SUBMISSION I

Inhale | Exhale

Perceive your breath through an immersive art installation

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PROCESS

We Breathe in this Moment

CONTENT

Blog:https://blogs.ed.ac.uk/dmsp-process25/

PROJECT BRIEF

Theme: The Process of Breathing

This project aims to highlight the often-overlooked **importance of breathing**, transforming it into a **sensory experience** that fosters **self-awareness, relaxation, and emotional balance.** By visualizing and signifying breath in **real time**, the installation encourages participants to **reconnect with their own breathing process**, promoting **mindfulness and inner stability.**

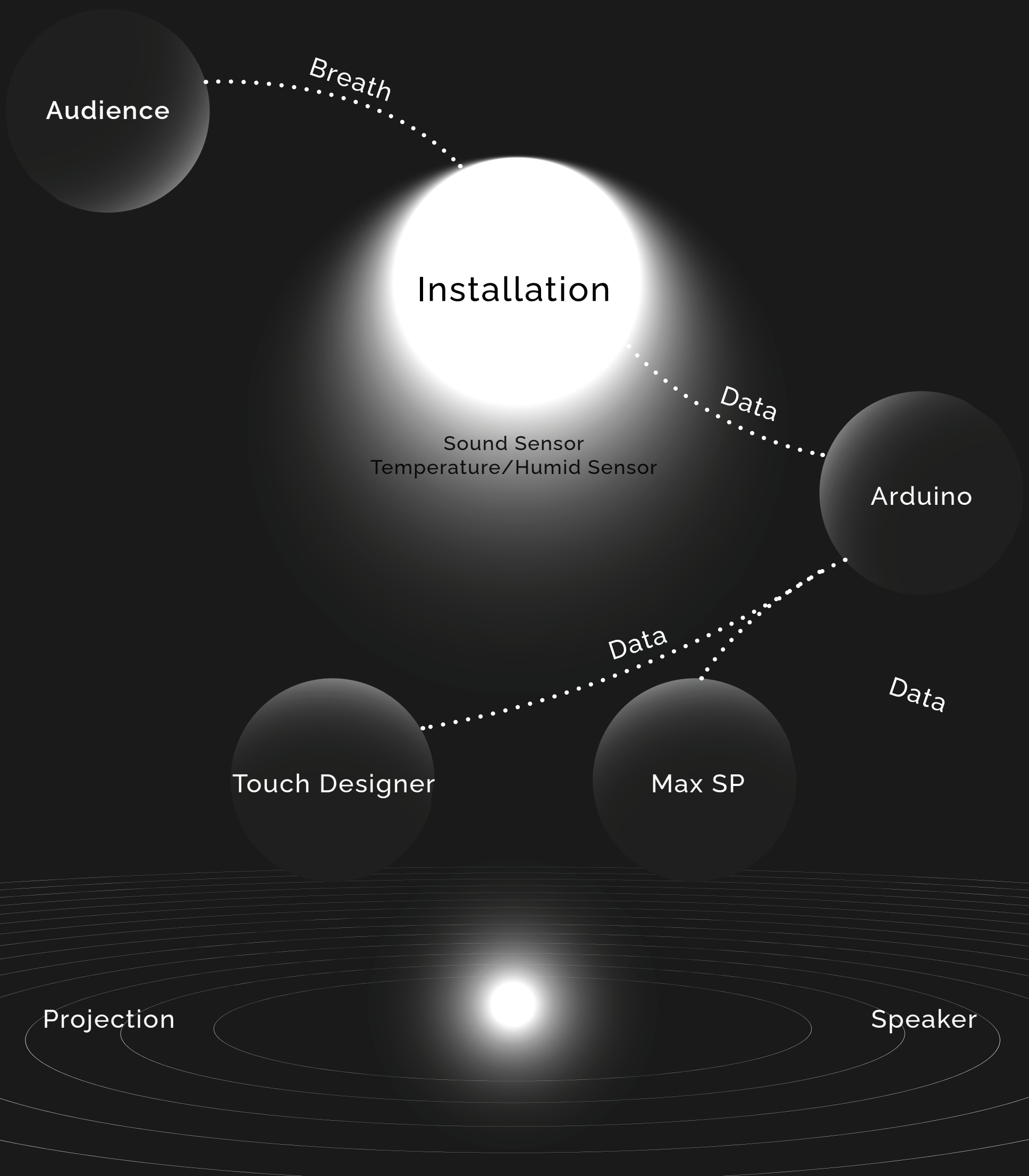
Background & Purpose

In the wake of **COVID-19**, where the ability to breathe freely was challenged for many, this project serves as a **gentle reminder** of the value of breath—not just as a biological function but as a **therapeutic tool** for mental and physical well-being. The interactive nature of the installation offers a **calm, immersive space** where individuals can **explore, observe, and regulate their breath** in an intuitive and stress-free way.

By fostering **a deeper connection between breath, body, and environment**, this project contributes to **mental health awareness**, encourages **stress reduction**, and provides an **innovative approach to self-regulation and relaxation** through interactive art.

