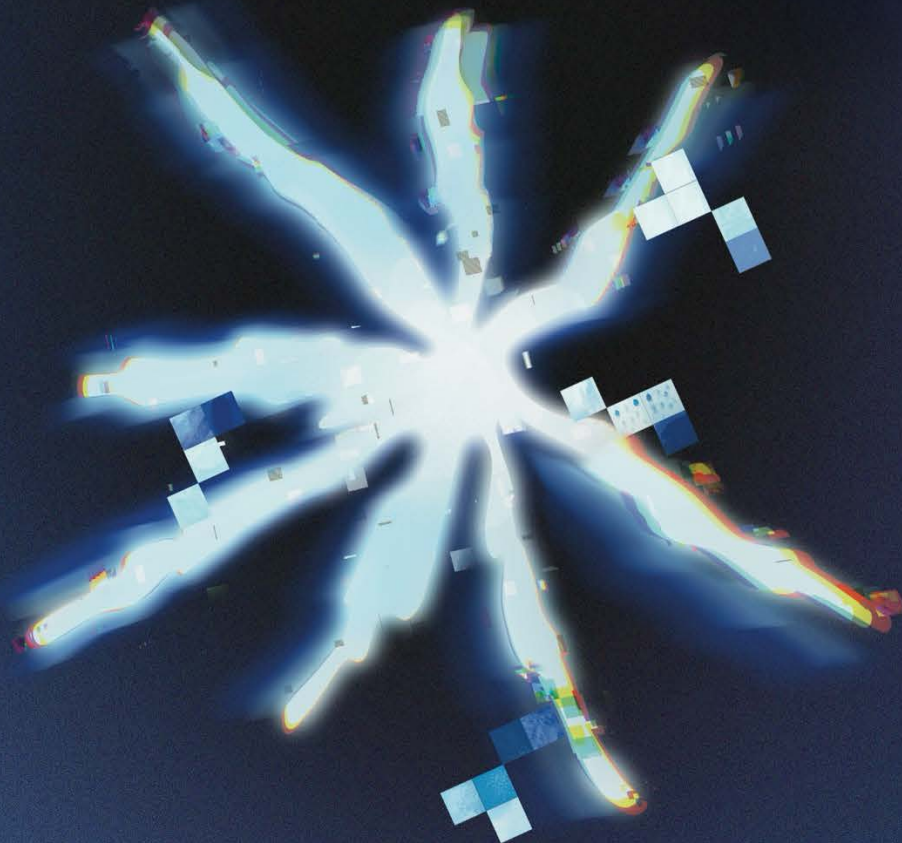


The Thing About
WONDER



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The Thing About Wonder

by

Vivienne Valladares

A thesis exhibition presented to OCAD University in partial fulfilment of
the requirements for the degree of Master of Fine Arts in
Interdisciplinary Master's in Art, Media & Design

Graduate Gallery,
205 Richmond Street W.
Toronto, Ontario, Canada
March 26th to 29th, 2026

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Abstract

The Thing About Wonder is a research-creation project that explores the potential of immersive installation art to invite sustained experiences of wonder. Working within the intersection of science and art, the project draws from cosmology, contemporary arts, curatorial practices, aesthetic theory and affect theory. Drawing on philosophical and psychological frameworks, this thesis develops a working definition of wonder as a personal, subjective, and aesthetic experience, with an impulse to be shared. These theoretical strands, in conjunction with empirical research, inform the creation of an immersive, interactive, light exhibit titled *All the Light Reveals*. Drawing on Carl Sagan's ideas on the cosmic perspective, the works invite viewers to consider their material relationship to the universe and to reflect on their place within its vast and intricate systems. Methodologically, the project combines studio experimentation with audience-based research, including two focus group sessions and observational analysis conducted during the exhibition, and a post-exhibition survey. Qualitative analysis of research findings suggests that participants engaged with the installations through playful exploration, displaying immediate affective responses and sustained interactions.

Keywords: *wonder, immersive installation, cosmology, light, interconnectedness, research-creation, aesthetic theory, affect theory.*

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Oftentimes, the research and making process can feel like a lone person's mission. And while it is, I have been fortunate to receive support at every moment that I needed it. I offer my gratitude and appreciation to the people who contributed to making this project a reality.

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All my love and gratitude to my family, who I could not have done this without.

To my father, who says he doesn't "get" art, thank you for always trying to get me.

To my sister, Natalia, I am eternally grateful for your unconditional support. I count myself very lucky to come home to the best meals and 8-second hugs from you. To Kristin, thank you for being so strong and brave. Installing 40-something little pieces from the ceiling would have been an impossible and very unfun task without you.

Dedication

To my mother, who always listened.

If myths are to be believed, you are now among the brightest stars in the night sky.

If not, I hope you have the most spectacular view of them.

To scientists, artists and curious souls,

May you always retain a sense of wonder for what the Universe has to offer.

But more importantly, may you always *share* this wonder with the world.

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Statement of Contributions

The research, writing, conceptual development, and fabrication of all three installations in this thesis are the original work of the author, except where explicitly noted.

Daniela Ortiz Correa, an undergraduate student in the Digital Futures program at OCAD University, collaborated on the development of *further and further still*, one of the installations in this thesis project. Her contributions included creating two of the four webcam filters integrated into the installation, as well as valuable technical support in setting up this installation. Her contributions are acknowledged within the relevant section of Chapter 5.

◆ Prelude: On Looking

*Everything else has its yin and yang.
But you – what do you have?
Your geodesic singularity gives no quarter.
How is it that you are infinitely vast,
and yet infinitely small?
Is this the point where magi lose their minds?*

*XYZ/05 BLACK HOLE
Joanna Tisley, 2014¹*

I have been drawn to the stars for as long as I can remember. Strangely, I do not have particularly significant memories of stargazing from my childhood. I grew up in a city, after all. So, while I do remember seeing some stars in the night sky, none were as bright and captivating as the pictures I saw in encyclopaedias. My grandfather, a hoarder of said encyclopaedias, also had a telescope in his possession. On special nights marked for astronomical observations, he would borrow the building keys, gather all his grandchildren, and take us to the seventh-floor terrace. These observation nights did not happen often and stopped altogether as we grew older. Luckily for me, my fascination remained. From brief moments spent stargazing out in the physical world and longer moments star-searching in vibrant printed pages, my younger brain deciphered that outer space and the Universe at large were definitely a sight to behold.

Years later, in 2018, I made the first decisive shift of my adult life. Up until then, I had believed science, particularly medicine, was my career calling. But then, there I was: in a new room, in a new city, looking over an email the evening before my first day of art school. It was a welcome email from the professor who would be teaching my first class. Attached to the email was a PDF titled *Inverse and Converse*, containing thirty poems, with no context about the author or content. We were just asked to read as many as we could.

I read all thirty and even marked my favourite ones.

¹ X Y Z. "30 Days". Quantum Press, 2014. Written by Joanna Tisley, a British biologist and poet.

Ironically, it was my first class at art school that brought me back to the stars. We were introduced to cosmology through a creative and artistic lens. We read excerpts from Carl Sagan's writings, learned about the origin and evolution of the Universe, and traced the biochemical composition of the human body back to ancient, long-dead stars. We watched scientific documentaries and cinematic ones. We were pushed into discovering our own unique bridge between our artistic practice and the scientific world. That class marked another decisive shift in my life, altering my trajectory of thought. Until that point in my life, I had always thought my artistic practice would remain separate from my curiosity for the sciences. I had never considered that I might inhabit both worlds at once.

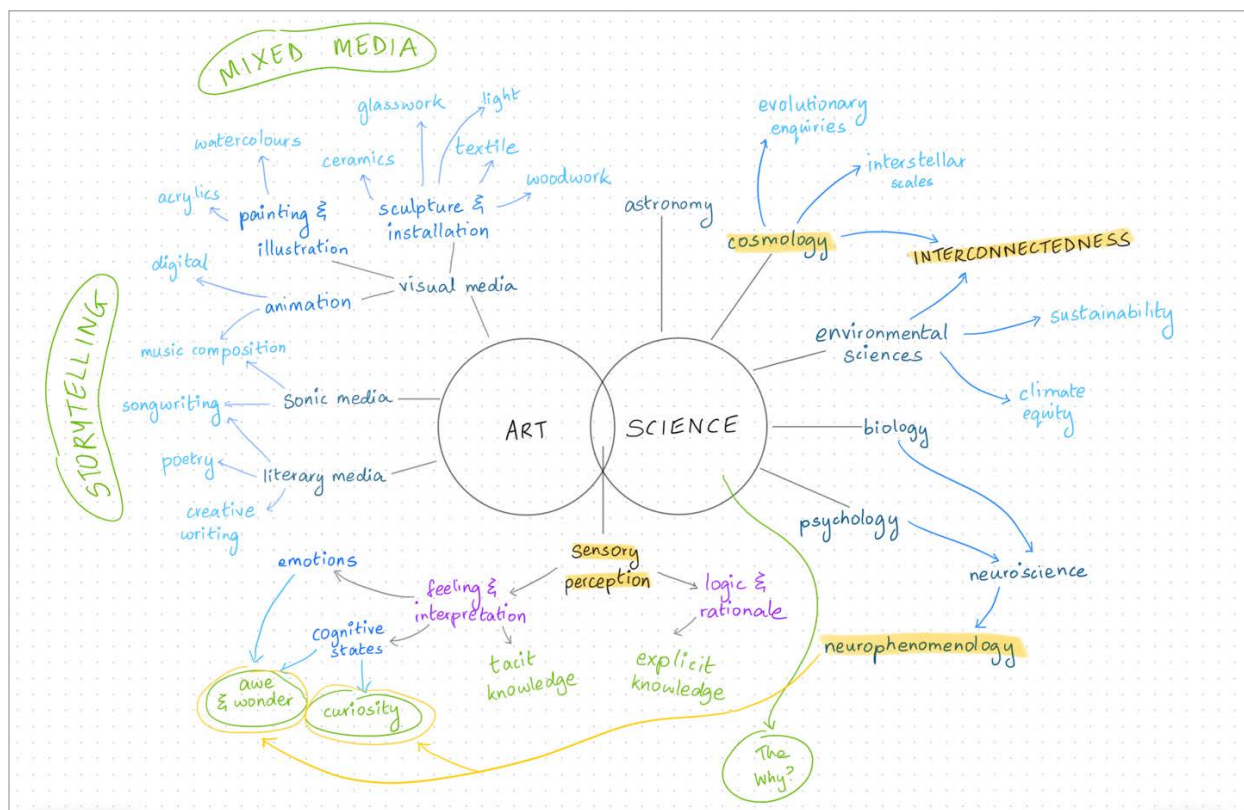


Fig. 1: Hand-drawn mind map of the author's personal approach to the intersection of art and science.

The following four years in art school saw countless questions, several projects, and material explorations and experiments, all of which eventually led me here. I often return to Joanna Tisley's question: "*How is it that you are infinitely vast, and yet infinitely small?*" It is a question that has unsettled mystics, scientists, and philosophers alike. But rather than madness, it has often given rise to *wonder*.

I have been a frequent traveller to the realm of wonder over the course of my life. As have you, I am sure, although you may have entered through a different door. The stars were my point of entry, or rather a constellation of entry points.

Astronomy, as I have lived and learned, is profoundly visual. My earliest encounters with the cosmos were through physical observation and through carefully composed images. So, it only felt right to begin this thesis with a picture. One of the better ones, if I may say so, and captured on our most powerful telescope yet.



Fig. 2: Webb's First Deep Field, Image credits: NASA, ESA, CSA and STScI.

1. Introduction

1.1 A million galaxies within a grain of sand

“If you held a grain of sand up to the sky at arm’s length, that tiny speck is the size of the telescope’s view in this image. Imagine—galaxies galore within a grain, including light from galaxies that travelled billions of years to us!”²

On July 11, 2022, NASA released a preview teasing the first cluster of images to be released from the James Webb Space Telescope. The image Webb’s First Deep Field (as seen in Fig. 2), revealed thousands of galaxies in a sliver of sky no larger than a grain of sand held at arm’s length.³ The following day, the full suite of images was unveiled by NASA and NASA-Webb. Even this preliminary glimpse, however, was enough to catalyse a global outpouring of response.

The James Webb Space Telescope (JWST), continuing the legacy of its predecessor, the Hubble Space Telescope (HST), made a similar, if not more grandiose, impact on science, history and culture. The images rapidly populated the internet, hailing admiration from astronomers, space enthusiasts and non-specialists alike. The outpouring of responses to these images ranged from astrophysicists posting TikTok videos of tearful reactions⁴ to heartfelt tweets acknowledging the outstanding feat of scientific advancement. Then, to some humbling sentiments and, of course, humorous ones like “All these galaxies and you still can’t find a girlfriend”.⁵



Fig. 3: Image credit: @abT315I via X (Twitter)



Fig. 4: Image credit: @99hitpoints via X (Twitter)

² Sabia, “Webb Image Galleries - NASA Science.”

³ NASA (@NASA), X (formerly Twitter), July 11, 2022.

⁴ Fowler, “Watch Scientists’ Wholesome Reactions to Images From James Webb Telescope.”

⁵ Dr. Parik Patel, X (formerly Twitter), July 12, 2022.

The release catalysed a widespread affective reaction across disciplinary and professional boundaries. Thousands of people attempted to articulate their reactions in brief, immediate language online. It is this broader linguistic field—where awe, wonder, humility, excitement, and existential reflection converged—that warrants closer examination.



Fig. 5: Carina Nebula, Image credit: NASA, ESA, CSA and STScI.

1.2 Affective Language and the Astronomical Sublime

To better understand how these immediate reactions articulate affect, I conducted a qualitative lexical analysis of the online public responses to two posts by @NASA and @NASAWebb on the platform X (formerly Twitter). The first tweet/post by @NASA on July 11, 2022, presented a preview image from the

full release to follow, and was met with over 7500 replies.⁶ Out of this large pool, 77 tweets were selected for their affective and introspective nature. The second tweet by @NASAWebb, posted on July 12, 2022, announced the full image release and was met with over 200 replies.⁷ The sample was narrowed down to 49 posts containing explicit descriptive or affective language. (For a detailed, expanded analysis of the datasets, view Appendix A.)

The lexical patterns emerging from the two datasets reveal a striking consistency. Viewers most frequently described the images as *beautiful*, *incredible*, *amazing* and *stunning*. Expressions such as *awe*, *awestruck*, *breathtaking*, and references to *tears* and *goosebumps* further suggest that these responses exceeded neutral admiration. Even responses praising the scientific and technological achievement used words like *extraordinary* and *excellent*, blending evaluative praise with emotional responses.

Considering that the two datasets reviewed responses to two different pictures (Fig. 2 and 5), there are also subtle differences within the replies. While the latter emphasised aesthetic admiration, Webb's First Deep Field image prompted stronger existential reflection. Words such as *vast*, *small*, *perspective*, and *unfathomable* suggest that viewers may have been grappling with the magnitude of scale, and perhaps even a sense of self. Together, the July 11 and July 12 datasets demonstrate a recurring pattern: astronomical imagery evokes aesthetic admiration, existential humility, and a reflective perspective.

The public reception of the JWST images and vocabulary used can be situated within a longer aesthetic tradition associated with the sublime. Drawing on German philosopher Immanuel Kant, the *sublime* arises when perception encounters magnitude that exceeds ordinary comprehension.⁸ The JWST images do exactly this: billions of galaxies captured within an image that is equated to the size of a singular grain of sand. As Kant writes, all objects of magnitude in nature require an "aesthetic estimation" or perception. When this magnitude reaches a maximum (units and measurements too large to comprehend), the aesthetic nature of perception turns into the idea of the sublime.⁹

⁶ NASA (@NASA), X (formerly Twitter), July 11, 2022.

⁷ NASA Webb Telescope (@NASAWebb), X (formerly Twitter), July 12, 2022.

⁸ Immanuel Kant, "*Critique of Judgment*", trans. Werner S. Pluhar, 103–114.

⁹ Ibid.

It is worth noting that astronomical images released to the public by NASA are distinct from those used for scientific purposes. So, astronomical images do not simply “capture” the sublime. The translation of astronomical data into published images involves a series of conscious aesthetic decisions, as noted by Elizabeth Kessler in her book *Picturing the Cosmos* (2012). Image scientists decide how to assign colour to wavelengths beyond human vision, how to frame scale, and how to render sometimes “invisible attributes of the data into visible form”.¹⁰ Astronomers working on projects such as the *Hubble Heritage Initiative* have been explicit about making aesthetic and compositional choices intended to evoke emotional responses.¹¹

The public response to the JWST images suggests that these strategies remain effective. The images circulated were “scientifically valid as well as aesthetically compelling”.¹² Through these images, viewers articulated wonder, humility, and joy. If intentionally curated astronomical imagery can elicit widespread affect, what might happen when the same aesthetic curation is applied to immersive, embodied experiences?

1.3 Curating Tender Encounters

On July 11, 2022, as the preview image from the James Webb Space Telescope circulated across X (formerly Twitter), Carl Sagan’s name was invoked over seventy times in relation to the telescope and its imagery.¹³ The re-emergence of Carl Sagan, beloved astronomer and science communicator, in public discourse surrounding JWST is telling. His language of cosmic humility and interconnectedness resurfaced as viewers sought the right words to express themselves. In *Pale Blue Dot*, he described Earth as a “mote of dust suspended in a sunbeam,” emphasising our smallness in a “vast cosmic arena”.¹⁴ His language signals a paradox central to this thesis: cosmic smallness need not produce nihilism. Instead, it may cultivate humility, care, responsibility and relational awareness. The public resonance with the JWST images depended on more than visual spectacle. It relied on narrative and poetic mediation, whether

¹⁰ NASA. “Season 5, Ep. 30: Gravity Assist: How We Make Webb (and Hubble) Images – NASA.”

¹¹ Elizabeth A. Kessler, “*Picturing the Cosmos: Hubble Space Telescope Images and the Astronomical Sublime*”, 7-8.

¹² Ibid.

¹³ Author’s survey of posts on X (formerly Twitter) dated July 11, 2022 mentioning Carl Sagan and JWST.

¹⁴ Planetary Society, “A Pale Blue Dot”, October 3, 2025.

generated by the viewers themselves or shaped through language borrowed from writers and thinkers of the past.

Artists working at the intersection of cosmology and art inherit this challenge. To invite sustained wonder, one must ensure vastness becomes relationally meaningful. Borrowing from interdisciplinary artist Dario Robleto and his notion of “poetic tenderness”¹⁵, I bring my own tenderness and poetic sensibilities to this project. Storytelling is crucial to my practice and to this thesis. Scientific facts describe the age of stars and the distances between galaxies, but it is through metaphor and poetic association that these abstractions become experientially meaningful. As an artist-researcher working at the intersection of art and science, my goal is to craft environments that translate magnitude into relational understanding, while bringing a particular attentiveness to the human within the infinite.

1.4 Research Questions

The public responses to the JWST images reveal wonder as a collective reaction to cosmic scale. It marks the beginning of my artistic inquiry. It led me to question: How might wonder be intentionally cultivated rather than stumbled upon? And what role might immersive installation art play in creating those conditions? This thesis aims to address the durational aspect of wonder, leading me to the central question of my thesis:

How can immersive installation art rooted in cosmic themes of interstellar interconnectedness invite sustained experiences of wonder?

Supporting it are further considerations:

1. What aesthetic and curatorial strategies are most effective in cultivating sustained experiences of wonder within immersive art environments?

¹⁵ Dario Robleto in “Interstellar Aesthetics,” Nublockmuseum, [Video].

2. How might scale, light and materiality be utilised to create participatory conditions that bridge sensory immersion, emotional response, and conceptual reflection?
3. How might metaphor, narrative, and poetic tenderness contribute to a felt awareness of cosmic entanglement?

This thesis treats wonder as an emergent, reflective state with the potential to lead to embodied ways of learning, knowing and relating. The project does not aspire to *create* wonder, which would be impossible, but instead curates conditions that invite the possibility of it. The hope is that encounters with wonder may spark curiosity and a felt awareness of our planetary and interstellar entanglements.

I intentionally use the word ‘sustain’ in this thesis. Thanks to English being the funny language that it is, the word denotes persistence of a phenomenon, while also carrying with it a particular resonance. Like the last note struck at an orchestra, still vibrating after the conductor’s hand has lifted, wonder, for me, when sustained, resonates in the same frequency as that pleasant culminating chord.

