



SIDDHARTH MEHTA

THESIS

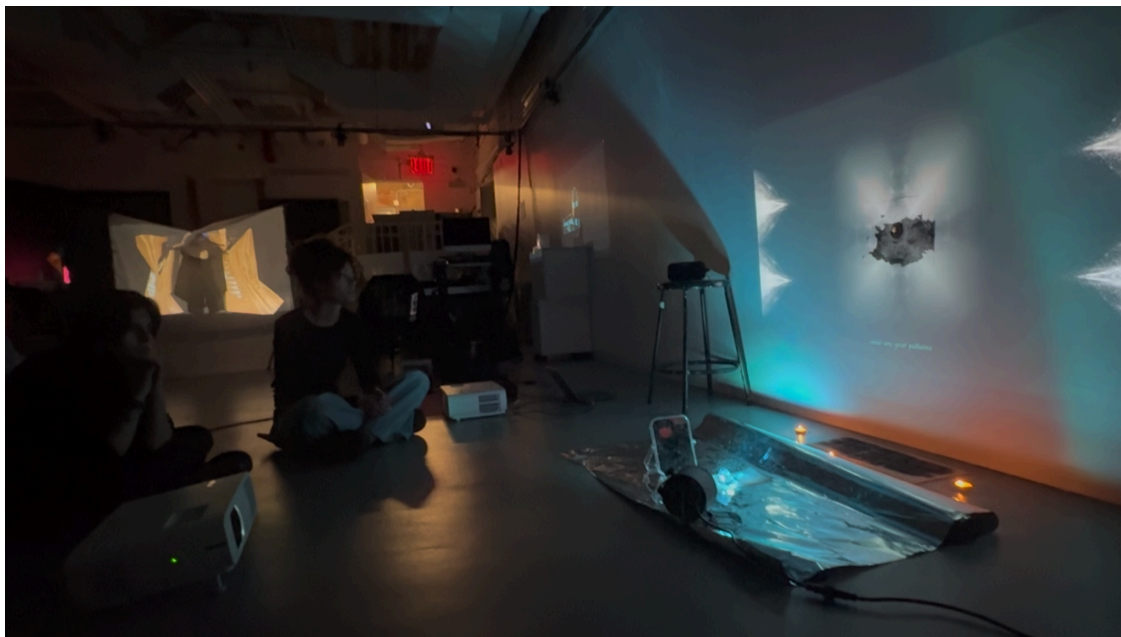
Ruminating Spaces

Chapter I. Introduction

Concept Statement

Ruminating Spaces is an immersive installation that treats reflection as a shared condition rather than a private one. Participants enter a darkened room one at a time. A generative mandala is projected onto a shallow water surface at the center of the space, and the image is held and broken by the water's slow distortion. Ambient sound shifts with the viewer's presence. The participant stays as long as they want. On leaving, they are invited to deposit a small trace, a word, a phrase, or a drawn mark. The trace does not appear anywhere visible. It is folded into the system's parameters, and it shapes what the next participant will walk into. In this way the room remembers. Each visitor inherits an environment partly formed by the people who came before, and leaves something of themselves for the people who come after.

The installation is a prototype for a larger vision of computational spaces that accumulate and hold collective memory rather than merely respond to individual input. In its thesis form, the project will be presented as a darkened spatial installation featuring projected generative visuals, reflective physical materials, environmental audio, and participant trace accumulation, designed for individual entry within a shared exhibition setting. The prototype demonstrates the experiential and conceptual framework of a larger system of responsive contemplative environments that evolve over time through communal participation.



The claim of this thesis is that immersive technology, which is most often designed to capture and fragment attention, can instead be used to slow attention down and to bind individual presence into a shared system of reflection. Ruminating Spaces proposes that the most interesting future of interactive environments is not in responsiveness or spectacle, but in inheritance. The project stakes the position that stillness, when measured and carried forward between participants, can function as a medium in its own right.

Impetus

The project began somewhere very different from where it is now, and the route it took to arrive here matters to the work. My first studio project at Parsons was called Good, Bad? Nothing. It was a setup in Union Square Park where passersby could stop and share a thought anonymously, written or spoken, about anything they wanted. I was there for many hours across several weeks, and what I learned from that setup is that people will share more than you expect if the invitation is open, the pressure is low, and nobody is asking them to perform an identity. Strangers told me about grief, about small daily joys, about what they thought was beautiful and what was broken, and they told me in a public park where there was no therapist's office and no framework telling them what to say.