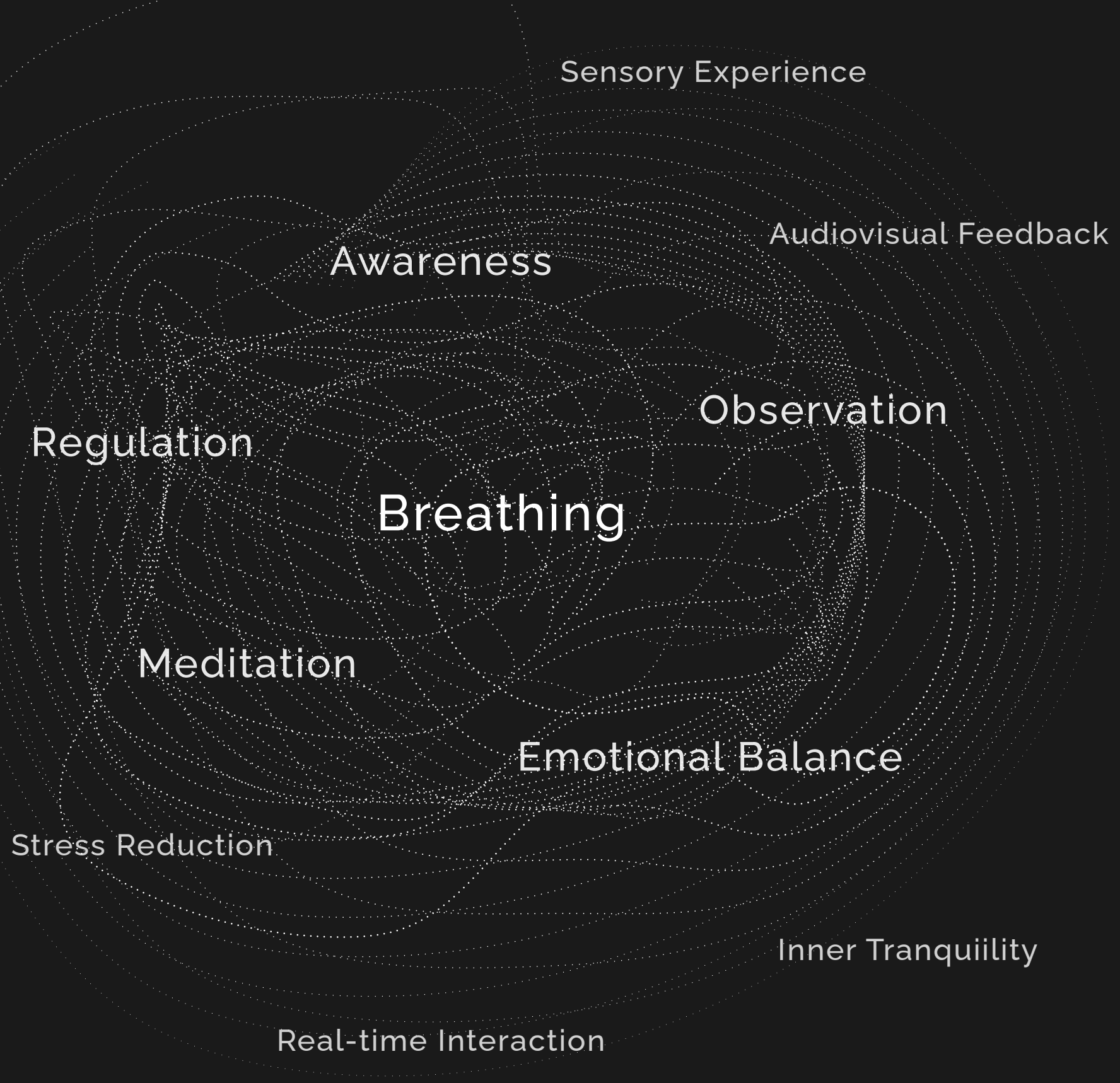
Project Content: Interactive Installation

This interactive installation visualizes the breathing process by collecting real-time breathing data from visitors using sensors. The collected data generates dynamic visual and auditory effects, allowing visitors to perceive their breath in an immersive environment created through sound and projection.



CONCEPT
GENERATION

- Brain Storming



Case Study

This initial case study laid the foundation for further exploration, with a focus on refining the technical approach.

Research

Research by Jerath et al. (2015) and Zaccaro et al. (2018) shows that slow, controlled breathing significantly affects emotions and the nervous system. It helps reduce stress, lower anxiety, and enhance relaxation by activating the parasympathetic nervous system, the body's natural calming mechanism.

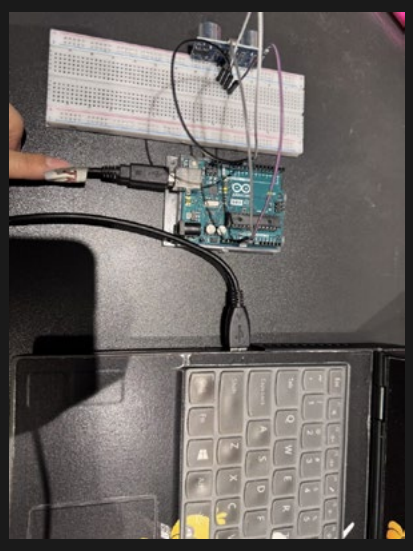
Breathing Pattern	Heart Rate	Parasympathetic Activation	Applicable Scenario
4:6 Ratio	Increased	Strong	Relaxation
5:5 Ratio (5s inhale, 5s exhale)	Balanced	Moderate	Focus

