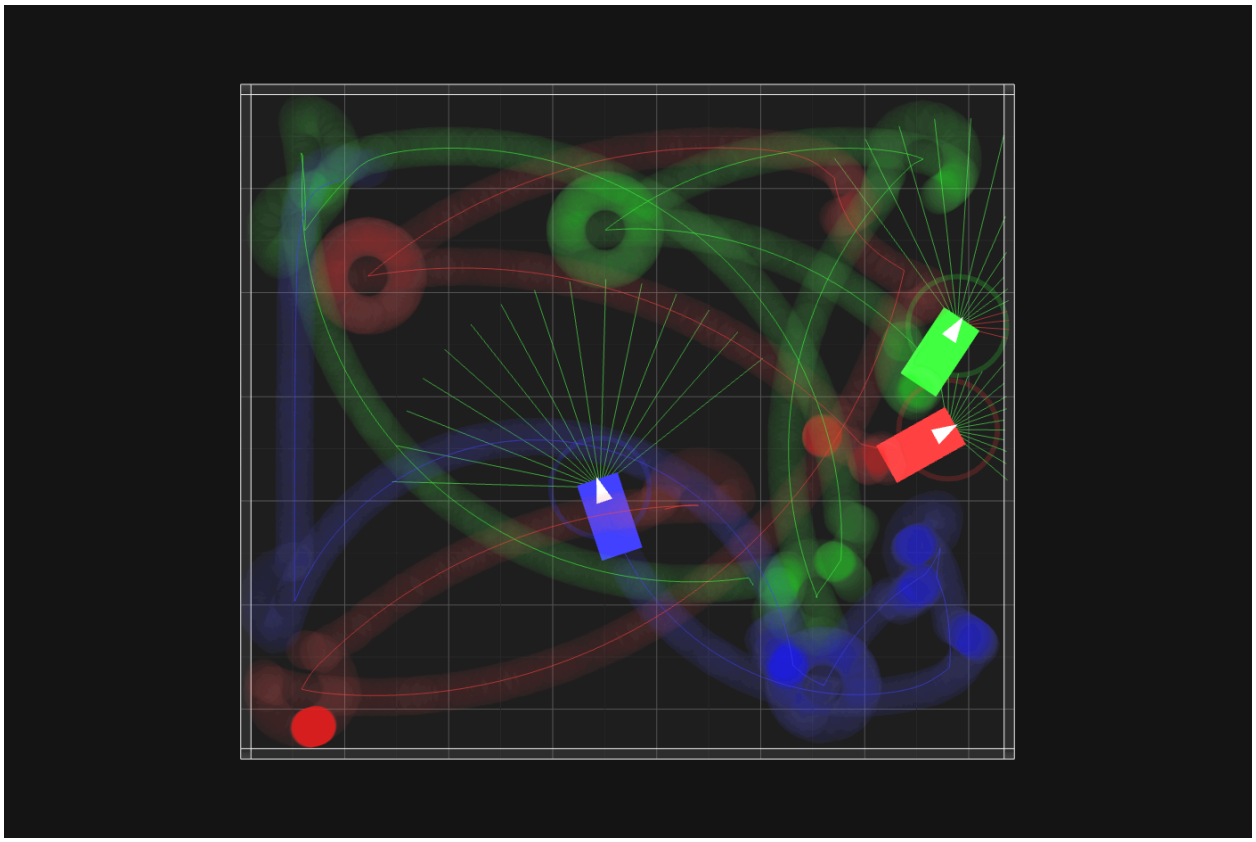

Figure 22
A schematic top view of the robots in the main space at the DXARTS Gallery (7.44m x 6.48m). Each square in the plan view represents 1m x 1m. This image consolidates a simulation of robots' trails as they move around in the gallery, showing positions where they performed "go around" pirouettes (circles).

At the same time, the robots' movement included behaviors that would drive them around the space in unexpected ways, while still avoiding crashing into people or walls. I understood this behavior, when performed collectively, as a more "chaotic" mode because it was unguided, improvised, but still responsive. Then, there were intervals. Timed every 2 to 5 minutes, these

intervals would trigger synchronized behaviors that marked a contrast to the previous chaotic motion.

Figure 23
One of the robots performing a scissor lift routine. Work by the artist. Photo by Eunsun Choi, 2024. Used with permission.

One of these behaviors, once triggered, involved all robots stopping and then performing a scissor lift routine. No matter where each robot was, it would halt and begin to ascend, then descend, in perfect timing with the others. This collective action made the three robots clearly readable as a group moving as one. At other times, the robots would suddenly stop, then immediately begin a “pirouette,” rotating in place. As they turned, their blue headlights followed the motion, creating a disruption in the audience's spatial experience and once again offering a moment where the robots could be perceived as expressing collective agency.

Overall, this was a successful instance for exploring the robot's movement and expression, the first time with a sophisticated technical system. Even so, there remained many things to experiment with and new questions to explore once this was over. Shortly after the General Exam, I headed to Mexico to begin my Fulbright exchange and last year as a DXARTS student. One of my biggest challenges was managing the logistics of transporting my robots across borders and into Mexico. Another challenge was to develop and unify a vision for a final project that would surpass my expectations related to my goals at DXARTS.

Bringing the robots was not an easy task, but one aspect of their fabrication proved to be the right decision in this context. Because the robot's "body" was digitally fabricated, I did not need to transport all the wooden pieces into Mexico; instead, I could fabricate them again locally using the same design files. Although the pieces fit together as intended, the plywood available was of a different quality, requiring adjustments in my work process. Connecting with local fabrication facilities allowed me to adapt to these material and process differences. Also, it opened up possibilities to rebuild the *Dispositivo de Realidad Mutada* in a way that would appear and function more explicitly as part of my "constellation" of robots.

For my final project at DXARTS and as a natural continuation of my research, I submitted a proposal on various levels. The most general dimension was the entire *Encuentro*, which I have briefly mentioned in the introduction to this text and will expand on in the next chapter. In this chapter, I will instead focus on the specific week in June 2025 when my work was showcased at the Galería de Arte Binario in the Centro Nacional de las Artes (CENART), from June 3rd to June 8th. First, I would like to provide a brief overview of the Galería de Arte Binario and, more broadly, CENART, to contextualize my work in this location.

CENART is Mexico's National Center for the Arts, a major institution in Mexico City dedicated to interdisciplinary artistic education, research, and production. It hosts a range of facilities across visual, performing, and media arts, and it often supports experimental and cross-disciplinary practices. Within its campus, the Centro Multimedia (CMM) stands out as an important space for media art in Latin America. Over the years, the CMM has cultivated a vibrant ecosystem around art, technology, and critical practice, including topics at the intersections of artificial intelligence, robotics, and local cultural narratives. The center supports exhibitions, grants, public programs, and research, offering artists both infrastructure and intellectual companionship.

Figure 24
A view of the Centro Nacional de las Artes (CENART) in Mexico City. Photo by the author.

This context was meaningful to me. While much of my recent research and development has taken place in the United States, my practice has been formed through a continuous exchange between places. The habit of reconfiguring materials I learned in Lima, the high-tech experimentation I pursued at the Massachusetts Institute of Technology (MIT) during my master's work and at DXARTS in Seattle, and the collaborative and critical environment I inhabit in Mexico City each influence the way I design, build, and present my work. The opportunity to collaborate with CENART and present my work within this environment was a significant milestone and a return to the broader cultural contexts that continue to shape my thinking.

Figure 25
Galería de Arte Binario, looking from the inside to the outside. Photo by the author.

In this context, the Galería de Arte Binario provides a space not only for experimenting with robots but also for fostering broader interactions and conversations with the communities surrounding CENART and CMM. The gallery is compact, slightly smaller than the DXARTS Gallery, which means it has limited space for displaying multiple works by various artists simultaneously. While multi-artist dialogue was an important aspect I aimed for in Mexico City, Cristina Brambila, the curator for the *Encuentro*, and I decided it would be better to share the same space at different times rather than all at once. This approach allowed each artist to "occupy" the gallery for an entire week, transforming it into an experimental open lab where the work developed in diverse ways throughout the exhibition period.

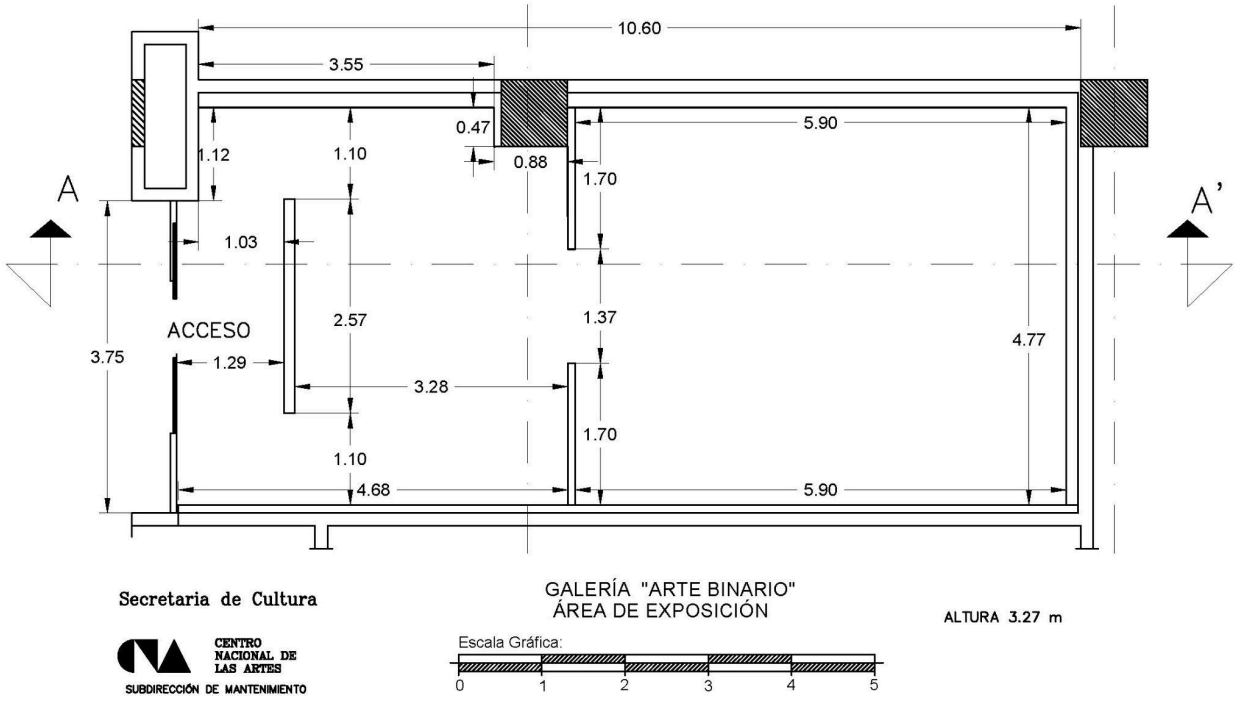

Figure 26
Floor plan of the Galería de Arte Binario at CENART in Mexico City. Units are in meters (m). Used with permission.

