# 7PM

12AM in London (GMT), 9AM in Tokyo (GMT+9)

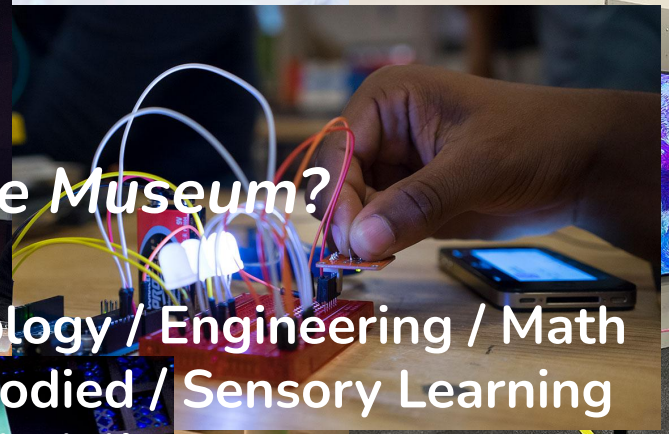
## Science Museums

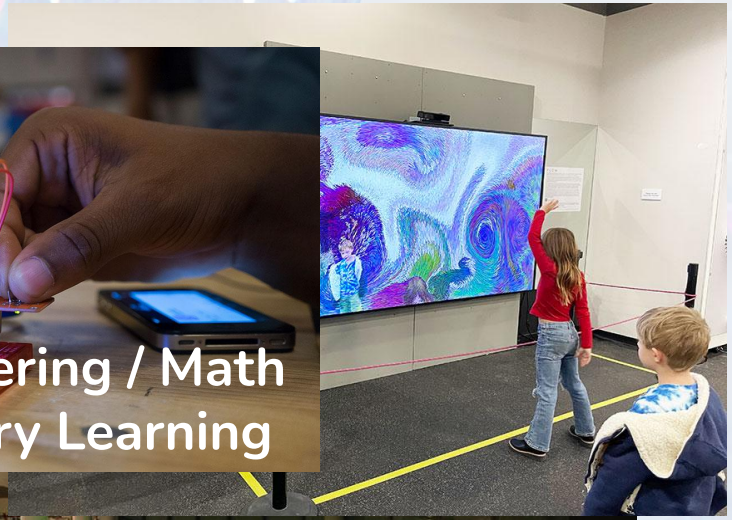
**Moderator:** Stephen Uzzo, *National Museum of Mathematics*

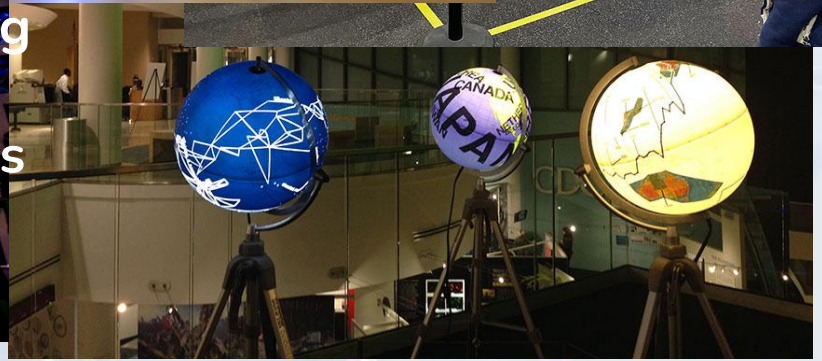
**Presenters:**

- Weidi Zhang, *Arizona State University*
- Yoon Chung Han, *San José State University*
- Joe Heimlich, *Center of Science and Industry*
- Katy Börner, *Indiana University*