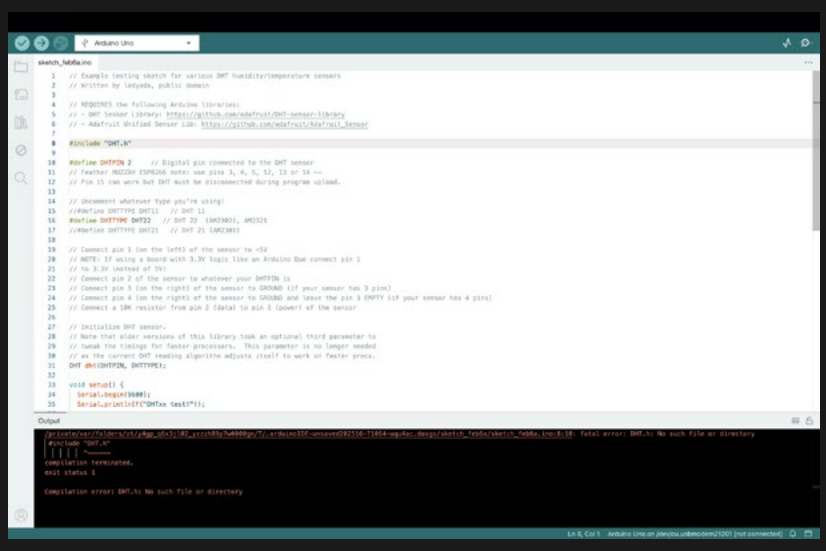
We will adopt these two guiding modes in the exhibition.

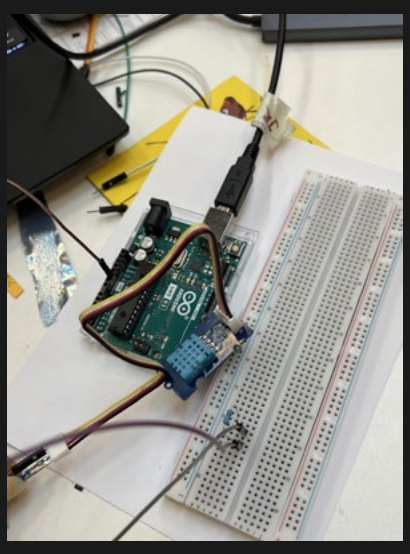
PROTOTYPE

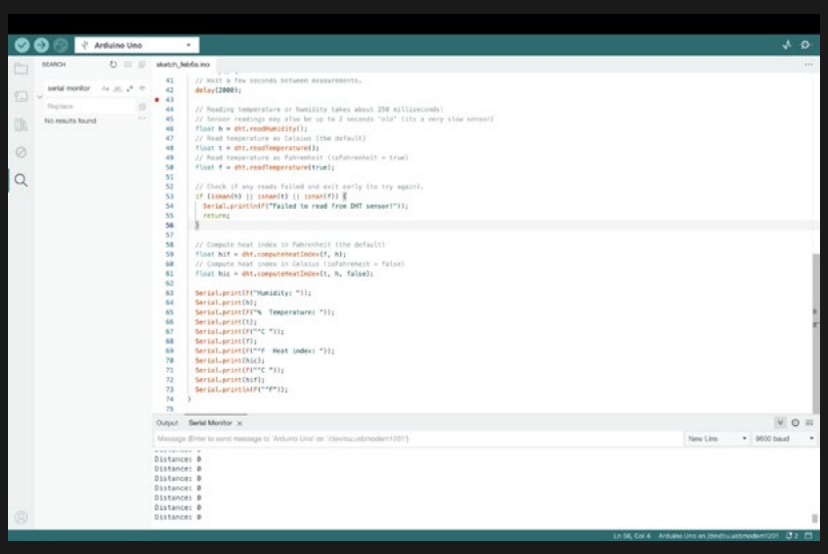
Interaction Design

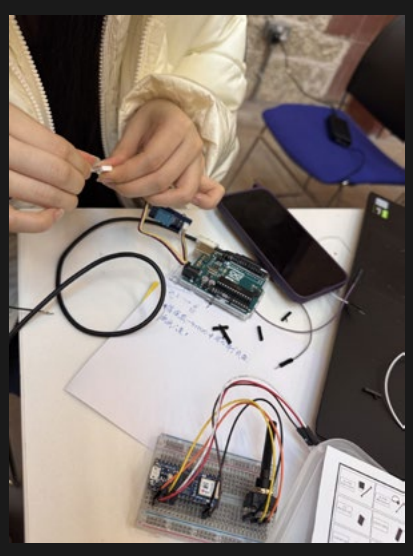
We aim to detect and analyze respiratory states using sensing technology, interpreting breathing patterns through various sensors. This includes expressing respiratory rate through acoustic frequency, capturing rhythm via breath duration, and distinguishing inhalation/exhalation using temperature differences.