The piece that followed was called Broken and Beautiful. (<https://qr-code-studio.vercel.app/>)It was a series of long interviews with people I met in and around the city. One of them, a man named Russell, spoke with me for close to four hours in a park. Another, a student named Karis, sat with me outside Parsons and talked through her own ideas about what it means for something to be both broken and beautiful at the same time. I recorded those conversations, and the recordings are raw in a way that polished work usually is not. In both Good, Bad? Nothing. and Broken and Beautiful, the thing I cared about was never the content of any single exchange. It was the condition that made the exchange possible. A space that does not judge, and a prompt that is open enough to catch whatever the person is actually carrying. That interest has stayed constant across the whole year, and it is what connects the seemingly disparate forms my thesis has taken.

piece about shared presence. I followed that signal, and the project reshaped itself into Ruminating Spaces.

A key visual foundation of the project is the use of mandalas and symmetrical generative forms. These forms are not used decoratively, but because of their longstanding relationship to perception, ritual, and contemplative practice. Across cultures, radial symmetry and repeated geometric forms have been used in meditation, sacred architecture, and image making as tools for directing attention and structuring reflection. Carl Jung described mandalas as symbolic representations of psychic order and self-integration, often emerging in moments of introspection or emotional reorganization (Jung, 1964). Their recurrence across both spiritual traditions and contemporary meditative practices suggests a broader human sensitivity to repetition, balance, and ordered complexity.



My research also draws from studies of fractals, biological growth systems, and natural pattern formation. Self-similar and recursive patterns appear repeatedly throughout the natural world, from branching vascular systems to coastlines to galaxies. Research suggests that exposure to fractal-like visual complexity can reduce physiological stress and support restorative attention (Taylor, 2006). These structures may feel grounding because they mirror organizational logics already embedded within both nature and perception itself. In my work, the mandala functions less as a spiritual symbol and more as a perceptual architecture: a visual system through which rhythm, coherence, and disturbance can be experienced.

Significance

The significance of this project is not that it builds a better meditation room. The significance is that it proposes a model of interactivity that most contemporary installation and XR work does not. A lot of immersive design privileges the loop between one user and one system. The viewer triggers an effect, the system responds, the viewer triggers another. That loop is legible, rewarding, and fundamentally lonely. Ruminating Spaces argues that a more honest and more interesting use of responsive space is to connect the current viewer to the viewers they will never meet, through the accumulated residue of attention itself.

This matters to me because the overstimulation of contemporary digital life is something I feel personally, and because I believe designers have a responsibility to make spaces that do not treat attention as a resource to be extracted. The technologies that dominate my generation's daily experience are engineered to capture focus and to fragment it, and a lot of my practice over the last two years has been an attempt to understand whether the same computational tools can be pointed in the opposite direction. Ruminating Spaces is my answer, at least for this stage of the work. The same sensors, projectors, and generative systems that are used in commercial immersive design to maximize stimulation are used here to slow a room down, to reduce the stimulus gradient, and to give the participant permission to stop.

It matters to participants because it offers ten minutes in which they are not being sold to, in which no interface asks them to decide anything, and in which their presence quietly becomes part of something that outlasts their visit. It offers the experience of being held by a space that was partly shaped by the attention of strangers. That is a condition most of contemporary life no longer provides by default.

It matters to the broader communities of immersive design and XR practice because it suggests that the next design frontier is not richer interactivity but slower accumulation. The project's argument, which I will unfold in the chapters that follow, is that inheritance, rather than responsiveness, is the underexplored register of interactive space.

The setting the project is designed for is a darkened room within a larger shared exhibition, with one participant at a time moving through in sequence. The audience is general. No prior knowledge of meditation practice, of immersive media, or of the project's cultural sources is required to experience it. The installation is intended to work on a person who walks in knowing nothing about it. That is a design goal as much as a curatorial one.



By positioning reflection as both personal and collective, this thesis proposes an alternative model for immersive technology: one in which responsive environments do not simply react to users, but remember them. In doing so, the work contributes to contemporary immersive installation discourse by shifting interactivity away from immediate control and toward gradual accumulation, inheritance, and subtle interpersonal connection.