Finally, for my exhibition at the gallery, I presented two aspects of my work. The first aspect was the material, while the second was the method I used to showcase and continue developing my work during that week at the gallery. For the material aspect, I rebuilt my three robots, *AGNS Collective*. I also wanted to create a moment where the "constellation" of robots I was building would come to life, so I proposed a new version of the *Dispositivo de Realidad Mutada* (DRM). This new version, the DRM v2, would be more of a robot and less just an interface. It would be more integrated into the entire robotic system and less of a standalone object with a separate logic. It would function more as a self-contained machine and less as an artifact that still relies on external power sources, computers, and peripherals. Finally, the DRM v2 would also incorporate a system that could adjust the height of the icosahedron, allowing audience members to put their heads inside and participate in the experience it offered as part of this constellation of robots.

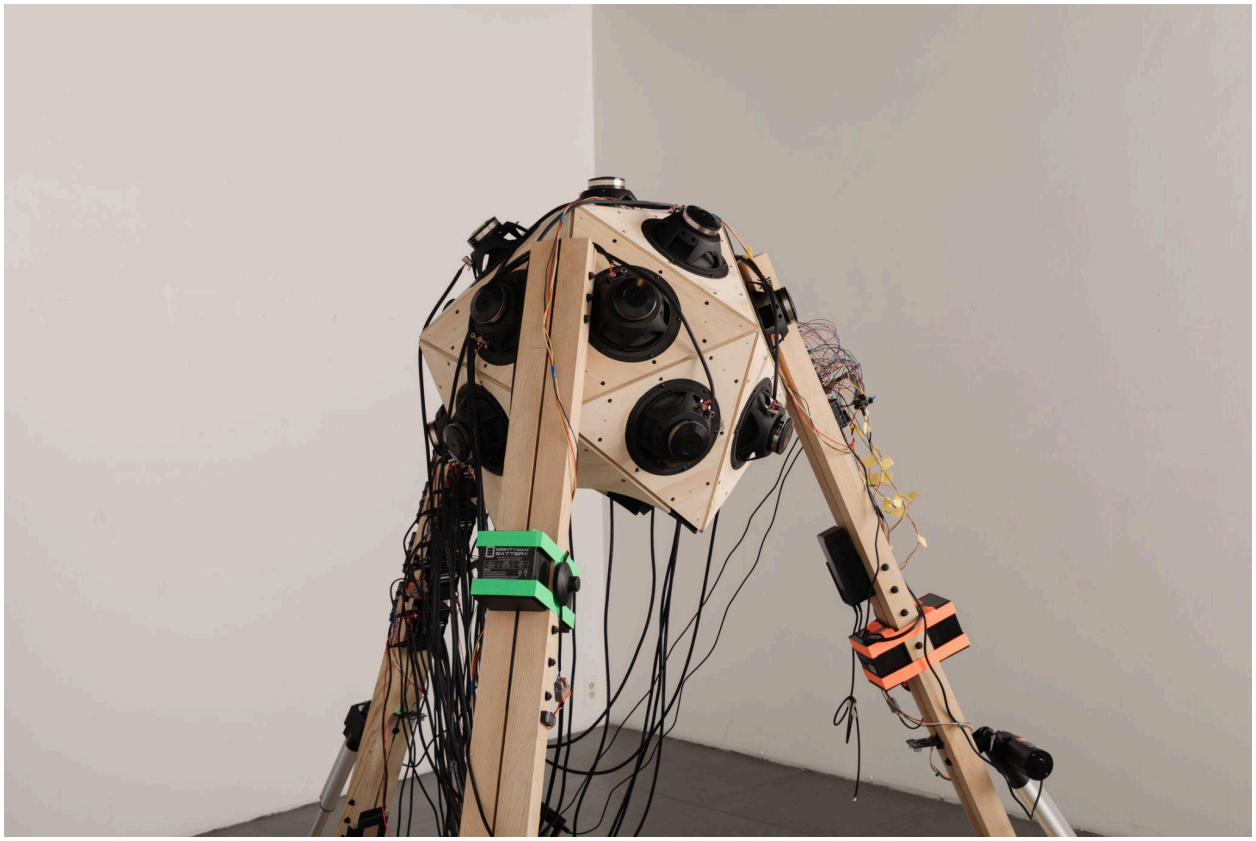

Figure 27
The new Dispositivo de Realidad Mutada, DRM v2. Work by the author. Photo by Janice Bryson. Used with permission.

Regarding the height-adjustment mechanism, in earlier versions of the DRM, I was unsuccessful in adapting it to accommodate different people's heights. The DRM hung from the ceiling of spaces and had a fixed, non-adjustable height. In addition to not being able to adjust the height for different users, this setup also forced audience members to bend awkwardly to fit inside the icosahedron. Some solutions I tried involved using adjustable-height seating, but I was never convinced that these systems provided a better experience. For DRM v2, I envisioned a system where the robot could stand on its own legs, rather than hanging from the ceiling. The legs would establish the idea of a self-contained entity and include a mechanism, like a knee, that would allow the height of the entire machine to change. With this design, the legs of the DRM v2 also

became a space to attach other peripherals and electronics. As a result, all amplifiers, sound interfaces, motor controllers, and computers were now contained within the DRM v2.

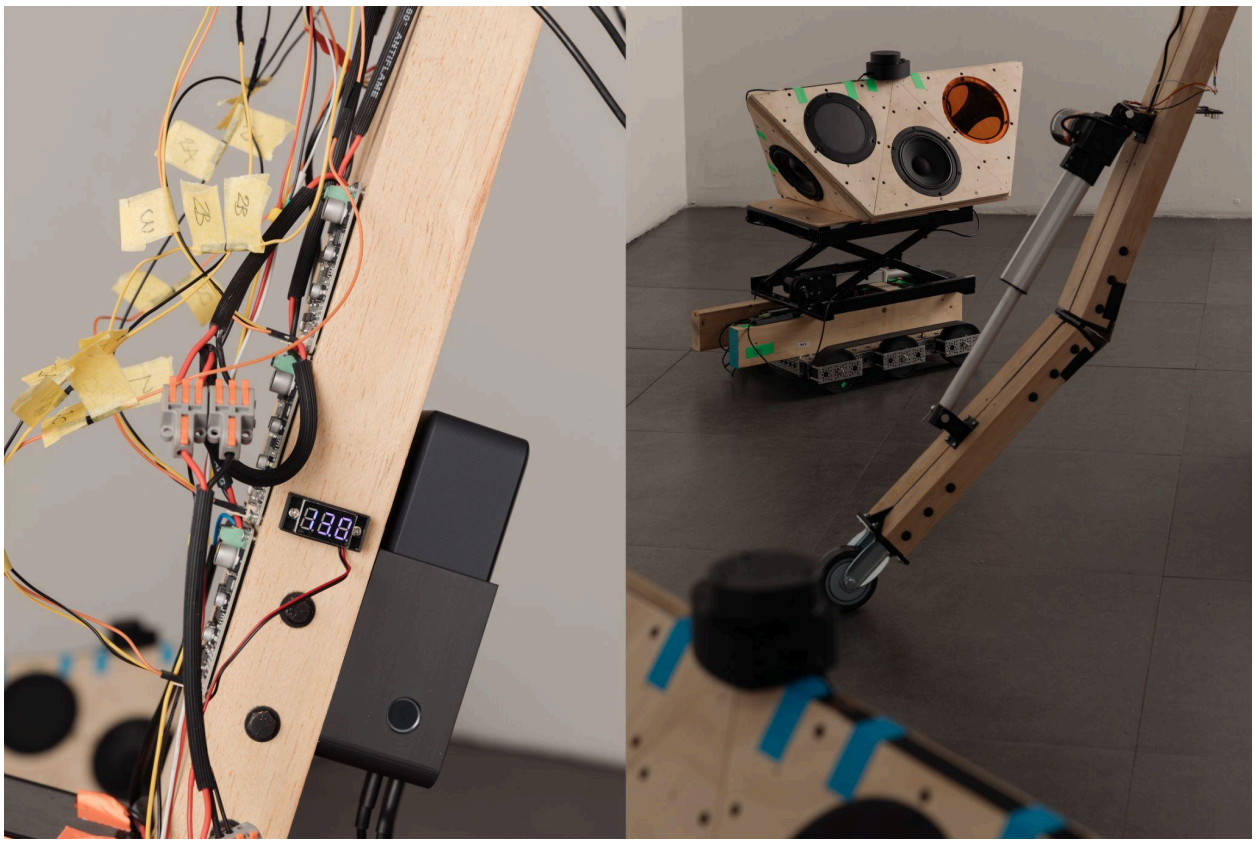

Figure 28
Details of peripherals and electronics attached to the leg (left) and leg "bending" mechanism using a linear actuator (right). Work by the author. Photos by Janice Bryson. Used with permission.

Continuing with the material aspect of my proposal for the Galería de Arte Binario, I would like to delve into additional technical aspects of the DRM v2. Since it was no longer running on an external computer (for the previous version, my laptop would connect to two large audio interfaces and process sound through Reaper[7]), it now had its own computer, a Raspberry Pi 5 with 16GB of RAM. This matches the computer system within each robot, and as a result, I could also install ROS2 on the DRM v2 computer. As I explained earlier, ROS2 enables nodes to communicate with each other and between computers, provided they are all part of the same

[7] REAPER is a Digital Audio Workstation (DAW) for playing, editing, and mixing audio.

network. In my case, I had a WiFi router that created a “disobedientrobots” network to which all Raspberry Pis were connected. With this mechanism in place, I was now able to communicate between all robots, *AGNS Collective*, and DRM v2 included. This was the first step into creating an interconnected experience and into materializing my “constellation” of robots.

Figure 29
Constellation of robots as it was presented at the Galería de Arte Binario, CENART, Mexico City. Work by the author. Photo by Janice Bryson. Used with permission.

For my week at the gallery, I began with the robots’ previous program, initially designed for the DXARTS Gallery, and approached the exhibition as a process of gradual transformation. Each day, I introduced variations and changes in response to the specific spatial and social conditions of the Galería de Arte Binario. For the DRM v2, I replaced the earlier ambisonics composition with a sound that connected more directly to the overall experience of the gallery: a steady, resonant beating, like a drum, moving across the 16 speakers embedded in the icosahedron. This

configuration was my starting point, shared by the robots, the DRM v2, and myself, and I chose to be present in the gallery throughout opening hours to witness and respond to sporadic and spontaneous interactions with the public.