1.5 Chapter Overview

The following chapters trace how this inquiry was pursued across theory, practice, and observational research. Chapter 2 develops a working definition of wonder through linguistic, philosophical, and psychological frameworks. It then examines the conditions of immersive experiences, and lastly, discusses why installation art is particularly well-suited to sustaining wonder. Chapter 3 outlines the methodological framework guiding this project. Chapter 4 documents the studio explorations and material experiments that preceded the final exhibition. It includes the theoretical and historical context for the primary material selections and the intentions behind choosing them. Chapter 5 presents the culminating thesis exhibition: *All the Light Reveals*. It begins with outlining the exhibition and spatial logic, leading to the conceptual development, making, testing, and final realisation of each of the three final works. Chapter 6 presents an overview of my empirical research methods and analyses all findings from the focus group testing, observational research, and the post-exhibition survey. Chapter 7 concludes what this project has discovered and what it leaves open.

2. Literature Review

This literature review works as a scoping review and builds the theoretical foundation for this thesis across three areas: wonder, immersion, and cosmic interconnectedness. I begin by asking what wonder actually is, tracing it through language, philosophy, and psychology until I form a working definition that carries forward into the rest of the research. From there, I ask under what conditions wonder might arise and be sustained, which leads me to immersive installation art and its potential. Cosmic interconnectedness—the idea that human life is materially entangled with the cosmos—is woven through both discussions and this thesis. It is introduced here as a premise and developed fully in Chapter 5, alongside the installations it shapes.

2.1 What is Wonder, Anyway?

Wonder is a familiar word, yet a difficult one to define. It appears across philosophy, science, everyday language and is often used to describe moments of astonishment, curiosity, reverence, or awe. Its recurrence across disciplines suggests its importance, but its resistance to linguistic encapsulation denotes its complexity.

For this thesis, it was necessary to develop a working definition of wonder so that I could clarify the phenomenon under investigation. In this chapter, I approach wonder with curiosity and questions.

2.1.1 The Semantics of Wonder

My first question regarded the use of wonder in everyday language. In the English language, “wonder” uniquely functions as both a noun and a verb. This grammatical duality reveals two distinct but closely related orientations. In its verb form, to wonder is to inquire. It implies curiosity, perhaps a line of questioning: *I wonder how that works*. In this form, wonder initiates investigation and problem-solving.¹⁶ Literature professor and author Philip Fisher notes this orientation aligns more closely with scientific

¹⁶ R.W. Hepburn in his inaugural address “Wonder” writes about wonder’s questioning and questing aspects.

practice, where curiosity becomes a catalyst for inquiry.¹⁷ As a noun, however, wonder denotes a state. One may be *in wonder*, *caught in wonder*, *filled with wonder*. So, wonder as a noun denotes an affective and durational experience.

In conversations with varied people over the course of this thesis, I found that each person had a preferred semantic orientation to wonder. This thesis, as do I, aligns more closely with wonder in its noun form, as an experiential condition. I do not dismiss the verb orientation, and I welcome my audience's preference for either. I recognise the overlap between the two, as does Lisa Sideris, who writes that wonder belongs simultaneously to "the wide-eyed child in the woods and the wild-eyed scientist in the lab".¹⁸ Wonder is not extinguished by explanation and understanding. Rather, understanding a phenomenon may sustain or even deepen wonder for it.

2.1.2 Wonder, Philosophically Speaking

Wonder has occupied philosophical thought since antiquity. In the Western world, this lineage is traceable at least as far back as Plato in the fourth century BCE.¹⁹ To keep this thesis brief, I start with British philosopher R.W. Hepburn's words from 1980. In his inaugural address titled *Wonder*, he writes that wonder can be aroused by sensory impressions, entirely independent of the phenomenon's emergence.²⁰ For example, when I visit the beach on a particularly sunny day, and the rays perfectly light up the sea in shades of dazzling blue, I experience a variant of wonder. In that moment of looking out at the sea, it is not the origin or emergence of the phenomenon that elicits wonder, but the phenomenon itself.

This emphasis on perception aligns with philosopher Ludwig Wittgenstein's observations. As he writes, "Aesthetically, the miracle is that the world exists. That what exists does exist". Hepburn extends this toward what he describes as 'existential wonder': wonder at the sheer fact of existence itself.²¹ To these

¹⁷ Philip Fisher, "Wonder, the rainbow and the aesthetics of rare experiences," 11.

¹⁸ Lisa H. Sideris, "1. Seeking What Is Good in Wonder," 14.

¹⁹ Laura Lee Kearns, "Subjects of Wonder: Toward an Aesthetics, ethics, and Pedagogy of Wonder," 101.

²⁰ R. W. Hepburn, "The Inaugural Address: Wonder", 9.

²¹ Ibid. 10.

sentiments, I add my own: *The miracle, too, that deems much wonder is that **we exist**—that consciousness and sentience emerged within the vast Cosmos, and **we** can reflect upon it.*

Alongside these Western philosophical accounts, I present far older Indigenous philosophies that offer a deeply relational understanding of wonder. In *An Ocean of Wonder: The Fantastic in the Pacific*, which focuses on the perspectives of Moananuiākea peoples, wonder is described as “an emotional and active process we negotiate through storied experiences, one that demands change in us and the world”.²² Within this framing, as it is in my practice and this thesis, wonder is inseparable from story and lived experience. As further noted in the book, Hawaiian creation narratives such as the *Kumulipo* trace genealogical relationships across species and elements, from humans to land, sea, and cosmic origins.²³ Wonder emerges through recognition of this interconnection and is sustained through attentiveness to these relationships. The next subsection, which discusses the psychological associations with wonder, further expands on the “change” wonder demands from us.

The Manitoba Education and Early Childhood Learning presents an indigenous education policy framework titled ‘*Mamàhtawisiwin: The Wonder We Are Born With*’. In this document, Mamàhtawisiwin is described as the notion of sharing one’s innate gift and “connecting people to the root of their existence”.²⁴ While this document doesn’t explicitly relate ‘wonder’ as it is understood in the English language to ‘Mamàhtawisiwin’, its adjacency in the title leads me to connect the two. As Willie Ermine, Cree education philosopher, states, “only through subjectivity may we continue to gain authentic insights into truth”.²⁵ In my subjective understanding of wonder, I further connect Mamàhtawisiwin to Rachel Carson’s writing. In her book, *The Sense of Wonder*, Carson ponders the value of preserving our sense of wonder.²⁶ In my worldview, perhaps preserving wonder has to do with *sharing* it. I assert our ability to wonder, to imagine, to dream, to be astonished, and to be curious are all intrinsic human traits that

²² “*Moananuiākea* is the oceanic home and heritage region for all peoples who are indigenous to islands and continents touched by Pacific waters” (kaiwakiloumoku.kbse.edu)

Cristina Bacchilega et al., “Introduction” in *An Ocean of Wonder: The Fantastic in the Pacific*, 4-7.

²³ Ibid.

²⁴ Bremner et al., “MAMÀHTAWISIWIN: The Wonder We Are Born With - an Indigenous Education Policy Framework.”

²⁵ Willie Ermine, quoted in Erika Faith, “Seeking “Mamatowisowin” to Create an Engaging Social Policy Class for Aboriginal Students”.

²⁶ Rachel Carson, “The Sense of Wonder”.

make up who we are. In sharing these gifts, then, as expressed by Mamàhtawisiwin, is to connect ourselves and others to our existence.

2.1.3 Wonder, Psychologically Speaking

In contemporary psychology discourse, wonder is frequently linked to awe, and the two terms are often used interchangeably. While distinct, their overlap is significant. So, although this thesis is about wonder, I *must* first briefly touch upon awe.

In psychology, awe has become the subject of focused empirical study only in recent decades. In what is now considered a seminal text within this field, psychologists Dacher Keltner and Jonathan Haidt identify two crucial conditions central to awe: *perceived vastness* and the *need for accommodation*.²⁷ Vastness may be physical, temporal, conceptual, or social—anything that exceeds one’s existing frame of reference. Accommodation refers to the adjustment that is necessitated when unfamiliar phenomena need to fit within existing mental systems of understanding.

In 2019, Dutch psychologist Michiel van Elk and collaborators published a paper on neural correlates to awe-related. Through neuroimaging studies, they identified decreased activity in the brain’s Default Mode Network, which is primarily involved in activities like mind wandering and self-referential thinking.²⁸ On the contrary, important regions of the Central Executive Network, the part of the brain primarily tasked with sustaining attention, complex problem-solving and working memory, were notably more strongly active. These findings support the idea that experiences of awe involve a temporary diminishment of self, in addition to heightened engagement and immersion. The study supported existing theories between awe and the “small self”. These findings also resonate strongly with philosophical accounts of wonder as self-loss or decentering.²⁹

²⁷ Dacher Keltner and Jonathan Haidt, “Approaching Awe, a Moral, Spiritual, and Aesthetic Emotion,” 303.

²⁸ Michiel Van Elk et al., “The Neural Correlates of the Awe Experience”.

²⁹ Sideris, Burton, Hepburn, and Kearns are all in agreement about wonder having the power to draw us out of ourselves (Sideris, 2019; Burton, 2024; Hepburn, 1980; Kearns, 2015).

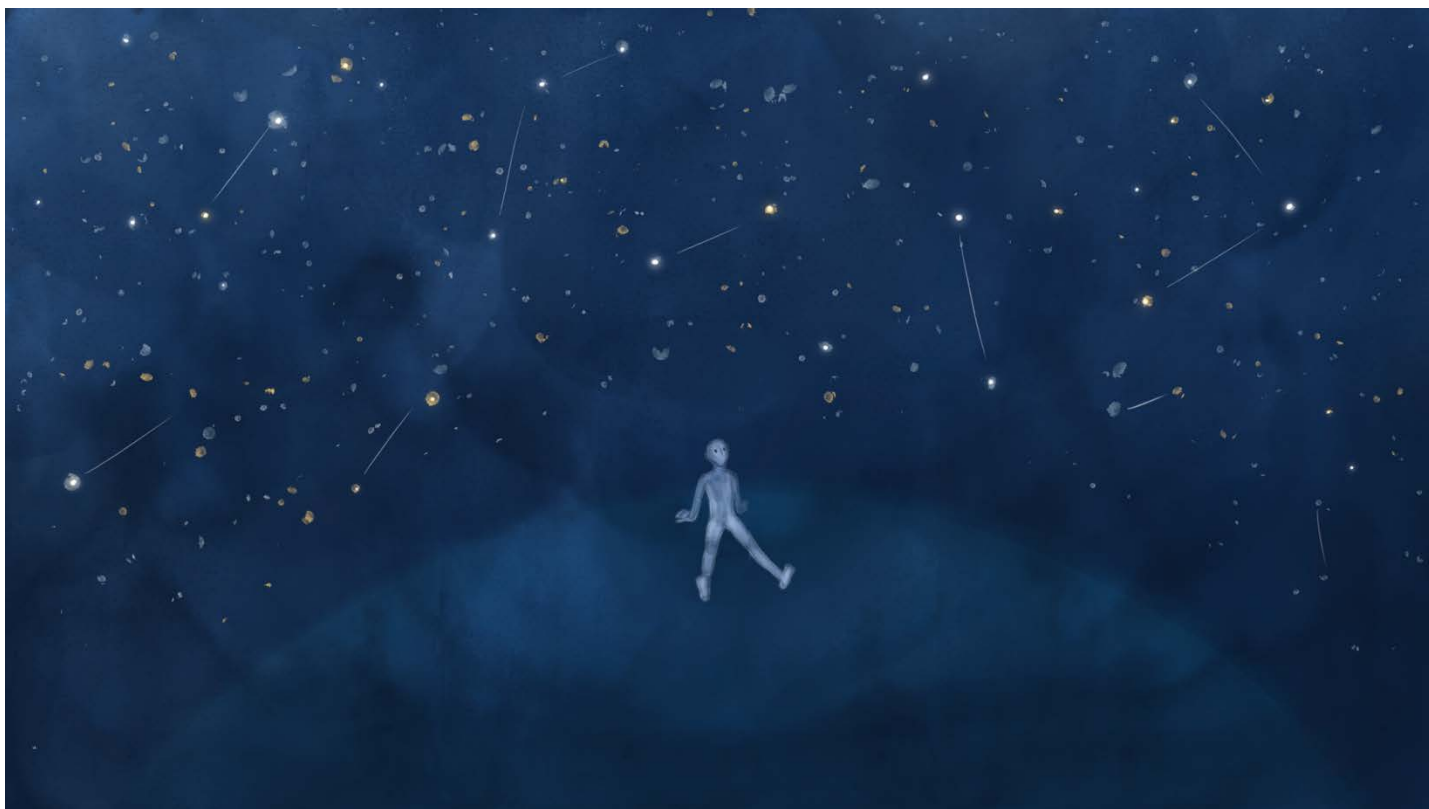


Fig. 6: Author's illustrative exploration of the "small self", 2022.

2.1.4 Toward a Working Definition

If the myriad of readings that inform this thesis have taught me one thing about wonder, it is that *wonder is personal, subjective, and often ineffable.*

From the linguistic, philosophical, and psychological perspectives explored above, several further characteristics emerge:

- It involves perceived vastness or excess
- It requires cognitive or perceptual accommodation
- It is embodied and multisensory
- It diminishes self-focus while heightening attention

Synthesising these threads, I extend the definition: *Wonder is a personal, subjective, and often ineffable experience. It is an aesthetic encounter that calls for a reworking of one's existing systems of understanding.*

There is one further dimension I wish to add: shareability. While wonder is deeply personal and subjective, it is also an experience that seeks to be eagerly *shared* with others. Like a child eager to share delight with a companion, wonder carries an impulse to point, to invite.

The lexical analysis of JWST discourse revealed this. Individuals publicly declared their astonishment instead of just privately experiencing it. In the first focus group session conducted for this project, participants reported that experiencing installations collectively deepened their engagement. Their observation of fellow participants' interactions reduced self-consciousness, encouraged experimentation, and prolonged immersion. This, too, reinforces the urge to *share*.

The impulse to share experiences of wonder also resonates with my own autoethnographic reflections. The desire to construct immersive installations rooted in cosmic imagery emerges from an urge to point out to the Cosmos. It is from this impulse that this thesis project emerges. My working definition, carried forward through the rest of this paper, is:

Wonder is a personal, subjective, and often ineffable experience. It is an aesthetic encounter that calls for a reworking of one's existing systems of understanding, and an inclination to share the experience.

"Look", I say, "This is a thing of wonder. It brings me joy, and I'd like you to revel in it with me".

2.2 Wonder and Cosmic Interconnectedness

As distant from us as the Cosmos is, we recognise ourselves in it. Our origins, existence and all of human history trace back to the origin of the Universe. Carl Sagan famously wrote, "The exploration of the

Cosmos is a voyage of self-discovery”, positioning the human subject within an intricate web of interstellar connections.³⁰



Fig. 7: *The Pale Blue Dot*, Image Credit: NASA.

Fig. 8 shows an image now lovingly called "The Pale Blue Dot". We have Carl Sagan to thank for both its humbling title and very existence.³¹ About the image, he wrote, "That's here. That's home. That's us. On it everyone you love, everyone you know, everyone you ever heard of, every human being who ever was, lived out their lives... on a mote of dust suspended in a sunbeam".³²

³⁰ Carl Sagan, "Cosmos", (1980), 298.

³¹ Sagan spent years petitioning NASA to permit the *Voyager* spacecraft to take this particular capture of Earth. The image was finally taken in 1990 as an afterthought, after the *Voyager* diligently completed its photographic survey of the Solar System: Stephen Carney, "Voyager 1's Pale Blue Dot," NASA Science.

³² Ibid.

The existential register and storytelling aspects of wonder, as presented in the preceding subsection, strongly align with Carl Sagan's articulation of the cosmic perspective. For Sagan, scientific knowledge intensifies wonder. To understand that we are composed of star-forged elements can, on the one hand, reduce human existence to its basic chemical composition. But with Sagan's poetic phrasing, it situates humankind within an infinite, unfolding cosmos.³³ That distinction is central to this thesis and is explored further in Chapter 5.

Amongst contemporary science communicators, astrophysicist Neil deGrasse Tyson and physicist Brian Cox echo Sagan's cosmic perspective and sensibilities. Tyson describes cosmic wonder as fundamentally democratising: "We are all connected; To each other, biologically. To the earth, chemically. To the rest of the universe atomically".³⁴ Similarly, Cox in his book *Wonders of Life* emphasises, "Deeper understanding confers that most precious thing — wonder".³⁵

This scientific articulation of wonder and interconnectedness resonates with Indigenous cosmologies referenced earlier in this review. As discussed in subsection 2.1.2, Indigenous philosophies such as *mamàhtawisiwin* and Pacific notions of *Moananuiākea* have long upheld reciprocal relationships with the cosmos through observation, stories, and lived practice.

2.3 Wonder and Immersion

Immersion, in the experiential sense, describes a state of deep absorption. Media theorist Oliver Grau writes, immersion can be characterised by "diminishing critical distance to what is shown and increasing emotional involvement in what is happening".³⁶ Immersion blurs the boundaries between the self and the surrounding world. It resists quick consumption and requires time.

³³ Carl Sagan, "Who speaks for Earth", in *Cosmos: A Personal Voyage*, episode 13. Previously quoted in his book "The Cosmic Connection" (1973).

³⁴ Neil deGrasse Tyson, "Beyond the Big Bang," in *The Universe*, season 1, episode 14.

³⁵ Brian Cox and Andrew Cohen, "Introduction" in *Wonders of Life* (2013).

³⁶ Oliver Grau, "Virtual Art: From Illusion to Immersion", 13.

In this sense, immersion, too, involves several of the factors crucial to wonder: both require accommodation, both are embodied experiences, and both tend towards the notion of the “small self”. The neurological research by Van Elk et al.’s neuroimaging study, as outlined in the previous section, supports this alignment. Neurologically and phenomenologically, to be immersed is very close to being in wonder.

So, then, if wonder is to be cultivated rather than stumbled upon, the conditions for it could be designed to invite immersion. The environment must offer the body something to encounter over mere visual spectacle. Immersive installation art is the most effective medium for creating these conditions.

2.3.1 What makes an installation “Immersive”?

Immersive installations and experiences are not a contemporary invention. Humans have long constructed spaces designed to envelop perception—from caves and ritual sites to theatres and cathedrals.³⁷ Artist Sylvie Coellier and art historian Christine V. Kayser describe installation as appearing to have “no fixed characteristics, except to be a multiple, hybrid, complex art form”.³⁸ They emphasise its performative aspects. Spatial arrangement contributes to dialogic interactions within these physical, imagined spaces. Similarly, art historian Julie H. Reiss emphasises the reciprocal relationship between viewer, space, and artwork. For Reiss, meaning emerges through movement, duration, and attention.³⁹ Together, these definitions inform my approach in a material, structural and curatorial sense. The hybridity described by Coellier and Kayser informs my multidisciplinary use of media and processes. As my project seeks dialogic interactions between the viewer and the work, I focused on spatial arrangements within the exhibition space as well as within each installation.

I’d like to bring in another definition of installation art that I am particularly fond of. Itzhak Goldberg, in defining installation art, writes: “installations create a space within a space, by extension, fragmentation

³⁷ Oliver Grau, “Virtual Art: From Illusion to Immersion”, 2-11.

³⁸ Christine Vial Kayser and Sylvie Coëllier, “Editor’s Introduction” in *Installation Art as Experience of Self, in Space and Time*.

³⁹ Ibid.

or intensification”.⁴⁰ The installations in this thesis project create a space inviting wonder *within* a space designed to foster relational awareness in our interconnected cosmos.

What constitutes an “immersive” experience?

a. The Body’s Experience

Drawing on Maurice Merleau-Ponty, Shaun Gallagher argues that perception emerges through the body’s active engagement with its environment. The lived body is the medium through which the world becomes meaningful.⁴¹ Installation art foregrounds this embodied condition by situating the viewer within the work rather than in front of it. When such encounters engage multiple senses through visuals, sound, movement, and spatial orientation, the body’s experience is intensified. Thus, reinforcing the understanding of perception as an integrated, bodily process rather than a purely visual one.⁴²

b. The Aesthetics of the Experience

Aesthetics, like wonder, is quite a subjective experience. Kant, in his writings about aesthetics, notes that aesthetic experiences are subjective and driven by individual perception and understanding of beauty. However, through reason, we might analyse the experience for its objective qualities and overcome our personal biases to settle on a universal appeal.⁴³

To paint a picture, while our understanding of the JWST images as non-specialists may be limited, we can still objectively appreciate the feat of human intelligence it took to acquire those images, and then visually appreciate the image itself.

⁴⁰ Ibid.

⁴¹ Shaun Gallagher, “Lived Body and Environment,” 139-145.

⁴² Ibid. 150-155.