Chapter II. Context

Ruminating Spaces draws on a set of influences that do not share a medium and, on their surface, are not all about meditation or immersion. What they share is a belief that a carefully held space, offered to a stranger with no demand attached, can produce something closer to honesty than almost any other kind of exchange, and that the traces people leave behind in such a space are worth taking seriously.



The Strangers Project

The clearest reference point for my work is The Strangers Project by Brandon Doman. Since 2009, Doman has set up a small table in public spaces, most often in Washington Square Park and now at the Oculus at the World Trade Center, and has invited passersby to sit down and hand write an anonymous story about their life (Doman, 2024). The collection now holds more than 100,000 stories. What interests me is not the archive but the architecture of the invitation. There is a table, paper, a pen, and a person who will not ask you anything beyond the open prompt. The anonymity and the physicality of the handwriting do most of the work. The accumulated stories become a distributed portrait of a city, and the project works precisely because no single contributor is identifiable.

Ruminating Spaces borrows this logic directly. My own earlier work, Good, Bad? Nothing. and Broken and Beautiful, was already trying for something similar in the field. What The Strangers Project taught me is that the collection is the piece, not any individual story inside it. When I

made the decision to fold participant traces into the environmental parameters of the installation rather than displaying them as text, I was applying a lesson from Doman's work. Displayed stories become a gallery wall. Absorbed stories become a room.



The Voyager Golden Record

The Voyager Golden Record, assembled by a committee chaired by Carl Sagan in 1977 and launched into interstellar space aboard Voyagers 1 and 2, works on a similar logic at a different scale (Sagan et al., 1978). The record contains 116 images, greetings in 55 languages, natural sounds, 90 minutes of music, and, in its strangest inclusion, an hour of Ann Druyan's brainwaves and heartbeat, recorded while she meditated on a prepared sequence of thoughts about being human. Druyan had recently fallen in love with Sagan. The recording is, in effect, the sound of a person being fully present in their interior life for one hour, compressed into a minute of signal and pressed onto gold.

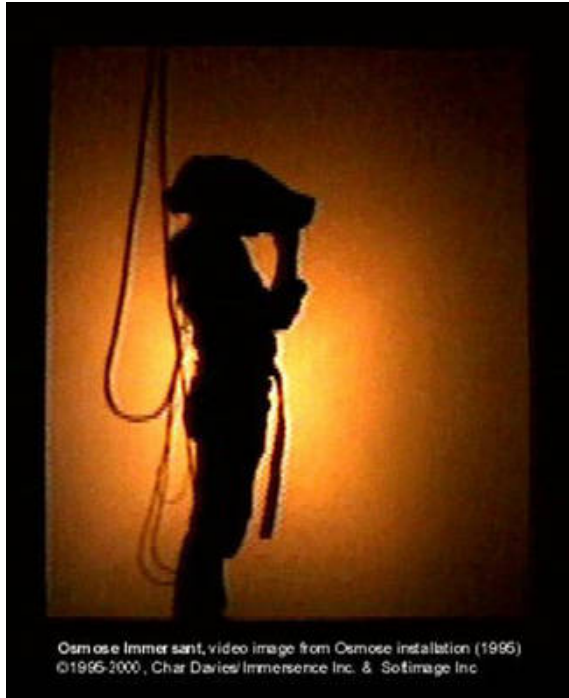
The Golden Record is often described as a message to aliens. Its real audience is us. The committee made a decision about what to include and what to leave out, and that decision reveals more about humanity than any explanation could. Ruminating Spaces takes from this the idea that a system for reflection can be a curated container rather than a mirror. The installation is not trying to show participants themselves. It is offering a shape that earlier participants have already been inside of, and inviting the current participant to step in too.



VRChat and anonymous presence

VRChat is a social VR platform where users inhabit avatars of their own choosing and spend time with other avatars in user-built worlds. I am interested in it less as a technology than as a social phenomenon. People on VRChat talk to strangers in ways they would not talk in person. Freeman and Maloney (2021) found that users frequently use the platform for self disclosure, identity play, and emotionally intimate conversations with people they have just met, and that the combination of avatar embodiment and shared synthetic space produces a kind of safety that video calls do not.