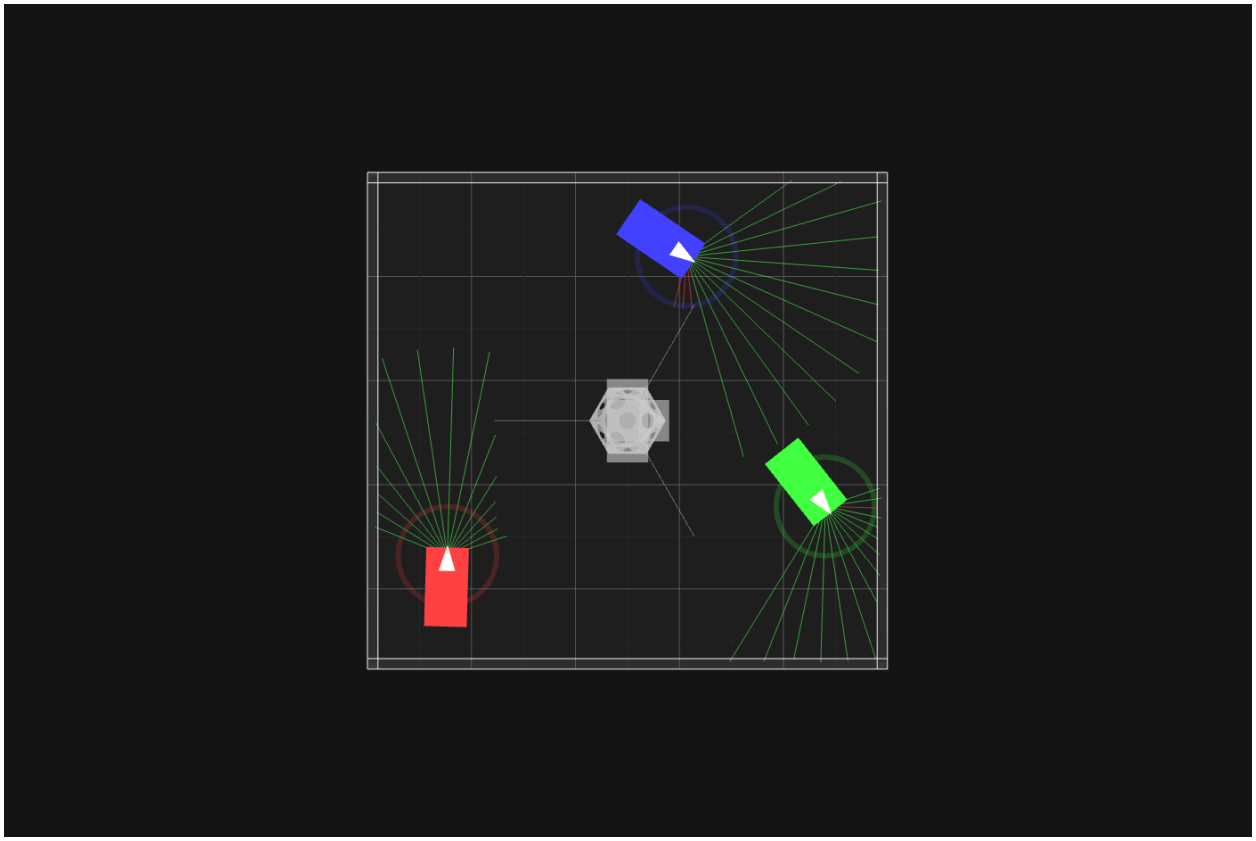

Figure 30
A schematic top view of the robots in the main space at the Galería de Arte Binario (5m x 4.77m). Each square in the plan view represents 1m x 1m. Each robot is surrounded by a circle representing its avoidance area. At the center of the space, the DRM v2. The space for robot navigation is clearly reduced as compared to the exhibition at the DXARTS Gallery.

The size and layout of the gallery meant that visitors first encountered the work from a distance, with a view framed by the entrance that made the constellation of robots and the DRM v2 appear almost as a stage. This perspective emphasized the sculptural presence of the pieces, visually connected and distributed across different subject-objects. Entering the main space required crossing a small step and threshold, a movement that signaled a shift from observer to participant. Many visitors paused at this point, looking in and considering the scene before

deciding to enter. My presence in the gallery allowed me to invite people to cross that threshold, to step into the environment, and to interact with the work from within. This combination of spatial framing, physical transition, and direct invitation shaped the way the installation was experienced and guided the adjustments I made throughout the week.

The decision to be present at the gallery also allowed me to take care of the machines the way I intended to by making sure the batteries were charged correctly, and by "operating" some functions, like the height-adjusting mechanism of the DRM v2, inviting users to immerse themselves in the experience. There is an additional consequence to being present all the time in the gallery, and this is that I become part of the performance too. At times, this aspect would take the form of an artist working behind a screen, researching various ways to adjust navigation. At other times, this would manifest as direct interactions with the public, through engaging in thoughtful conversations, understanding the audience's impressions, embracing insightful comments, and observing interactions that would then inform the adjustments and experiments I wanted to enact next.

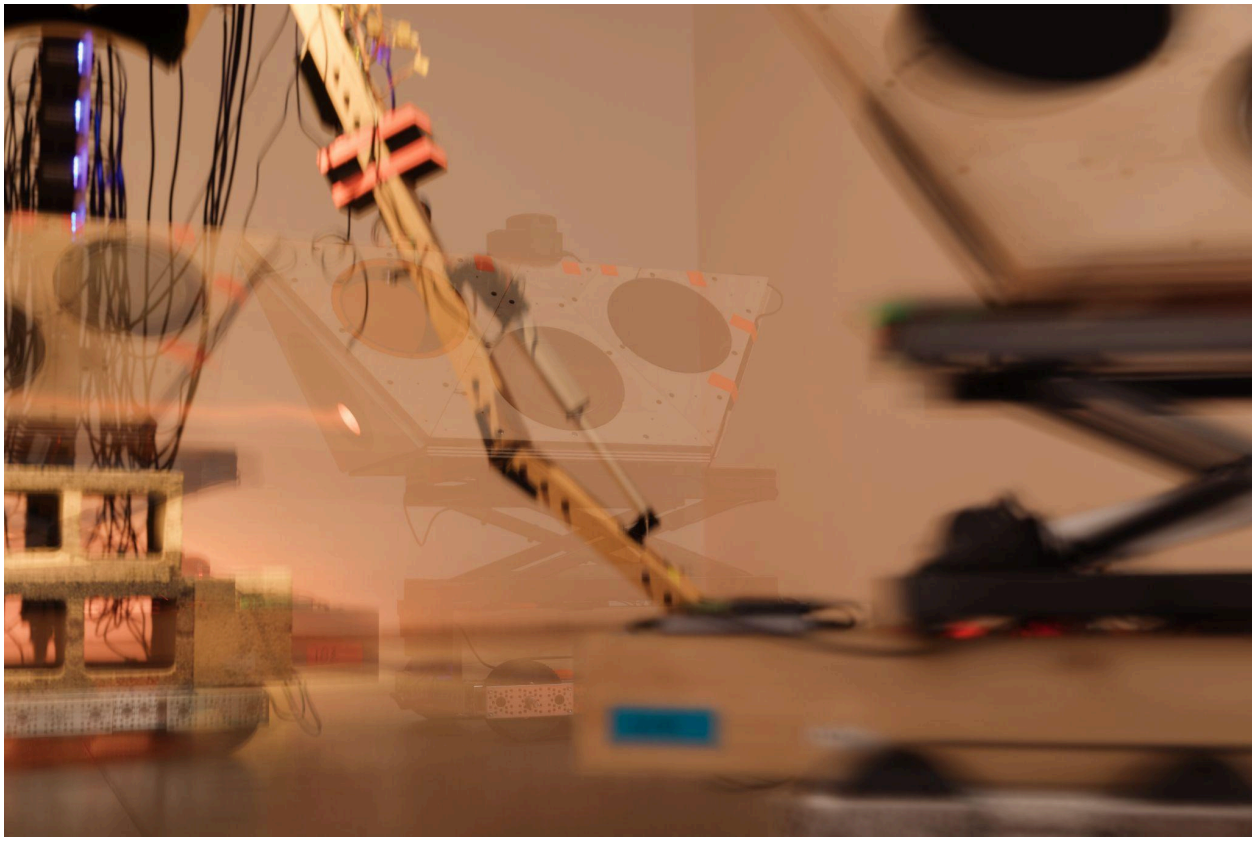

Figure 31
Robots moving around the gallery space at the Galería de Arte Binario, CENART, Mexico City. Work by the author. Photo by Janice Bryson. Used with permission.

For example, as soon as the exhibition week started, I realized that the *AGNS Collective* robots needed to slow down. The gallery space was smaller than the DXARTS Gallery, and with the DRM v2 in place at the center, the remaining space for navigation was even more reduced. Changing algorithms within the navigation nodes in ROS2 is a trial-and-error process that I was unable to try before installing my work in the gallery[8]. Having my art displayed at a gallery represents the privilege of exhibiting my work in public and also provides a space large enough to experiment with different variables, something I was unable to do at home. Once installed at the gallery, from a small desk we had placed in a corner outside the main space, I was able to

[8] One important detail is that we only had a single day, Monday, for installation. The exhibition opened to the public the very next day, leaving no room for trial and error during setup.

adjust the speed, obstacle-avoidance clearances, and the ways the robots navigated as a collective by making changes, receiving instant feedback, and then trying again.