⁴³ Immanuel Kant, “*Critique of Judgment*”, trans. Werner S. Pluhar, 103–114.

c. Emotional Evocation

The body's sensorial experience, in conjunction with aesthetic elements such as light, scale, movement, and sound, plays a central role in creating what can be described as a visceral, emotional connection to the artwork. Media theorist Oliver Grau argues that immersive artworks operate by engaging the viewer's senses in ways that diminish critical distance and heighten emotional involvement. Immersive environments aim to envelop the body and appeal to all the senses, producing an experience that is felt as much as it is perceived.⁴⁴

These factors, crucial to the immersive installation experience, tie in neatly with the conditions to fulfil the experience of awe: vastness and accommodation. If wonder requires perceptual recalibration and carries an impulse toward shared experience, immersive installation art creates a space for wonder to emerge. Hence, immersive installation art becomes the primary output of this thesis.

⁴⁴ Oliver Grau, "Virtual Art: From Illusion to Immersion", 13-15.

3. Methodologies & Methods

This chapter outlines the methodological foundations and specific methods employed in this research.

3.1 Methodologies

3.1.1 Research-Creation

This thesis is situated within a research-creation framework. Owen Chapman and Kim Sawchuk describe research-creation as a methodological approach best understood as a concept with blurred boundaries.⁴⁵ More specifically, this thesis can be situated within the subcategory they term: “research-from-creation”. Knowledge emerges through iterative cycles of making, analysis, and reflection. The installations function as sites of inquiry in which concepts of wonder, immersion, and interconnectedness are tested materially and spatially. Experience and insight gained through observation directly influence the progress and evolution of the work. Thus, the writing develops alongside making, documenting and interpreting discoveries as they unfold.

3.1.2 Phenomenological Inquiry

Wonder, as explored in this thesis, is fundamentally a phenomenological experience—a subjective, first-person encounter characterised by altered perception and heightened receptiveness. As per Maurice Merleau-Ponty’s notion of phenomenology, the “body is not just an object in the world, but the very medium through which we experience and understand the world”.⁴⁶

This thesis employs phenomenological inquiry in two ways. First, as a stance toward the subject matter: wonder is treated as a phenomenon to be described through attention to lived experience. Second, as a methodological approach to data collection and analysis: participant responses such as their verbal reflections, observed behaviours and survey descriptions are treated as windows into subjective experience.

⁴⁵ Owen Chapman & Kim Sawchuk, “Research-Creation: Intervention, Analysis and “Family Resemblances,” 14.

⁴⁶ Saul McLeod, “Phenomenology In Qualitative Research,” *Simply Psychology*.

3.1.3 Autoethnography and Reflexivity

Communication scholars Ellis, Adams, and Bochner define autoethnography as research that “describes and systematically analyses personal experience in order to understand cultural experience.”⁴⁷ This approach acknowledges that the researcher is not external to the phenomenon under study.

This thesis is driven by my own encounters with wonder. My history with the stars and cosmos—from childhood observation nights to my first class in art school to my artistic practice—provides both the motivation and reflexive grounds for this inquiry.

Further, autoethnography is also employed as a method to describe embodied responses during studio experimentation, trace conceptual developments and clarify the affective motivations behind material decisions. Including reflexive writing, I situate myself within the context of my thesis and provide context to both the methods of discovery and justifications for them.

3.2 Methods

3.2.1 Literature/Scoping Review

Theoretical inquiry in this thesis focuses on three bodies of knowledge that are central to the research questions: wonder, immersive installation art, and cosmic interconnectedness. The scoping review and practice co-develop throughout the research process, each reshaping the other. Readings encountered at the beginning of the project opened new material directions, and new material discoveries in the studio sent me back to sources I had not previously considered. This iterative cycle between reading and making is characteristic of the research-creation methodology. The literature review is presented in Chapter 2, where it is organised thematically.

⁴⁷ Carolyn Ellis, Tony E. Adams & Arthur P. Bochner, “Autoethnography: An Overview,” 273.

3.2.2 Lexical Qualitative Analysis

This project includes a lexical qualitative analysis of public responses to the first image release from the James Webb Space Telescope, as detailed in Chapter 1. This method identifies recurring linguistic patterns, affective descriptors, metaphors, and references used to articulate wonder. Language is treated as data that reveals shared affective structures. This aligns with qualitative methodologies that prioritise meaning-making over quantification.⁴⁸

The lexical analysis served two functions in the development of this research. First, it established that wonder, awe, and existential reflection are consistent and nameable features of public response to cosmic imagery. Second, the vocabulary and thematic categories that emerged from the analysis were instrumental in the development of observational criteria for the focus group sessions that followed. The full datasets and methodological notes for this analysis are provided in Appendix A.

3.2.3 Studio Practice and Material Experimentation

In the true spirit of research-creation, this project did not begin with pre-determined visual outcomes or fixed installation plans. Studio experimentation began with open-ended material explorations and with attempts to visualise conceptual narratives. Through continuous and iterative art-making, and conversations with supervisors, fellow artists and friends, new concepts, new processes and new ways of visualisation emerged. One of the most important aspects was continuous testing for interaction and immersion. This cyclical process aligns with Chapman and Sawchuk's emphasis on intervention: prototype testing generates insights that reshape the next iteration.⁴⁹ Studio practice works to both generate new works as well as help analyse them. The full documentation of this process, including material exploration, prototype development and the evolution of each installation, is presented in Chapter 5.

⁴⁸ Carolyn Ellis, Tony E. Adams & Arthur P. Bochner, "Autoethnography: An Overview," 273-275.

⁴⁹ Owen Chapman & Kim Sawchuk, "Research-Creation: Intervention, Analysis and "Family Resemblances," 22. The paper discusses how a project can be considered as an "intervention" in nuanced ways, including the reactions to a creative work as well as the process through which a project is realized in its final form.

3.2.4 Focus Groups Testing

Audience engagement was tested through two semi-structured focus group sessions. The first session tested installation prototypes and gathered qualitative feedback through open-ended discussion and written responses. The second session was conducted six weeks later during the final exhibition, and tested engagement with the installations in their final forms. This approach reflects user-centred methodology wherein participant feedback shapes the advancement of the work without constituting collaborative authorship.⁵⁰ The sessions functioned as a 'testing and refinement phase', consistent with iterative design practices and the research-creation framework.⁵¹

Data collection methods include in-person observation, audio and video recording with informed consent, and a semi-structured group interview conducted over a shared closing meal. The informal setting of the shared meal was a deliberate methodological choice, intended to reduce social distance and facilitate open, honest reflection and communication. Participants were also invited to complete anonymous written reflection cards at the end of each session (see Appendix B), allowing for quick and candid individual responses alongside the group conversation.

Data analysis focused on affective language and behaviour observed in participants. This dual data collection method and analysis allows for a more nuanced understanding of participant response than either approach could have provided alone.

The findings from the first focus group session, which tested two prototypes out of three final installations, are discussed within the relevant installation write-ups in Chapter 5. Patterns emerging across both sessions are synthesised and analysed in Chapter 6 alongside the larger observational findings from the exhibition.

⁵⁰ Elizabeth B.-N. Sanders and Pieter Jan Stappers, "Co-creation and the New Landscapes of Design," *CoDesign* 4, no. 1 (2008): 5–18. Sanders and Stappers distinguish explicitly between co-design, in which users participate as co-authors, and user-centred design, in which users inform the designer's decisions without authorial agency over the outcome.

⁵¹ Chapman and Sawchuk, "Research-Creation," 22.

3.2.5 Audience Observation

In addition to the focus group sessions, observational research was conducted during the thesis exhibition. In accordance with Research Ethics Board approval, audience members were observed interacting with the installations, and field notes were recorded in real time. Unlike the focus group sessions, this observation extended beyond the invited participant pool to include general exhibition attendees, broadening the scope of the data. Research findings and analysis are presented alongside the focus group research findings in Chapter 6.

3.2.6 Post-exhibition Survey

A post-exhibition survey was distributed to willing participants approximately one week after the close of the thesis exhibition. The deliberate time lag between the exhibition encounter and the survey response was intended to test, firstly, whether wonder arises during an immersive encounter, but more importantly, if it persists. The survey functions as a measure of duration, probing whether the conditions cultivated in the exhibition were sufficient to sustain wonder, curiosity, or a felt sense of cosmic interconnectedness beyond the immediate experience.

The survey was distributed digitally, and the responses collected were anonymous. The data was analysed qualitatively, testing whether the vocabulary of wonder, vastness, and connection, that appeared consistently across the lexical and focus group analysis, resurfaced in reflections on the exhibition. Research findings and analysis are presented in Chapter 6.

4. Exploration and Experimentation

4.1 A Little Bit of Everything

My Instagram biography for the last 5 years has been “a little bit of everything”, which I think perfectly sums up my artistic practice. I am a charcoal artist, a painter, an illustrator, an animator, a tattoo artist, a singer-songwriter, and above all else, a storyteller. I have worked with wood and clay, carved and cut into it, then drawn and painted on it. I have played with textiles, creating both wearables and viewables (paintings and installations) alike. I take pride in the versatility of my practice because it has always allowed me to prioritise what a project needs and *asks* for, rather than defaulting to what I already know how to do or create.

Over the course of this project, I have been fortunate to explore a plethora of artistic media and make intentional selections for use in my final work. Two materials in particular, glass and light, shaped the direction of everything that followed. I arrived at both these materials through explorative making, and it was the making that sent me back to their histories.

4.2 From material to medium

4.2.1 Glass

In the summer of 2024, while finalising my thesis proposal, I had the opportunity to explore glassblowing and glass-fusing during a residency in Haliburton. While I was taken up with glass simply for the gorgeous, flexible medium that it is, my fascination for it grew when I began to learn of its tremendous impact on the history of humankind.

The invention of glass, beginning around the third millennium BCE in Mesopotamia and Egypt, marked a significant turning point in material culture.⁵² For centuries, it remained primarily decorative and

⁵² Carolyn Wilke, “A Brief Scientific History of Glass,” *Smithsonian Magazine*.

functional. Over time, glassmaking techniques evolved, eventually enabling the production of lenses. By the early seventeenth century, telescopes extended human vision *outward* towards distant stars, while microscopes extended our vision *inward*, revealing cellular structures within living organisms.⁵³

The dual expansion of vision—toward the infinitely large and the infinitesimally small—profoundly altered human self-understanding. Glass lenses facilitated the advancement of cosmology and biology, linking the study of the universe with the study of life. It is this quality of glass that made it the perfect medium for this project. In my installations, I use glass to do what it has always done: refract light. Through its refraction, light reveals what would otherwise remain invisible or unconsidered.

Optics relies on light. Reversing the logical sequential order, I arrived at light through exploring glass.

4.2.2 Light

Without light nothing is seen.

– Francis Bacon (ca. 1219/20–ca. 1292)⁵⁴

Beyond glass, it was one of many conversations with my secondary advisor, Angus Mok, that pushed me towards exploring light. He mentioned the most exciting aspect of Astronomy for him was trying to understand the Universe, trying to solve the grand mystery of it through all the “light that we collect”. He stated it quite simply, because yes, astronomical knowledge *does* depend on light. Astronomy is, quite literally, a *collection of light*. Stars, galaxies, and nebulae are visible and known to us through the light they emit, absorb, or reflect, among other things.

Humans have always craved light.⁵⁵ Before we were able to create and harness it for ourselves, we lived by its natural emergence and rhythms: the arc of the sun through the day, the twinkling stars by night.

⁵³ Seth C. Rasmussen, “How Glass Changed the World”, 72-74.

Omar Ismail, “Glass The Innovation That Built The Modern World”, *Medium*.

⁵⁴ Roger Bacon (ca. 1219/20–ca. 1292), quoted in Kristen Collins and Nancy K. Turner, “Lumen: The Art and Science of Light, 800–1600”, viii.

⁵⁵ *Ibid*, 1.

Starlight paved the way for timekeeping, as we tracked the movement of the sun, noted the passage of time and created calendars.⁵⁶ It also helped with navigation as we learned to chart the night sky, using the stars as guides.⁵⁷ Light provided structure to human activities, while also shaping how they understood the world and their place in it.

Over centuries, humans were able to discover and create our own sources of light. Starting with the discovery of fire in the Palaeolithic Age, which sustained us for centuries.⁵⁸ Then came the invention of electricity and Thomas Edison's infamous incandescent light bulb, and more recent adaptations into halogen and LED lights.

We have now multiplied artificial light so aggressively that it has turned against its own origin. Light pollution—the excessive use of artificial light—critically hinders our ability to observe stars and other celestial bodies. More than 80% of the world's population lives under what has been termed “skyglow”, the brightening of the night sky due to large installations of artificial outdoor lighting. Skyglow has such a tremendous impact that it is now even reaching into remote parts of the Arctic.⁵⁹

In terms of my own practice, I do not particularly like calling light a “medium”. I borrow the words of James Turrell, a true master artist of light, who said, “I use light as a material, but my medium is actually perception”.⁶⁰ In my work, I use light for the phenomenon it is and *bargain* with it. I follow its natural tendencies of behaviour and adapt the rest of my media around it.

Light is the *grand revealer* in my work, both visually and conceptually.

⁵⁶ Mark Cartwright, “Ancient Timekeeping”, *World History Encyclopedia*, Accessed on March 3, 2026.

⁵⁷ Jon Powell, “When Ships Were Steered by Starlight. How Ancient Mariners Used the Stars as Their Own GPS,” *BBC Sky at Night Magazine*, Accessed on March 3, 2026.

⁵⁸ “Earliest Fire-Making Dating Back 400,000 Years Ago Unearthed in Suffolk, England”, *Natural History Museum*. “Electrifying: The Story of Lighting our homes”, *Science Museum*, both articles accessed on February 27, 2026.

⁵⁹ John Barentine, “Artificial Light at Night: State of the Science 2025,” *Zenodo (CERN European Organization for Nuclear Research)*, Accessed February 20, 2026.

⁶⁰ Stephanie Grey, “James Turrell, ‘Into the Light’”, August 11, 2021.

4.3 Free Explorations

Unlike my usual art-making process, which tends to demand a clear sketch or plan, but in line with research-creation frameworks, I started by simply *making*. I followed my curiosity without a predetermined destination.

4.3.1 Exploration #1

Following my initial tryst with glass during my residency at Haliburton in August 2025, I sought out more affordable options to continue playing with the medium. Having discovered during glassblowing that I was comfortable with the torch, a flameworking workshop became my starting point.



Fig. 8: Author's glass comets.



Fig. 9: Author flameworking glass.

While flameworking was fun, the scale was too small to be of any efficient use in creating installations. I also realised through honest conversations that my intended glass comets or shooting stars bore an unfortunate resemblance to human sperm, or shooting cells if you'd please. Funnily enough, these glass pieces did begin as potential elements for an installation exploring our material relation to the stars. Holding onto that theme, I pivoted to glass fusing, successfully creating the first prototype for what would then become *you were once a star*.

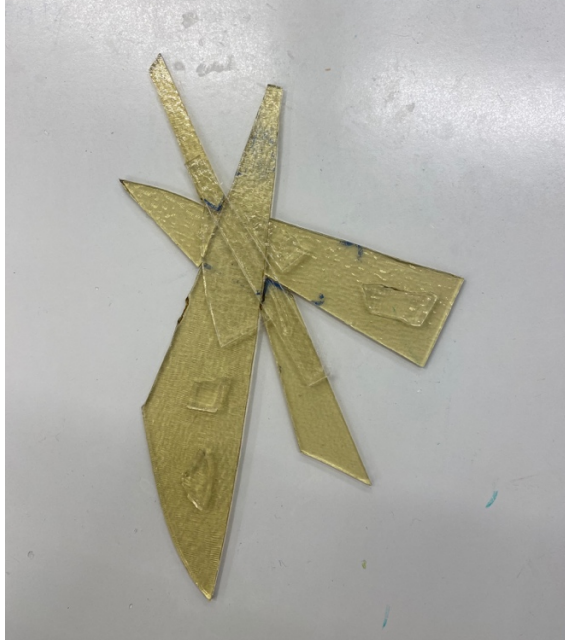


Fig. 10: Glass star prototype.



Fig. 11: Glass star prototype with light shining through.

4.3.2 Exploration #2

My first free exploration with light was extremely simple. I filled a tray of water and set it on the floor of a dark room. I used my phone flashlight to shine light onto the tray and created ripples in the water using my fingers. Lo and behold, it refracted light, casting shifting reflections onto the surrounding surfaces—a phenomenon known as caustics. **Caustics** refer to the envelope of light rays that are reflected or refracted by a curved surface or object, which can be projected onto another surface.⁶¹

My next exploration was slightly more complicated. I wanted to experiment with using a vocal input to create ripples and patterns in the water, bringing in another phenomenon known as cymatics. **Cymatics** explores the relationship between sound waves and physical matter, particularly how sound vibrations can create intricate geometric patterns and shapes in different materials, such as powder or fluids.⁶²

⁶¹ Taylor & Francis, "Caustics - Knowledge and References."

⁶² Hub Media Inc, "Cymatic Pursuits."



Fig. 12: Initial caustic explorations testing light passing through water-filled trays of varied materials.

I used a **tactile transducer**, also known as a bass shaker, which is a device that converts audio signals into vibrations. They are commonly used in simulation rigs to allow users to *feel* bass sounds instead of just hearing them. I used the bass shaker to convert vocal audio signals into vibrations that could be visualised in water. The signal chain ran from a microphone —> audio mixer —> Class-D mini-amplifier —> bass shaker —> water-filled container. The setup successfully produced ripples and geometric patterns. However, bass shakers respond most readily to low frequencies, so a higher-pitched voice produced weaker vibrations than a lower-pitched one. This was a limitation that directly informed the technical decisions made in the final installation.

Building on these initial explorations, I was able to develop the methods and media that became the foundation of each installation. The following chapter presents the exhibition in full. It begins with the exhibition statement and spatial logic, and then moves through each of the three installations: their conceptual development, making and testing process, and their final realisation.

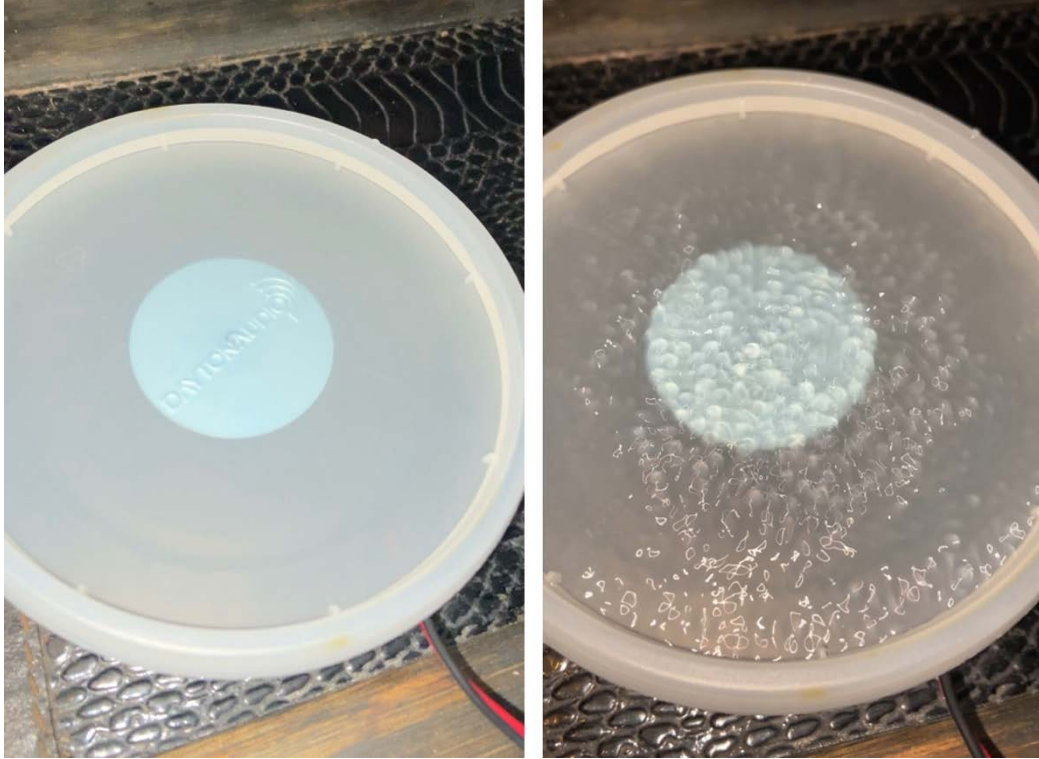


Fig. 13: Still water vs. geometric patterns created by a bass shaker in a water-filled lid of a deli container.