This parallels something I noticed in my own interviews. Russell told me things in a public park that he probably would not tell a therapist, and part of the reason was that we were sitting next to each other instead of across from each other, and there was no structure forcing the conversation toward any conclusion. Ruminating Spaces is trying to design a physical version of that condition. The projection is the shared space. The mandala is the avatar. The viewer is not asked to perform or to answer anything. They are there with the shape, and the shape is slowly responding both to them and to the people who were there before.



Char Davies and biometric-as-pacing

Char Davies' *Osmose* (1995) gives the project its technical lineage. Davies replaced the game controller with breath and balance as the means of moving through a virtual environment (Davies, 1995). The viewer floats through abstract natural spaces at the pace of their own breathing. What I take from *Osmose* is not the VR form but the design principle: biometric input used to slow a system down, rather than to speed it up or to give the user power over it. In *Ruminating Spaces*, the subtle responsiveness of the projection to participant presence follows the same logic. The sensors exist so that the space can listen, not so that the viewer can control.

Relational aesthetics and the architecture of atmosphere

Two frameworks from outside new media shape the way I think about the room itself. Bourriaud's concept of relational aesthetics (Bourriaud, 2002) describes art whose substrate is human relations and their social context rather than the object. *Ruminating Spaces* is a relational piece in this sense. The substrate is the relationship between successive participants who do not meet. Pallasmaa's *The Eyes of the Skin* (Pallasmaa, 2012) argues that architecture is experienced through the whole body and not only through vision, and that contemporary design has overweighted the visual at the cost of the haptic, the acoustic, and the temporal. The

choice to project onto water, to include ambient sound, and to slow the pacing of environmental change below the threshold of conscious detection, is a response to Pallasmaa's argument as much as it is to anything else.

Where this work sits

Across these references, the common thread is restraint. The Strangers Project does not ask follow up questions. The Golden Record does not explain itself. VRChat does not require you to show your face. Rangoli and sand mandalas are designed to be erased. Osmose refuses the controller. Bourriaud reframes the artwork as the relation, not the object. Pallasmaa argues for a design that recedes. Ruminating Spaces is trying to join this lineage.

What distinguishes this project from its influences is the mechanism of inheritance. The Strangers Project is an archive that remains static once a story is written. The Golden Record is sealed. VRChat is ephemeral and forgets its users. Ruminating Spaces is designed to remember its participants without displaying them, and to allow their traces to inflect future experiences in ways that are felt rather than read. That mechanism is the contribution this project makes to its field.

Chapter III. Methodology

Scope

For the thesis exhibition, Ruminating Spaces will be presented as a darkened spatial installation inside a shared gallery setting. A single participant at a time enters the room. They are greeted by a generative mandala projected onto a shallow water surface, layered reflective material on the floor and walls, and ambient sound that shifts in response to their presence. They may stay as long as they want. A short guided provocation plays once near the beginning of the experience, after which the room goes quiet and allows the participant to remain with the image. On exit, they are invited, but not required, to leave a small trace: a word, a phrase, or a mark. That trace is absorbed into the environmental parameters of the installation and influences the state the next participant will encounter.

The thesis prototype is a proof of concept for a larger envisioned system. The larger vision is a network of such spaces, installed across different contexts, galleries, libraries, hospital waiting

areas, and community centers, whose accumulated traces communicate across locations. The thesis installation is a single node of that network, scoped to demonstrate the experiential and conceptual viability of the collective memory model within the time and resource constraints of the degree show.



