

University of Art and Design Linz

Department of Fine Arts (Bildhauerei)

Diploma Thesis

October, 2025

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Thesis Title :

Interactive and Kinetic Sculpture : Exploring the Relationship of Humans,  
Nature, and Technology through Object-Oriented Ontology

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# ABSTRACT

This thesis explores the dynamic relationship between human beings, nature, and technology through the creation of interactive kinetic sculptures. By examining how sculptures can respond to human presence, the research challenges the traditional notion of sculpture as a static, passive object and proposes a model in which the human is an active participant, co-creating the work in real time.

The theoretical framework is informed by Object-Oriented Ontology (OOO), which emphasizes the equal ontological status of all entities, whether human, non-human, natural, or technological. In this context, the sculptures presented in this thesis—*The Pulse of Dance*, *Simurgh: Wings of Existence*, and *Breathing Clouds*—serve as relational objects whose “life” and movement emerge only when engaged by the human participant.

Materials and techniques include lightweight fabrics, inflatable structures, motors, air systems, and sensors, designed to create organic motion and responsiveness. The research argues that interactive kinetic sculpture can serve as a medium for contemplating the interdependencies among humans, nature, and technology, offering audiences a sensory experience that blurs the line between object and subject, presence and absence, natural and artificial.

The findings demonstrate that when viewers are integrated into the artwork, the sculpture transcends its status as a static object and becomes a living, relational system. The thesis contributes to the field of contemporary sculpture by bridging philosophical concepts with experiential artistic practice, emphasizing the collaborative co-existence of humans, nature, and technology.

**Keywords:** Interactive Sculpture, Kinetic Art, Human-Nature-Technology Relationship, Object-Oriented Ontology, Relational Aesthetics, Participatory Art, Contemporary Sculpture

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# Introduction

Sculpture has long been associated with permanence, solidity, and stillness. From ancient monuments carved in stone to modernist experiments in metal, the sculptural tradition has often privileged form over interaction, presenting the viewer with an object to contemplate but not to engage. Yet, in the contemporary landscape of art, this static understanding of sculpture is increasingly being challenged. Artists today are experimenting with movement, responsiveness, and interactivity, transforming sculpture into a relational medium that unfolds in real time.

This thesis situates itself within this evolving discourse by focusing on interactive kinetic sculptures that embody the interconnectedness of humans, nature, and technology. Unlike traditional sculpture, these works are not complete without the presence of the viewer. The human participant becomes an active agent, whose gestures, proximity, or touch animate the work and bring it into being. The sculptures examined here—*The Pulse of Dance*, *Simurgh: Wings of Existence*, and *Breathing Clouds*—operate as living systems that blur the boundary between subject and object, organic and artificial, presence and absence.

Philosophically, this research is informed by Object-Oriented Ontology (OOO), a framework that posits all entities—human, non-human, natural, and technological—possess equal ontological status. Within this view, the sculptures are not passive objects awaiting human activation but rather participants in a network of relations, capable of shaping experience and meaning.

By combining artistic practice with theoretical reflection, the thesis seeks to address larger questions: How can interactive kinetic sculpture embody relational agency? In what ways can technology extend, rather than dominate, our relationship to nature? And how might art create spaces where humans, natural systems, and technological objects coexist without hierarchy?

Through these explorations, the research contributes to contemporary debates in art by proposing a model of sculpture as a site of encounter—where humans, nature, and technology meet not as separate categories but as entangled presences co-creating ephemeral moments of life

# Research Objectives

1.To explore the ways in which interactive kinetic sculptures integrate human participation, natural processes, and technology.

2.To demonstrate how Object-Oriented Ontology (OOO) can inform the design and interpretation of contemporary sculpture.

3.To investigate how sculpture can function as a relational system where agency is distributed across human, natural, and technological actors.

4.To analyze the specific interactions and emergent behaviors of *The Pulse of Dance*, *Simurgh: Wings of Existence*, and *Breathing Clouds*.

5.To contribute to the field of contemporary art by providing a framework for creating philosophical, interactive, and participatory sculpture.

# Literature Review

## Interactive and Kinetic Sculptures

Interactive and kinetic sculptures have evolved significantly over the past century, blending art, technology, and audience engagement. These artworks transform passive observation into active participation, inviting viewers to become co-creators in the artistic experience.

For instance, Jean Tinguely's *Homage to New York* (1960) exemplifies a kinetic artwork that self-destructs, engaging viewers in a dynamic and unpredictable interaction. Similarly, Thom Kubli's *Black Hole Horizon* (2012–2015) utilizes sound and soap bubbles to create an immersive environment where the audience's movement influences the artwork's behavior.