# Multiscale Human: Science Museums







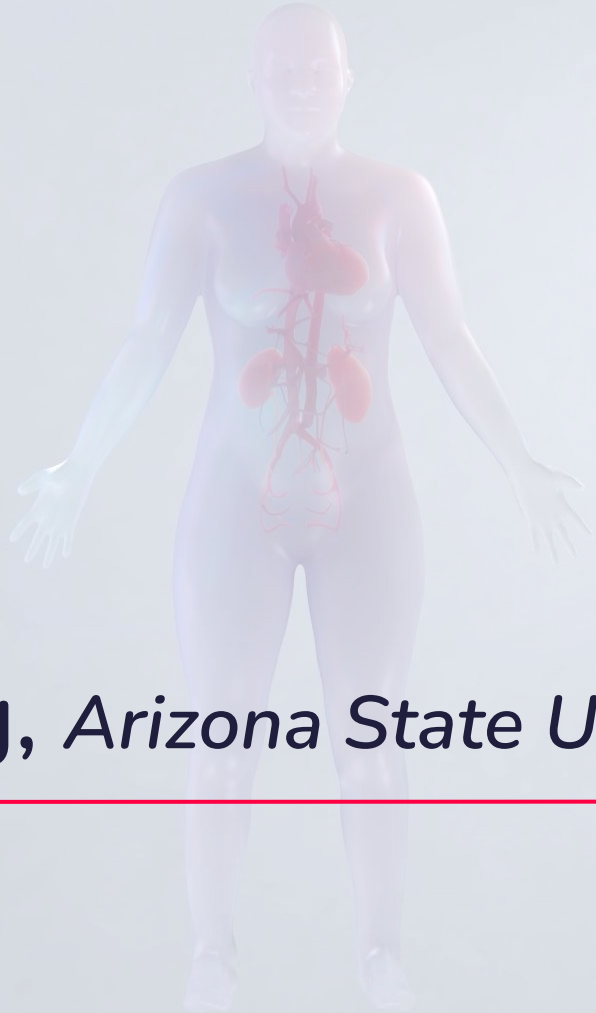
## *What is a Science Museum?*

- Science / Technology / Engineering / Math
- Hands-on / Embodied / Sensory Learning
- Visualization / Modeling
- Doing / Making
- Immersive / Simulations