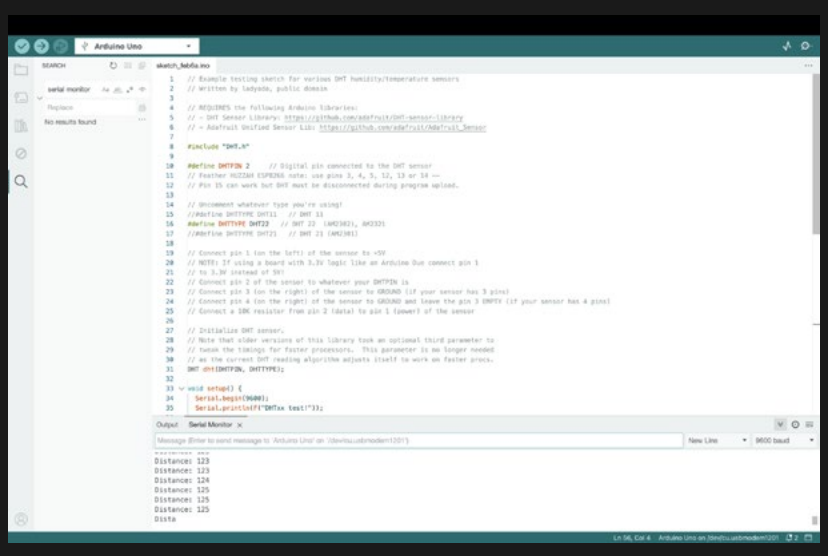








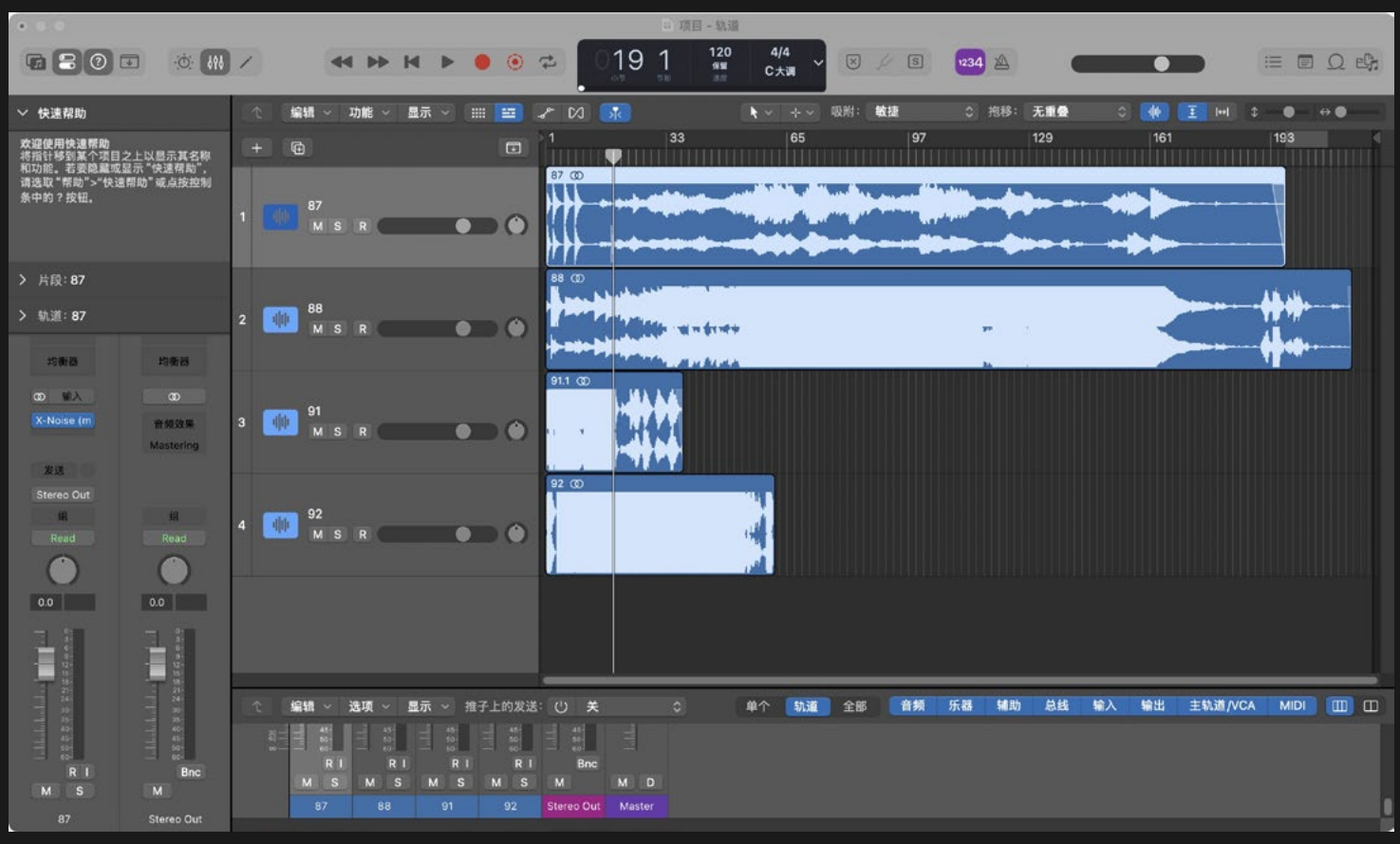




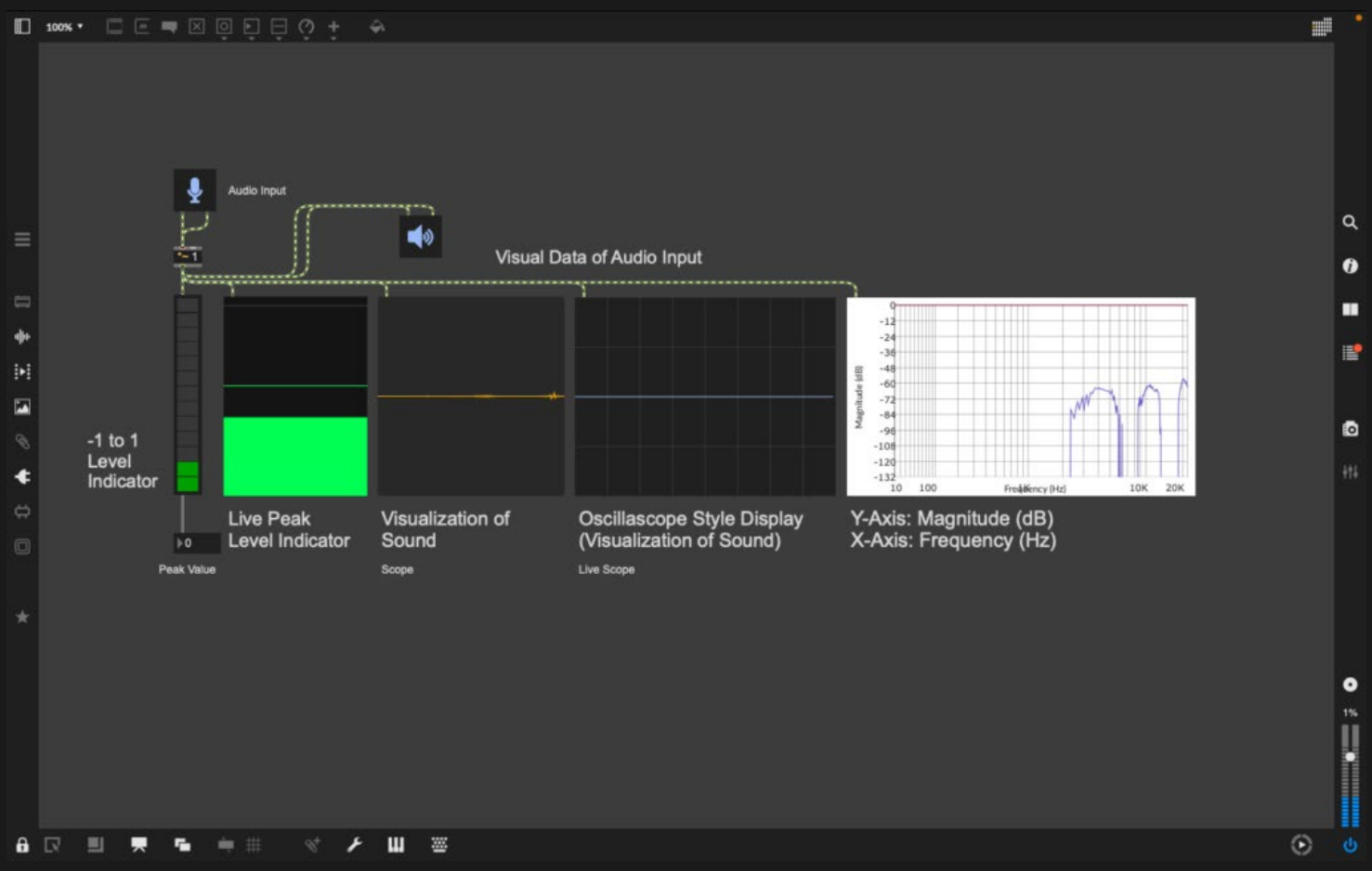
https://blogs.ed.ac.uk/dmsp-process25/2025/02/06/arduino-testing/

Sound Design

The sound design of this installation consists of three main components: a stable background music soundscape for a meditative atmosphere, atmospheric sound effects reflecting human breath and physiological states, and synchronized sound effects that interact with visual elements based on participants' breathing data.