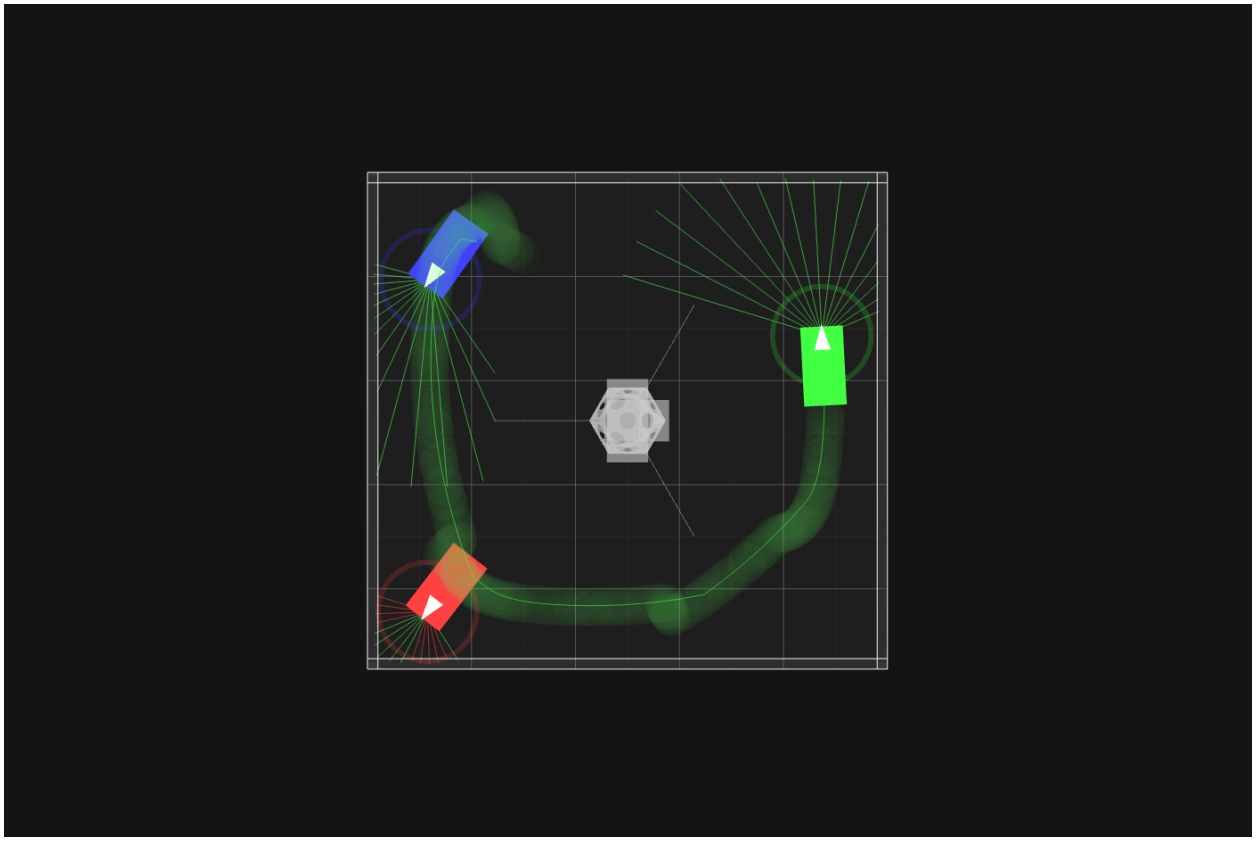

Figure 32
A schematic top view of the robots in the main space at the Galería de Arte Binario (5m x 4.77m). Each square in the plan view represents 1m x 1m. Each robot is surrounded by a circle representing its avoidance area. At the center of the space, the DRM v2. In this simulation, the green trail represents one robot that moves at a time while the other two robots wait for their turn.

If I had more time in the gallery, the project would have continued evolving in meaningful ways. More time would have allowed for deeper refinement of the robots' behaviors, yet what would have been equally important is more space. My ideal situation would be to continuously work in a space that functions as both laboratory and exhibition, equipped with fabrication tools to build new robots, adapt existing ones, and let the constellation grow and transform. This week offered a small-scale version of that ideal. On a larger scale, the work could enter a state of continuous evolution, which remains one of my most ambitious and perhaps most challenging goals to

achieve. After this week, the robots were already navigating the space in a way that differed from the first day, and I can only imagine how much further the work could develop under sustained conditions.

By the end of the week, instead of all robots moving at the same time, the final version of navigation I developed had robots move one at a time, with the other two robots stopping while one was moving. Next, the movement lead would transfer to a separate robot, making the other two stop again. This, instead of giving the sense of a robot moving individually without the other two coordinating, was, to the contrary, a highly coordinated formula. It demonstrated communication between robots while maintaining a safe space and distance for navigation. While the two static robots weren't moving forward or backward, they still could rotate in their position, often giving way to the moving robot or visitors in the gallery. At the same time, this behavior was complemented with the synchronized 'routines' described before, especially the scissor lift routine occurring in 2-3 minute intervals. Finally, as expected, the difference in movement of the robots began to create a shift in their acoustic expression.

A significant change occurred in the "robotic voice." Initially, the recorded sound I used as a base was the same one featured during the performance at the DXARTS Gallery. This sound, once shaped by the variables communicated by the robots' sensors, had a *clicking* quality that evoked a mechanical, even insect-like presence. As the robots' movement logic evolved, their sonic articulation also transformed. With the new algorithms, the clicking sounds became more sparse and isolated, with only one robot emitting them at a time, producing a sense of call-and-response or a kind of acoustic dialogue within the *AGNS Collective*. Inside the DRM v2, these external clicks were reflected and refracted by the icosahedron's structure, creating distorted echoes of what was happening outside—clicking, voices, and other mechanical noises

filtered through the chamber. This effect was especially compelling because it was not intentionally designed. It emerged accidentally through the system's acoustic behavior and, through use, became an essential characteristic of the DRM v2. After all, its name is the "mutated reality device."

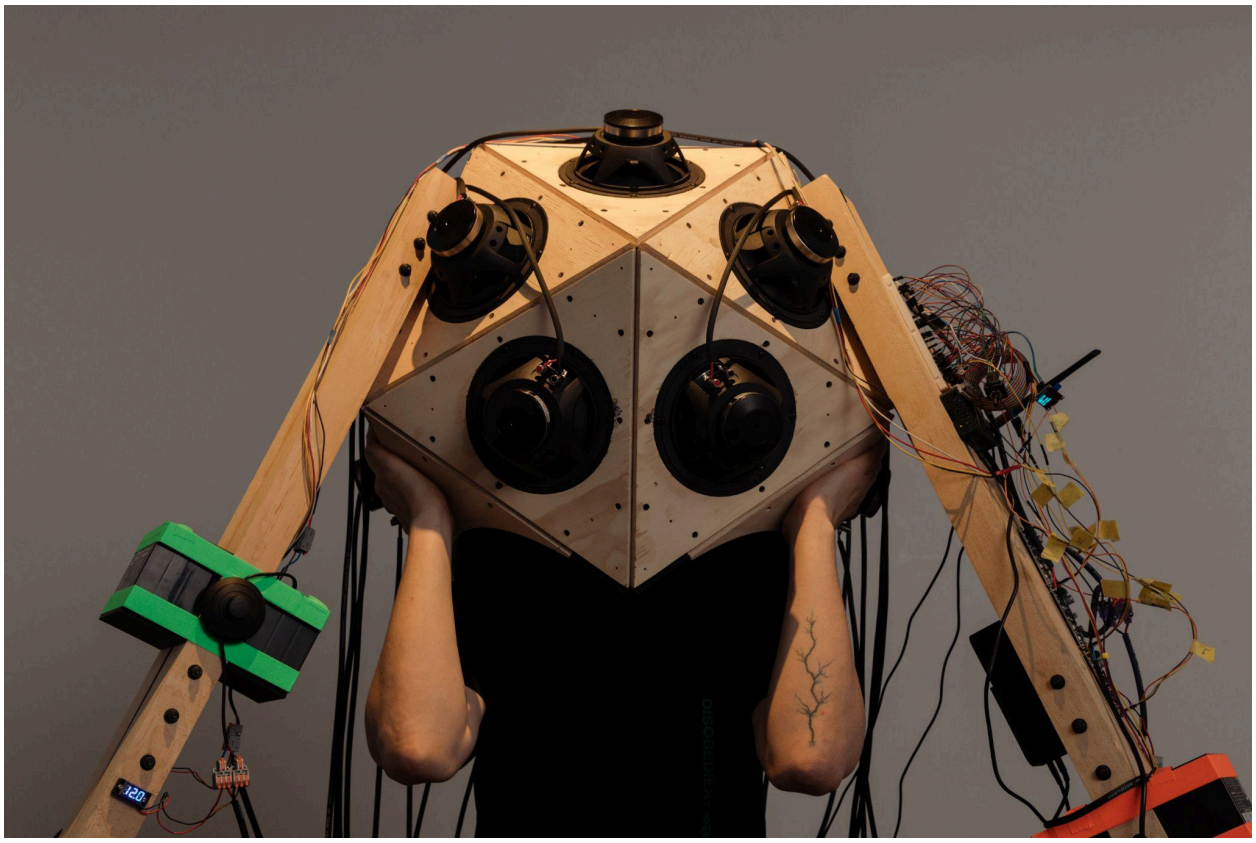

Figure 33
Close-up of the icosahedron section of the DRM v2. The dome-like structure and inner materiality create an acoustic effect that responds to external sounds. Work by the artist. Photo by Janice Bryson. Used with permission.

These external, distorted sounds, merged with the percussive beating diffused throughout all the audio channels, were accompanied by an auditory experiment designed to communicate what occurred with the robots outside. Every time the robots stopped to perform the scissor lift routine, a 'noise routine' occurred inside the DRM v2. In technical terms, this happened through my 'ros2osc' node, a node that effectively transforms ROS2 messages into OSC messages. Even

though each robot was functioning within a different domain ID[9], a ‘domain bridge’ node retransferred messages to the DRM v2. Once the DRM v2 received these messages containing information from the *AGNS Collective* robots, the ‘ros2osc’ would send those to Supercollider. At the same time, my Supercollider code was waiting for OSC messages to trigger the ‘noise routine’ every time the robots performed their scissor lift routines.

Figure 34
AGNS Collective robots performing the scissor lift routine, while the action is simultaneously reflected inside the DRM v2 through the triggered ‘noise routine’. Work by the artist. Photo by Janice Bryson. Used with permission.

In terms of experience, this gesture was not obvious. In part, this is because once inside the icosahedron, there is darkness, and one can only listen to what happens outside. This sensory

[9] In ROS2, a domain ID is an identifier that allows multiple independent ROS2 networks to coexist on the same physical (wifi) network. Nodes with the same domain ID communicate with each other automatically, while those with different domain IDs remain isolated. This is useful for separating systems or avoiding interference between robots.

limitation was intentional. It created a reversal: while the robots moved visibly through the gallery space, those inside the DRM v2 experienced things primarily through sound. The connection between the scissor lift routine and the ‘noise routine’ inside the icosahedron was not immediately evident. Still, for those paying close attention, it became a subtle point of connection. The robots outside were not just moving: their clicks, rhythms, and bursts of noise became traces of behavior, and inside the DRM v2, those same sounds returned in a different form.

In addition to these connections, I introduced another sonic layer drawn from the process of fabricating the robots themselves. I recorded the sounds of the 3D printer I used to produce several of its components, capturing the electromagnetic field (EMF) generated during printing with an EMF inductor microphone. This approach referenced Robert Morris’s *Box with the Sound of Its Own Making* (1961), reframing the idea within the context of robotics. The resulting recording carried the mechanical and electrical signatures of production, offering another exploration of the robotic voice. In this case, the voice was articulated through the “sound of its own making,” replacing the navigation clicks with a register that conveyed the electromagnetic qualities and material transformations involved in the robots’ creation.

