A RESEARCH + DESIGN PROJECT · 2026

MYCELIUM

The Whisper Network
an underground web of feeling

Whisper an anonymous sentence. An AI reads the feeling inside it and grows a small pixel creature — it drifts into a shared, living colony. **More connected than ever. Still disconnected.**



React · canvas 2D · Claude · Edge · Redis

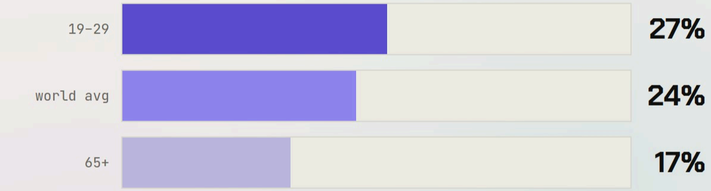
mycelium-abxv.vercel.app

01 · CASE STUDY

Background

Study abroad, relocation, a first job — transitions rarely end relationships; they cut the everyday synchrony those relationships ran on. Loneliness is **the gap between the connection you want and the connection you feel** (U.S. Surgeon General, 2023).

WHO FEELS IT MOST — BY AGE



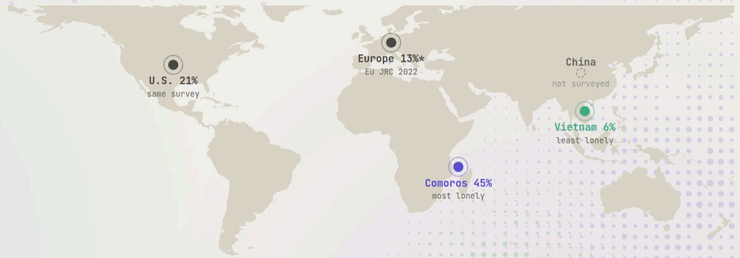
~50%	−70%	+29%
of U.S. adults report loneliness	teen in-person time vs. 20 yrs ago	early-death risk ≈ 15 cigs/day

Meta-Gallup 2023 (142 countries) · **U.S. Surgeon General** 2023 · Pew · World Happiness Report 2025 · Baek et al., Psych. Science 2023.

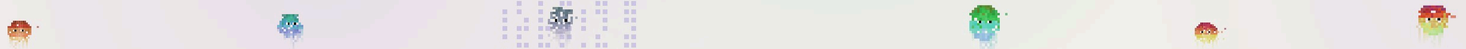
02 · CASE STUDY

Problem

Platforms make expression and contact visible, but not the perception of collective emotional connection.



"Very / fairly lonely" — **Meta-Gallup 2023**. *Europe: EU JRC 2022, stricter measure. China not among the 142 countries polled. What is missing is **perceivable emotional co-presence** — a different model of representation, not another feed.



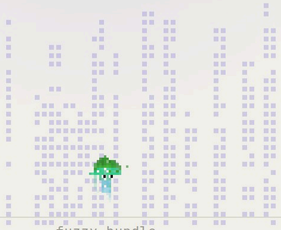
03 · CASE STUDY

Target Users

18–30 young adults in transition — defined by life stage, not pathology.

- **In transition**
  study abroad · relocation · first job — students, migrants, graduates, remote workers.
- **Renegotiating relationships**
  across distance, time zones, language, identity, shifting roles.
- **Not a clinical group**
  life stage, not diagnosis — never framed as a disorder to be treated.

Missing: **perceivable emotional co-presence** — not another social feed.



fuzzy bundle

04 · CASE STUDY

Research Questions

How might anonymous emotional input become a perceivable, evolving collective emotional environment?

RQ2
without public performance
expression that never becomes performance

RQ3
AI as rule generator
not a conversational companion

RQ4
emotion → morphology
states mapped into form, behaviour, relation

RQ5
time-based ecological states
loneliness, support, transformation over time



moony moth



little dumpling

05 · CASE STUDY

Literature

SUPPORTS	SOURCE
loneliness as perceived disconnection, not a lack of people	**Surgeon General** (2023)
young adults' high platform use & loneliness	**Pew · WHR** (2025)
lonely people process the world idiosyncratically	**Baek et al.** (2023), Psych. Science
care, ethics, contestability in sensitive design	**Tad Hirsch**
humane data representation over dashboards	**Giorgia Lupi** — Data Humanism
affect spreads through networks — cited critically	**Kramer et al.**

Cited as grounding, not as measured claims.



sunny sprite



misty bell

06 · CASE STUDY

Design Opportunity

From a platform logic to an ecological one.