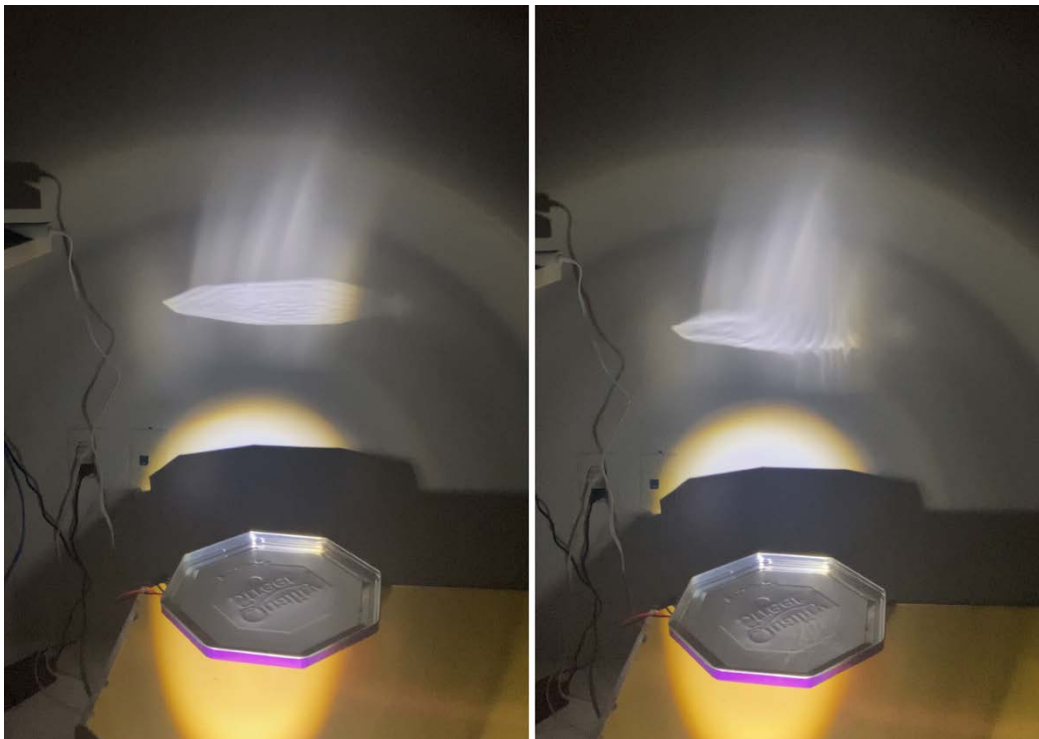


Fig. 14: Reflections of light passing through still water vs. light passing through patterns created by a bass shaker.

5. All the Light Reveals

The preceding chapters have asked what wonder is, under what conditions it arises, and how this project was designed to investigate it. This chapter looks at the works created for it.

The chapter is structured in three sections, starting with the exhibition statement and spatial logic. Following that, I discuss each installation in depth: including artist statements, documentation, the conceptual development and making process. Focus group findings from the first session relevant to each work are noted here.

5.1 Exhibition Statement

All the Light Reveals is an exhibition of immersive installations inviting viewers to reflect and revel in the light. Much of what we understand about the Universe emerges from collecting and interpreting information carried by light — a process that has shaped both scientific knowledge and our sense of place within the cosmos. The exhibition reflects on how these acts of interpretation reveal an interconnected universe, positioning the human subject within the expansive, intricate web of the Cosmos.

5.2 The Space

The exhibition is presented in the Graduate Gallery at OCAD University, 205 Richmond Street W., Toronto. It is a large, open room approximately 34' long and 24' wide, with a ceiling height of 10'4". Two large windows bring significant natural light into the space. Given the exhibition's dependence on controlled light conditions, the windows were blocked from any incoming light. Similarly, blackout curtains are installed at the gallery door, blocking ambient light while keeping the entrance open and welcoming.

The three installations occupy the gallery in a deliberate three-point spatial arrangement. Each work is complete on its own terms, but the three were conceived and curated to be encountered in one

interconnected exhibit. Together, they trace a movement that the viewer physically follows through the gallery space: from the cosmos, to the night sky, to the self. The exhibition begins at the largest scale and draws progressively inward, arriving finally at the body of the viewer.

you were once a star is situated in the upper right corner, emerging from the corner walls of the gallery. The second installation, *touch what grass?*, occupies the lower centre and has the largest footprint of the three. The third work, *further and further still* is situated in the upper left corner, mirroring the first installation on its right, thus also anchoring the back of the space symmetrically. Two smaller encounters connected to this final installation are spread across the gallery, maximising the given space. The exhibition layout is provided in Appendix C.

5.3 The Works

1. you were once a star

Artist Statement:

Humans have had an extensive history of looking to the night sky and asking where we come from. Different cultures and Indigenous knowledge systems have long held the stars as ancestors. Scientific inquiry eventually unearthed the factual truths at the hearts of these stories.

Through astrophysics, we learned how most elements heavier than hydrogen and helium are fused in the hearts of stars through a process called nucleosynthesis. When a star dies in a supernova, these elements are scattered across the cosmos, coalescing over billions of years into new forms: meteors, planets, protostars, and eventually, life.

you were once a star is a mixed-media installation using glass, bioplastic, textile, reflective mylar, and light. The work uses the supernova as a metaphor for the continuous redistribution of matter across the cosmos — the process by which star stuff becomes everything, including us.



Fig. 15: Installation view of 'you were once a star', March 2026. Photographed by Aman Deshmukh.



Fig. 16: Installation view of 'you were once a star', March 2026. Photographed by Aman Deshmukh.

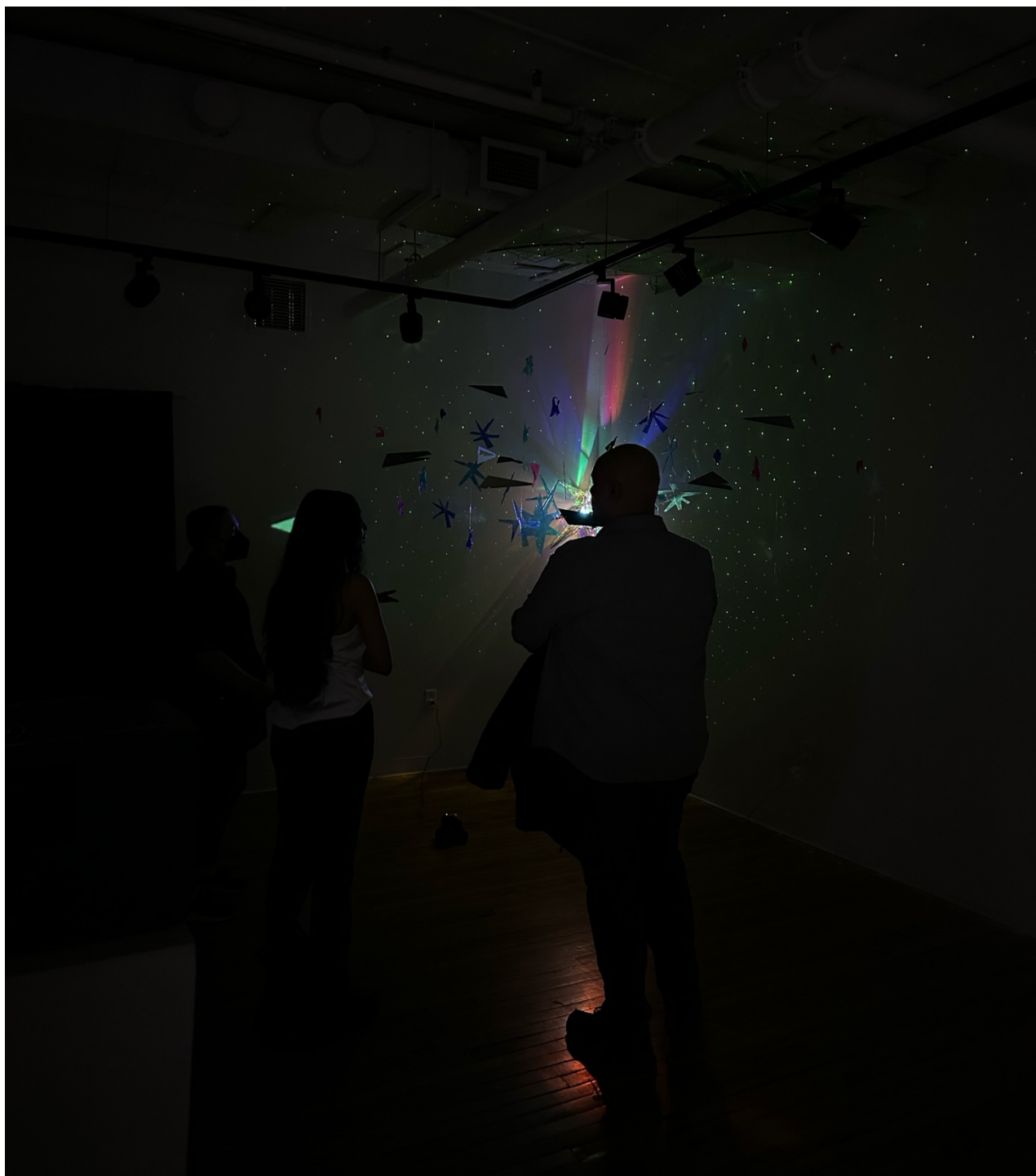


*Fig. 17: Author and audience members looking at 'you were once a star', March 2026.
Photographed by Natalia Valladares*

The Idea:

This installation is the conceptual origin point of the exhibition, and in many ways, of the thesis itself. The premise that the elements composing human bodies were forged in the cores of dying stars, is at once a scientific fact and a breathtaking one. As Carl Sagan rightfully said,

“We are a way for the Cosmos to know itself... **We are star stuff**, harvesting sunlight. Our lives, our past and our future are tied to the sun, the moon and the stars.”⁶³

While probably the most memorable narrator of this sentiment, Sagan was not the first to trace our lineage to cosmic origins.⁶⁴ Long before modern cosmology, human cultures around the world had developed their own accounts of our relationship to the stars. As Duane Hamacher, the Elders and Knowledge Holders who co-authored *The First Astronomers* (2022) demonstrate: Indigenous peoples around the world developed rich and rigorous star knowledge through centuries of careful observation, and this knowledge was deeply interwoven with understandings of origin, identity, and belonging.⁶⁵

Wilfred Buck, science facilitator and Cree knowledge holder at the Manitoba First Nations Education Resource Centre, describes how First Nations people “had a deep understanding of the sky” and engaged in sophisticated cosmological reflection — pondering, debating and philosophising about the nature of the universe long before contact with Western science.⁶⁶

Modern cosmology confirms what many cultures observed and discerned. The elements composing human bodies were forged in stars. Hydrogen and helium emerged from the earliest moments of the universe, while heavier elements like carbon, oxygen, iron were synthesised in the cores of massive stars

⁶³ Carl Sagan, “Who speaks for Earth”, in *Cosmos: A Personal Voyage*, episode 13
Previously quoted in his book “The Cosmic Connection” (1973).

⁶⁴ Thomas Moynihan, “How Humanity Discovered We’re All Made of “Star Stuff”,” *Big Think*.

⁶⁵ Duane Hamacher, with Elders and Knowledge Holders, “The First Astronomers: How Indigenous Elders Read the Stars”, *Sydney: Murdoch Books*.

⁶⁶ Wilfred Buck quoted in “We Come from the Stars: How Indigenous Peoples Are Taking Back Astronomy.”

and dispersed across space through supernovae.⁶⁷ Over billions of years, this stellar material coalesced into planets, ecosystems, and eventually the building blocks of earthly life. Through this account, the notion of human separateness becomes difficult to sustain. The tilt of our planet, the presence of our Moon, and the magnetic field shielding us from solar winds are all delicate and rare alignments that support our life.⁶⁸ These conditions, born of cosmic processes and interstellar chance, bind us inseparably to the Universe. Our bodies are temporary arrangements of cosmic matter, shaped by processes vastly older and larger than ourselves.

The Process:

The supernova is the installation's visual and conceptual metaphor. The work is situated in the upper right corner of the gallery and appears as if it is emerging out of the walls. It occupies a variable footprint, currently expanding across a 6 x 8 ft square. At its centre is a large, abstracted star form constructed from wooden skewers, reflective mylar, cellophane wrap, and PVC film. This form encases two LED spotlights fixed to the wall. Light escapes through this central form and passes through the smaller suspended star forms distributed in the space around it. Each smaller form represents a fragment of the explosion, a piece of the dispersal. The overall effect is of an abstracted supernova caught mid-event.

Caustics, one of light's phenomenal properties, is central to the piece. Light refracts through the varied media used to cast shifting, luminous reflections onto the surrounding walls. The smaller suspended forms use media like glass, laser-cut clear acrylic covered in holographic film, silver mirrored acrylic and bioplastics.

Glass was the first material developed for this work, emerging directly from the frameworling and glass fusing explorations documented in Chapter 4. Glass proved caustic-friendly but also expensive and fragile. These constraints pushed me to explore alternative materials, leading me to bioplastics.

⁶⁷ Chandra X-ray Center, "Stellar Evolution." Smithsonian Astrophysical Observatory
Barbier, Beth. "NASA's Cosmicopia - Basics - Composition - Nucleosynthesis".

⁶⁸ Peter D. Ward and Donald Brownlee, "Snowball Earth," in *Rare Earth*.



Fig. 18: Pre-fused glass stars sitting in the kiln.

In my bioplastic experiments, I tested two recipes: a corn-starch base and an agar-agar base. The cornstarch-based recipe produced a more opaque material that diffused rather than refracted light. The second recipe, using agar-agar as its primary ingredient, produced a semi-transparent material with excellent caustic properties. However, the agar-agar-based bioplastic had a short life span in its clear form, eventually turning opaque within 5-6 days. The material's impermanence resonated with the installation's theme. Since the installation is about the temporality of cosmic matter, utilising a material that is itself temporary felt fitting. However, this created a practical challenge as I had to ensure the bioplastic was cast as close to the exhibition date as possible to maintain it in its prime caustic period.

you were once a star was not tested in the first focus group session. It developed through an iterative studio process of continuous experimentation and testing.

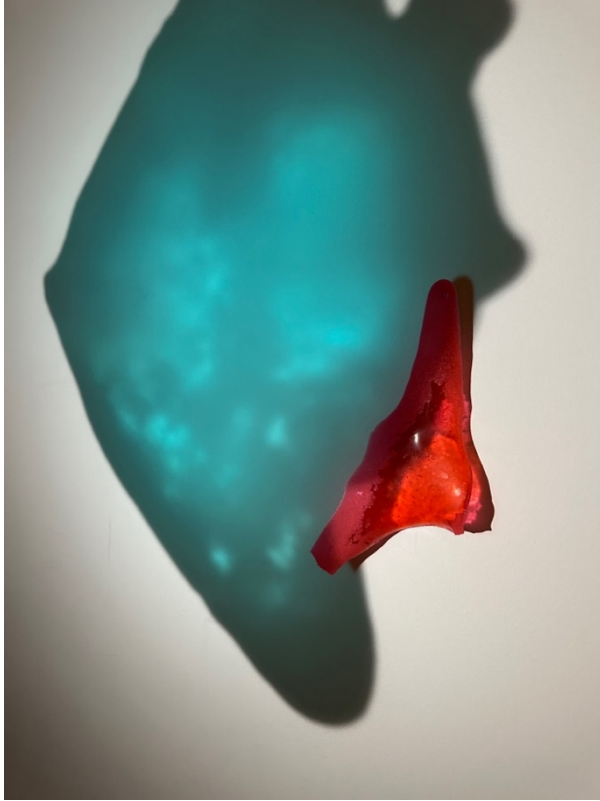


Fig. 19: Light passing through bioplastic creating caustics.



Fig. 20: Bioplastic production line pre-exhibition.



Fig. 21: Progression of the centre star form. Left picture shows the wooden skewer frame. Right picture shows the frame covered in cellophane wrap, reflective mylar and PVC film.



Fig. 22: Laser-cut clear acrylic star forms before peeling off the protective layer.

2. touch what grass?

Artist Statement:

For most of history, the night sky was a shared inheritance and global resource. It has been a constant presence that shaped how we told time, navigated the world, and understood our place within it. Today, more than 80% of the world's population lives under skyglow. The artificial lights of our cities have steadily erased the night sky from view. The stars are not gone. We simply cannot see them from where we stand. More recently, the rapid proliferation of satellite megaconstellations — most visibly Elon Musk's Starlink network — has introduced a new layer of obstruction, cluttering the sky and Earth's exosphere.

We have never known more about the universe, yet we have rarely been less able to simply look up at it. touch what grass? features a carpet of grass, inviting viewers to sit or lie down. Directly ahead is a large hand-woven paper screen painted to evoke an abstract cityscape. Suspended overhead is a black canopy, enveloping the space like a night sky emptied of stars. On either side, metal water trays sit on plinths,

each one mounted to bass shakers. Viewers are invited to speak or hum in low tones into a microphone, introducing vibrations into the trays of water. Light beams shine onto each tray, casting shifting caustic projections onto the woven screen and the canopy above. The light patterns are produced by the audience themselves. The viewers create the very thing that obscures the sky.

"Touch grass" is a phrase used in online spaces to tell someone to step away from the screen and re-engage with the physical world. The question this installation asks is: touch what grass? It asks us to confront how much of the natural world we have yet to experience in its original forms.



Fig. 23: Author sitting at installation of 'touch what grass?', March 2026. Photographed by Aman Deshmukh.



*Fig. 24: Audience member lying down on the grass carpet and observing the shifting light patterns as they speak into the mic.
Photographed by Natalia Valladares.*



Fig. 25: Installation view of 'touch what grass?' in daylight, March 2026. Photographed by Natalia Valladares.

The Idea:

The conceptual architecture of this installation rests on two related ironies, one environmental and the other technological. The first is the paradox of light itself, as established in Chapter 4. Light—the phenomenon that has always connected us to the stars and through which all astronomical knowledge is gathered—is the same phenomenon that now blinds us to them. Light pollution is not an accident; it is the consequence of a deliberate and largely unregulated accumulation of artificial light, contributing to skyglow.⁶⁹

Ronald Drimmel of the Turin Astrophysical Observatory has described the megaconstellation of satellites in Earth's exosphere as a potential "tragedy". He says, "Starlink, and other mega constellations, would ruin the sky for everyone on the planet."⁷⁰ As *Time* magazine noted in a 2023 piece, Musk has "charged forward with his vision for humanity regardless of the collateral damage". Altering what billions of people see when they look up to the heavens is among the most visible examples of that damage.⁷¹ The International Astronomical Union has called for the United Nations to protect the pristine night sky, arguing that it constitutes a shared global resource.⁷² That call has yet to be answered at sufficient scale.

The second is the irony encoded in the hand-woven screen. The choice to weave the cityscape by hand is a subtle acknowledgement of craft's contribution to the history of computation. When Joseph-Marie Jacquard patented his automated loom in 1804, the punch cards that instructed it operated on a binary system. This encoding is often considered 'a predecessor to modern computing', inspiring the design of early computers.⁷³ The weave, in *touch what grass?*, represents our increasingly digital and artificial world, that at its core, is built of binary 1s and 0s.

The grass carpet, the black canopy, and the caustic projections work together to create an environment that is a substitute for *and* a reflection of the natural world. The viewer lies on artificial grass beneath a

⁶⁹ Barentine, "Artificial Light at Night: State of the Science 2025,".

⁷⁰ Ronald Drimmel, quoted in Chelsea Gohd, "Astronomers Warn Elon Musk's Satellites Could Change Our Night Sky," *Big Think*.

⁷¹ Paris Marx, "Elon Musk Should Not Be In Charge of the Night Sky," *Time*.

⁷² Elizabeth Howell, "Astronomers Ask UN Committee to Protect Night Skies from Megaconstellations," *Space.com*.

⁷³ Science and Industry Museum. "Programming Patterns: The Story of the Jacquard Loom."

manufactured night sky and generates, through their own voice, the very light patterns that stand in for and obscure the stars.

The Process:

The developmental process of this installation began with free exploration #2, as detailed in Chapter 4. The first focus group session included a rudimentary prototype of this work. At that stage, the woven screen and canopy had not yet been built. The setup was limited to the microphone-to-bass-shaker signal chain attached to a small water tray. A single bright light source was angled to cast reflections onto the ceiling of the testing room. The ceiling in that space was visually busy, and the caustic projections were largely lost against it. Participants did not engage with the ceiling at all until the effect was pointed out to them. When the angle of the light was shifted to cast reflections onto the wall directly in front of participants instead, the change in engagement was immediate and dramatic. Both groups spent twenty to thirty minutes interacting with this single element, making the experience more social and dynamic. They shared laughter and joy as they experimented with different vocal tones and intensities. The reflections on the wall and ceiling produced different forms. Wall projections produced forms resembling animated sound waves, an immediately relatable visualisation of voice. Ceiling projections, by contrast, produced more geometric and abstract patterns.