The week at the Galería de Arte Binario was, for me, the most complete expression of the work I developed during my time at DXARTS. It brought together many threads explored in earlier projects, such as robotic agency, sonic expression, modular construction, and collective behavior. The constellation of machines, *AGNS Collective*, and DRM v2 moved, listened, and communicated in ways I could not have entirely predicted. They inhabited the space, shaped it, and responded to it. In that sense, the exhibition was a living system that remained open to change rather than a demonstration of finished work.

This gallery presentation in Mexico City was another iteration within a process that remains ongoing. This way of working, where making, testing, and reflecting feed back into each other, is central to how I approach my practice: my machines are never finished; they are constantly evolving. In that sense, the time spent at the Galería de Arte Binario was important in terms of exhibiting and to continue developing the work in situ, responding to space, public interaction, and unexpected behaviors. This process of continuous adaptation will persist, as I intend to keep expanding my constellation of robots, refining their capacities for communication, agency, and sonic expression, and exploring how their gestures can remain disobedient technically, conceptually, and socially.

Throughout this chapter, I have outlined the development of my artistic practice from its early investigations into sound and protest to the creation of interconnected robotic systems that challenge dominant narratives of technology and control. Whether through experiments with language, physical movement, or sonic presence, questions about what machines can do and how we can relate to them in different ways emerged from each project. At the core of my practice lies a willingness to produce robots, artifacts, and devices, and also new conditions for listening, inhabiting, and imagining. In embracing the conceptual framework of Disobedient Robots in my work, I have aimed to challenge both disciplinary boundaries and conventional expectations about what robots are for and what they can become.

In the following chapter, I shift my focus to the larger context in which this practice operates. While this chapter has focused on my own artistic development and the works that emerged from it, the next chapter will look outward toward the collaborative processes, curatorial strategies, and event-making efforts that support and extend the research presented here.

Chapter 3: **Collective Research Practices**

In this chapter, I turn the focus toward the collective dimensions of the Disobedient Robots project. While previous chapters emphasized individual artistic works and technical developments, the following pages examine how my research developed in more collaborative, public, and pedagogical ways. The chapter is organized into three main sections. First, it presents the Disobedient Robots research platform as a conceptual and technical structure for experimentation. Second, it explores the formation and activities of the Disobedient Robots Research Group (DRRG), a collaboration I led between DXARTS and Electrical and Computer Engineering (ECE) at the UW. Third, it documents the Encuentro Internacional de Robótica Artística / Desobediencias Robóticas (the *Encuentro*), a weeklong gathering that brought together artists, researchers, students, and the public to engage with ideas around robotics, disobedience, and experimentation.

I created the Disobedient Robots research platform as a space for collective thinking about artistic robotics. Rather than functioning as a traditional archive or portfolio, it brings together documentation, reflections, and ongoing processes that support artistic research in art and robotics. Funded in part by a grant from the National Association of Latino Arts and Cultures (NALAC), the platform has helped me sustain various stages of my work, offering a public-facing structure for sharing projects, inviting dialogue, and connecting with collaborators. It currently manifests as the Disobedient Robots website. This bilingual English/Spanish platform includes interviews, code repositories, writing, and information about the events and projects that have shaped this research.

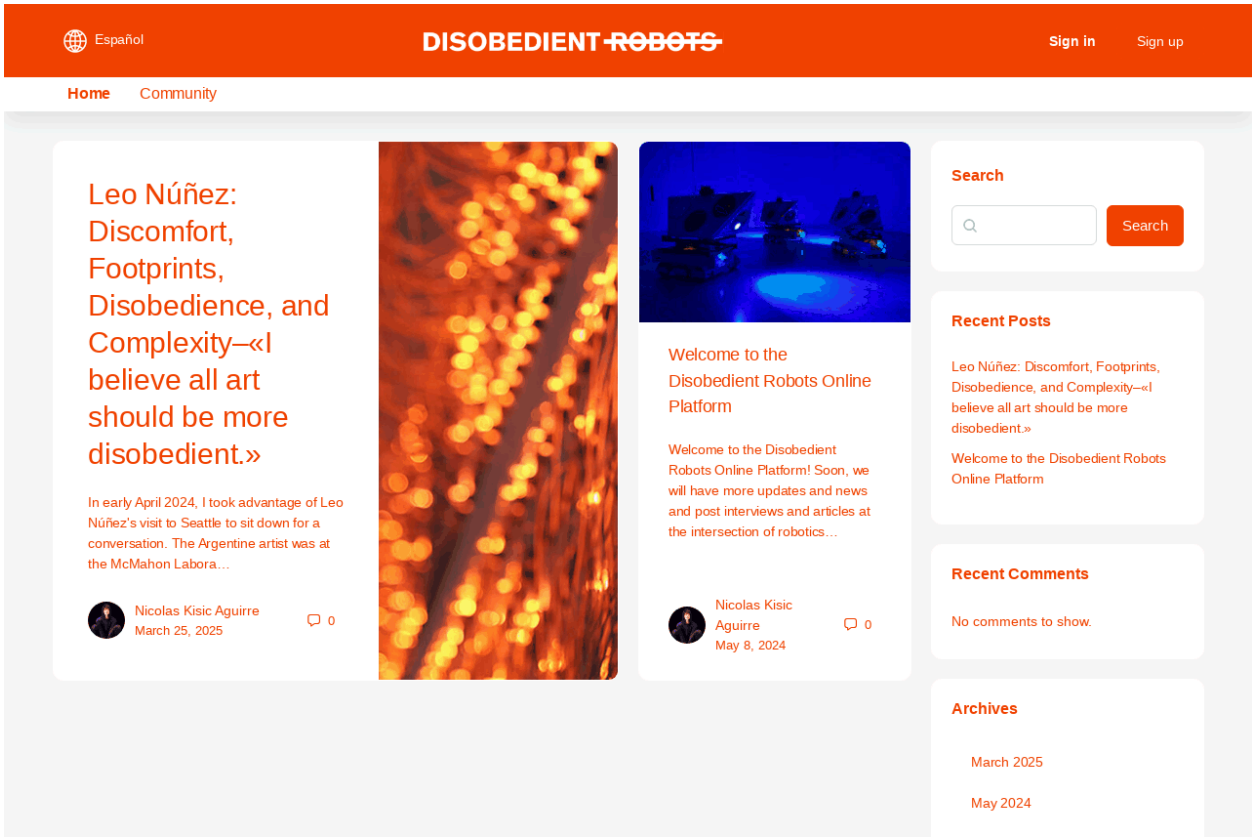

Figure 35
Screenshot of the Disobedient Robots website at https://disobedientrobots.org/. Taken on 7/7/2025.

The website has two main components: one designed for public access and another for internal use as a wiki. The public-facing section is still in progress but will eventually include documentation of select projects, reflections on process, and an interview series. Currently, only one interview has been published, but more are planned as they are edited and prepared for publication. The internal wiki serves as a working space to document what we have learned so far, especially in the areas of robotics and ROS2, and to organize tutorials, code, and technical notes. This part of the platform supports ongoing development rather than presenting finished outcomes, and serves as a growing record of the tools, challenges, and strategies that give shape to our work.

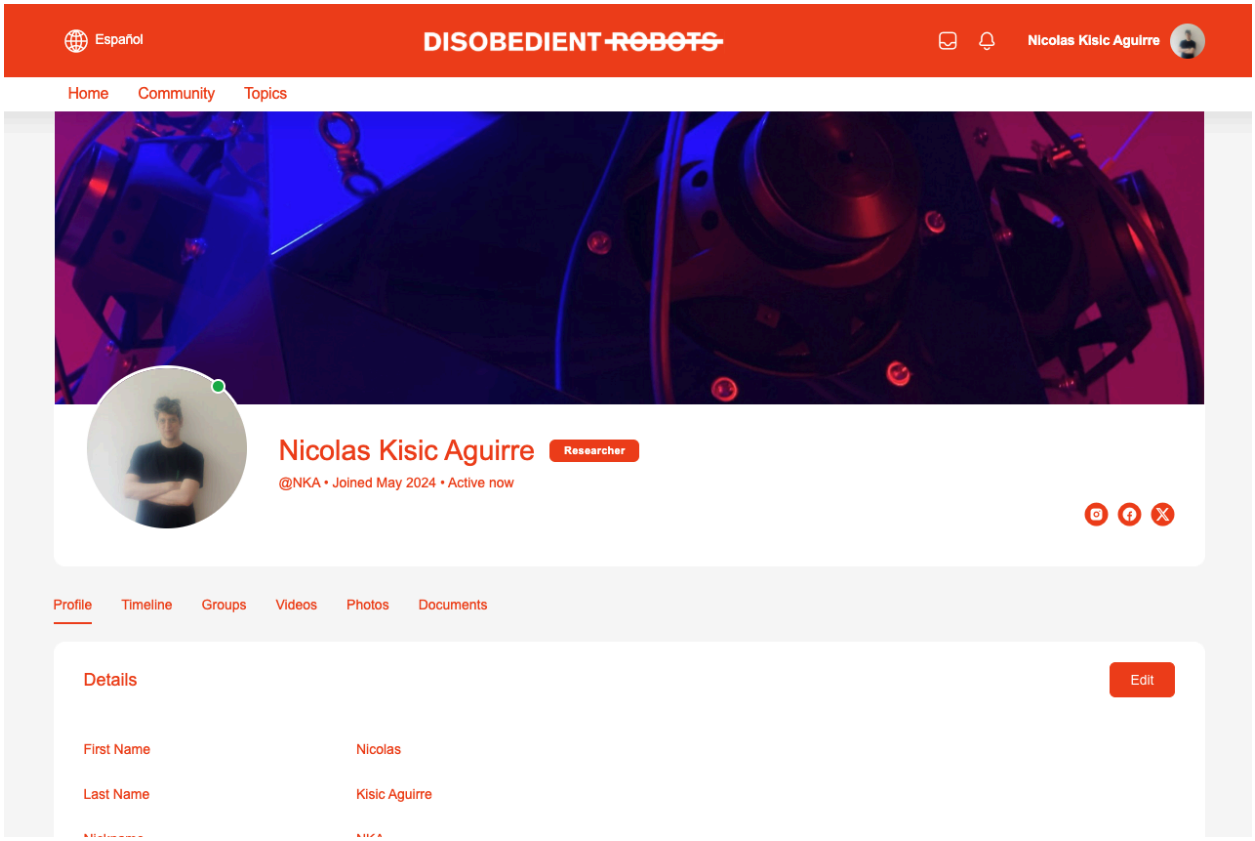

Figure 36
Screenshot of my profile in the Community/Wiki side of the Disobedient Robots website at https://disobedientrobots.org/community. Username and password required. Taken on 7/26/2025.