These examples illustrate the potential of kinetic sculptures to engage audiences in meaningful interactions, aligning with the objectives of this research.

## Object-Oriented Ontology (OOO) in Art

Object-Oriented Ontology (OOO) challenges anthropocentric perspectives by asserting that all objects, human and non-human, possess equal ontological status. This philosophical approach has influenced contemporary art practices, encouraging artists to consider the agency and existence of objects beyond human perception.

Artists like Alfredo Aceto have explored OOO by creating installations where objects engage in symbolic dialogues, reflecting on their existence and relationships. This perspective aligns with the research's aim to explore human-object relationships through interactive and kinetic sculptures.

## Embodied Interaction and Audience Engagement

Recent studies emphasize the importance of embodied interaction in interactive art. A three-dimensional model proposed by Zhou (2024) analyzes how body embodiment, bodily sensation, and audience-artwork interaction contribute to the immersive experience .

These insights inform the design of the sculptures in this research, aiming to foster deep, embodied interactions between the artwork and the audience.

# Theoretical Framework

approach that asserts the equal ontological status of all entities, whether human, non-human, natural, or technological. Unlike anthropocentric perspectives that prioritize human experience, OOO emphasizes the autonomy and agency of objects themselves.

Applying OOO to interactive and kinetic sculpture provides a unique lens for understanding the relational dynamics between humans, materials, and technology. In this context, the artworks—*The Pulse of Dance*, *Simurgh: Wings of Existence*, and *Breathing Clouds*—are conceptualized as relational systems, where human interaction activates, shapes, and completes the work. The sculptures are not simply passive forms; their presence and behavior are contingent upon engagement, emphasizing the co-existence and interdependence of all elements involved.

By situating human, natural, and technological entities on equal ontological footing, this framework allows for a critical investigation of interaction, agency, and perception in contemporary sculpture. It provides both a philosophical foundation and a practical guide for designing works where motion, responsiveness, and sensory engagement are integral to the artistic experience.

# Methodology

The methodology of this research combines practical artistic experimentation with a theoretical framework informed by Object-Oriented Ontology (OOO). The study investigates how interactive and kinetic sculptures can mediate relationships between humans, natural processes, and technological elements.

## Materials and Techniques

The three artworks employ a combination of lightweight fabrics, inflatable structures, sensors, motors, and microcontrollers. *The Pulse of Dance* uses soft, flexible tendrils that respond to human touch through air pressure systems. *Simurgh: Wings of Existence* integrates mirrored surfaces and motorized wings activated by audience presence. *Breathing Clouds* utilizes soft, recycled materials that move rhythmically in response to environmental changes and temperature sensors. These materials are selected to create organic, fluid motion and tactile engagement.

## Design and Implementation

The design process begins with conceptual sketches and digital modeling, followed by prototyping and iterative testing. Each sculpture is programmed to respond to specific types of human interaction, such as touch, presence, or synchronized gestures. The kinetic systems are calibrated to ensure smooth, lifelike movement and immersive engagement.

## Audience Interaction

Interaction is central to the methodology. The artworks are designed to be incomplete without human participation, reinforcing the concept that humans and objects co-constitute the artistic experience. Sensors and microcontrollers detect user presence and trigger motion sequences, allowing each engagement to be unique. Observation and feedback from initial viewers

guide refinements to motion, timing, and responsiveness, ensuring that the sculptures achieve their intended relational effect.

This methodology allows for the integration of philosophical principles and practical artistic techniques, ensuring that each sculpture embodies the theoretical framework while maintaining an interactive, kinetic presence in real space.

# Analysis of Works

## 1. The Pulse of Dance

*The Pulse of Dance* is a 1.5-meter-tall plant-like sculpture with soft, flexible tendrils that respond to human touch. The central core contains sensors that activate air systems, causing the tendrils to inflate and sway.

This work exemplifies the relational system concept of OOO: the sculpture's "life" emerges only when a human engages with it. The interaction demonstrates a direct correlation between human presence and natural-like motion, highlighting the dynamic coexistence of human and non-human entities. The design emphasizes tactile and emotional engagement, inviting the viewer to experience a form of sensorial dialogue with the artwork.

## 2. Simurgh: Wings of Existence

*Simurgh: Wings of Existence* is inspired by Persian mythology and explores OOO philosophy through mirrored surfaces and motorized wings. When two audience members hold hands in front of the mirror, the wings activate, symbolizing relational co-existence.