After scaling the water tray to 16 x 16 inches and adhering reflective mylar to the inner base of the tray, the ceiling projections became considerably more prominent and visually interesting. This led to the decision to use two light sources per tray: one angled toward the woven screen ahead, the second angled toward the canopy above. Giving the caustic projections two distinct surfaces to inhabit simultaneously created a more enveloping environment within the installation footprint.

The hand-woven screen was developed after the focus group session, in direct response to the finding that a defined projection surface directly in front of the viewer dramatically increased engagement. The abstract cityscape was painted onto the strips of watercolour paper and then woven into its final form. The weaving process, while slow and painstaking, created a more dramatic surface for the light to interact with, also strengthening the conceptual fabric of the work.



Fig. 26: Initial prototype of woven form with caustics projected on it.



Fig. 27: Progress shot of the watercolour-painted woven screen.

3. further and further still

Developed in collaboration with Daniela Ortiz Correia

Artist Statement:

In the early seventeenth century, humans invented the first optical lenses, forever changing the way we see the world. Microscopes and telescopes showed us worlds that had always existed but been entirely invisible to us. We could see into intricate cellular structures within living organisms as well as observe galaxies billions of light years away. Every advancement in optical knowledge has expanded human knowledge. And with each advancement, our understanding of who and what we are has shifted.

further and further still takes its title from that ongoing movement. No matter how far our instruments reach, there is always more to see and more to learn — about the universe, and about ourselves.

At the centre of the installation is a circular screen displaying an abstract animated video that moves between microscopic and macroscopic scales. It positions the viewer within the vast range of scales that optical technologies have made visible. Surrounding it are suspended clear acrylic orbs, reflecting live footage of the audience through filters developed in TouchDesigner. The viewer is confronted with abstract and altered versions of themselves in real time.

Through this work, the audience is invited to consider how we come to know about ourselves and our place in the Universe, has been shaped by the instruments through which we look.

*The exhibit looks at light and what it reveals about the Universe. This work asks you to consider what light reveals about **us**.*



Fig. 28: Installation view of 'further and further still', March 2026. Photographed by Aman Deshmukh.



Fig. 29: Author interacting with 'further and further still', March 2026. Photographed by Aman Deshmukh.



Fig. 30: Expanded installation view of 'further and further still', March 2026. Photographed by Kristin Rodrigues.

The Idea:

This installation draws from Chapter 5's discussion of glass and optics. The invention of optical lenses and the subsequent development of telescopes and microscopes were among the most consequential shifts in the history of human perception. As explored in that chapter, these tools fundamentally altered what we understood ourselves to be, where we understood ourselves to live, and how we came to know anything about either.

Where glass historically extended vision outward toward the cosmos and inward toward the cellular, in this work, I ask: how have the instruments through which you see shape what you know, and, by extension, who you understand yourself to be?

This thread connects directly to the arc of the exhibition. *you were once a star* situates the viewer within a cosmic material history. *touch what grass?* places viewers at the centre of a contemporary environmental crisis of our own making. This installation completes the movement by making the viewer the object of the lens. It situates them within the history of observation, knowledge-making, and technological development that all three works draw upon. The installation also connects to Gallagher's account of the lived body as the medium through which the world becomes meaningful.⁷⁴

The Process:

The installation occupies a variable footprint of approximately 8 x 6 feet in the upper left corner of the gallery, mirroring the position of *you were once a star* in the upper right.

TouchDesigner was a new software environment for this project. Learning to build and optimise real-time performance files in it was a significant technical challenge, particularly given the processing demands of running multiple webcam filters simultaneously. Four filters were developed for the final installation, each drawing on a distinct scientific or perceptual concept:

1. A wispy filter evoking the quality of cosmic particles and stellar matter
2. An organic chromatic aberration that references the light spectrum and the way optical instruments split light into its constituent wavelengths
3. A thermal mapping filter that renders the viewer as a heat signature, referencing energy readings and non-visible forms of data collection used in scientific observation
4. An RGB starry filter that dissolves the human form into thousands of tiny points of light, connecting directly to the premise of *you were once a star*

⁷⁴ Shaun Gallagher, "Lived Body and Environment," 150-155.

Two looped background visuals accompany the filters: of a generative organic form and the other one of fractals—the repeating self-similar patterns found throughout nature, from fern leaves to galaxy formations.

Daniela Ortiz Correa, a Digital Futures undergraduate student at OCAD University, collaborated with me on this piece throughout the project's duration. Her contributions included two of the four webcam filters, as well as technical support in optimising the TouchDesigner file for performance mode and configuring the projection mapping setup.

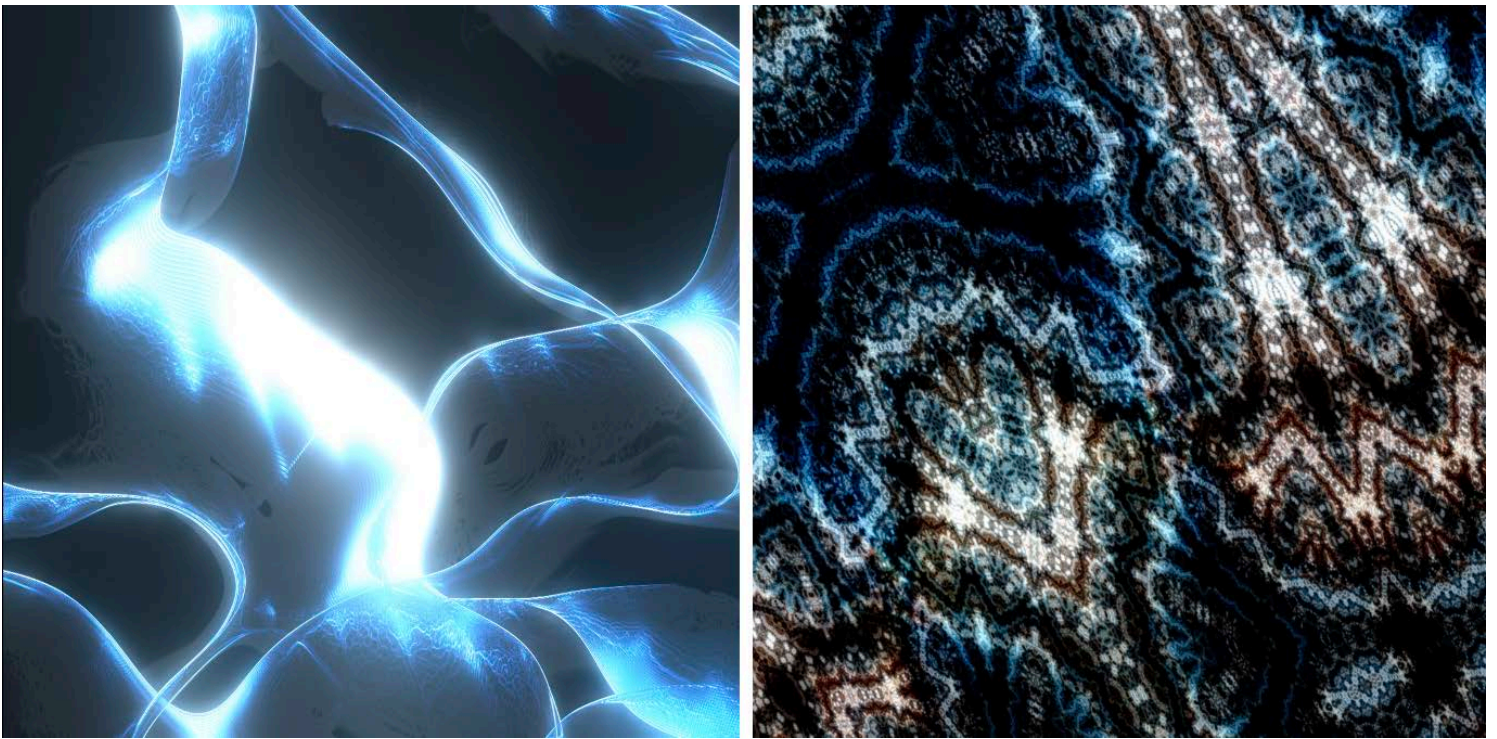


*Fig. 31: Stills from the looped background visuals: a generative organic form and generative fractals.
Developed by the author.*



Fig. 32: Still from the wispy webcam filter 1. Developed by Daniela Ortiz Correa.

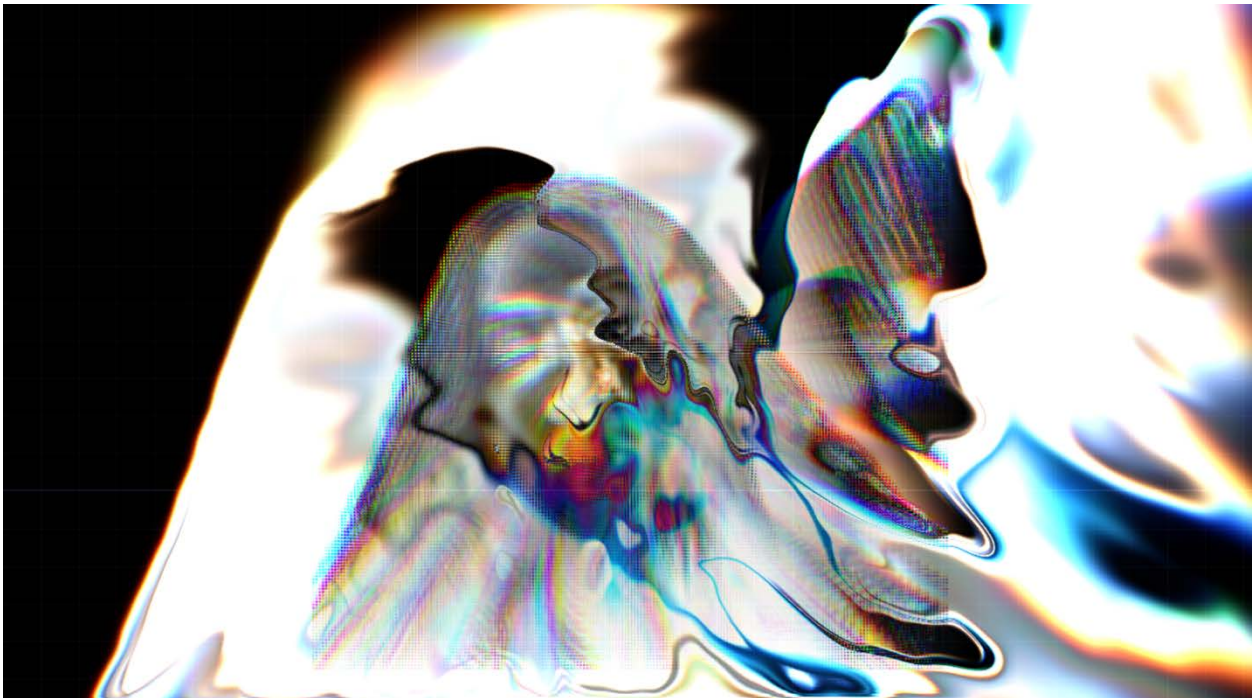


Fig. 33: Still from chromatic aberration webcam filter 2. Developed by the author.

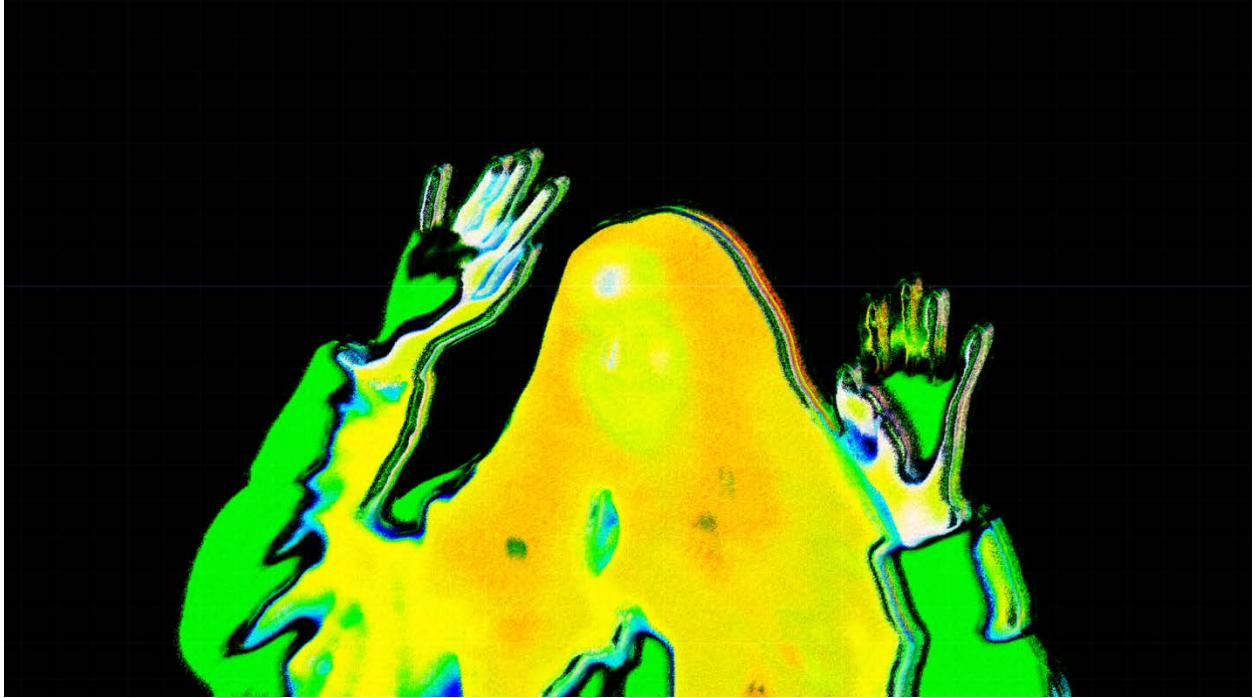


Fig. 34: Still from thermal map webcam filter 3. Developed by Daniela Ortiz Correa.

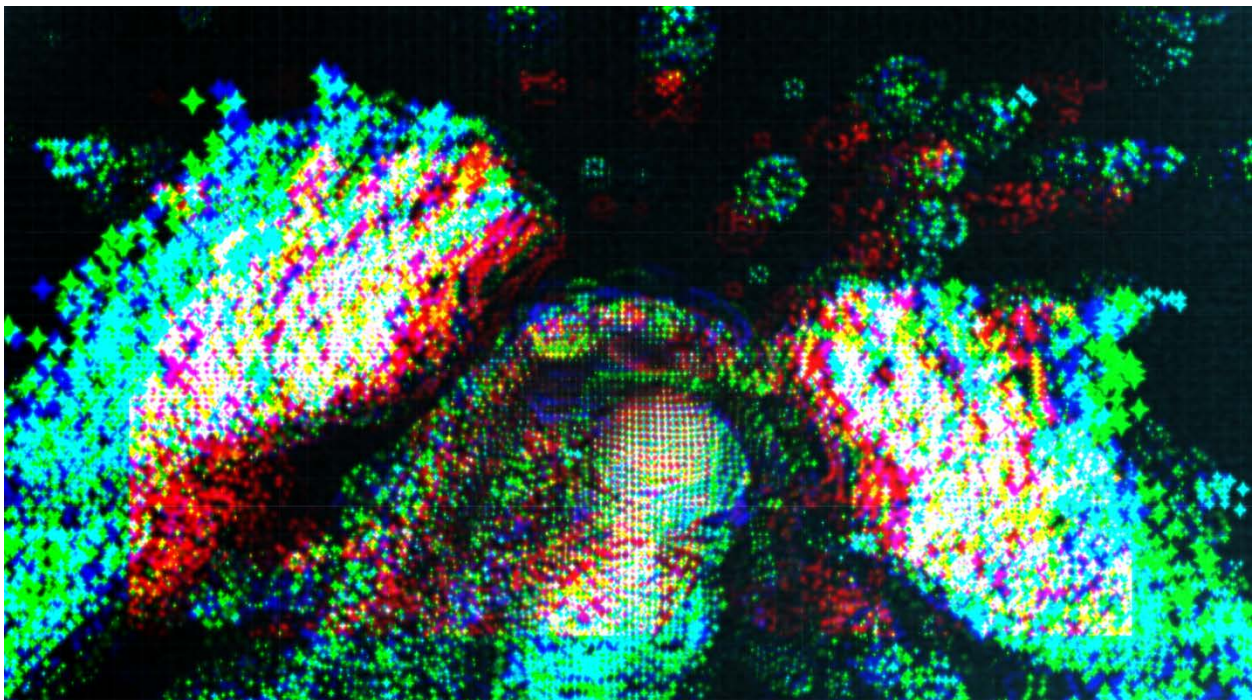


Fig. 35: Still from RGB stars webcam filter 4. Developed by the author.

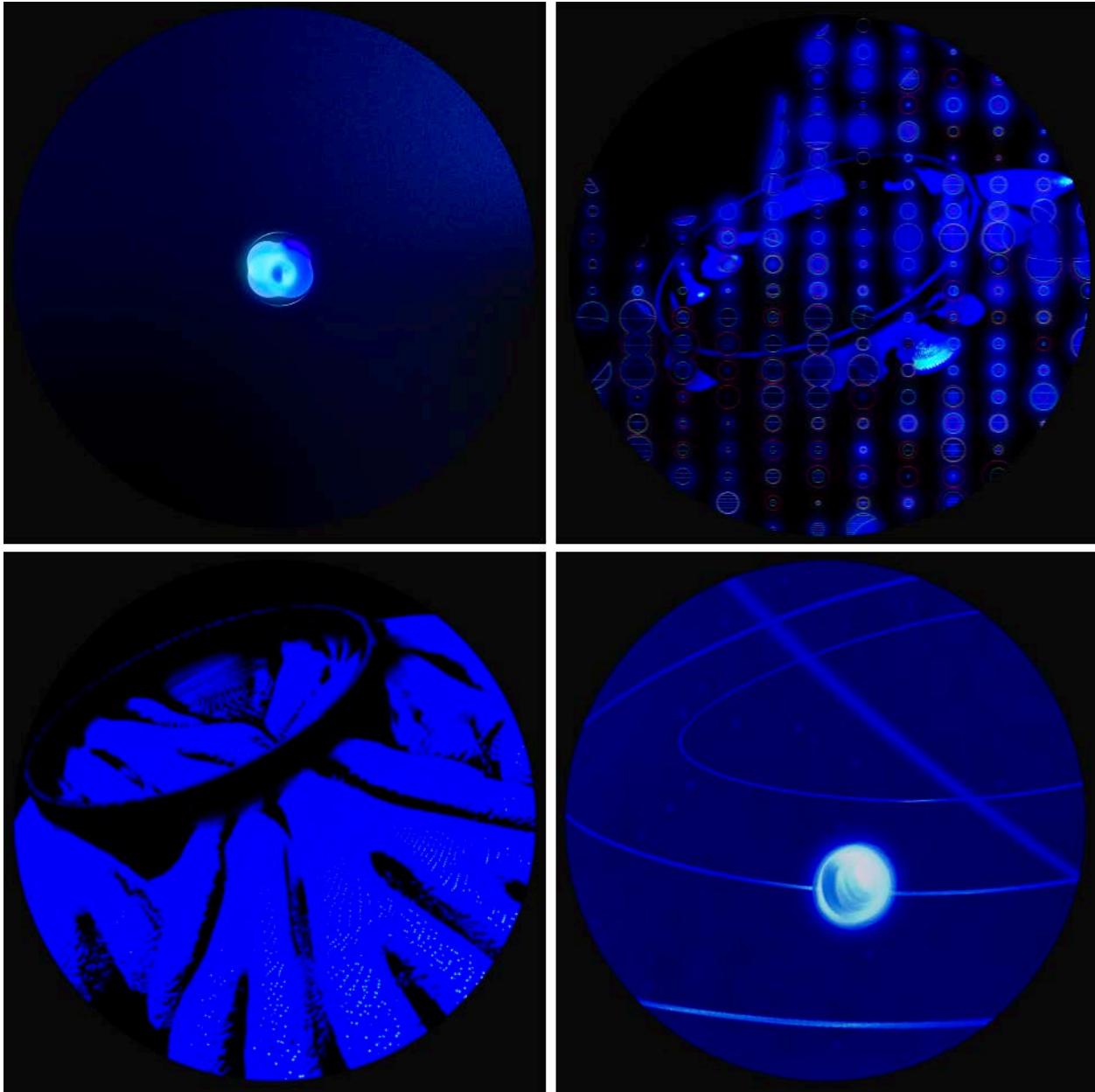


Fig. 36: Stills from the centre animation of 'further and further still', March 2026. Animated by the author.