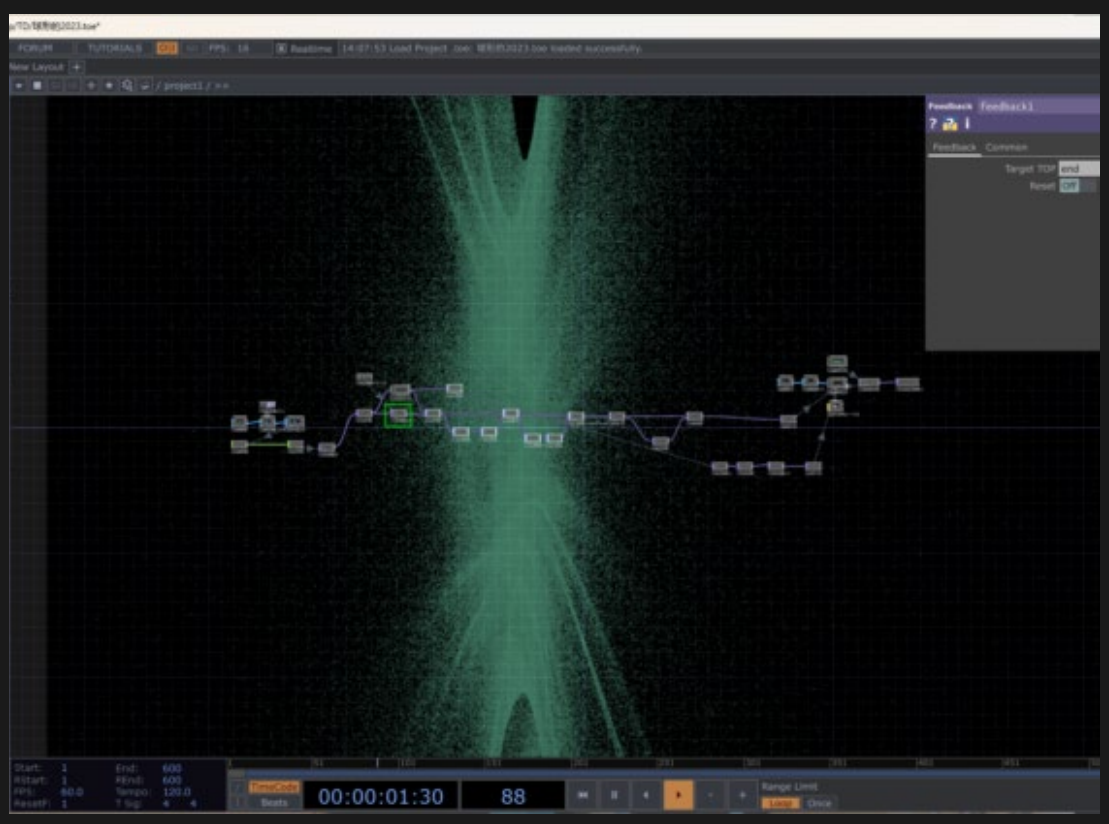
Backgroung music samples by Roulin: https://blogs.ed.ac.uk/dmsp-process25/2025/02/10/initial-inspiration-for-sound-design/

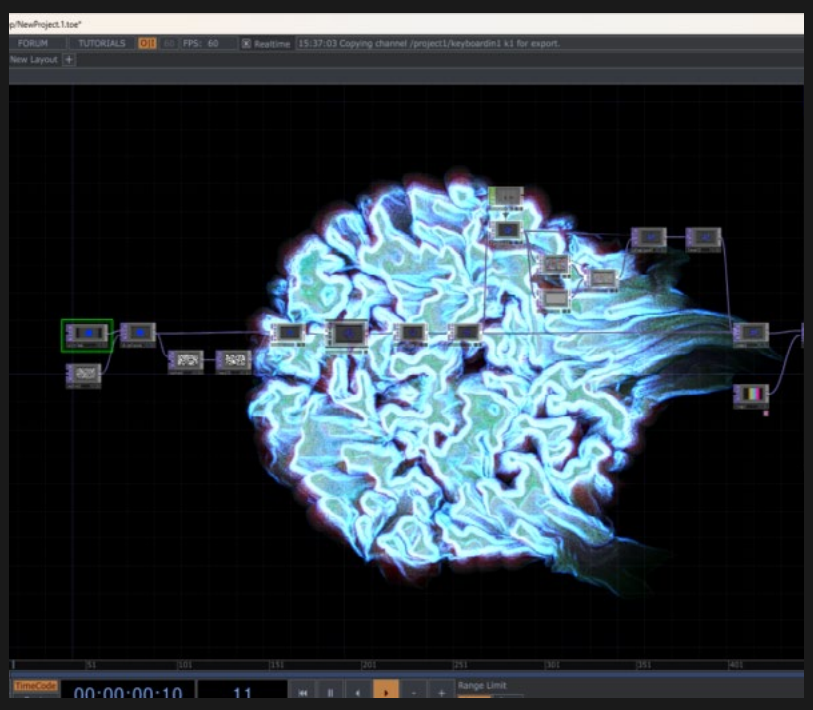


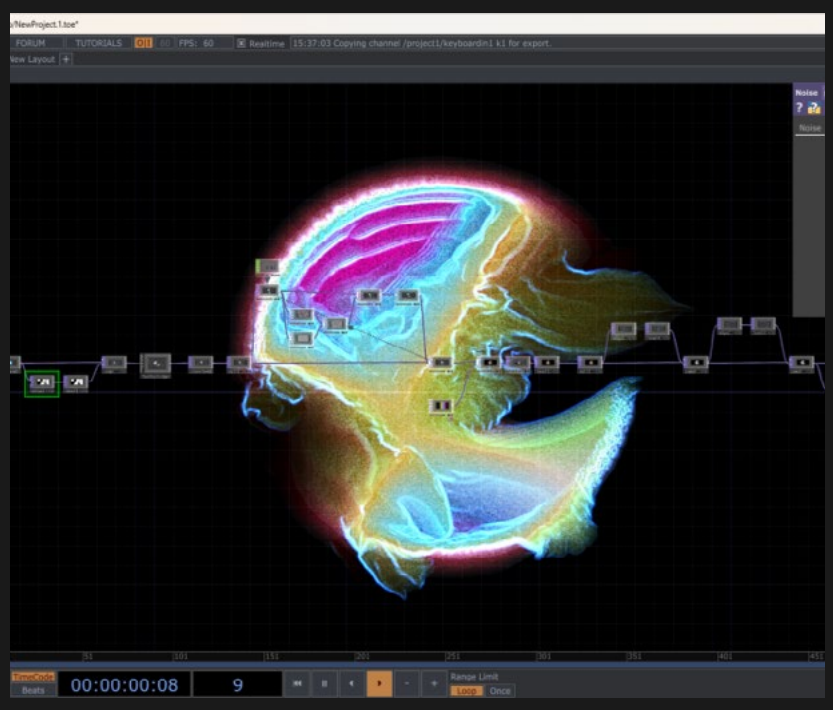
Real-time interactive abstract manipulation of sound by Ashley: http://blogs.ed.ac.uk/dmsp-process25/2025/02/11/sound-design-max-msp-approaches-ideas-and-sources-for-project-proposal-ashley-loera/