Figure 4. Early spatial testing of immersive projection setup

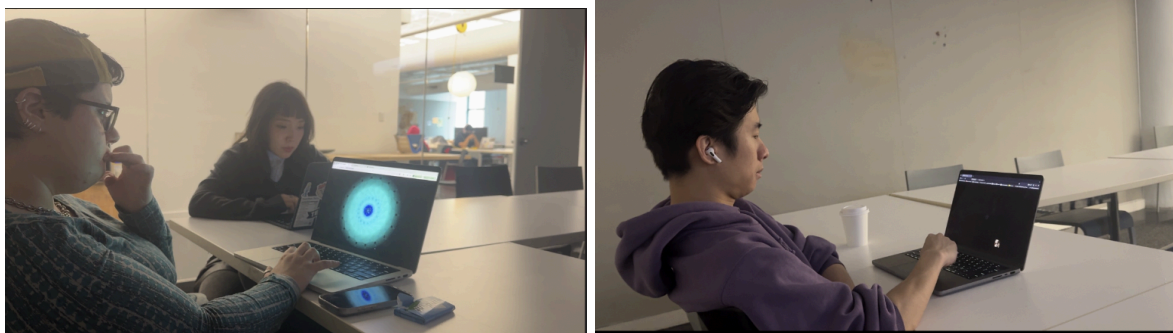
Approach to form

The approach to form for *Ruminating Spaces* can be described with a few deliberate descriptors: contemplative, ambient, participatory but not interactive in the game loop sense, slow, and cumulative. The installation is designed to hold attention rather than to demand it. It is built on the assumption that responsiveness below the threshold of conscious detection produces deeper engagement than responsiveness that the viewer can clearly decode.

This approach was not my starting position. It emerged through testing, and the core tension it resolves, visible responsiveness versus inhabited presence, is the tension that has structured the entire project.

Iterative decision points

From interactive to ambient. The earliest prototypes of this project were built on a one to one interaction model. A participant's movement or gaze would trigger a direct visual response in the projection. I assumed that visible causality would feel engaging. In practice, the opposite happened. Participants would notice a response, attempt to reproduce it, and within about ninety seconds they were no longer in the room. They were inside the interface, trying to solve it. This is a well known failure mode in interactive work, but I needed to see it happen in my own space to understand it. The decision to slow responsiveness and to move below the threshold of legibility came out of this test, and it is the single most important design decision in the project.



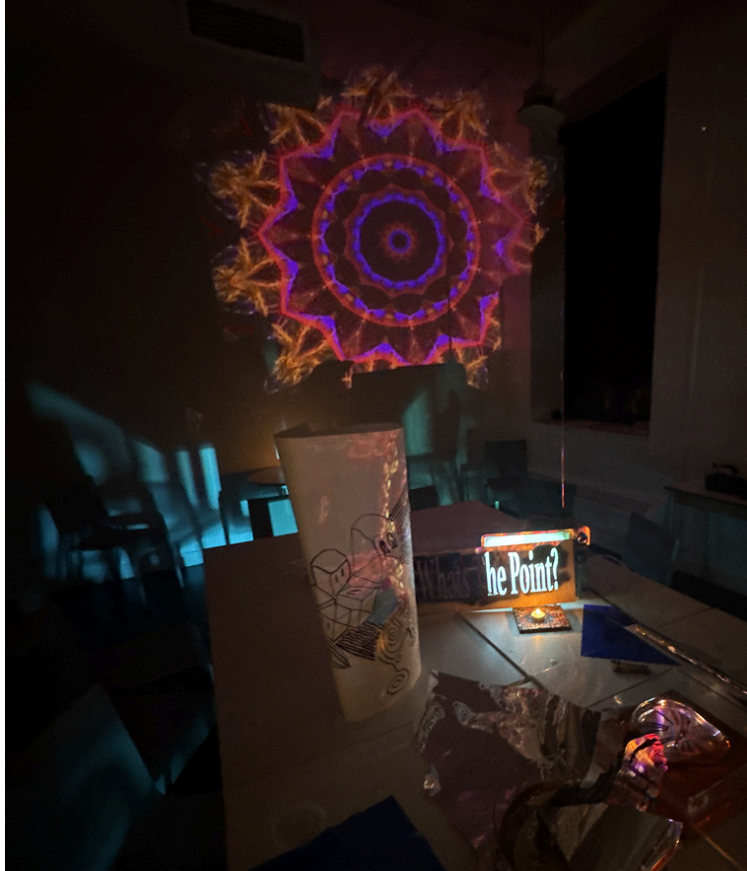
From layered narrative to cleaner generative form. An intermediate prototype combined the mandala with layered video clips, moving image overlays, and spoken audio from figures like Ram Dass and Alan Watts. My instinct had been that adding narrative and voice would deepen the meditative quality. Testing showed the opposite. Participants described the layered video as distracting, and several said they began watching and analyzing the imagery rather than being present. The spoken audio introduced a worse version of the same problem. Because words carry meaning, people focused on listening and interpreting rather than simply being there. Some found that the guided voice made the reflection feel too directed, when I wanted it to remain open ended. The decision to strip back to a simpler generative form and to replace voice with ambient, nonverbal sound came out of these sessions.