During the first focus group session, the TouchDesigner file was significantly laggy, and participants were not able to experience the prototype installation in its intended form. However, participants were invited to interact directly with the filters on a laptop screen, which they engaged with enthusiastically. In place of the animated short, a compilation video of footage captured by the artist using a handheld microscope at 200x magnification was shown. The filters, the microscope footage, and the spatial

arrangement of the installation elements collectively gave participants a strong sense of scalar shift, as several noted this directly. Participants also spent considerable time trying to identify what they were looking at in the magnified footage, an interaction that was playful, curious, and sustained.

This response led to the development of a short video titled *what the f*** am I looking at?*, which is a compiled sequence of twenty objects captured at 200x magnification. It is presented as a game in which viewers attempt to identify the subjects. This video plays on a CRT television within the exhibition, offering a fun and accessible point of entry into the themes of optical knowledge and perceptual scale.



*Fig. 37: Installation view of the video 'what the f*** am I looking at?' playing on a CRT TV, March 2026.*

To emphasise my starting point into glass and its subsequent development into optical lenses, a second, smaller interaction was arranged beside the main component. On a long, narrow plinth, I presented a handblown glass sphere, a handheld microscope and an amateur telescope. The handblown glass sphere and microscope served as two varied points of interaction. Audience members were invited to look through the glass sphere to see the accidental optical illusion caused by the little bubble of glass at its base. Similarly, they were also invited to look through the microscope

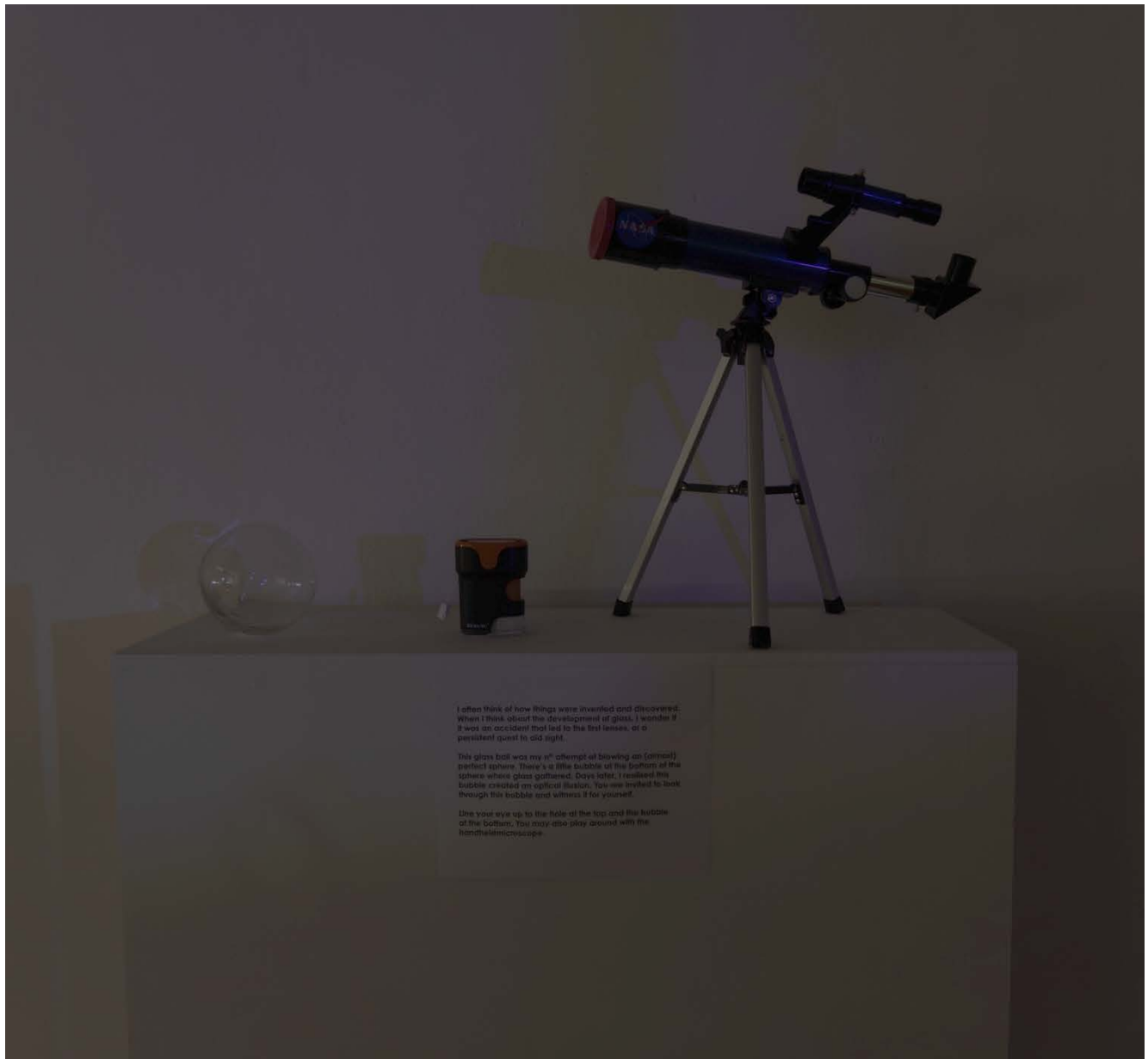


Fig. 38: Installation view of a handblown glass sphere, handheld microscope and amateur telescope presented on a plinth as part of 'further and further still', March 2026.

6. Research Findings and Analysis

This chapter presents findings from three interconnected empirical research methods: focus group testing, audience observation, and a post-exhibition survey. Using qualitative analysis methods, I trace recurrent themes and patterns across these data sources to understand how, and if, the immersive installations were able to invite experiences of wonder and resonate with the theme of cosmic interconnectedness. Secondly, it looks at whether these experiences of wonder were sustained.

This investigation is grounded in phenomenological inquiry—an approach concerned with understanding lived experience from the perspective of those who experience it.⁷⁵ Phenomenology offers analytical tools particularly suited to investigating a phenomenon like wonder. Phenomenological research demands attention to "lifeworld"—the structures of experience and principles or concepts that give meaning to how we live our lives.⁷⁶ This includes four existential dimensions: lived space (how we experience and inhabit environments), lived time (temporal experience beyond clock time), lived body (embodiment and physical presence), and lived relation (our fundamental connectedness to others).⁷⁷ These dimensions structure my analysis, framing my observations of how visitors moved through the gallery space, how long they lingered, what bodily gestures they exhibited, and how they interacted with one another as well as with me.

My methods draw on Shaun Gallagher's work on intersubjective perception, which provides a way to understand how wonder might be both individually felt and collectively shaped. Gallagher emphasises that our perception of objects is shaped by social interaction, by "the possible perceptions that others could currently have".⁷⁸ Similarly, Grant Kester's writing on dialogical aesthetics and Nina Simon's concept of participatory museum experiences provide practical insight into how artists and gallery

⁷⁵ Linda A. Bliss, "Phenomenological Research," *International Journal of Adult Vocational Education and Technology* 7, no. 3.

⁷⁶ Ibid.

⁷⁷ Ibid.

⁷⁸ Shaun Gallagher, "Intersubjectivity in Perception," *Continental Philosophy Review* 41, no. 2

contexts facilitate these intersubjective encounters.⁷⁹ Both Kester and Simon advocate for creating spaces where visitors can share their experiences and for artists to make use of viewers' participation and their insightful meaning-making.

My position as artist-researcher also shapes this inquiry in ways that require explicit acknowledgement. As phenomenological researcher Max Van Manen asserts, the challenge with phenomenological research is that "we know too much" about the phenomena we investigate, making it essential to engage in ongoing reflexivity about our assumptions and preconceptions.⁸⁰ Throughout this chapter, I practice what phenomenology calls "bracketing": attempting to set aside my intentions and expectations to remain open to what participants actually experienced.⁸¹ But while doing so, I also acknowledge the impossibility of complete neutrality.

The research methods employed generate different forms of phenomenological knowledge. Focus group sessions revealed how participants articulated their experiences through language. Following Van Manen's frameworks, my analysis moves beyond what participants explicitly say to uncover "implicit meanings".⁸² Audience observation documented embodied engagement and affective expressions. The post-exhibition survey captured reflective accounts after a temporal distance allowed the experience to settle into their memory and invite interpretation. Together, these methods provide a "rich and evocative description", while also foregrounding intersubjectivity, both of which are central to convincing phenomenological research.⁸³

⁷⁹ Grant H. Kester, "Dialogical Aesthetics" in *Conversation Pieces*, 2013.

Nina Simon in "The Participatory Museum: An Interview With Nina Simon," with Gerry Gaffney the host of the User Experience podcast, 2012.

⁸⁰ Linda A. Bliss, "Phenomenological Research".

⁸¹ Ibid.

⁸² Ibid.

⁸³ Saul McLeod, "Phenomenology In Qualitative Research," *Simply Psychology*.

6.1 Focus Group Testing: Session 1

Focus group participants were recruited through an open call circulated via social media and professional networks. The call described the sessions as an opportunity to interact with cosmic-themed immersive installations and noted that participant responses would help shape the ongoing development of the work. There was no mention of wonder as a concept or research focus, to allow affective responses to organically arise with no preconceived expectations or priming.

The initial screening form confirmed that participants were over 18 years of age and assessed their self-reported levels of interest in the cosmos. I received fourteen responses to this form and was able to confirm ten as participants. The four unconfirmed respondents did not respond to initial correspondence after completing the screening form. Amongst the ten confirmed participants, two identified as having a high level of interest in the cosmos, seven reported occasional curiosity, and one reported minimal prior interest. This distribution allowed for a range of entry points into the work, avoiding a sample skewed towards prior interest and enthusiasm for the subject matter.

The first focus group session was conducted on February 13, 2026. Ten participants were divided across two time slots: one with four participants and the other with six, to allow for closer observation of individual and collective interactions. Each session was scheduled for approximately one hour, with the second extending to one hour and twenty minutes as participants continued to engage with the works beyond the anticipated duration.

The two prototypes presented during this session would later evolve into *touch what grass?* and *further and further still*. Prototype 1 invited viewers to speak in low, bass tones into a mic. Their vocal inputs were converted into vibrations via bass shakers connected to a water-filled metal tray. A flashlight shining on this tray of water projected the shifting patterns of reflections onto the ceiling and wall.

Prototype 2 consisted of a circular screen suspended in the centre with smaller, spherical orbs surrounding it. A looped video was projected in the central screen, while live footage of the participants passed through abstract webcam filters was projected in the smaller orbs.



Fig. 39: Set-up for Prototype 1



Fig. 40: Set-up for Prototype 2

I analyse focus group data using thematic analysis, following Braun and Clarke's approach, of familiarisation through repeated reading of transcripts, reviewing for themes, defining and naming these themes, and then producing the analysis.⁸⁴ This method suits phenomenological inquiry because it prioritises identifying patterns in how participants describe their lived experience rather than imposing predetermined categories onto their responses. As Braun and Clarke note, themes should capture "something important about the data in relation to the research question".⁸⁵ In this case, it reflects how participants experienced and made meaning from their encounters with the prototypes.

6.1.1 Behavioural Patterns and Social Dynamics

Initial interactions were marked by shyness and hesitation. Participants approached the works cautiously, often observing before physically engaging. Participants frequently looked to one another before engaging, especially amongst friends and partners. Early moments of quiet observation gave way to increasingly animated interaction as participants became more comfortable within the group. More expressive participants shaped the rhythm and tone of interaction for the group as a whole.

The duration of engagement exceeded expectations. While the session agenda estimated participants would spend between 5-10 minutes at each prototype, participants spent between 15-20 minutes engaging with each prototype. The second group of 6 participants spent 25 minutes engaging with Prototype 2. Rather than brief encounters, participants remained with each installation for approximately fifteen to twenty minutes, suggesting sustained attention and continued curiosity. Laughter and dialogic exchange were prominent, particularly as participants took turns interacting with the microphone-based installation. This element encouraged playful experimentation, including calling out names, singing, and testing vocal range.

⁸⁴ Virginia Braun and Victoria Clarke, "Thematic Analysis," in *American Psychological Association eBooks*.

⁸⁵ Ibid.

6.1.2 Language and Conceptual Associations

Across both installations, participants linked visual, sonic, and bodily experiences into a broader conceptual framework. In Prototype 1, where vocal input generated vibrational patterns in water, participants connected their embodied actions to visual outputs resembling sound waves. One participant interpreted the mirror arrangements as resembling constellations, demonstrating a spontaneous projection of astronomical meaning onto the material composition. A second participant made note of the work's potential in holistic healing practices, while another interpreted the work more philosophically as visually demonstrating the "impact" of our words. Overall, participants agreed on the immersive nature of the work. To quote one of them:

"I think it's very immersive as well. It's not like a one-and-done experience; you can talk in different ways, change the way the light is reflecting. We spent a lot of time trying and testing different things at the mic; it was very consuming in that sense."

With Prototype 2, participants frequently drew connections to scale, particularly in response to its incorporation of microscopic imagery. One participant said:

"I was thinking of the micro and the macro, about how when you look at a cell, the structure is so weird, and that's what galaxies look like. So, I was thinking about the Cosmos, and it's something I often think about: how we're so tiny in comparison to this vast Universe."

Another participant contributed:

"It was interesting how there were different reflections of yourself around it, but like the middle stays the same. So, there's this curiosity because you're trying to make sense of your face in these different kinds of aspects. And when you figure out what the centre one is, you're also making that connection between the two. So, I guess it's a little thought-provoking because it's not obvious right off the bat."

The presence of thermal imaging alongside other abstracted projections of themselves further reinforced associations with energy systems and frequencies, as many noted in conversation and the reflection cards.

These conceptual associations demonstrate what phenomenology identifies as the movement from pre-reflective perception to articulated meaning.⁸⁶ Participants interpreted their perceptions through their existing frameworks of understanding. The installations became sites where their embodied experience met conceptual interpretation, generating meanings that exceeded my own intentions.

6.1.3 Affective Responses

Affective engagement was evident through both verbal and behavioural responses. Immediate reactions like “wow” and “ooh”, followed by laughter and playful interactions were common, particularly in installations that encouraged shared participation. Participants frequently returned to specific elements within the installations, testing variations and exploring different possibilities. This iterative engagement reflects curiosity and openness, as well as a willingness to remain within the experience rather than move on quickly.

These affective markers, too, are suggestive of the “pre-reflective” stage within phenomenological experiences.⁸⁷ The “wow” moments represent the immediate bodily recognition that something significant is occurring, even before understanding what that significance is.

Reflection Cards (Summary Table)

Responses collected through reflection cards during the first focus group session further support these observations. A summary of key responses is provided below, with the full set included in Appendix B.

These responses point toward a consistent set of experiences shaped by curiosity, sensory engagement, and conceptual connection.

⁸⁶ Saul McLeod, “Phenomenology In Qualitative Research,” *Simply Psychology*.

⁸⁷ Ibid.

Question	Representative Responses
First word that comes to mind	“Interesting,” “small,” “cosmos,” “vibrations,” “space,” “engaging”
What drew your attention	“light waves reacting to voice,” “patterns on water,” “microscopic footage/world,” “different projections of ourselves”
Resonant feelings	curiosity, immersion, playfulness, vastness, connection, movement, stillness

Source: Author’s summarisation of data collected from reflection cards filled out by 9 out of 10 focus group participants.

6.2 Focus Group Testing: Session 2

The second focus group session was conducted on March 27, during the exhibition. The same ten participants were invited to encounter the installations in their fully developed form. Unlike the first session, which presented two prototypes, participants encountered all three works. This shift from prototype to exhibition context introduced new variables, including spatial sequencing, material expansion, and the presence of an artist walkthrough. This session aimed at collecting reflective responses on the evolution of the work, while also observing new ways of engagement and interpretation.

The methodological approach remained consistent with Session 1: a thematic analysis of verbal responses combined with observational documentation of behaviour. However, my dual role as artist-researcher became more pronounced here. During the walkthrough, I narrated conceptual frameworks and material choices, inevitably shaping how participants subsequently interpreted the works. I acknowledge this influence while noting that typical gallery experiences occur within similar frameworks of curatorial mediation via artist statements and other institutional contexts that may shape reception.

6.2.1 Behavioural Patterns and Spatial Engagement

Participant behaviour in this session was marked by a more immediate and confident engagement with the installations. Hesitation was less pronounced than in the first session, as participants had prior experience with some of the interactions. Overall, the collective social dynamic of following the more confident and expressive participants remained the same.

The first installation, *you were once a star*, functioned as a strong entry point into the exhibition. Participants spent extended time with this work and even returned to it later, suggesting that it held both initial and sustained attention. Engagement frequently began with observation, followed by interaction once participants became familiar with the available tools, such as the flashlight. Moments of stillness were particularly noticeable in this session. For instance, when experimenting with light in *you were once a star*, participants would stay still, focusing on subtle visual changes before resuming movement. These pauses suggest a shift toward attentive and reflective engagement.

The addition of new material elements, particularly the grass surface in *touch what grass?*, shaped the way participants physically inhabited the space. Participants sat and lay down within the installation, extending the duration and quality of their engagement. This work in particular became a site for shared conversation as participants chose to sit within the installation to converse and reflect on their experience.

Similarly, the addition of elements and interactions to *further and further still* also contributed to prolonged and deeper engagement. Participants who had previously encountered the microscope footage in session one enjoyed playing the guessing game on the CRT TV. They had questions about the objects displayed, even expressing disbelief over some of the answers. They also enjoyed looking through the handheld microscope, taking it for a stroll through the exhibition.

6.2.2 Affective Responses and Evolving Interpretation

Affective responses in this session were more immediate and a constant presence through the exhibit. Expressions such as “wow”, “that’s so cool” and “mesmerising” were vocalised frequently, often at the first encounter or at a moment of discovery. These vocal responses were accompanied by quieter moments of stillness and prolonged observation.

Interactions were a lot more playful in this session. In the 15 to 20 minutes spent at *touch what grass?*, participants spent time playing news reporters, singing songs and laughing boisterously into the mic. They experimented with their vocal range along with barks and other animal sounds.

The spatial arrangement of the exhibition influenced interpretation. Participants encountered the works in sequence, allowing connections to form across installations. The presence of the artist walkthrough also shaped engagement. Participants described the works as intentional and interconnected, appreciating the storytelling aspects provided in the walkthrough. They noted that the context helped them better understand the intentions behind the work, while still allowing space for personal interpretation.

This playful mode of engagement and interpretation contests the "orthopedic aesthetic" that Grant Kester critiques, where artists impose meanings onto passive viewers.⁸⁸ Instead, the installations invited participants to exercise agency and actively shape their own experiences within the established conditions.

Finally, many participants documented their experience through photographs and videos. They spent time taking pictures of their views through different objects, such as the handblown glass sphere or the microscope, as well as conducting mini photo-op sessions in the midst of installations like *you were once a star*. This behaviour suggests a desire to capture and extend the moment beyond the exhibition itself. It also reflects how the visual and interactive qualities of the work translated into forms that participants found meaningful enough to record and revisit.

⁸⁸ Grant H. Kester, “Dialogical Aesthetics” in *Conversation Pieces*, 2013.

6.3 Audience Observation during the Exhibition

Audience observations conducted over the four days of the exhibition provide insight into how a broader audience engaged with the installations. This section draws on observational methods adapted from grounded theory ethnographic research methodologies but employed for phenomenological purposes.⁸⁹ My observational approach involved positioning myself within the gallery space, making note of visitor movements, duration of engagement, verbal utterances, facial expressions, and social interactions through written field notes. I did not use video or audio recordings to avoid influencing natural behaviour and to respect visitor privacy. This method provided access to dimensions of experience that verbal reports cannot capture alone.

However, observation carries inherent limitations requiring acknowledgement. I was not a neutral presence; some visitors recognised me as the artist, which likely affected their behaviour. My field notes necessarily filtered observations through my perspective, selecting certain details while overlooking others. Most significantly, my observation captures external behaviour without accessing viewers' internal experiences: I could see someone pause but not necessarily know what they felt or thought in that moment.

6.3.1 Embodied Engagement and Affective Responses

Upon entering the space, most viewers were immediately drawn to the first installation, *you were once a star*. Their approaches to interaction varied. Some began engaging right away, particularly those who read the interaction guide. Others spent time observing before interacting. Despite these different entry points, the majority of participants did not move quickly through the exhibition. Out of approximately twenty audience members, only two engaged briefly (approximately 5 minutes), while the remaining eighteen spent extended time within the space (10-15 minutes on average). Viewers moved slowly between installations, often pausing, returning, and re-engaging with works multiple times. Sustained

⁸⁹ Tahereh Fathi Najafi et al., "Observation in Grounded Theory and Ethnography: What Are the Differences?," *Iranian Red Crescent Medical Journal* 18, no. 11, 2016.

attention was particularly evident in *you were once a star* and *touch what grass?*, the former accounting for the strongest initial reactions, while the two tied for the longest durations of interactions (15-20 minutes).