Visual Design - Yixuan

Our design focuses on an immersive, interactive experience that connects audience breathing patterns to dynamic visuals in Touch Designer. Using Arduino, we will collect real-time breath data, such as rate and depth, and transmit it to drive visual responses. Uneven breathing will create chaotic, distorted visuals, while steady breathing will produce calm, harmonious imagery, symbolizing tension and relaxation. This direct connection between physiological state and visual narrative makes the experience deeply personal, turning the audience into active participants in shaping the installation's outcome.



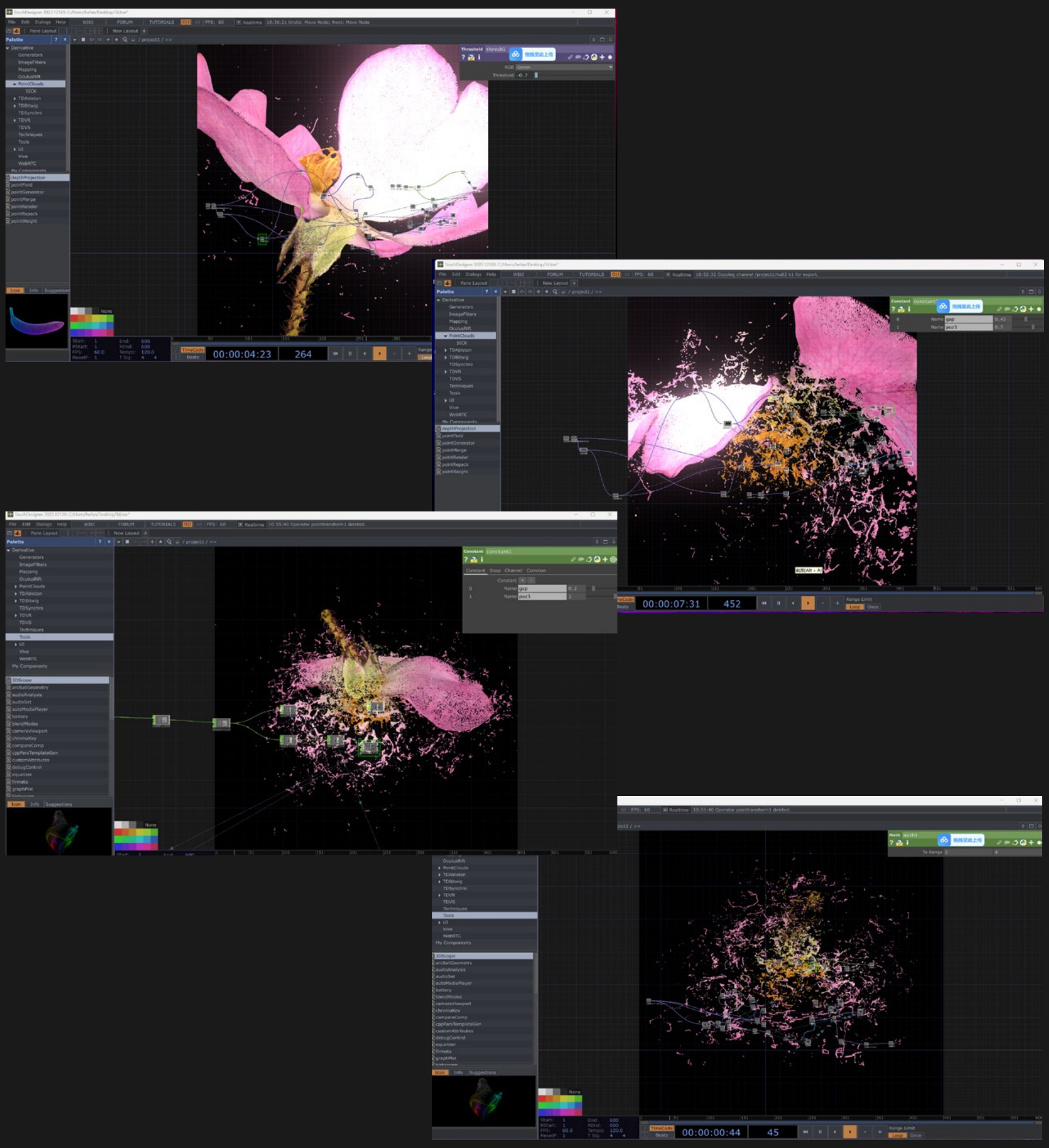




https://blogs.ed.ac.uk/dmsp-process25/2025/02/09/progress-update-on-touch-designer-effects-troubleshooting-and-new-discoveries/