FROM	TO
direct communication	indirect emotional co-presence
posting & replying	observing & inhabiting a shared field
emotion as a label	emotion as form, behaviour & relation
AI as response generator	AI as ecological rule generator

07 · DESIGN PRINCIPLES

- **Don't diagnose, don't treat**
  no scores, no therapy claims.
- **No companion, no performance**
  not a friend or chatbot.
- **Emotion through form**
  indirect, slow, observable.
- **Loneliness as a state**
  can change; not a label.
- **Care emerges from relations**
  rules, not a consolation button.
- **Keep ambiguity, show failure**
  uncertainty stays discussable.



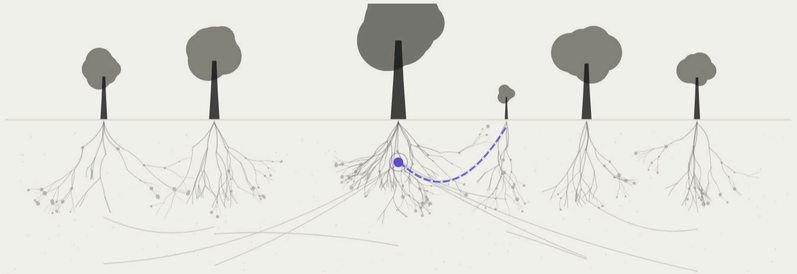
sunny crumb

POP. 6,856 CREATURES

08 · CASE STUDY

Biological Inspiration

Mycelial networks as a **metaphor** for indirect connection — a source of language, not a literal model; the biology is never offered as scientific proof.



BIOLOGY (AS INSPIRATION)	INTERACTION BEHAVIOUR
underground network	indirect connection across a shared field
growth & decay	entities emerge, fade, change over time
mother trees supporting seedlings	mature entities support isolated ones
nutrient exchange	relation leaves traces between bodies

The real wood-wide web: Simard et al., Nature 388 (1997) · K[illegible] et al., Science 352 (2016) · Beiler et al., New Phytologist 185 (2010).

09 · CASE STUDY

The Role of AI

AI is framed as an ecological rule generator — not a chatbot, therapist, or emotional authority.

A disclosure becomes ecological parameters; the model sets the conditions for something to grow — it never writes back a comforting reply.

Interpretation, not truth
a reading that may be wrong — never a verdict on how you feel.

Boundaries are explicit
input → interpretation → parameters → organism. Never a persona.

Uncertainty is visible
errors are part of the system's story, open to contestation.

10 · CASE STUDY

System Overview

01 **Input**
tree-hole text or voice, anonymous

02 **AI interpretation**
Claude Haiku → labels + parameters

03 **Morphology**
parameters → a generated body

04 **Social simulation**
forces, compatibility, connection

05 **Ecological feedback**
loneliness, support, transformation

06 **Observation**
heatmap · gallery · debug

11 · USER JOURNEY

01 **Arrive**
a quiet living stage

02 **Notice**
the tree-hole input

03 **Disclose**
one anonymous sentence

04 **Wait**
the system interprets

05 **Emerge**
a new entity is born

06 **Respond**
neighbours gaze, greet

07 **Dwell**
bonds form, fade, transform

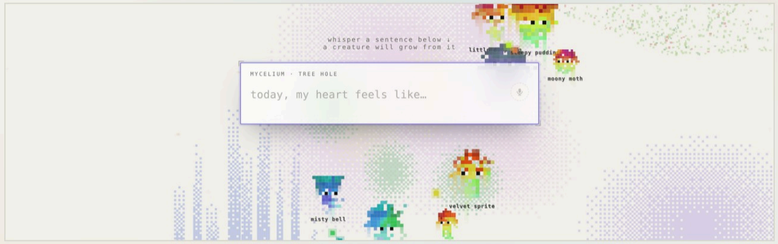
08 **Explore**
heatmap · gallery · debug

sunny sprite · honey bean · sleepy pudding · quiet wisp · velvet sprite · marble mochi · gentle pip

12 · CASE STUDY

Interaction Flow

The interaction that matters is not typing the sentence — it is watching the social field rearrange itself afterward.



The tree-hole input on the live field — everything after this sentence is a system response.