Conducting the first interview with Leo Núñez (Kisic Aguirre, 2024) was an insightful instance of "collective research," as I have learned from his views on disobedience as a method, not just a theme. His reflections on discomfort, situated knowledge, and the refusal of legibility resonated with many of the questions I was exploring through my own work. The conversation helped clarify how dialogue itself can function as a form of artistic research, documenting practice and expanding it. Moreover, through Leo Núñez, I connected with the work of Rodrigo Alonso and Rodolfo Kusch. These two important authors have helped me further contextualize my work within the context of Latin America. Ultimately, I hope these dialogues can serve as a source of inspiration for others developing their own robotic practices. While some users may first

encounter the platform through its internal wiki and technical resources, I see the interview series as an equally important space for reflection, exchange, and expansion.

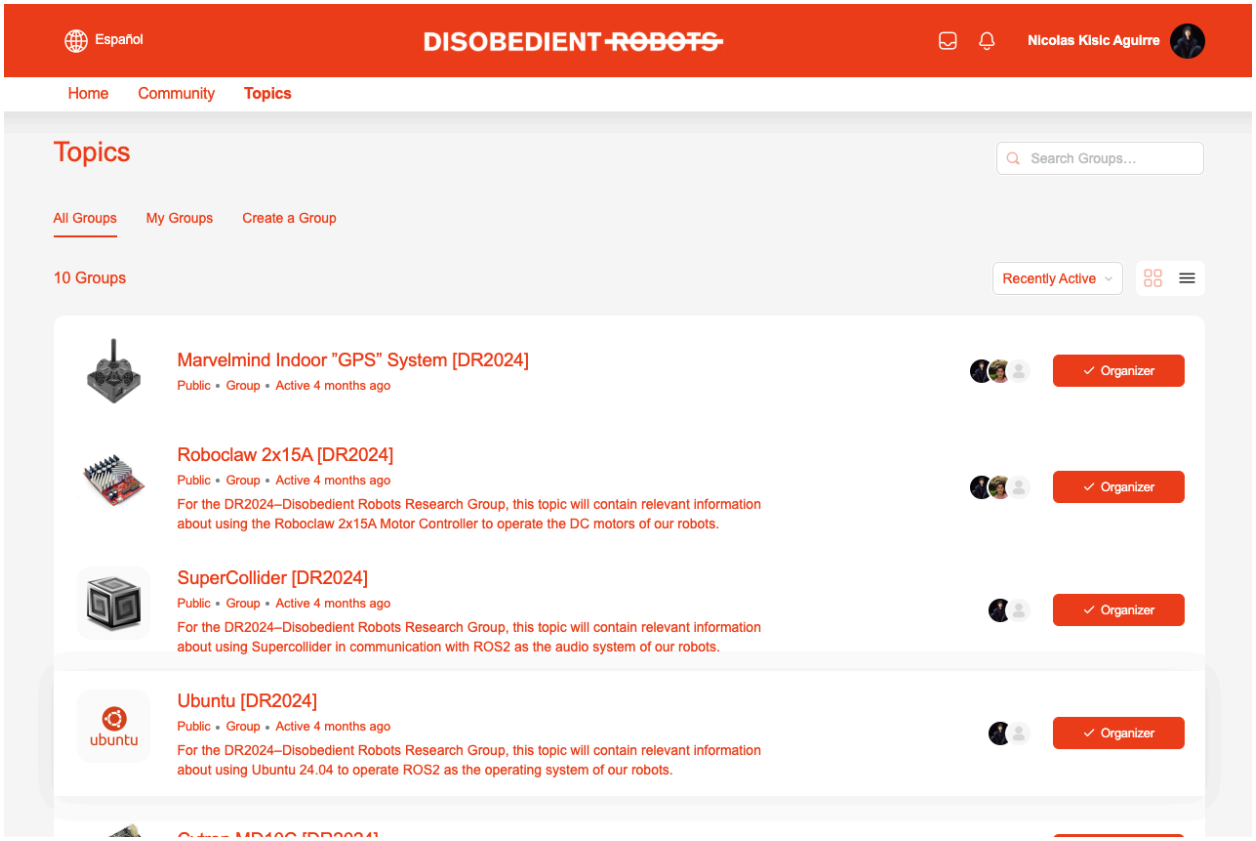

Figure 37
Partial view of the list of topics relevant to the construction of *AGNS Collective*. Taken on 7/26/2025.

The wiki invites participation through a login-based system, encouraging users to create profiles and contribute collaboratively. This structure is intended to organize technical knowledge while cultivating a sense of shared process. Knowledge is organized in Topics, each dedicated to documenting our findings and how-tos for specific hardware or software components. To this date, we have created Topics for the Marvelmind indoor “GPS” system, the Roboclaw 2x15A motor controller, Supercollider, the Ubuntu operating system, the Cytron MD10C motor controller, ROS2 (specifically the ‘Jazzy’ version), MicroROS, the RPLiDAR A1M8 sensor, the

Raspberry Pi 5 8GB, and a general Topic for hardware such as robot chassis, batteries, and cabling.

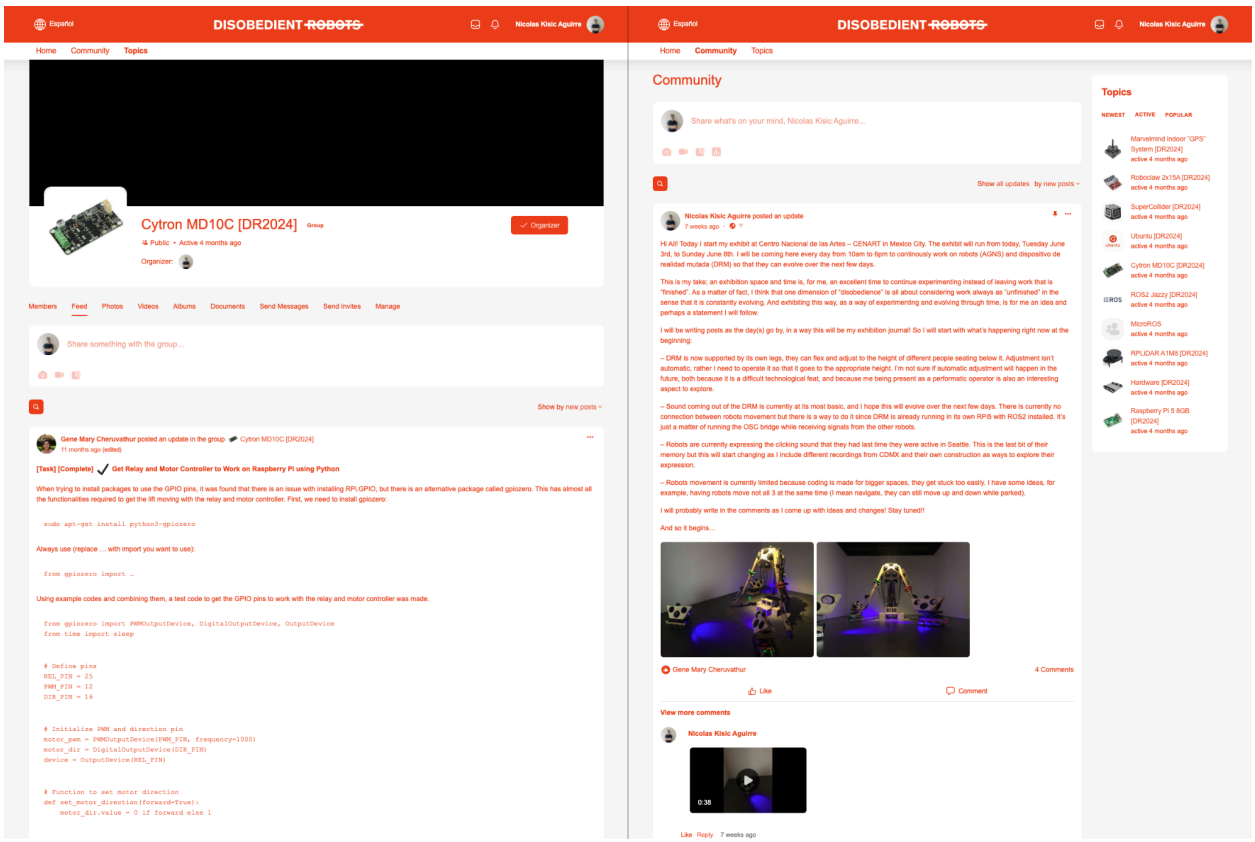

Figure 38
Left: Wiki ‘Topic’ site to document all essential technical findings related to the Cytron MD10C Motor Controller. Right: The Community landing serves as a ‘wall’ where the latest updates are displayed. Username and password required. Taken on 7/26/2025.

Within each Topic, we organize ourselves based on the tasks that need to be completed. Once finished, the “wiki” entry for that task is updated with documentation that can be referenced later. This system has proven essential, particularly when parts of the project are paused for weeks at a time. When returning to those components, we often forget how they were originally built or configured. Having a clear record within each Topic allows us to pick up where we left off with little disruption. At the same time, anyone joining the team can get up to date with what has been achieved with the help of the wiki. Finally, anyone curious about implementing these

systems in their robots or artwork can access this information to find step-by-step instructions that break down the initial barrier of working with complex systems like the ones used in our robots.

