
Matter to Meaning
A story of universal connection, written in data

“And above all, watch with glittering eyes the whole world around you because the greatest secrets are always hidden in the most unlikely places. Those who don’t believe in magic will never find it.”

Roald Dahl

Every pattern has a story

In the first moments after the Big Bang, gravitational waves began structuring space and time. Eons later, Earth's forest networks learned to reach out in chemical code, bees choreographed intricate messages, and humans crafted stories to share our most universal emotions.

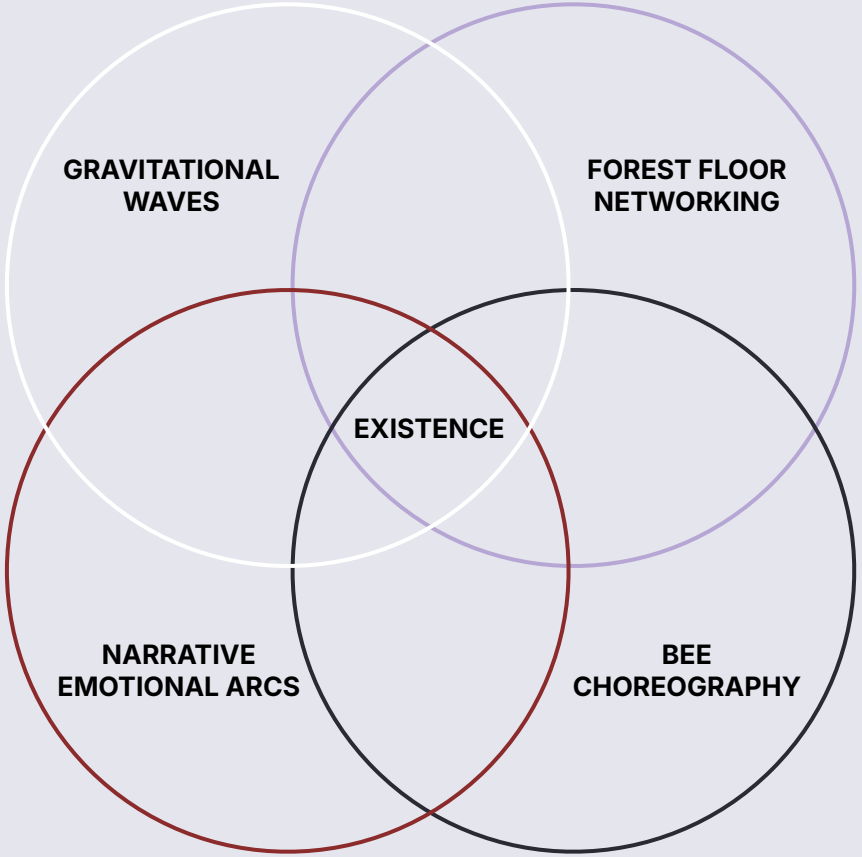
Today, we are able to observe the universe, our planet, and ourselves more closely and accurately than ever before, finding patterns so complex that they were invisible to us until recently. And yet, we see them only through screens and sensors. How can we experience these truths as our ancestors experienced the night sky, the living planet, and the stories shared around a fire?

This data expression installation transforms four fundamental forms of organization – gravitational waves, forest networks, bee communication, and human narrative arcs – into experiences that speak to our evolved senses, telling the story of how the universe taught itself to tell stories.