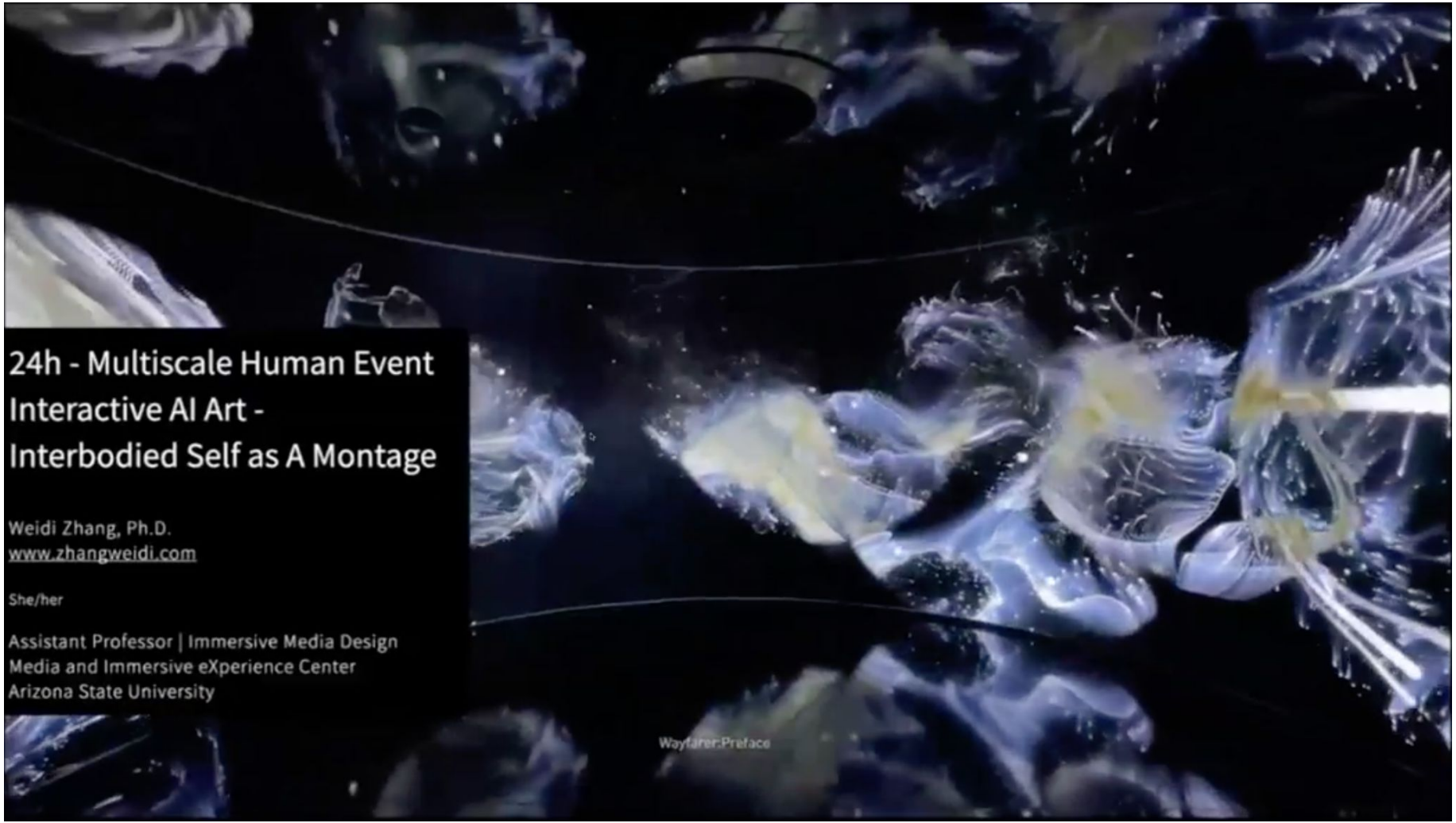
# Multiscale Human: Science Museums

*Format*

- Panelists' Introductions and Remarks
- Whole Panel Questions / Prompts
- Audience Q & A



Weidi Zhang, *Arizona State University*


24h - Multiscale Human Event
Interactive AI Art -
Interbodied Self as A Montage
Weidi Zhang, Ph.D.
www.zhangweidi.com
She/her
Assistant Professor | Immersive Media Design
Media and Immersive eXperience Center
Arizona State University
Wayfarer:Preface

# ReCollection

AWARDS:

A' Design Award, Italy, 2024

EXHIBITIONS:

*ReCollection [ 2nd Edition ]* Highlight Art Gallery, Singapore, 2024

*ReCollection [ 2nd Edition ]* CVPR AI Art Gallery, Seattle, US. 2024 【 Shortlisted ]

*ReCollection [ Immersive Edition ]* Alvolution, Cinema Mystica, Budapest, Hungary, 2024

*ReCollection [ 2nd Edition ]* Worlds For Change, Media and Immersive eXperience Center, Arizona State University, 2023

*ReCollection [ 2nd Edition ]* Signal Immersive Gallery, Curated by Vancouver International Film Festival and DigiBC, Vancouver, BC, 2023

*ReCollection [ 1st Edition ]* Siggraph Art Gallery, Los Angeles Convention Center, CA, US, 2023

*ReCollection [ online ]* International Symposium For Electronic Arts (ISEA), Paris, FR, 2023

PRESS:

Neural Magazine, 2024 'NEURAL 74, CONNECTIVE THEORIES, 30 YEARS OF NEURAL' (ISSUE #74 2023 ISSN: 2037-108X) 'ReCollection: Recreating Memories'

Piksel Bülten, "Hatırlamanın Eşiğinde: Weidi Zhang," Piksel Bülten (2024): https://www.pikselbulten.com/posts/hatirlamanin-esiginde-weidi-zhang (accessed September 30, 2024).