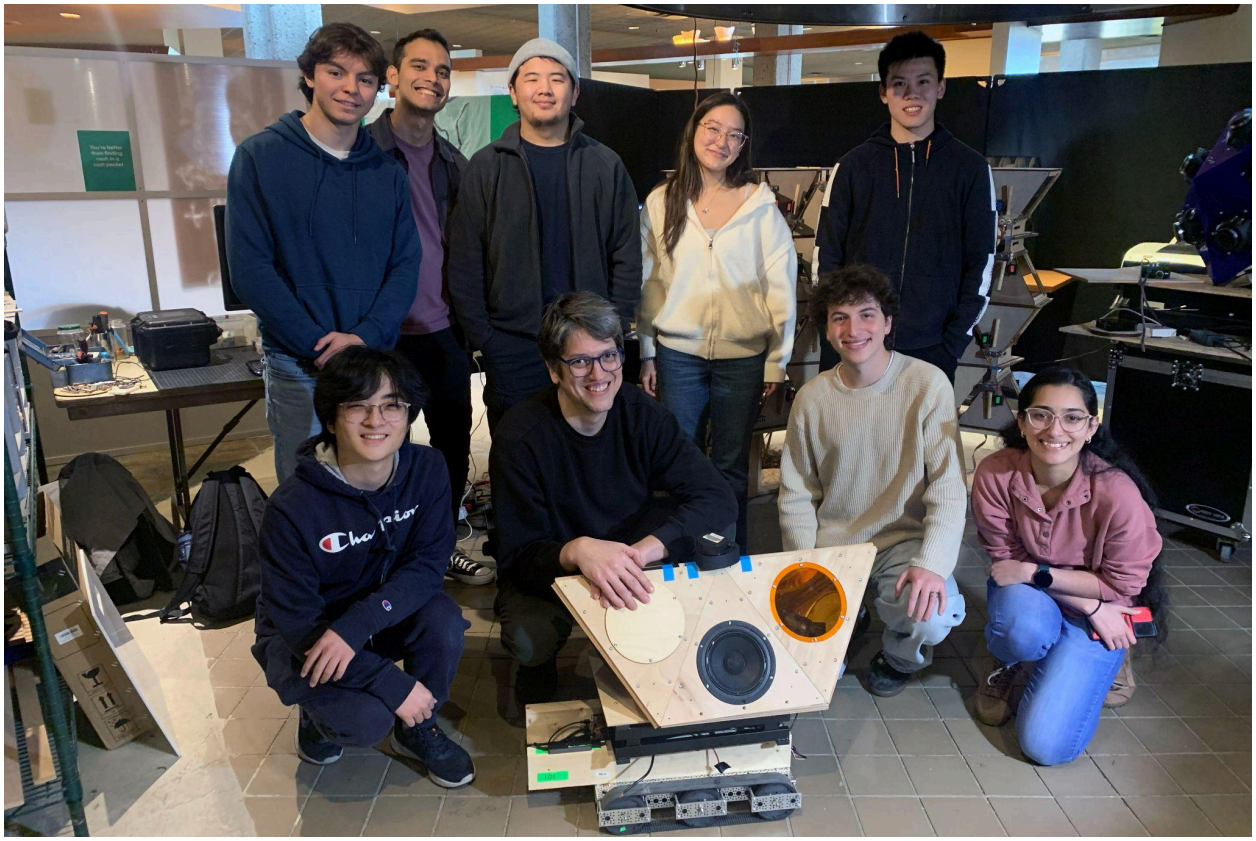

Figure 39
The DRRG, from left to right (top) Lucas Bucci, Prithvi Krishnaswamy, Izzy Nurdin, Eun Be Cha, Ruiqi Li, (bottom) Michael Tsien, Nicolás Kisic Aguirre (myself), Zev Alvidrez, and Gene Mary Cheruvathur. Photo by the author.

What is more important to me is that this structure allowed us to work as a group. In other words, it facilitated the interactions between team members and helped create an atmosphere of camaraderie. In recognition of their support and effort, I would like to acknowledge the members of the Disobedient Robots Research Group: Zev Alvidrez, Lucas Bucci, Eun Be Cha, Gene Mary Cheruvathur, Prithvi Krishnaswamy, Ruiqi Li, Izzy Nurdin, and Michael Tsien. Together, and with the guidance of Professor Sep Makhsous, we created an ecosystem of learning and

discovery, where experimentation, documentation, and mutual support enabled us to grow as researchers.

Aside from documenting our learnings, I used the platform during my exhibition week at Galería de Arte Binario to initiate a journal focused on the evolving technical challenges related to adapting the work to the gallery's context. I described incidents, limitations, and areas I wanted to improve. For example, I reflected on the challenges of robot navigation in that particular space, as well as the steps I was taking to connect the DRM v2 with the rest of the robotic system. We have also had foreign guests from the DRRG join the platform who were interested in building their own robotic projects; they have asked questions, participated, and even documented some of their achievements. I see great potential in this type of interaction and hope the platform can open more to guests who aren't necessarily related to specific projects we're working on.

Finally, as I prepare new projects and participatory sessions in the near future, I see how the Disobedient Robots platform will play an essential role in inviting others to participate, document, question, and draw inspiration from the Disobedient Robots structures. I look forward to building a sense of community around the robots we create and to making the ideas in the public-facing part of the website, such as the interviews and articles, increasingly inspiring for community members who join the platform.

One example of this effort to build community around artistic robotic practices took shape between May and June 2025, when I organized the Encuentro Internacional de Robótica Artística / Desobediencias Robóticas in Mexico City (the *Encuentro*). This monthlong event brought together artists, researchers, students, and members of the public to explore shared questions

around disobedience, language, sonic expression, and machine agency. As both a culmination of the work presented so far and an invitation to new forms of collective engagement, the *Encuentro* extended the goals of the platform into a physical, communal space. Cristina Brambila, a fellow DXARTS student, joined the organization efforts as the main event curator, and we received institutional support from Centro Multimedia (CMM) at Centro Nacional de las Artes (CENART), Universidad Autónoma Metropolitana Lerma (UAM), DXARTS, Fulbright, the National Association of Latino Arts and Cultures (NALAC), and Src Material, a Seattle-based non-profit organization dedicated to supporting initiatives at the intersection of art and technology. Together, we organized the *Encuentro*, consisting of an exhibition, a colloquium, a *jornada académica* at UAM Lerma, and a workshop.

Figure 40
Banner for the II Encuentro Internacional de Robótica Artística / Desobediencias Robóticas.

The exhibition was held at the Galería de Arte Binario inside CENART and featured five artists whose practices had the potential to engage with the ideas behind Disobedient Robots: Daris Rubio, Víctor Hugo Rodríguez, Nicolás Kisic Aguirre, Cristina Brambila, and Hugo Solís. In that order, each artist presented a work during one week that explored questions of machine agency and robotic imaginaries. During each week, the gallery became an active environment where movement, sound, and informal exchange emerged naturally between artworks and visitors. Rather than positioning the robots as static sculptures or polished final products, the exhibition emphasized their liveliness, unpredictability, and the disobedient qualities that defined the *Encuentro* as a whole. My own contribution, described in Chapter 2, included the most recent

version of the Disobedient Robots constellation, which combines the *AGNS Collective* and the DRM v2.

The second component of the *Encuentro* was a day-long colloquium held on May 29, 2025, in the CENART auditorium. We invited a diverse group of speakers to reflect on artistic robotics and disobedience. The event was structured to include a keynote lecture, two individual presentations, and three discussion panels. Participants included the following artists and scholars:

- Adriana Casas, director of Centro Multimedia at CENART, served as moderator for the second discussion panel "La voz robótica y otras escuchas desobedientes" [The robotic voice and other disobedient ways of listening].
- Nicolás Kisic Aguirre (myself) served as general coordinator and exhibiting artist in Desobediencias Robóticas, and participated in the second discussion panel.
- Fernando Palma (Huehuecoyotl), artist and scholar, presented the keynote lecture "Amantecayotl. Cosmogonía Nahua. Una breve comparación con el ejercicio actual tecnológico a través de la lengua" [Amantecayotl. Nahua cosmogony. A brief comparison with the current technological practice through language] and participated in the first discussion panel "Arte, tecnología y robótica indígenas" [Art, Technology, and Robotics from an Indigenous Perspective].
- Daris Rubio (Ndömbo), artist and scholar, exhibiting artist in Desobediencias Robóticas, participated in the first discussion panel.
- Viviana Díaz, artist and scholar, served as moderator for the first discussion panel and participated in the third discussion panel "Robótica artística y otros modos de hacer" [Artistic Robotics and Other Ways of Doing].

- Paula Gaetano Adi, artist, and scholar, presented the second lecture “Robots indóciles y cosmotécnica insurrecta” [Unruly Robots and Insurrectionary Cosmotechnics]. She is affiliated with the Rhode Island School of Design (RISD).
- Juan Pampín, artist and scholar, presented a video capsule. He is affiliated with DXARTS as the Chair of the program.
- Cristina Brambila, an artist and scholar, and exhibiting artist in Desobediencias Robóticas, served as the leading event curator and presented a video capsule. She is affiliated with DXARTS.
- Hugo Solís, artist and scholar, participated in the second discussion panel. He is affiliated with UAM Lerma.
- Fernando Monreal, researcher in art and technology, presented the third lecture, “¿Automatizar lo sensible?” [To Automate the Sensible?]. He is affiliated with UAM Lerma, where he serves as Chair of the Department of Arts and Humanities.
- Cecilia Sánchez Nava, artist and researcher, participated in the third discussion panel.
- Víctor Hugo Rodríguez, an artist and exhibiting artist in Desobediencias Robóticas, participated in the third discussion panel.
- Doreen Ríos, curator and researcher, wrote the text in the main event brochure titled “Desobediencias y otros modos de hacer” [Disobediencies and Other Ways of Doing].

The colloquium was free and open to the public, and the conversations that emerged helped anchor the ideas explored in the gallery within a broader discursive context. As I wrote in a text included in the event brochure:

> ¿Qué es la desobediencia robótica? El título sugiere múltiples interpretaciones, pero fundamentalmente propone alejarse de la idea de la robótica obediente, hegemónica: la

que está al servicio de la vigilancia, la guerra, la industria, la extracción. Podríamos coincidir en un punto de partida: la desobediencia tecnológica, así nombrada por Ernesto Oroza para describir la actitud frente a la tecnología que impera en Cuba, también en otros países latinoamericanos que sufren cíclicamente de crisis económicas, políticas y sociales. Así, surgen maneras de adaptarse, de construir y de hacer distintas, a veces claras muestras de nuestra identidad. ¿Pero qué más? La desobediencia robótica no busca ser un término cerrado, sino que está abierto a discusión y diálogo continuos para así entender, desde el arte y desde Latinoamérica, qué posibilidades podemos explorar desde una base conceptual que nos refuerce en la idea de una relación distinta con nuestras máquinas, artefactos y robots. Este coloquio es, pues, una de muchas instancias que buscan ese diálogo expansivo. ¡Bienvenidxs!

[What is robotic disobedience? The title suggests multiple interpretations, but at its core, it proposes a departure from the idea of obedient, hegemonic robotics—the kind that serves surveillance, war, industry, and extraction. We might agree on one starting point: technological disobedience, a term used by Ernesto Oroza to describe the prevailing attitude toward technology in Cuba, as well as in other Latin American countries that suffer cyclical economic, political, and social crises. From this, different ways of adapting, building, and making emerge—sometimes as clear expressions of our identity. But what else? Robotic disobedience is not meant to be a closed term. Instead, it remains open to ongoing discussion and dialogue, in order to explore, through art and from Latin America, what possibilities we might imagine from a conceptual base that strengthens the idea of a different kind of relationship with our machines, devices, and robots. This colloquium is one of many spaces that seek to foster that expansive dialogue. Welcome!]