STEP	USER DOES	SYSTEM RESPONDS
enter	arrives on the stage	ambient field, living population
disclose	writes / speaks	listening / interpreting state
emerge	watches	a new entity is generated
greet	observes	neighbours gaze & approach
evolve	stays	the field reorganises over time

13 · CASE STUDY

Emotion Pipeline

A translation system, not an emotional diagnosis.

INPUT
Text / voice
one anonymous sentence

MODEL
Claude Haiku
interprets the disclosure

READING
Labels + intensity + topic
18 emotion labels

PARAMS
Morphology
six parameters

OUTPUT
Entity
a unique emotional body

A failed reading is handled cleanly instead of hidden — and, as future work, opened up so it can be challenged.

14 · CASE STUDY

Morphological Mapping

PARAMETER	BECOMES
density	body density · opacity · scale
agitation	jitter · breathing rhythm
tendrilCount	connective tendrils
glow	glow intensity
tintHue	spore colour
particles	spore-emission frequency

FORM
central-axis symmetry + per-row envelope + edge dither

COLOUR
tintHue + intensity widen the palette

EXPRESSION
procedural face — the pupil glances, blinks

RHYTHM
agitation drives jitter & breathing



Same family, three intensities — systematic, never fully deterministic.



15 · CASE STUDY

Biological Archetypes

Six prototype species — **a generative grammar, not fixed emotion mascots**. Morphology and hybridization mutate them; the field reads as one system while every member stays distinct.



tender
H 24°



calm
H 205°



curious
H 32°



dreamy
H 268°



companion
H 158°



lonely
desat.

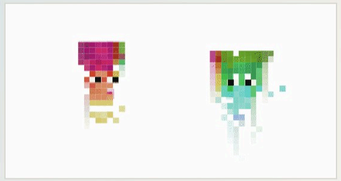
16 · CASE STUDY

Social Simulation

A bond is not drawn as a line — it shows up as **tile-swap dyeing**: the tendril is made of colour, from the point of contact.



Contact-point dyeing
the connection, as colour — it releases when they part

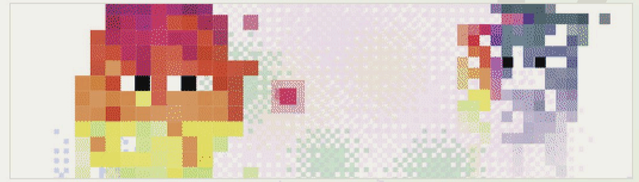


Matter exchange
bonded partners ferry mosaic tiles back and forth

BOND LIFECYCLE	SHOWN AS
meet	the dye sweeps in from the contact side
bonded	borrowed colour holds (≤45%, identity preserved)
part	the colour slowly releases
cooldown	a pause before the pair can dye again

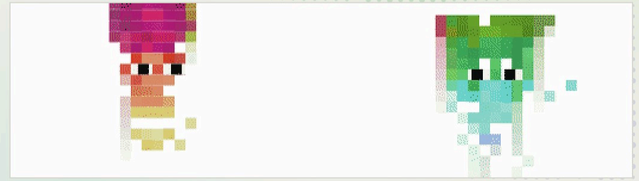
17 · CASE STUDY

Mother Tree



Care as an internal ecological mechanism
an entity that has stayed ~40s becomes a mother tree, reaching softer tendrils toward those left alone — nobody presses a button.

18 · HYBRIDIZATION



Encounter becomes memory & mutation
sustained contact: infection → transforming → hybrid — fifteen forms implemented.



sleepy pudding



little dumpling



moony moth



misty bell



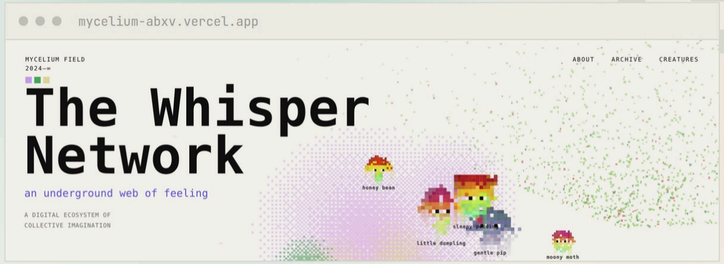
sunny crumb



sunny sprite

19 · CASE STUDY

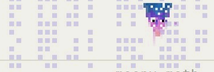
Prototype



ROLE — IMPLEMENTED

ROLE	IMPLEMENTED
Core	living stage · tree-hole input (text + voice) · Claude Haiku analysis · six morphology parameters · physics field · dyeing lifecycle · compatibility matrix · mother tree · hybridization
Supporting	heatmap · time-of-day mood · gesture · ambient audio · 15 hybrid forms
Research tools	gallery · debug — observation instruments, not product features

Every specimen in this document is rendered by the same deterministic engine — no hand-drawn art, no image model.


moony moth


honey bean

20 · CASE STUDY

Evaluation

Not whether it cures loneliness — whether it makes co-presence perceivable, interpretable, discussable.