RESEARCH PAPER:

"ReCollection: Creating synthetic memories with AI in an interactive art installation" Siggraph Art Paper
The Proceedings of the ACM on Computer Graphics and Interactive Techniques

WWW.ZHANGWEIDI.COM

ASU Herberger Institute for Design and the Arts
Arizona State University

University of Sheffield | Healthy Lifespan Institute


ReCollection
Design Concept
ReCollection is an interactive AI art installation that assembles synthetic collective visual memories based on language input, blurring the boundaries between remembrance and imagination through AI system design and interactive experimental visualization.


"GIVING BIRTH TO MY SON WAS THE BEST THING I EVER DID."
I STILL REMEMBER OUR FIRST PHOTO TOGETHER, JUST MOMENTS AFTER HIS BIRTH, HIS PEACEFUL SLUMBER AND MY RADIANT SMILE CAPTURED PERFECTLY, A MEMORY THAT I CHERISH DEEPLY..
/*
OUR A.I. SYSTEM AUTO-FILL THE DETAILS
*/


WEIDI ZHANG / RODGER LUO
RECOLLECTION
An Interactive AI Art Experience For Synthetic Memories

*Whisper a Fragmented Story From the Past*
*Our System Fills in Details, in Real-time, Weaves Memories*

ReCollection at Signal 2023

-

When we coexist with machines, will we accumulate synthetic recollections of symbiotic imagination?

Is language capable of triggering and synthesizing memories?

How does our collective memory inspire new visual forms and alternative narratives?

# MEMORY, IMAGINATION, AND AN INTER-EMBODIED SELF AS A MONTAGE

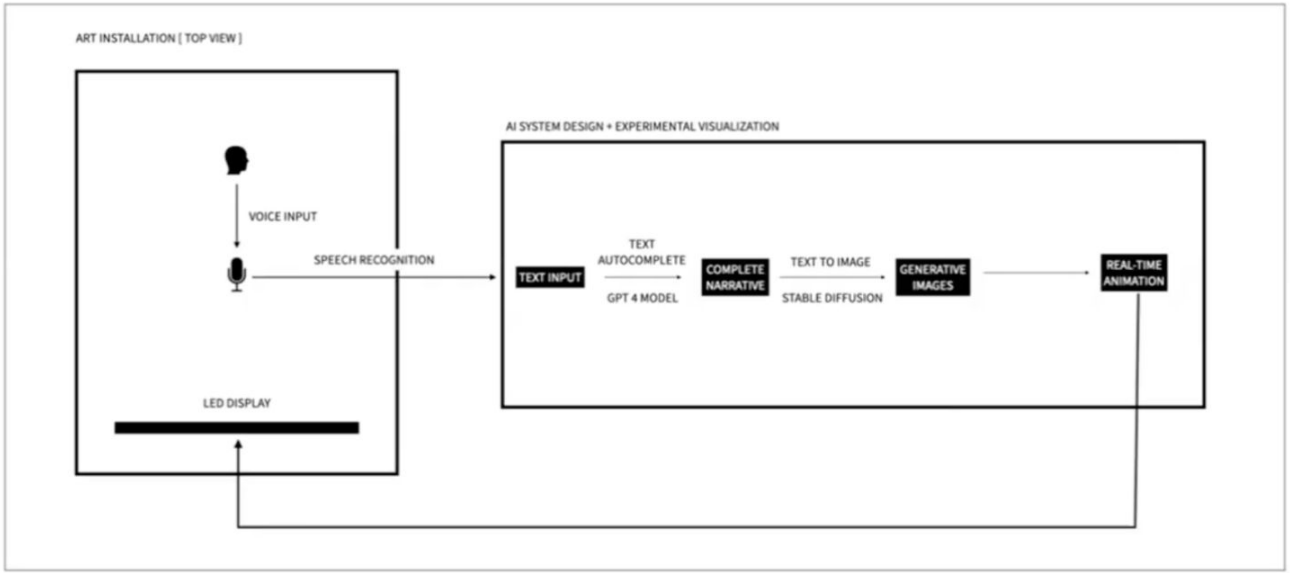
"Contrary to person-centred approaches, the inter-embodied self does not require a unified or coherent narrative in order to thrive. On the contrary, our inter-embodied selves may be more fruitfully conceptualised as montages; polyphonic repertoires of voices and experiences that co-exist in dialogical relationship to one another; constantly updating, constantly changing."