Although the colloquium took place as a live event, its ideas, and discussions are meant to circulate beyond that moment. In future updates of the Disobedient Robots online platform, I will publish video excerpts, reflections, and transcripts from the colloquium. This effort will allow broader audiences to engage with the conversations and contribute to the ongoing dialogue the platform seeks to foster across artistic, technical, and conceptual domains. The colloquium was broadcast live online through the YouTube channel of Centro Multimedia, and it remains archived there for future reference (Centro Multimedia & Centro Nacional de las Artes, 2025).

As part of the *Encuentro*, a *jornada académica* was held on June 11, 2025, at the Universidad Autónoma Metropolitana in Lerma. This day-long event focused on the technical and conceptual aspects of ideating and building robots, particularly in relation to the works presented in the exhibition. It featured a series of artist talks, some in person, others online, by all participating artists, including myself, Cristina Brambila, Daris Rubio, Víctor Hugo Rodríguez, and Hugo Solís. Additionally, we included the participation of Leo Núñez, online, from Argentina. Leo discussed his work and his ways of making. Additionally, we had the opportunity to see in person one of Leo's works, titled *Desquilibrios* [Imbalances], which had been presented years earlier at Centro de Arte Alameda in Mexico City and was later donated to UAM Lerma.

Including Leo Núñez's participation, these presentations offered insights into each artist's processes, methodologies, and perspectives on robotic art. The day concluded with a hands-on workshop titled *Máquina Discordante* [Discordant Machine], facilitated by Cecilia Sánchez. Like the colloquium and the exhibition, the *jornada académica* extended the spirit of the *Encuentro* to Lerma, providing a space for young students to discuss together with the participating artists of the *Encuentro* how the artworks were imagined, constructed, and shared.

Finally, the fourth and final component of the *Encuentro* is a children's workshop, scheduled to take place in mid-August 2025 at the Centro Multimedia in CENART. This workshop, designed and facilitated by Julio Ernesto Zaldívar Herrera and Ivón Alejandra Escárcega Santos, invites young participants to reimagine their relationship with machines through collaborative, hands-on exploration. While the event has not yet occurred at the time of writing, it is an important continuation of the *Encuentro*'s goals, opening up conversations around disobedient robotics to new generations and audiences through creative engagement.

At this point, I want to reflect on the importance of these mutual encounters for my own practice and the future of Disobedient Robots. The collective dimensions of this project have revealed that artistic knowledge develops best through shared documentation and dialogue. Whether by troubleshooting navigation algorithms together, comparing approaches to machine construction, or interacting with the robots and sharing interpretations, each exchange generates insights that individual work cannot produce on its own. The wiki, the platform, and the events have created structures that allow technical knowledge and artistic speculation to develop simultaneously, grounded in both actual practice and theory.

These collaborative methods will continue to shape how Disobedient Robots evolves. The platform will expand to include more contributors and projects, future *Encuentros* will bring together new constellations of practitioners, and the documentation will grow as more people build, break, and rebuild their disobedient machines. This approach addresses a practical reality: working with robotics in artistic contexts requires technical skills and conceptual frameworks that are still being developed. By sharing processes, failures, and discoveries, we build a corpus of knowledge that makes experimental robotics more accessible and fosters a more critical engagement. Collective practices are, therefore, essential to the project's core proposition, which

is that our relationships with machines can be reimagined through artistic research and collaborative experimentation.

Conclusion

With this concluding chapter, I reflect on the trajectory of Disobedient Robots, both as an artistic and research-based project. What began as an effort to challenge dominant narratives in robotics through hands-on experimentation developed into a multifaceted practice grounded in disobedience, machine agency, and a search for identity. In what follows, I revisit the questions that initiated this research, analyze the processes and limitations that emerged, and state what I believe to be its most significant contributions.

This concluding chapter is not meant to offer closure or final answers. Instead, it marks a threshold: a moment to reflect on the path taken, while also looking toward what remains unresolved and what might still emerge. Disobedient Robots is not a project with a fixed destination, but rather a space for ongoing experimentation, failure, and redefinition. Therefore, this conclusion embraces Kusch's idea of *estar siendo* to acknowledge, first, the incompleteness of the work. It is not complete, but on purpose. It remains open, permeable, and receptive to future transformation.

I would like to restate the initial questions I posed in a previous document about Disobedient Robots when I began this project. I quote myself:

> How can robots 'disobey' their categorization as mere extensions of the human body to become bodies with agency themselves? How can we think about robots, instead of objects, as subjects and, rather than tools, as collaborators? To explore the answer to these questions, Disobedient Robots is an experimental artistic research project that pushes against contemporary notions of robotics. My project takes on the challenge of defying the purpose of mainstream robot fabrication, responding to the productive and

> surveillance imperative that drives most robotics. The word disobedience sprouts conceptually from ‘technological disobedience,’ a term coined by artist Ernesto Oroza to refer to the necessity-driven ingenuity and creativity employed to subvert, assemble, repair, and imagine technology outside the mainstream.

Methodologically speaking, instead of arriving at answers, I am more interested in approaching them. This means treating answers as dynamic conditions that shift with each iteration, each context, and each encounter. The questions themselves transform through the process of exploration, revealing new dimensions and contradictions that keep the inquiry alive. So, how can robots 'disobey' their categorization as mere extensions of the human body to become bodies with agency themselves? It is only fair to speak of the right direction toward this disobedience: it begins with wanting to change our minds—rewiring, untangling, or unlearning the way we relate to the idea behind the word "robot."

Having identified—hopefully substantiated—some of the causes that lead us to have a strained connection to the ever-more-present robots, artifacts, and machines around us (such as the Great Divide, cultural hegemony dominated by the North, colonialism, anthropomorphism, among others), the original question can be unpacked into smaller ones: How do we escape the Great Divide? How do we shift our focus to cultures that cultivate relationships with machines from which we can learn? What can we learn from decolonial practices? What alternative is there to anthropomorphism? These questions guide my approach to artistic research[10].

These questions trigger an imagination in me that I transform into artworks. And while I cannot be sure of the capacity of these works to answer questions definitively, they consistently provide

[10] ‘Artistic research’ is a contested term, far from having a major consensus on its meaning. There is no single methodology, and my own is not necessarily similar to others—and not necessarily better. It works for me.

valuable insight. This is how the ever-evolving cycle of artistic research materializes for me: I transform my imagination into artifacts, and through the process of making, I learn. Then I learn again when observing them in a "finished" state. What I learn from those observations feeds my imagination again, creating the desire to change something, and so on. The cycle repeats itself, often prompting me to create new artifacts, machines, or robots, which are then constellated with the others.

Some insights that have emerged from this work have been particularly refreshing. For example, perhaps we can reshape our relationship with robots if we design them in ways that ask us to enter them or become "one" with them, as with the DRM. This suggests ideas of hybridity and mutualism into the discussion.

Building the robots myself, as Leo Núñez emphasizes, creates knowledge through the messy process of making. When I solder connections, debug navigation algorithms, or design for a 3D printer to construct a joint, I am thinking through making. Each failed attempt, each adjustment, and each unexpected behavior teaches me something that could never be learned through theory alone. This practice of sustained making, of refusing the temptation of already packaged solutions, contributes to transgressing the Great Divide. It keeps me connected with the machines I create, preventing them from becoming sealed black boxes that reinforce the separation between nature and culture.

I also reflect on how disobedience might reside in the systems that allow machines to continually change form and function. For example, creating a modular fabrication system that allows for multiple configurations challenges the idea that one object maps neatly onto one subject. Instead,

we can perceive entities in multiple bodies working as "constellations," as I have described in this thesis for my *AGNS Collective* and my DRM v2.

The question of anthropomorphism reveals itself as more complex than simple imitation or projection. As I've explored through this research, the problem is not anthropomorphism itself, but the oversimplified version that reinforces human exceptionalism. Making robots that merely mimic human characteristics without recognizing their own forms of agency perpetuates the illusion that humans are the "sole active agents of the cosmos," as Erik Davis describes. My work aims at a different path. Instead of eliminating anthropomorphism entirely, we can reimagine it through what Viveiros de Castro calls perspectivism: recognizing that different beings, including machines, can be subjects with their own points of view without necessarily being human-like.

Finally, and this is the contribution I have made most clearly, is the exploration of the robotic voice, stepping away from the (simplified) anthropomorphic gesture of imitating the human and exploring a form of expression emerging from within the machine's own logic and constraints. This rethinking of robotic voice invites us to imagine machines as entities with their own forms of articulation, generating presence through clicks, drones, and spatial sonifications that emerge from their interaction with the world. My robots translate LiDAR data into sound, mutate external acoustics through icosahedral chambers, and they are not failing to speak correctly; they are speaking in their own terms. This creates a sonic presence that is neither human nor attempting to be.

Indigenous approaches, particularly Amerindian perspectivism and the concept of *ch'ixi*, offer alternatives to Western technological frameworks. Rather than seeing machines as tools to be

mastered or threats to be contained, these frameworks suggest we recognize robots as hybrid subject-objects with their own perspectives. The *ch'ixi* state, where opposing elements coexist without resolution, helps me understand my robots as entities that are simultaneously precise and chaotic, engineered and unpredictable, cultural and natural. This is not a failure of categorization but a generative space where new relationships between humans and machines might emerge. As Fernando Palma's work with Nahua cosmotechnics demonstrates, and as Daris Rubio's Earth Machine embodies, technology can participate in reciprocal relationships that challenge extraction and domination.

At the same time, I recognize where my work remains undetermined. For instance, I frequently discuss my Peruvian identity and its impact on the formal aspects of my work. This may not always be visible to others, and, truthfully, I do not always see it myself. I struggle with representing myself in ways that align with cultural expectations, and this often differs from how my imagination operates. In a similar way, I find tension between the privilege of pursuing a Ph.D. at DXARTS, with access to sophisticated technologies and institutional support, and my identification with systems of fabrication born from necessity and scarcity.

The reality is complex. And here I return to Silvia Rivera Cusicanqui's concept of *ch'ixi*. I am all of these things at once, and they coexist in contradiction, in me and in my work. Perhaps this lack of clarity is, itself, another form of disobedience.

Moving forward, Disobedient Robots will continue to evolve as both a personal practice and a collective platform. My constellation of robots and machines will grow, new voices will join the conversation through the online platform and future *Encuentros*, and the questions that drive this work will shift in response to new contexts and collaborations. What remains clear is my

commitment to approaching robots as accomplices in an ongoing experiment to relate to technology differently, rather than viewing them as problems in need of solutions. In this sense, the project's incompleteness is not a limitation but its greatest strength and a deliberate openness that invites continued transformation, unexpected encounters, and the possibility that our relationships with machines might become something we cannot imagine—yet.

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