From solo meditation to collective memory. Originally, the project was a solo meditation tool. The shift to a collective memory frame came from an observation I was not looking for. In one

round of testing, two participants happened to use the installation in sequence. The second asked me, unprompted, who had been in the room before them. They could not articulate why, but they said the room felt different because of it. When I pressed further, they described it as a residue of attention. I realized that the most interesting thing happening in the project was not the single participant's reflection, but the handover between participants. I redesigned the architecture around that observation. The trace deposit ritual, the parameter inheritance system, and the framing of the piece as a collective memory space all came from that single piece of testing feedback.

Visually, the installation uses a generative mandala engine as its primary representational language. The mandala functions not as a symbolic spiritual object but as a dynamic system through which order, disturbance, and inherited memory can be visualized. Its form continuously evolves in response to cumulative participant traces, allowing the installation to function as both a perceptual and temporal record of collective engagement.

As the thesis developed, I adopted a stricter evaluative framework for feature inclusion. Experimental interactions, visual systems, or technical additions were retained only if they directly strengthened the central experiential throughline of collective introspection. Features that distracted from or complicated the core experience were removed or deferred for future exploration. This process of reduction became essential in shaping a more coherent and focused final installation. Physical reflection also plays an important role in the installation's material language. A shallow reflective water surface introduces imperfect mirroring and secondary distortion into the projected environment. Water was chosen specifically because of its unstable reflective quality, which allows the projected image to feel both mirrored and distorted at once, reinforcing the project's interest in memory as something reflective yet never fully fixed. This reflection destabilizes the projected image, creating subtle physical variation and reinforcing the project's thematic interest in perception, memory, and incomplete reflection. The addition of physical reflective materials grounds the computational image within material space, helping the installation resist feeling purely screen-based or virtual.