Visual Design - Hefan

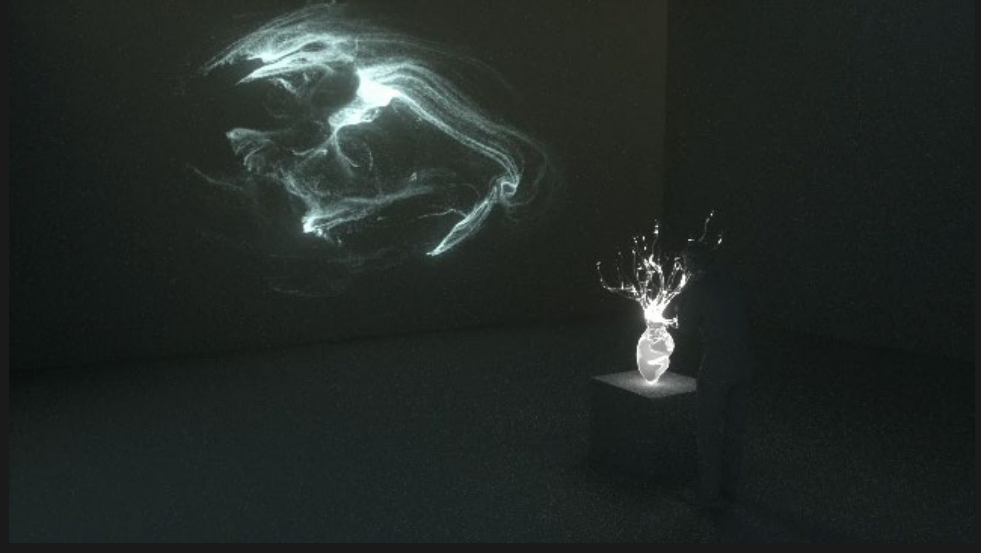
Plants release oxygen through photosynthesis, while humans absorb oxygen through respiration, creating a natural energy exchange. By allowing “flowers” to bloom or wither in response to the audience’s breathing, the installation serves as a visual meditation aid. In psychology and meditation practices, breath regulation is commonly used to relax the nervous system. This artwork enables viewers to influence the form of digital flowers by adjusting their own breathing, thereby achieving a deeper state of relaxation.

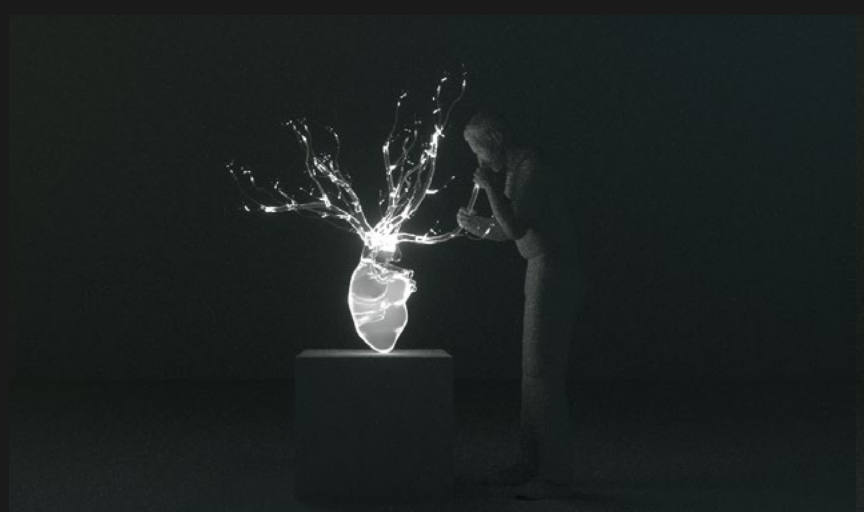


https://blogs.ed.ac.uk/dmsp-process25/2025/02/12/flower-movement-experiment/

Initial idea of Installation

This installation externalizes and visualizes breath, transforming an invisible, unconscious process into a tangible experience. The glowing branches symbolize how each breath feeds life, mirroring the exchange between humans and nature. By making breath perceptible, the work highlights its interconnection with the environment, emphasizing that breathing is not an isolated act but part of a larger ecological and existential cycle.





https://blogs.ed.ac.uk/dmsp-process25/2025/02/09/progress-update-on-touch-designer-effects-troubleshooting-and-new-discoveries/

APPENDIX

Tutorial

1. https://youtu.be/WS2Ww6zYgJw?si=WEciGTxVPYVflYVt
2. https://youtu.be/qLebV9rjqb4?si=SHn13N4ogxACea1D
3. https://youtu.be/NulShUTg3nI?si=wpbzgs0xKmoLTals

Article

1. Jerath, R., Crawford, M. W., Barnes, V. A., & Harden, K. (2015). Self-Regulation of Breathing as a Primary Treatment for Anxiety. Applied Psychophysiology and Biofeedback, 40, 107–115. DOI: 10.1007/s10484-015-9279-8
2. Zaccaro, A., Piarulli, A., Laurino, M., Garbella, E., Menicucci, D., Neri, B., & Gemignani, A. (2018). How Breath-Control Can Change Your Life: A Systematic Review on Psycho-Physiological Correlates of Slow Breathing. Frontiers in Human Neuroscience, 12:353. DOI: 10.3389/fnhum.2018.00353

Image

1. Resonance Room: https://bcaf.org.cn/Studio-Nick-Verstand(Accessed on 07 Feb 2025)
2. Live Performance：https://vimeo.com/893472100(Accessed on 07 Feb 2025)
3. Vicous Circular Breathing: https://www.lozano-hemmer.com/vicious_circular_breathing.php
4. Last Breath: https://vtol.cc/filter/works/last-breath