Affective engagement was immediately visible through verbal responses. Similar to the focus group session, expressions such as “wow”, “that’s so cool” and “mesmerising” were frequently heard throughout the exhibition. These reactions were typically spontaneous and unprompted, offering a direct indication of impact. Within existing neurophenomenological and affective studies of awe, experiences are measured through self-reported scales or physiological markers and facial expressions.⁹⁰ Spontaneous verbal utterances as indicators of awe have received less empirical attention. The vocal expressions observed here align with Weger and Wagemann’s distinction between the initial phase of wonder and the more contemplative state and sustained reflection that follows.⁹¹

Alongside these vocal expressions, quieter embodied forms of engagement were also present. Viewers often paused in silence when first encountering a work or while focusing on subtle changes within the installations. Participants engaged with the work through physically moving through the installation space, touching various elements. These patterns of affective and embodied engagement align with the phenomenological understanding of immersion discussed in Chapter 2. Drawing on Shaun Gallagher's concept of the lived body⁹², the installations functioned as environments to be inhabited and navigated. Participants' embodied responses, such as their pauses, silences, and physical repositioning, demonstrate the body's role as the primary medium through which an experience becomes meaningful.

⁹⁰ Michiel Van Elk et al., “The Neural Correlates of the Awe Experience”.

Shiota, Michelle N., Dacher Keltner, and Amanda Mossman. “The nature of awe: Elicitors, appraisals, and effects on self-concept.”

Weger, Ulrich and Johannes Wagemann. “Towards a conceptual clarification of awe and wonder: A first person phenomenological enquiry.”

⁹¹ Weger, Ulrich and Johannes Wagemann. “Towards a conceptual clarification of awe and wonder: A first person phenomenological enquiry.”

⁹² Shaun Gallagher, “Lived Body and Environment,” 150-155.

Social interaction also played a role in shaping the experience. When multiple viewers were present, they observed one another, shared reactions, and occasionally drew attention to specific elements. While not all interactions were explicitly collaborative, the presence of others influenced how the work was approached and experienced. Occasionally, parallel experiences intersected, such as a spontaneous "wow" from one visitor would draw another's attention to what had provoked that response. Strangers would briefly become co-participants in their experience. These moments evidence what phenomenology recognises as the fundamentally intersubjective nature of experience; we are always already in a shared world, even when experiencing it from unique perspectives.⁹³

Some viewers also engaged in conversation about the works with me. Snippets from these conversations, like an audience member mentioning they felt "tricked" by the "floating" orbs, part of *further and further still*, and a few others mentioning the "thought-provoking" nature of the works, are also suggestive of embodied engagement and affective responses.

6.3.2 Childlike Playfulness

A strong sense of playfulness emerged across audience interactions. Viewers approached the installations with curiosity, experimenting with different ways of engaging and observing how the work responded. While I always intended for the works to include playful interactions, the childlike quality of this playfulness was explicitly articulated by an audience member. They described my artistic practice as having an overall "childlike" quality and sensibility. In my observations, I noticed the openness, curiosity, and freedom with which audience members engaged with the works. This playful mode of engagement reflects what Rachel Carson describes as the essence of wonder.⁹⁴ As she notes, a child's world is fresh and full of wonder, but somewhere along the way, as we reach adulthood, "that true instinct for what is beautiful and awe-inspiring, is dimmed and even lost".⁹⁵ Audience members explored different possibilities of interaction, such as moving the flashlight, adjusting their position, or interacting repeatedly to see variations in outcome. Their willingness to engage in this exploratory, non-prescriptive

⁹³ Linda A. Bliss, "Phenomenological Research".

⁹⁴ Rachel Carson, "The Sense of Wonder".

⁹⁵ Ibid, 30.

manner suggests the installations created conditions where the kind of open, receptive engagement that Carson and this thesis associate with wonder became possible.

6.3.2 Storytelling and Intentionality

Storytelling and intentionality also emerged as key themes through direct audience feedback. Several participants shared that they experienced the exhibition as having a strong sense of narrative, describing the works as feeling connected and unfolding in a meaningful sequence. Others commented on the intentionality of the elements and materials used in each work, noting the strong conceptual ties to each installation felt carefully considered. These responses indicate that viewers were simultaneously engaging with individual works, while also perceiving the exhibition as a cohesive and structured experience. Even with the provided artist statements, audience members continued to form their own interpretations, connecting what they encountered to ideas of the cosmos, scale, and interconnectedness.

These responses reflect the role of narrative and poetic tenderness as discussed in Chapter 2. Drawing on Dario Robleto's emphasis on storytelling within scientific art practices, the installations were structured to invite narrative interpretation while leaving space for individual meaning-making.⁹⁶ The scientific articulation of the cosmic perspective, as well as indigenous storytelling practices, as detailed in Chapter 3, also informed this approach. The language of interconnectedness provided a conceptual foundation that participants appeared to recognise and extend through their own interpretations. The sense of intentionality noted by participants further suggests that the curatorial strategies employed, such as material selection, spatial arrangement, and conceptual framing, successfully communicated relational meaning. This further aligns with Oliver Grau's assertion that immersive environments operate by heightening emotional involvement through deliberate aesthetic choices.⁹⁷

⁹⁶ Dario Robleto in "The Art of Scientific Storytelling (Dean's Seminar Series)," Northwestern Engineering, [Video].

⁹⁷ Oliver Grau, "Virtual Art: From Illusion to Immersion", 13.

6.4 Post-exhibition Survey

Following the exhibition's conclusion, a digital survey was distributed to all attendees. Of the 20 visitors who signed up to receive the survey and 8 focus group participants who attended the second session, 15 completed the survey. Their responses provide reflective insights into how the installations were received and whether the experience persisted beyond immediate engagement. Tables documenting all the responses are included in Appendix D.

I analyse survey data using a combination of content analysis and thematic analysis. For the closed-ended questions that offered response categories, I employ basic content analysis, tabulating frequency to identify patterns within the responses. Content analysis, a more practical approach that determines the presence of certain words or concepts, provides a complementary approach to thematic analysis's focus on meaning.⁹⁸ For open-ended questions inviting written responses, I use thematic analysis following the same approach employed with the focus group data.

6.4.1 Duration and Engagement

Survey responses confirmed the sustained engagement observed during the exhibition. Eight respondents (53%) reported spending more than 20 minutes with the installations, while four (27%) spent 15–20 minutes, and three (20%) spent 10–15 minutes. This aligns with observational data indicating that the installations successfully attracted sustained attention.

All 15 respondents indicated they either lingered at certain points (12 respondents) or revisited specific installations (3 respondents), corroborating observations of repeated interaction and selective focus. This pattern suggests participants were actively choosing where to spend their time based on personal resonance. This temporal data contributes to a more holistic understanding of the phenomena under investigation.⁹⁹

⁹⁸ Daniel Politz, "Content Analysis Vs Thematic Analysis: What's the Difference?" *Delve*, 2025.

⁹⁹ Saul McLeod, "Phenomenology In Qualitative Research," *Simply Psychology*.

6.4.2 Affective and Experiential Responses

When asked to describe their experience in one word or phrase, respondents used language strongly aligned with wonder and cosmic interconnectedness. Responses included: "expansive," "celestial," "magical," "immersive," "dimensional," "mesmerizing," "intriguing," "stellar," "spiritual," and "playfulness." These descriptors echo the theoretical framework established in Chapter 2, particularly the vocabulary associated with awe, vastness, and the sublime.

Question 7 asked participants to select words from predetermined categories that described or resonated with their experience. While not universal, the strong selection of "Awe / Wonder" and "Immersion / Connection" by 73% of respondents, alongside high rates for curiosity (67%), calmness (67%) and playfulness (53%), provides evidence that the installations successfully evoked the emotional and perceptual states central to the project's aims.

These affective descriptors cluster thematically around experiences of transcendence (expansive, celestial, spiritual), absorption (immersive, mesmerising), and positive engagement (magical, playfulness, intriguing). The diversity within this clustering suggests that wonder manifests through a variety of affective registers. It can sometimes be contemplative and calm, sometimes be playful and curious, and sometimes be characterised by a sense of vastness. This variation confirms wonder's resistance to a singular definition as previously articulated in Chapter 2.

6.4.3 Experiential Dimensions

Question 8 measured experiential dimensions using a Likert scale. The results reveal strong patterns of altered attention and embodied presence. 14 of the 15 participants agreed they paused or lingered, 13 lost track of time, and felt physically moved or affected, and 12 experienced a sense of scale or vastness. These findings support observations that the installations facilitated shifts away from ordinary perception toward embodied, contemplative engagement.

All 15 respondents selected Installation 1 (*you were once a star*) as the strongest resonating work, further noting its combination of light, materiality, interactivity, and direct engagement with stellar origins created the strongest resonance. Installations 2 and 3 received 5 selections each, with respondents commenting on the calm, immersive and contemplative nature of these works.

Some notable comments made here include:

"The simple yet extremely effective way it used light, shade and light modification to create the visual effects... as a visitor it was simple to interact with and I think that has great value."

"Vastness and interactive elements to how light could or can respond to my presence. Light connects everything."

When asked which aspects of the installations were most significant to their experience, participants could select multiple options. "Light and other visual elements" was selected by 14 respondents, and "Interactive elements" was selected by 13. Respondents also resonated with the spatial arrangement (8 selections) and the sense of scale (7 selections) throughout the exhibit. The consistent selection of interactivity and light confirms these as foundational to the experience, while the emphasis on scale reinforces the connection to themes of cosmic vastness explored in the literature review.

6.4.4 Lasting Impact

Question 9 asked whether the exhibition had stayed with participants since their visit. Twelve respondents (80%) answered "Yes, very much so," and three (20%) answered, "Yes, somewhat". All 15 respondents indicated the "Visual or sensory details remain vivid," while 8 reported having discussed it with others and 7 reported it sparked new questions or curiosity. These responses indicate the experience extended beyond the moment of engagement, persisting as vivid sensory memory. The experience also sparked curiosity and prompted sharing with others through discussion.

Seven respondents reported that the exhibition influenced their thinking about "Interconnection between things," aligning directly with the project's core theme. Open-ended responses also revealed

explicit connections to cosmic frameworks, with participants noting the installations prompted reflection on "the vastness of space and our place in it" and recognising "the world and its scale are far grander than we can imagine."

Other comments highlighted the intentionality of the curatorial arrangement, the value of the accompanying text, the parallel between the exhibition and coursework on astronomy, and the capacity of the works to "scale out even more or multiply." One respondent uniquely described the experience as "unfathomable yet completely fathomable".

This paradoxical description—"unfathomable yet completely fathomable"—beautifully captures wonder's simultaneous embrace of mystery and understanding. The installations were "fathomable" in the sense of being experientially accessible. Yet, they evoked something "unfathomable", maybe in the vastness of cosmic scales or the impossibility of fully comprehending our place in the universe.

6.5 Summary and Synthesis

Having presented findings across three empirical methods, I now examine whether these findings fulfill the conditions for wonder as I have defined in Chapter 2. My working definition identifies wonder as involving four interconnected conditions:

- **Wonder as a personal and subjective experience.**
- **Wonder as an aesthetic encounter.**
- **Wonder involving a reworking of existing systems of understanding.**
- **Wonder carrying the impulse to share the experience.**

6.5.1 Personal and Subjective Experience

The research findings and analysis confirm that visitors experienced the installations in personally variable ways. In both focus group sessions, participants offered diverse interpretations to the works. Similarly, survey responses revealed varied affective registers (some emphasising calm, others

playfulness). Observational data also documented variation in movement patterns, engagement duration, and points of focus.

This variability evidences what phenomenology recognises as the irreducibly first-person nature of experience.¹⁰⁰ Even with these varied interpretations of what could be considered the same spatial experience, viewers suggested their experiences were one of wonder through their affective responses and articulation in the survey responses (73% of survey respondents self-reported their experiences as resonant with awe and wonder, as well as immersion).

6.5.2 Aesthetic Encounter

Across all methods, the aesthetic dimensions of the work, particularly light, materiality, and spatial qualities, emerged as central to the viewers' experience. Focus groups emphasised the movement of light and its use in visualising sonic vibrations. Audience observations documented embodied responses to light and materiality, such as reaching gestures, postural adjustments to follow changing light, and extended visual attention. 93% of the survey responses identified "Light and visual elements" as most significant, with vivid sensory details persisting in memory for all 15 respondents weeks after the exhibition.

The aesthetic strategies employed were aimed at amplifying perceptual engagement, in line with Gallagher and Hepburn's views on wonder and immersion's perceptive qualities.¹⁰¹ The multiplicity of aesthetic encounters across the research findings confirms the second condition for wonder.

6.5.3 Reworking of Existing Systems of Understanding

This third condition of wonder proves more complex to assess with certainty. Some of the evidence fulfilling this condition includes:

¹⁰⁰ Saul McLeod, "Phenomenology In Qualitative Research," *Simply Psychology*.

¹⁰¹ R. W. Hepburn, "The Inaugural Address: Wonder", 9.
Shaun Gallagher, "Lived Body and Environment," 139-145.

- The extended temporal engagement (most visitors spending 10-20 minutes) suggests the installations demanded different modes of attention than quick consumption.
- The high selection of "Curiosity" (67% in survey) indicates a mode of inquiry, not immediate understanding or resolution.
- Comments from viewers describing the experience as "thought-provoking" and "a trick".
- The "unfathomable yet fathomable" paradox, capturing wonder's simultaneous knowing and not-knowing

The installations did challenge certain expectations about "immersive" art, which typically emphasises technological spectacle, overwhelming scale, or sensory intensity. My works embraced simplicity, subtlety, and gradual revelation. As one survey respondent noted, they operated through "simple yet extremely effective" means. This departure from immersive art conventions may have constituted a gentle reworking of expectations, creating space for wonder through restraint rather than spectacle.

However, I must acknowledge limitations in claiming "reworking" of perceptual or conceptual systems. I interpret "reworking existing systems" not as requiring revolutionary cognitive transformation, but as involving what phenomenology identifies as shifts from "natural attitude" to "phenomenological attitude".¹⁰² It suggests a shift from habitual perception to heightened awareness of perception itself. When visitors paused to notice how moving the flashlight changed the reflected light patterns, they were engaging in this shift. When they lost track of time, they moved from clock-time consciousness to lived time. These shifts, while perhaps not permanent transformations, do evidence wonder's capacity to temporarily alter ordinary modes of engaging with the world.

¹⁰² Saul McLeod, "Phenomenology In Qualitative Research," *Simply Psychology*.

6.5.4 Shareability

The research findings and analysis also satisfy the shareability aspect of wonder. Focus group participants explicitly noted that sharing their experiences with co-participants influenced their personal encounters. Together, they contributed to dialogical meaning-making, with participants building on each other's observations. Similarly, during audience observation, social interaction and shared experiences were observed when one participant's spontaneous exclamations drew another's attention. Similarly, 53% of survey respondents reported discussing their experiences with others.

6.5.5 Overall Assessment

The empirical findings substantially confirm that *All the Light Reveals* created conditions for wonder across all four definitional criteria. Further, these findings confirm that immersive installations rooted in cosmic themes *can* create environments where wonder is sustained.

6.6 Limitations

This research is limited by its scale and scope. The lexical qualitative analysis detailed in Chapter 1 and Appendix A draws from a selective sample of publicly available social media responses and identifies recurring patterns rather than comprehensive trends.

Similarly, the rest of the empirical research methods outlined here involve a small number of participants, which limits the generalizability of the findings. The insights are contextual and interpretive, shaped by the specific individuals involved and their prior experiences, cultural backgrounds, and familiarity with art and science discourse.

This study is shaped by my dual role as artist and researcher. While this positionality allows for deep reflexive engagement, it may introduce interpretive bias in my observation and analysis of participant responses. Phenomenological bracketing, the attempt to set aside preconceptions, can only ever be

partial, as I cannot completely separate my intentions from my interpretations.¹⁰³ My presence in the gallery during observations, my voice in the exhibition walkthrough, and my design of research instruments all inevitably influenced what participants experienced and how they articulated those experiences.

Finally, wonder is inherently subjective and resistant to quantification. The methodologies employed can indicate affective and reflective responses, but they cannot fully capture the depth or duration of internal experience. Survey respondents selecting "wonder" from predetermined categories may understand that term differently than I do, theoretically. The findings should therefore be understood as exploratory and interpretive rather than definitive.

¹⁰³ Linda A. Bliss, "Phenomenological Research," *International Journal of Adult Vocational Education and Technology* 7, no. 3.

7. Conclusion

This thesis explored how immersive installation art can create conditions for experiencing wonder. Through the exhibition *All the Light Reveals*, this research demonstrates that thoughtfully designed aesthetic environments can invite encounters where wonder emerges, affects perception and cognition, and persists beyond the moment of engagement.

In this concluding chapter, I lay out the theoretical contributions offered by this project, briefly present some future avenues, and expand on the significance of the project as a whole.

7.1 Theoretical Contributions

This research extends existing scholarship across multiple fields. It contributes to the psychology of awe and wonder by providing phenomenological data on how wonder manifests in designed environments. While existing studies measure awe through self-reported scales and physiological markers, this research documents wonder through observed behaviours, interaction patterns, and reflective descriptions.¹⁰⁴

The research advances installation art theory by demonstrating that immersive environments intentionally designed around cosmic themes facilitate sustained, meaningful engagement. Survey data showing prolonged interaction (80% spending 15+ minutes) and lasting impact (100% reporting vivid sensory memory), provide empirical evidence that installation art can function as a vehicle for perceptual recalibration and conceptual reorientation.

This project offers a working definition of wonder synthesised from linguistic, philosophical, psychological, and Indigenous frameworks. It presents wonder as a personal, subjective aesthetic experience characterised by perceptual vastness, cognitive accommodation, embodied engagement, and

¹⁰⁴ Michiel Van Elk et al., "The Neural Correlates of the Awe Experience".

Shiota, Michelle N., Dacher Keltner, and Amanda Mossman. "The nature of awe: Elicitors, appraisals, and effects on self-concept."

Weger, Ulrich and Johannes Wagemann. "Towards a conceptual clarification of awe and wonder: A first person phenomenological enquiry."

an invitation for shared reflection. I hope this definition can be taken forward by other researchers, or maybe even contested.

Finally, the research validates research-creation and phenomenological inquiry as complementary methodologies for investigating subjective experiences, further demonstrating how artistic practice can function as knowledge production.

7.2 Future Avenues

This project opens several directions for future research:

Testing for extended longevity could reveal whether brief encounters with wonder have lasting effects on behaviour or perspective. While the survey demonstrates persistence of vivid sensory memory a week later, interviewing participants six months or a year later could illuminate whether such experiences catalyse sustained shifts in perception or environmental awareness.

Cross-cultural research could investigate how wonder is conceptualised and experienced across diverse contexts. This research explored wonder within English-language scholarship and Western frameworks, complemented by Cree and Hawaiian cosmologies. How do different cultural and cosmological traditions shape experiences of cosmic interconnection?

Comparative studies could examine whether virtual reality experiences, planetarium shows, or reading Sagan produce similar or distinct outcomes to wonder as emergent through immersive installations, Do embodied, material encounters generate different qualities of engagement in comparison to digital/screen-based and text-based experiences?

Investigations into wonder and ecological awareness could explore whether recognising oneself as "made of stardust" or connected through shared elemental origins fosters environmental concern or action. Can wonder function as an affective foundation for ecological ethics?

7.3 Why This Matters

Ultimately, this project suggests that wonder can be approached as something that is intentionally and aesthetically cultivated.

We live in a world characterized by fragmentation, disconnection, and accelerated consumption. So, as artists and researchers, we *can* create spaces for prolonged attention, embodied engagement, and relational awareness. This becomes both an aesthetic act and an ethical one.

By creating environments that invite curiosity, interaction, and reflection, we create moments where viewers can pause, engage, and reconsider their relationship to the world around them—and to the cosmos of which we are inextricably a part. The cosmic perspective can be radicalising. If we're all made of stardust, all temporary arrangements of matter, all inhabitants of this fragile pale blue dot, then our differences shrink into proper perspective.

Rachel Carson wrote that wonder is "an unfailing antidote against the disenchantments of later years."¹⁰⁵ In a time of climate crisis, political polarisation, and widespread disenchantment, wonder offers a vital alternative way of encountering the world. I don't expect my work to change the world, but I do hope I can create moments where people feel a sense of cosmic connectedness, where they exit more curious, more humble, more aware of this planet's preciousness. If exhibitions like *All the Light Reveals* can offer even brief respite from the accelerated rhythms of contemporary life, inviting viewers to slow down, look closely, and recognise their place within something larger, then the work has fulfilled its purpose.