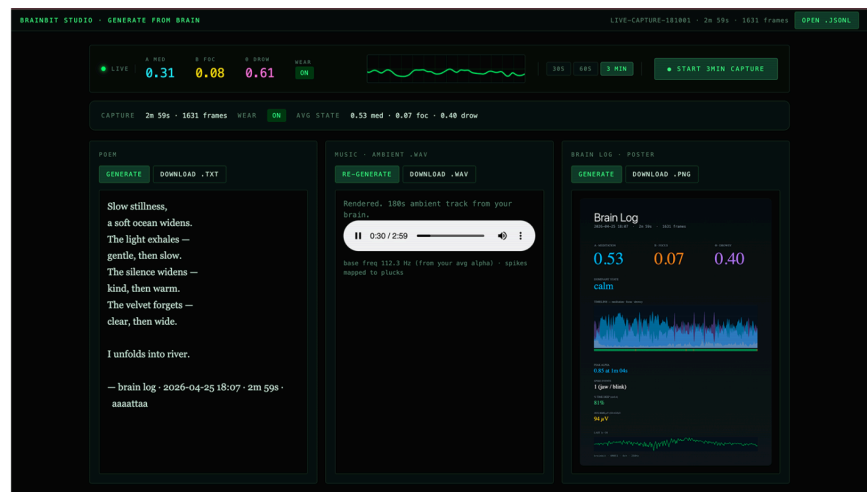
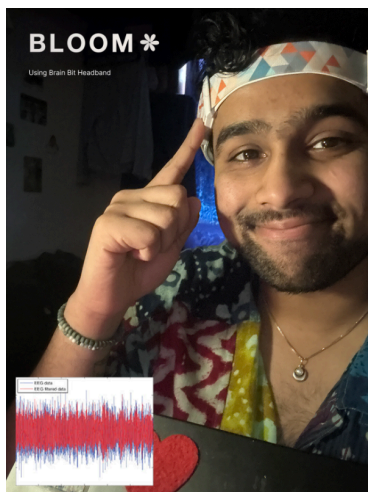
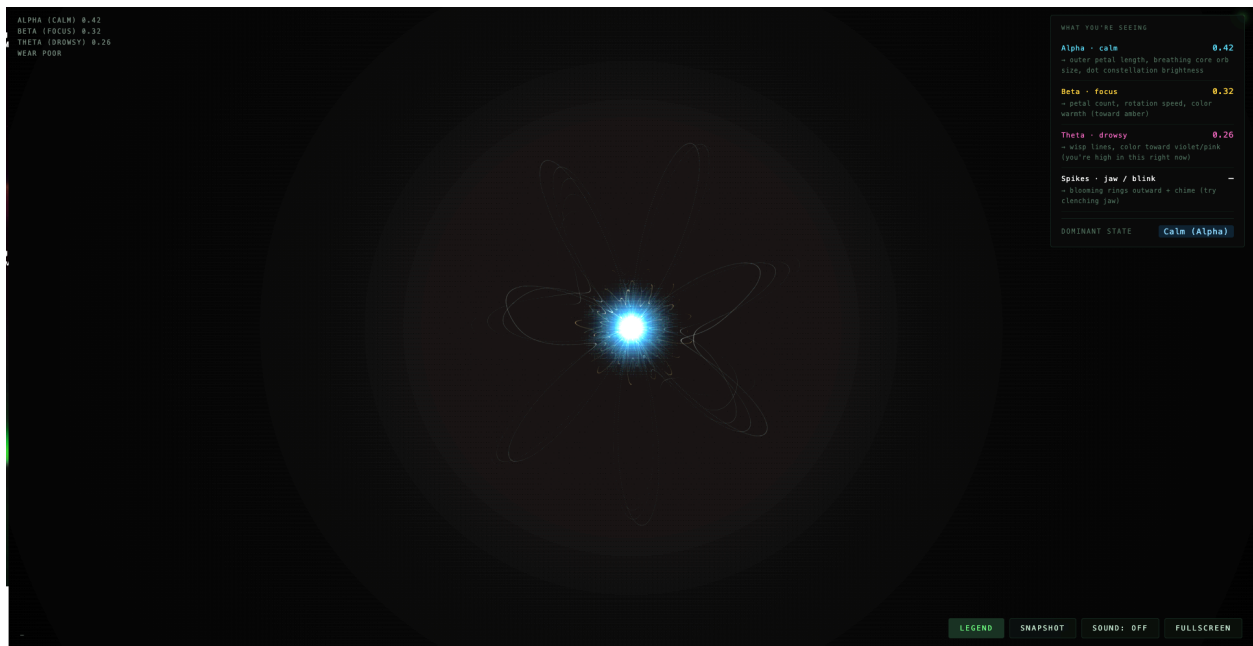
Another ongoing challenge has been balancing subtlety with legibility. If the installation changes too dramatically, it risks becoming performative or distracting. If it changes too little, participants may not perceive that the environment is responsive or cumulative at all. Much of the design process has involved calibrating this threshold, determining how environmental transformation can remain perceptible while still preserving ambiguity and contemplative pacing.

Throughout development, iterative testing and critique sessions played a central role in shaping the final form of the project. Earlier versions relied on more explicit one-to-one interaction and technologically visible input systems. The project evolved toward more ambient and interpretive forms of responsiveness, reducing visible interface logic in favor of environmental transformation.

At its current stage, the thesis prototype functions as a proof of concept for a broader vision of computational environments that remember, accumulate, and evolve through shared presence. While future iterations may expand into larger architectural or networked environments, this

thesis focuses on demonstrating the experiential and conceptual viability of collective introspection through responsive immersive space.

I am also trying to merge live EEG data with my mandalas to try to have a performance element of the data you see on the outside looking in versus how abstract and difficult to quantify the inner data really is.



Chapter IV. Evaluation

Status

Ruminating Spaces is built as a working installation, but not yet as the installation I set out to build. The core system runs. A generative mandala is projected onto a shallow water surface at the center of a darkened room. Ambient sound shifts with participant presence. The trace deposit station at the exit is functional. Traces are abstracted and folded into the parameter set that controls the next participant's starting state, and the inheritance loop has been verified across sequential sessions in internal testing. A short guided provocation plays near the start of each visit. The space accommodates a single participant at a time, and the turnover between visits is smooth enough to run during gallery hours without an operator intervening.

What is not yet done is the full sensory register I proposed. Certain secondary reflective materials are staged but not integrated into the live responsive loop. The extended vision for a networked version, in which multiple rooms in different locations accumulate traces that communicate across sites, remains a future prospect and not a thesis deliverable. Within the scope I set for the thesis prototype itself, the installation is running. Within the scope of the larger vision, it is a first node.