The flow

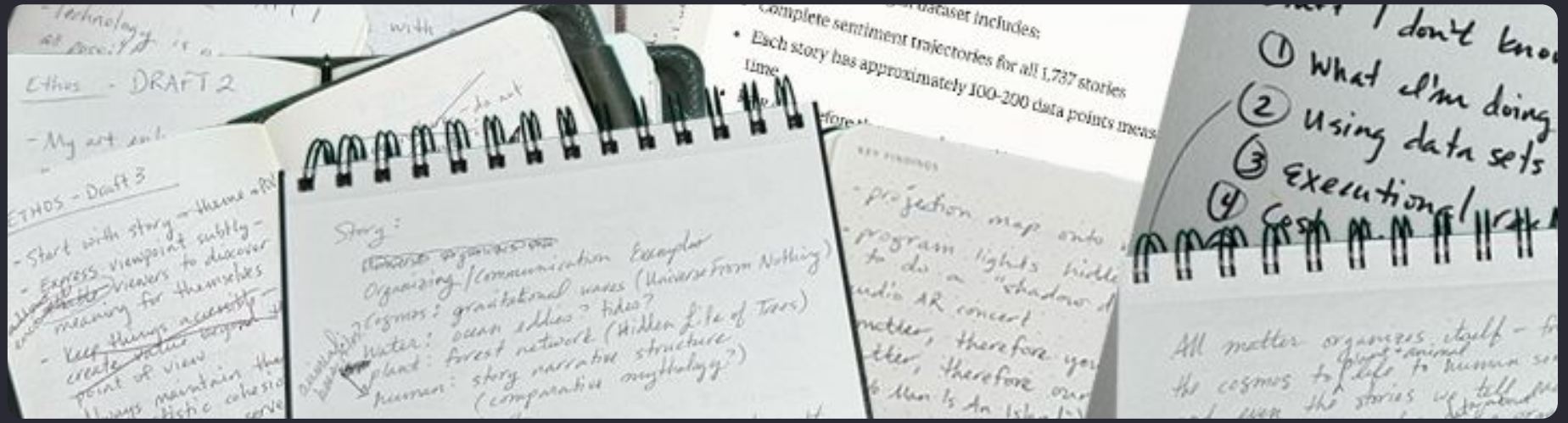
The story unfolds as a 4-part revelation of the interconnected universe. Through data expression, viewers can explore the patterns that underlie our very existence:

- Gravitational waves organize the universe.
- Fungi networks connect the forest floor.
- Bees communicate simple messages through dance.
- Humans reveal abstract emotions through narrative structures.



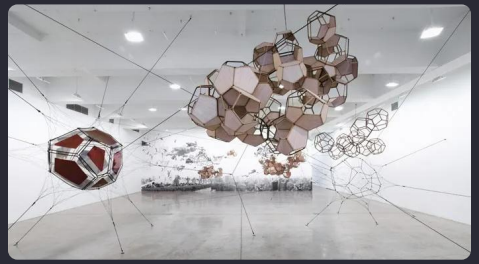
Finding the plot

Reading, writing and resting my way into the big idea

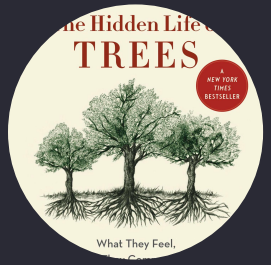


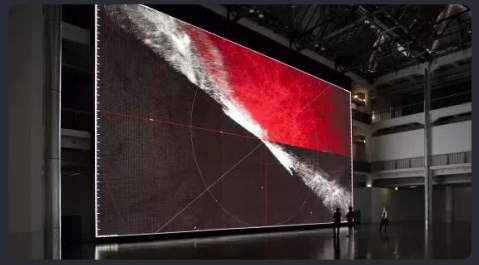
The fuel

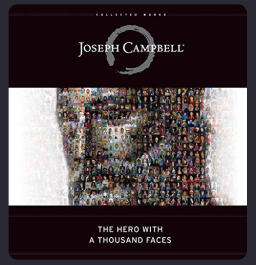
- Rafael Lozano-Hemmer
- Ryoji Ikeda
- Neri Oxman
- Tomás Saraceno
- Joseph Campbell
- Carl Sagan
- Olafur Eliasson
- Sarah Sze
- Peter Wohlleben
- Maya Lin
- Lawrence M. Krauss
- Refik Anadol

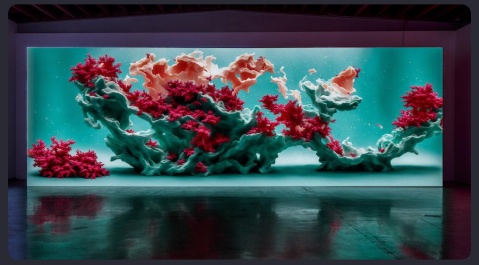



PULITZER PRIZE–WINNING AUTHOR OF COSMOS
CARL SAGAN
A NOVEL
CONTACT

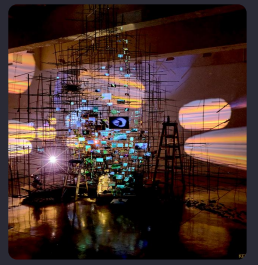

TREES
A NEW YORK TIMES BESTSELLER
What They Feel,




JOSEPH CAMPBELL
THE HERO WITH
A THOUSAND FACES




a
universe
from
nothing
why there is something
her than nothing



The framework

Story-based

Begin with a clear story, theme, and point of view, ensuring every creative choice serves the core concept.