¹⁰⁵ Rachel Carson, "The Sense of Wonder". 30.

Appendix A:

Lexical Qualitative Analysis of Public Responses to JWST Imagery (July 11–12, 2022)

A.1: Overview & Methodology

This appendix presents the full datasets from the lexical qualitative analysis of the public responses to two tweets posted on July 11 and July 12, 2022, in connection with the first image release from the James Webb Space Telescope (JWST). The analysis was conducted to identify recurring patterns of affective and reflective language in the public reception of astronomical imagery, and to situate those patterns within the broader aesthetic and emotional tradition examined in Chapter 1.

X (formerly Twitter) was selected as the platform for this analysis due to the directness and traceability of its reply structure. To keep the process straightforward, the sample pool focused on responses to a single original post rather than a broader sweep of mentions across the platform. Replies marked as probable spam by the platform were excluded.

The first dataset was drawn from replies to a preview tweet posted by @NASA on July 11, 2022, which included a single image—Webb's First Deep Field—accompanied by a detailed image description. July 11 was selected as a significant date precisely because it represented an unmediated first encounter: viewers were responding to a single, unprecedented image with no prior frame of reference for JWST's visual output. The source tweet featured over 7500 replies, which were narrowed down to a pool of 77, of which 55 were identified as affective in register (direct emotional or aesthetic responses to the image) and 22 as introspective (responses marked by self-reflection, existential consideration, or a shift in perspective).

A secondary dataset was drawn from replies to a tweet posted by @NASAWebb on July 12, 2022, which announced the release of the full set of images. Over 200 replies were reviewed, and 49 were retained as containing explicit descriptive or affective language.

The analysis of both datasets is qualitative and interpretive rather than statistically generalizable. Terms were grouped by semantic and thematic orientation. Representative language is quoted directly from

the source posts and lightly standardised for clarity (spelling variants and capitalisation) without altering the meaning.

A.2: Dataset 1 – Replies to NASA’s Preview Tweets

Table A.1. Frequency of Descriptive Terms in Affective Replies to @NASA’s Preview Tweet

Descriptor	Frequency
Incredible	13
Amazing	10
Beautiful	7
Cool (incl. variants)	7
Wow / Woah / keysmash*	5
Stunning	5
Breathtaking	4
Awe / Awe-inspiring / Awesome	3
Fascinating / Astonishing	2
Mind-blowing / Monumental	2
Wonder / Wonderful	2
Brilliant / Interesting	2
Emotional responses (teary-eyed, joy, hope)	4
Grateful responses	4
Congratulatory responses	8

*A “keysmash” is a random string of characters sent as a message to indicate intense emotion, such as excitement or anger. For example, asdjvdbck is a keysmash. (Dictionary.com)

Source: Author’s qualitative lexical analysis of 77 public replies to @NASA’s post on X (July 11–12, 2022).

Table A.2. Thematic Grouping of Reflective Responses

Category	Representative Language	Instances
Cosmic Humility	“makes you realize how small we are,” “tiny blue planet,” “inconsequential,” “so vast”	6
Existential Reflection	“existential dread,” “we are not alone,” “there must be aliens,” “life beyond Earth”	7
Temporal Vastness	“13 billion years ago,” “looking into the past,” “start of time”	4
Moral / Political Perspective	reflections on humanity’s skewed priorities in the grand cosmic scale	3

Source: Author’s qualitative lexical analysis of 77 public replies to @NASA (July 11–12, 2022).

A.3: Dataset 2 – Replies to @NASASpaceWebb’s Full Image Release Tweet

Table A.3. Frequency of Descriptive Terms in Replies to @NASASpaceWebb’s Image Reveal

Descriptor	Frequency
Beautiful	10
Amazing	10
Stunning	5
Incredible / Astonishing	5
Awe / Awestruck / Awesome	7
Wow (including variants)	5
Magnificent / Magnifique	3
Breathtaking	2
Wonderful / Inspiring	3
Extraordinary / Majestic	2

Descriptor	Frequency
Spectacular / Mesmerized	2
Fabulous / Excellent	2
Emotional responses (tears, goosebumps, joy)	4

Source: Author’s qualitative lexical analysis of 200+ public replies to @NASASWebb’s announcement tweet across July 12–13, 2022, documenting descriptive and affective language.

Table A.4. Thematic Grouping of Lexical Responses

Category	Representative Terms	Instances
Aesthetic Language	beautiful, stunning, magnificent, spectacular, fabulous, majestic	17
Evaluative Achievement Language	incredible, extraordinary, excellent, amazing, groundbreaking	13
Affective / Emotional Language	awe, awestruck, breathtaking, mesmerized, wonder, tears, goosebumps, joy	12
Exclamatory Intensifiers	wow (all variants)	5

Source: Author’s classification of lexical data derived from replies to @NASASWebb across July 12–13, 2022.

A.4: Notes on the Analysis

Several patterns across both datasets merit attention and are addressed in the analysis in Chapter 1. Observations noted are interpretive and contextual. The selected datasets are small and limited to a specific platform, further narrowed down to only individuals who chose to publicly reply to the original posts. They cannot be taken as representative of the full range of responses to the JWST release.

However, they do serve as an illustrative but limited window into a larger affective event. This analysis is significant to this thesis for the documented consistent lexical patterns.

It is worth noting that social media platforms have come to function as archival sites during significant cultural and historical moments of this kind. Vlassenroot et al., writing in the context of social media archiving, describe the archived web as providing “an important footprint of the past, documenting online social behaviour through social media”.¹⁰⁶

For most of recorded history, public responses to major scientific or astronomical events were either entirely undocumented or preserved insofar as they were articulated by scholars, academics or institutional figures deemed worthy of record. Social media content challenges this precedent, creating its own category of material that heritage institutions are now beginning to develop frameworks for preserving and studying.¹⁰⁷ That said, participation on social media remains shaped by factors including digital access and literacy, device ownership and even platform design. The selected and analysed datasets in this thesis are understood accordingly: as a meaningful portrait of public response, wider than any prior era could have produced, while remaining a partial rather than comprehensive one.

¹⁰⁶ Eveline Vlassenroot et al., “Web-archiving and social media: an exploratory analysis,” *International Journal of Digital Humanities* 2, no. 1–3 (2021): 107.

¹⁰⁷ *Ibid.*, 108.

Appendix B:

Appendix B includes the poster circulated to recruit focus group participants, the blank reflection card distributed during the first focus group session, and a complete table of all responses received. The open-ended prompt invited participants to share their immediate reactions and reflections on their experience with the prototype installations

B.1: Focus Group Recruitment

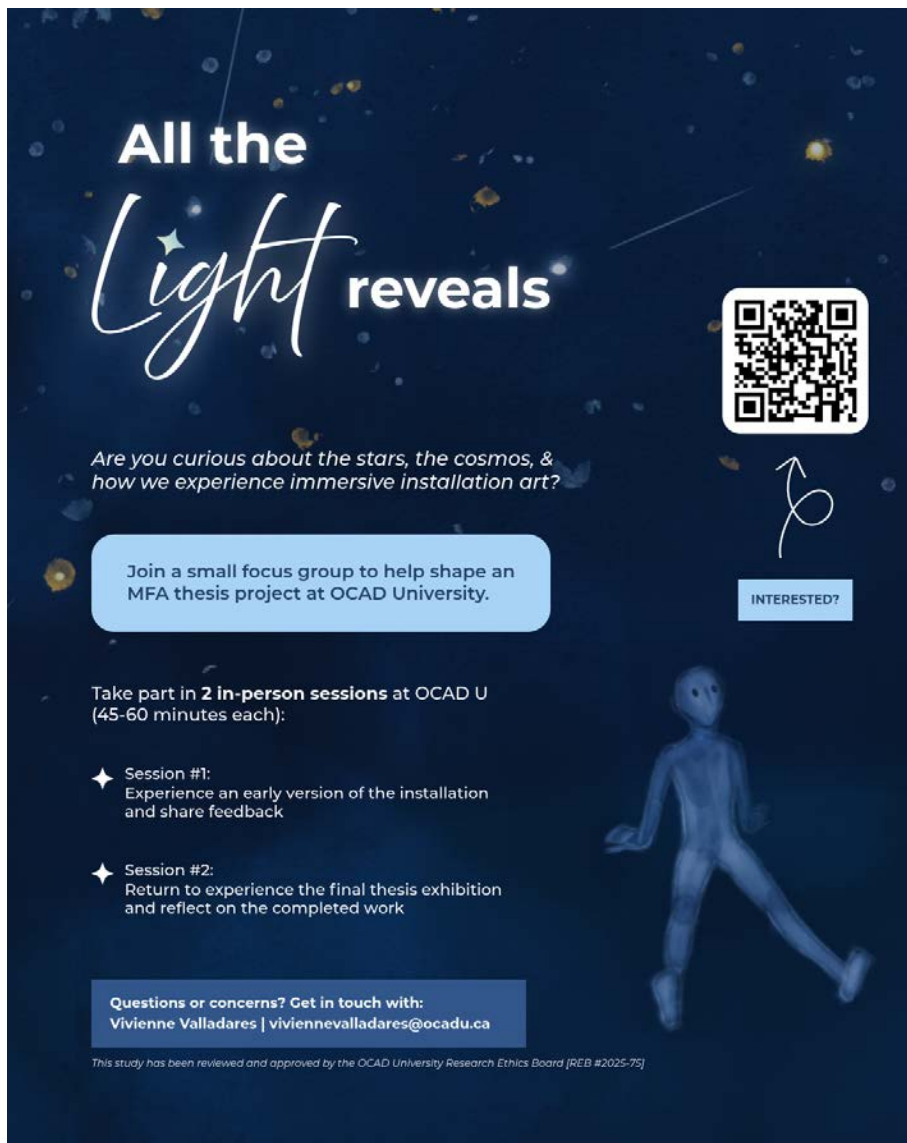


Fig. 41: Poster circulated for recruitment of focus group participants.

B.2: Qualitative Analysis of Responses Collected in Focus Group Session 1

A reflection card with a dark blue background on the left featuring a stylized white figure of a person walking. The right side is white with the title 'REFLECTION CARD' in bold blue letters. Below the title is a prompt: 'Please take a quiet moment to reflect on your experience. Write as little or as much as you like.' There are three numbered questions with corresponding horizontal lines for answers. Question 1 asks for the first word that comes to mind. Question 2 asks what drew attention the most. Question 3 asks to circle words that resonate with the experience, with a list of words and blank lines for additional words.

REFLECTION CARD

Please take a quiet moment to reflect on your experience. Write as little or as much as you like.

1. What is the first word that comes to mind after this experience?

2. What drew your attention the most?

3. Circle words that resonate with your experience. Feel free to add some too!

stillness / curiosity / calm / playfulness / immersion / _____

vastness / unfamiliar / disorientation / alert / strangeness / _____

reflection / connection / quiet / movement / _____

Fig. 42: Reflection card handed out to focus group participants at the end of the session.

Fig. 26 features the blank reflection cards that were handed out to focus group participants at the end of session 1. Participants were given 10 minutes to fill this form post the informal group discussion. The prompts were designed to understand a) the immediate associations participants were making about the work and its concepts, b) what was most visually captivating or attention-grabbing, and c) what emotions/feelings they associate with their experience.

Below is a complete table of all the collated responses to the reflection cards. Nine out of ten participants filled out these cards. An analysis of this data is presented in Chapter 6.

Table B.2: Reflection Card Responses

Participant	First Word(s)	Key Focus	Emotional / Experiential Terms
1	small, universal	scale, cosmic relation	calm, playfulness, immersion, vastness
2	holistic	relational experience	curiosity, calm, playfulness, immersion, unfamiliar, connection, movement
3	scale, light, frequencies	conceptual linking	curiosity, playfulness, immersion, energy, vastness, disorientation, reflection
4	interesting, curious	visual intrigue	curiosity, unfamiliar, movement
5	interesting	visual + social perception	curiosity, playfulness, immersion, unfamiliar, reflection, movement
6	cosmos	microscopic awareness	curiosity, immersion, strangeness
7	vibrations	sensory response	playfulness, reflection
8	engaging	interaction mechanics	curiosity, immersion, alert, mesmerising, quiet, movement
9	space	conceptual framing	stillness, curiosity, immersion, vastness, connection, movement

Source: Author's classification of data collected from reflection cards filled out by 9 out of 10 focus group participants.

Appendix C:

Exhibition Layout

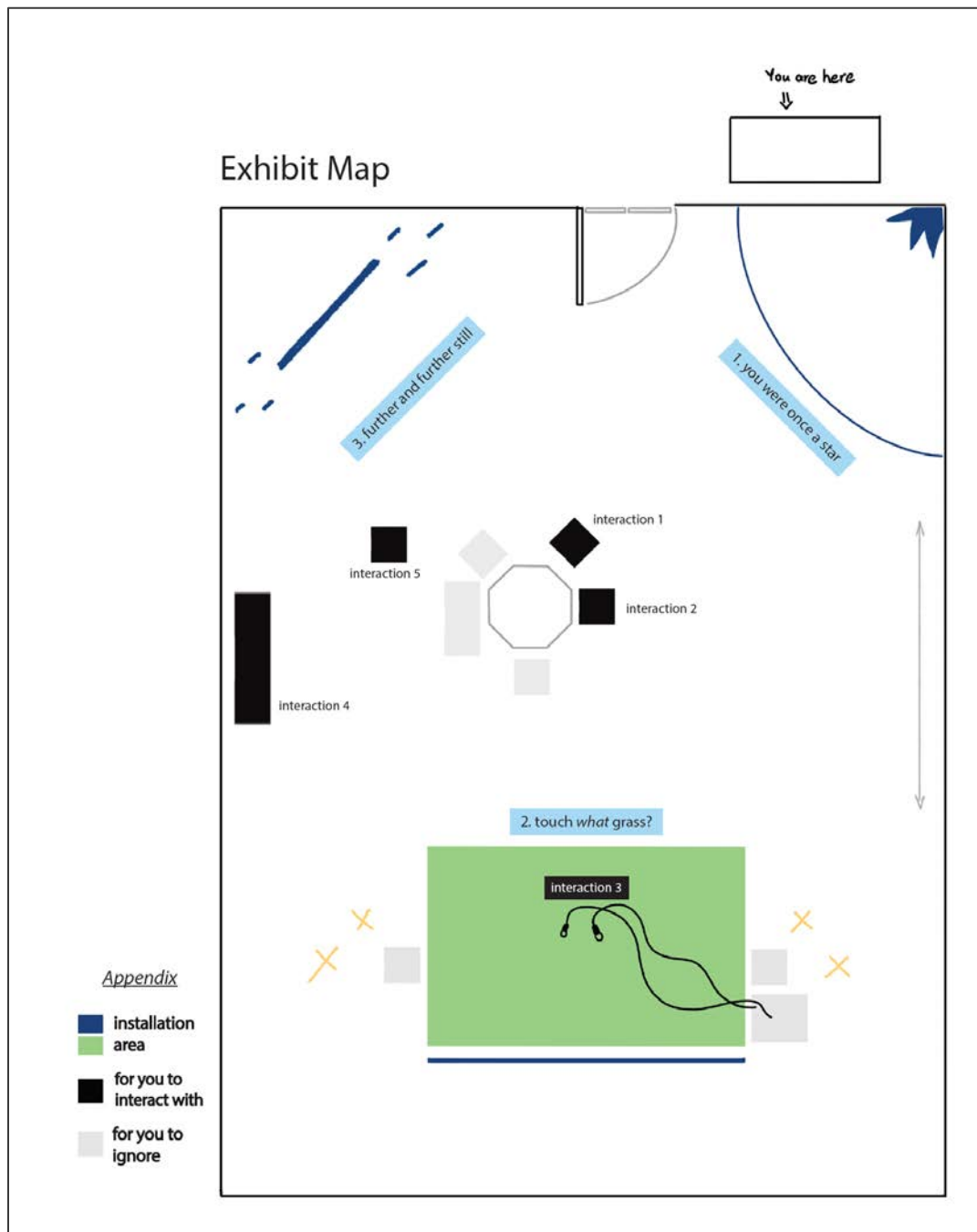


Fig. 43: Exhibit map as presented in the exhibition's interaction guide.

Appendix D: Post-Exhibition Survey Data

Survey Overview:

Total Responses: 15

Total Sign-ups: 20 (response rate: 75%)

Distribution: Digital survey link sent to registered attendees following exhibition conclusion

Focus Group Participants: 1 of 15 respondents

TABLE C1: Duration of Visit (Q2)

Duration	Responses	%
10-15 minutes	3	20%
15-20 minutes	4	27%
More than 20 minutes	8	53%

TABLE C2: Most Significant Aspects (Q3)

Aspect	Selections	%
Light and visual elements	14	93%
Interactive elements	13	87%
Spatial arrangement/movement	8	53%
Scale/sense of vastness	7	47%
Materials and textures	6	40%
Sound/acoustic elements	6	40%
Presence of others	3	20%

TABLE C3: Lingering Behavior (Q4)

Response	N	%
Lingered at certain points	12	80%
Revisited certain installations	3	20%
Moved through at steady pace	0	0%

TABLE C4: Installation Preferences (Q5)

Installation	Selections	%
Installation 1: you were once a star	15	100%
Installation 3: further and further still	5	33%
Installation 2: touch what grass?	5	33%
Interaction zones (microscope/glass ball)	2	13%

TABLE C5: Descriptive Words (Q7)

Category	Selections	%
Awe/Wonder	11	73%
Immersion/Connection	11	73%
Curiosity/Intrigue	10	67%
Calm/Stillness	10	67%
Playfulness/Excitement	8	53%
Reflection/Quiet	7	46%
Strangeness/Unfamiliar	2	13%
Other options	0	--

TABLE C6: Persistence of Experience (Q9)

Response	N	%
Yes, very much so	12	80%
Yes, somewhat	3	20%
A little	0	0%
No	0	0%

TABLE C7: Experiential Dimensions (Q8) - Agreement Levels

Statement	Strongly Agree	Moderately Agree	Neutral	Disagree
I often paused or lingered	11 (73%)	3 (20%)	1 (7%)	0
I lost track of time	7 (47%)	6 (40%)	1 (7%)	0
I felt physically moved	6 (40%)	7 (47%)	1 (7%)	0
Sense of scale/vastness	6 (40%)	6 (40%)	3 (20%)	0
My senses felt heightened	5 (33%)	6 (40%)	3 (20%)	1 (7%)
My thoughts became quieter	7 (47%)	4 (27%)	4 (27%)	0
Connection to the cosmos	8 (53%)	5 (33%)	0	2 (13%)
Challenged usual way of understanding the world	6 (40%)	3 (20%)	5 (33%)	1 (7%)
Experience felt difficult to put into words	5 (33%)	5 (33%)	4 (27%)	0

TABLE C8: How Experience Persisted (Q10)

Mechanism	Selections	%
Visual/sensory details remain vivid	15	100%
Discussed it with others	8	53%
Sparked new questions/curiosity	7	47%
Thought about it often	3	20%

TABLE C9: One-Word/Phrase Descriptions (Q1)

Expansive • A celestial escape • Magical • Immersive • Dimensional • Celestial • Mesmerizing • Intriguing • Unfamiliar • Light Responsiveness • Dreamy • Stellar! • Spiritual • Playfulness • Marvel

TABLE C10: Conceptual Influence (Q11)

Concept	Selections	%
Interconnection between things	7	47%
Sense of self/place in world	3	20%
Scale or vastness	2	13%
Time or temporality	1	7%
Shadows/reflections interplay	1	7%

TABLE C11: Selected Open-Ended Responses

Q6 - What resonated most:

"I think the idea of interacting with space and light and reflecting on the vastness of space and our place in it resonated most with me."

"The light, the environment, and the sound made me feel very immersed. I felt unfamiliar with the scale, which reminded me of the vast universe..."

"Vastness and interactive elements to how light could or can respond to my presence. Light connects everything."

Q12 - Additional comments:

"This was a wonderful experience I'd want to introduce to people to spark in them a sense of wonder and curiosity about the universe we live in... coming to terms with our place in the universe and the fleeting nature of our time alive can often put so much in perspective."

"This experience felt unfathomable yet was completely fathomable"

"Some aspects or after-effects are difficult to explain, but materially, the works have an ability to scale out even more or multiply."

Summary:

Survey data demonstrates sustained engagement (80% spent 15+ minutes), strong affective responses aligned with wonder (73% selected "Awe/Wonder"), universal persistence of vivid sensory memory, and significant conceptual influence regarding interconnection (47%). Installation 1 achieved universal resonance (100%), with light and interactivity identified as foundational to the experience.

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