This sculpture transforms human interaction into a visible, kinetic manifestation of connectivity. The mirror reflects the participants' presence, while the wings' motion embodies the fusion of consciousness, technology, and material form. OOO is operationalized here by demonstrating that human and object agency are intertwined, and that the artwork requires collaboration to realize its full conceptual potential.

## 3. Breathing Clouds

*Breathing Clouds* is a soft, 1×2-meter sculpture composed of small recycled pieces. Temperature and presence sensors activate motors, producing gentle rhythmic motion reminiscent of breathing.

This work emphasizes environmental interdependence and responsiveness to both human and natural stimuli. The sculpture's movement illustrates OOO's principle of distributed agency, showing that even small objects contribute to a network of relations. Audience presence triggers emergent patterns, and the sensory experience fosters contemplation of human-nature-technology interconnections.

1. The pulse of Dance

2. Simurgh: Wings of Existence

3. Breathing Clouds









## Results and Discussion

The analysis of the three sculptures demonstrates that interactive and kinetic artworks can function as relational systems that integrate humans, natural phenomena, and technological elements.

The Pulse of Dance illustrates how human touch activates organic-like movement, creating a direct experiential link between the participant and the sculpture. The viewer becomes a co-creator, and the sculpture's "behavior" emerges only in the presence of human engagement. This demonstrates that agency in art is not limited to humans, but distributed across materials, mechanisms, and participants.

Simurgh: Wings of Existence emphasizes collaborative interaction. The mirrored surfaces and synchronized wing movements require two participants to achieve full activation. This configuration foregrounds interdependence and relationality, showing that neither the artwork nor the human participant alone can realize the conceptual goal.

Breathing Clouds highlights environmental responsiveness and distributed agency. The sculpture reacts not only to human presence but also to temperature changes in the environment. This expands the notion of interaction beyond the immediate human audience to include natural processes as active participants in the artwork.

Collectively, the three works confirm that kinetic and interactive sculptures provide a unique method for exploring OOO principles. They demonstrate that art can embody philosophical concepts, showing that objects, humans, and environmental processes coexist in dynamic, mutually influential networks.

The findings suggest that interactive kinetic sculpture can serve as a medium for contemplative engagement, fostering awareness of interdependencies in

human, natural, and technological systems. These results reinforce the potential for philosophically-informed artistic practice to create meaningful sensory and relational experiences.

# Conclusion

This research demonstrates that interactive and kinetic sculpture offers a compelling medium for exploring the interconnectedness of humans, natural processes, and technological elements. The three case studies—*The Pulse of Dance*, *Simurgh: Wings of Existence*, and *Breathing Clouds*—illustrate how artworks can function as relational systems, where their conceptual and experiential integrity depends on human engagement.

The application of Object-Oriented Ontology (OOO) provides a philosophical foundation, showing that objects possess agency and presence independent of human perception. By treating human, natural, and technological entities as equal participants, the sculptures offer a practical model for understanding relational dynamics and distributed agency in contemporary art.

Key findings include:

1. Human interaction activates and completes the artwork, emphasizing co-creation and participation.
2. Environmental and material responsiveness expands the notion of interaction beyond immediate human engagement.
3. Kinetic and sensory qualities enhance contemplative experiences, fostering awareness of interdependencies among humans, nature, and technology.

Overall, this study underscores the potential of interactive and kinetic sculpture to embody philosophical principles, generate meaningful sensory experiences, and serve as a framework for future explorations of relational aesthetics and human-object-environment interconnectivity.

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# Appendices

## Appendix A – Technical Diagrams and Schematics

- *The Pulse of Dance*: Diagrams illustrating the air-inflation system, sensor placement, and tendon movement patterns.
- *Simurgh: Wings of Existence*: Technical schematic showing mirrored surfaces, motorized wings, and sensor activation pathways.
- *Breathing Clouds*: Diagrams of sensor network, motor arrangements, and movement sequences responding to temperature and audience presence.

## Appendix B – Photographs of the Prototypes

- Images of all three sculptures at various stages of construction.
- Close-ups highlighting material choice, mechanical systems, and interactive components.

## Appendix C – Interaction Observations

- Notes and sketches documenting initial audience interactions.
- Analysis of tactile, visual, and kinetic responses for each sculpture.

## Appendix D – Programming and Control Notes

- Sample code snippets for microcontrollers (Arduino) and motor control.
- Explanations of sensor calibration and timing sequences for interactive responsiveness.