Human

Design experiences that are safe for the human body and mind, embracing gentle light and sound elements.

Elegant

Pursue simplicity in all things, applying technology as invisibly as possible to bring the core concept to life.

Respectful

Create space for audiences to discover and interpret meaning through their own personal experience.

The datasets

Gravitational Waves

The Gravitational Waves Discovery Data | IEEE DataPort

LIGO Scientific Collaboration, "LIGO Open Science Center release of GW150914", 2016, DOI10.7935/K5MW2F23

Bee Communication

Data used in Machine learning reveals the waggle drift's role in the honey bee dance communication system

Dormagen, D. M., Wild, B., Wario, F., & Landgraf, T. (2023). Data used in Machine learning reveals the waggle drift's role in the honey bee dance communication system (1.0) [Data set]. Zenodo.

Forest Networks

Dryad | Data -- MycoDB, a global database of plant response to mycorrhizal fungi

Chaudhary, V. Bala; Rúa, Megan A.; Antoninka, Anita et al. (2017). Data from: MycoDB, a global database of plant response to mycorrhizal fungi [Dataset]. Dryad.

Human Narrative

The emotional arcs of stories are dominated by six basic shapes.

Reagan, A.J., Mitchell, L., Kiley, D. et al. The emotional arcs of stories are dominated by six basic shapes. EPJ Data Sci. 5, 31 (2016). https://doi.org/10.1140/epjds/s13688-016-0093-1

The possibilities

Suspended Objects

Data visualization created through a suspended array of preserved leaves and book page cutouts.

- Precise height measurements map directly to data points
- Materials move gently with air currents and cast shadows
- Subtle bergamot and sage scent is barely perceptible

Topographical Sculpture

A sculptural data visualization made from hundreds of wooden dowels cut to different heights.

- 1/4" or 3/8" dowels arranged in a precise grid
- Heights directly correspond to data values
- Natural wood material creates organic terrain effect

Dichroic Patterns

Layered patterns of blue/teal dichroic film on clear acrylic create fluid, shifting movements.

- Film density and pattern placement determined by data
- Edge lighting enhances dimensional water effect
- Interactive viewing experience changes with movement

Vibration Patterns

Copper-treated metal panel transmits tactile vibration patterns for visitors to feel.

- Amplitude values derived directly from data points
- Arduino controls continuous wave patterns through motors
- Vertical display with programmed edge lighting suggests flames

The possibilities (cont.)

Earth flow patterns

Precise patterns of layered sands and soils create organic flowing forms within a shallow frame.

- Data determines path and density of each material layer
- Contrasting light and dark materials show flow patterns
- Natural materials create terrain-like topography

Standing wave patterns

A shallow water tray activated by motors creates dynamic wave interference patterns.

- Motor placement and intensity controlled by data points
- Underlighting creates shadows and reflections
- Wave patterns shift and interact continuously

Fiber optic art

Bundled fiber optic strands create a glowing data visualization through light transmission.

- Individual fiber intensity varies based on data
- Programmed pulse patterns flow through the network
- Light creates dynamic, flame-like effects

Sonification (stretch goal)

Spatial audio experience converts data into interactive soundscapes.

- Distinct sound patterns represent different datasets
- Audio zones mix and respond to listener position
- Echoes.xyz platform enables augmented reality audio

The big picture (wireframes TBD)

Doing the work

What I have, what I need, and what I don’t know

Tools and resources

Research

Dataset Search
Google Scholar
Claude
ChatGPT

Visualization

RAWGraphs
TensorFlow
Tableau
Power BI

Expression

TouchDesigner
SuperCollider
Sonic Pi
Echoes.xyz
Arduino
Raspberry Pi

Current Unknowns

Installation location

Space limitations

Location lighting

Material procurement

Cost of materials and builds

Achievable executions

Timeline (TBD)

1/23
- All datasets examined
- Datapoints selected
- “Current unknowns” answered

1/30
- Executions chosen
- Installation wireframed
- Timeline set
- All data visualized with tools
- Permissions requested
- Materials ordered

2/6
- Data mapped to elements in all executions
- Execution 1 started

2/13