The other thing I should be honest about is that my Context chapter was weaker, in earlier drafts, than the project deserved. My advisor's note on the first draft, that it read like an abstract proposal rather than a deeply explored body of work, was correct at the time. The research I was actually drawing on lived in my sketchbook, in my interviews with Russell and Karis, in the Rangoli my family drew, and in the conversations I had in Union Square Park. Translating practice based research into writing is a skill I am still building. The current draft of the Context chapter is closer to the project than earlier versions were, but the gap between what I know in practice and what I can say in prose is a gap I am aware of.

Learning

The largest thing I learned is that I had the scope of my project wrong for most of the year. I began trying to design a solitary meditation space. What emerged through testing was a piece about shared presence across time. That shift, from solo tool to collective memory system, is

the intellectual center of this thesis, and I did not arrive at it through research or conceptual planning. I arrived at it because one participant asked me who had been in the room before them, and I paid attention to the question instead of moving past it. The lesson, which I think generalizes beyond this project, is that the most valuable signal in iterative design work is often a piece of feedback nobody asked for and nobody expected. The designer's job is to notice when that signal arrives and to reshape the work around it rather than defending the plan.

I also learned, on a more practical level, that legibility is not the same as engagement. This is not a new idea in the field, but it is a different thing to read about in a paper and to watch happen in your own room. Participants who understood the interactive system disengaged. Participants who did not decode it stayed. Every major design decision in the final installation, the slowed responsiveness, the removal of spoken narrative, the decision to absorb traces rather than display them, follows from that observation.

What this tells me about my field is that immersive design has a tendency to default to one of two modes: gameplay, in which the user drives everything, or passivity, in which the user watches. Ruminating Spaces occupies a third mode. The participant observes, but their attention becomes part of the environment, and the environment carries that attention forward for the next person. This is adjacent to the territory Davies opened with *Osmose* in 1995, where breath became an input instead of a button, but where Davies used biometric input to let a single viewer navigate a landscape, Ruminating Spaces uses accumulated presence to let successive viewers inhabit a shared landscape. The small contribution this project makes to the conversation is that stillness, when measured and inherited, can function as a medium.

Finally, I learned something about my own relationship to work. I grew up with the Rangoli my family drew on the floor at Diwali, and I reached for the spiral form of the mandala in this project before I understood why. I understood only later, during the set design phase, that the reason the form felt right was that it was already a container I knew how to sit inside of. A piece of me suspects that the entire project is, at root, an attempt to build a version of that container for people who did not grow up with one.

Future

The nearest term future is the exhibition itself. I want to see what the installation does with actual strangers cycling through it across a multi hour session, which is a condition I have not yet been able to test in full. I expect that the accumulated inheritance from the early visitors will

make the later sessions feel perceptibly different, and I want to find out whether that difference reads as richer or as more confused. Both are useful answers. The other near term test is whether participants leave traces at the rate I expect. If they do not, the inheritance mechanism is starved and the whole premise of the piece is weakened, and in that case I will need to redesign the deposit ritual itself.

Beyond the thesis, I see *Ruminating Spaces* as a template. The single room version is a node. The larger vision is a network of such rooms installed in contexts where reflection is already needed and rarely supported: hospital waiting areas, school counseling offices, transit hubs of the kind I was already thinking about with *Good, Bad? Nothing*. The traces accumulated in one node could propagate across the network, so that a person sitting in a hospital in one city inherits the residue of a person who sat in a library in another. The technical infrastructure for this is within reach. The interesting questions are curatorial: what kinds of spaces should be connected, what kinds of traces should be allowed to travel, and what happens when a location's character is shaped by visitors from very far away. A short field guide, on how to build and install a lightweight node, is a document I would like to publish, so that the work can travel without me.

I would also like to return to the *Broken and Beautiful* interviews as a standalone piece. They were researching for this project, but they are their own thing. A short film, or a spatial audio piece built only from those conversations with Russell and Karis, feels like the companion to *Ruminating Spaces* that I did not have time to make this year.

The original provocation that has shaped my work since my first studio project was the question of what people will say, or what they will allow themselves to feel, when the container is held gently enough. *Ruminating Spaces* does not answer that question. It extends it by adding a second condition: what happens when the container is held by the people who were there before you.

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