METHODS	MEASURES	ETHICS
walkthrough · think-aloud	perceived co-presence	consent · privacy
interview	trust in AI mediation	emotional sensitivity
expert critique	comfort with anonymity	no therapy claims
diary · observation	concern about misreading	debriefing



Status: methods planned; the in-product survey (right) is live as one instrument. Findings reported qualitatively — no claims not gathered.


mint pip


quiet wisp


marble mochi

21 · CASE STUDY

Future Work

- **AI contestability** — revise, reject, or reinterpret a reading.
- **Long-term ecology** — traces across sessions and deployments.
- **Community deployment** — situated studies with international students.
- **Exhibition build-out** — the physical installation — sterile cultivation, sensor loop.
- **Transparent morphology** — reveal how parameters shape form.
- **Expanded evaluation** — walkthroughs & expert critique first.

The most important direction is not more features — it is making the system more transparent, easier to challenge, and grounded in an actual setting.


gentle pip

22 · CASE STUDY

Reflection

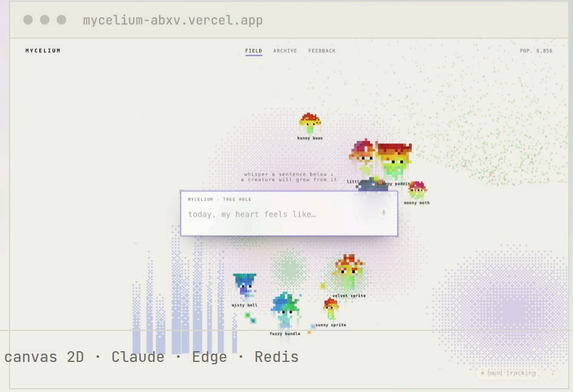
A mature reflection makes the project **more credible, not weaker** — limitations become the next research questions: no therapeutic claims; AI can misread; the mycelial metaphor risks reading as cute; user research remains to be done. Naming these openly is part of the method.

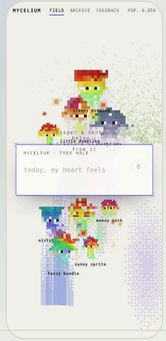
The clearest research identity: **emotional visualization, AI mediation, social simulation, design ethics** — in the tradition of care-oriented design research (Hirsch).

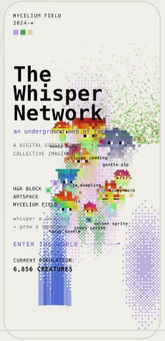
23

Final









The live prototype. Every creature is a real sentence someone whispered — held in a colony that keeps moving whether or not anyone is watching.

No accounts. No feed. No metrics.



24 · INSTALLATION

Hyphal Column

The Whisper Network now has a **body**: a five-foot steel column with six screens and a tree hole inside. Whisper one sentence and a pixel spore grows. **Your sentence never shows on any screen — only the spore it grew.**

Cushions down, tower running, plush guardian on top. The wall text introduces Mycelium, the system it grows from. Visitors sit, whisper to the tower, and watch their spore drift into the colony beside everyone who sat there before them.

top	the plush guardian — the companion robot's seat
sky screen	the whole colony at night — every spore ever whispered, drifting
micro screen	one spore's record: name, family, intensity — the one being watched
pocket screens	twin ESP32 eyes — the spore picked from the field, live
field screen	the tree hole: type a sentence, a spore grows; QR to grow one on your phone
roster strip	the newest arrivals, in a row, by name

One Pi runs the screens; the tower's screens and the desk companion share a LAN bus, so a spore picked on the field goes live on the small screens the moment it is touched. **No accounts. No feed. No metrics.**

25 · DETAILS

Up close

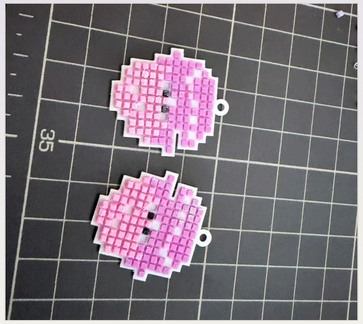


Details — the twin pocket screens, the spore field, the roster strip. The field runs inverted for the room: colour glows out of darkness; the web and phone experience stays paper-cream.

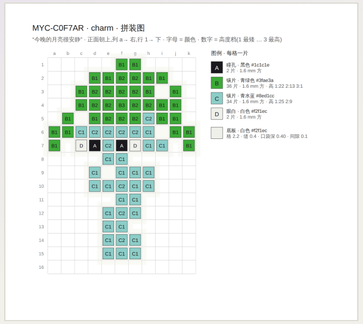
26 · OFF-SCREEN

Spore charms

Spores printed into charms, **tile by tile**. Every charm comes with its own build chart, and the assembly tray has numbered pockets and magnets — so a visitor's spore can go home as an object.



Printed charms, one pixel per tile.



Each charm's own build chart — letter = colour, number = height.

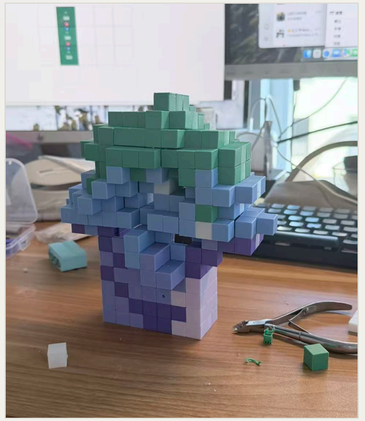


The assembly tray — numbered pockets and magnets.

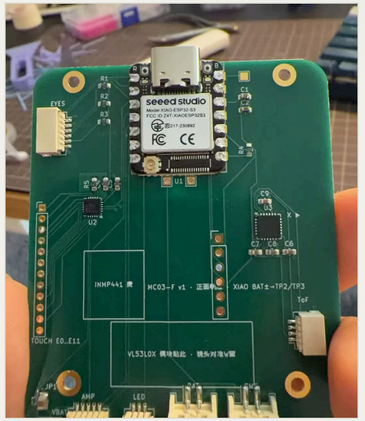
27 · IN PROGRESS

Desk companion

A desk companion robot on the **same network as the tower**: a spore body built from magnetic voxels, two pixel eyes, a tree hole of its own. Board v1 just arrived — **ESP32, mic, time-of-flight eyes, touch pads**.



The shell — a spore body built from magnetic voxels.



MC03-F v1: XIAO ESP32-S3, MPR121 touch, INMP441 mic, VL53L0X eyes, OLED sockets.

28 · SHOWN

BU Art Market

Fri, Oct 30, 2026 · 808 Commonwealth Ave, Boston

People sat on the cushions and whispered their sentences to the tower. Spores grew, and some went home as charms. Three visitors left an anonymous account of what the work left with them — their words, and how they felt right after writing (1–7):

> “I liked the way you can create a character based on how you feel and it can interact with other mycelium. I would like to see other ways to interact with mycelium. It’s a very creative idea and I love the software — super easy to use and very beautiful.”
>
> 13:11 · 18–29 · not in a transition
>
> ○○○○○○● harder to bear → easier to bear
> ○○○○○○● harder to put into words → easier to put into words
> ○○○○○○● more confused → clearer
> ○○○○○○● push it away → let it stay open

> “The colors and animations drew me in. I thought that this was such a cool concept and the idea of people influencing each other being depicted as “exchanging colors” is very sweet and touching.”
>
> 15:29 · 18–29 · in a life transition
>
> ○○●○○○○ harder to bear → easier to bear
> ○○○●○○○ harder to put into words → easier to put into words
> ○○●○○○○ more confused → clearer
> ○○○●○○○ push it away → let it stay open

> “人们之间的互动，but why things get so digitalized nowadays”
>
> 17:04 · 18–29 · in a life transition
>
> ○○○○●○○ harder to bear → easier to bear
> ○○●○○○○ harder to put into words → easier to put into words
> ○○○●○○○ more confused → clearer
> ○○○○○●○ push it away → let it stay open

Formative feedback, pre-IRB. The scales read the visitor's own state, not the work — the warmest words came with the lowest numbers, which is what they are for. Grow one now → mycelium.yueyao.design