"connection flourishes when we shift away from the expectation of memory and toward the freedom of imagination and shared expression."

*Jenkins, Nicholas. 2014. 'Dementia and the Inter-Embodied Self', Social Theory & Health, 12.2 (2014), 125–37*
*Basting, Anne Davis. 2020. Creative Care: A Revolutionary Approach to Dementia and Elder Care. New York: Harper Collins. Kindle Edition*

# ReCollection 2023

An Interactive AI Experience
for Synthetic Memories




**SYSTEM MAP**

**VIDEO DOCUMENTATION**
HTTPS://VIMEO.COM/880433966/2867957757

**USER INTERACTION**
In the art installation, a participant will whisper **fragmented memories** into the microphone. The AI system will automatically fill in the details of the spoken words to complete the text with a narrative using the **GPT-4**, a large language model. The completed narrative will be sent to **Stable Diffusion to generate synthetic images** representing the memories based on the machine's interpretation. The images output by machines is further developed and visualized algorithmically as an **evolving interactive experience.**

ReCollection

## Visual Inspiration

YUKO KIMURA

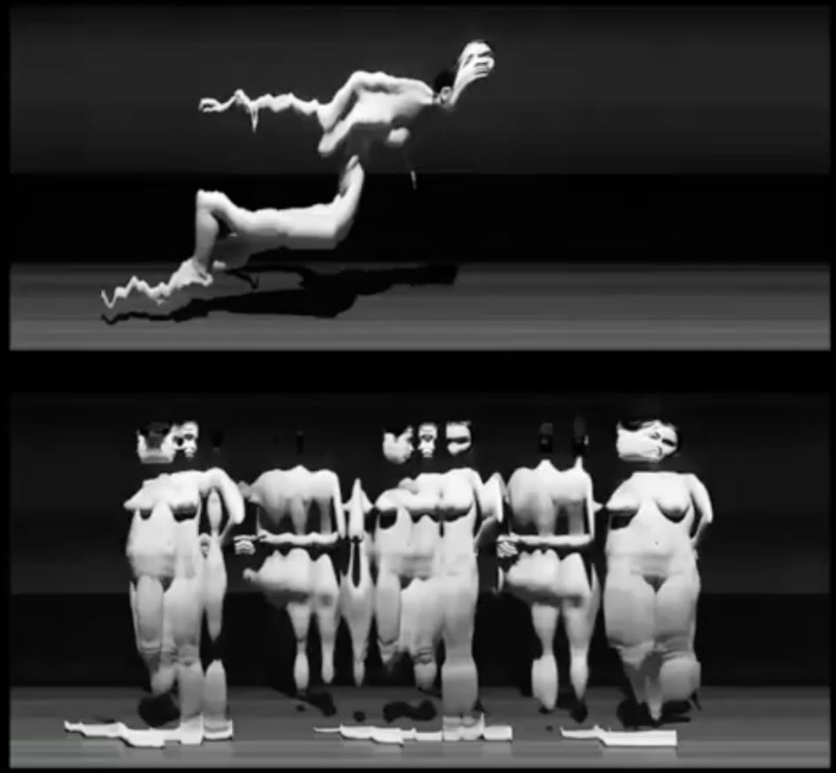
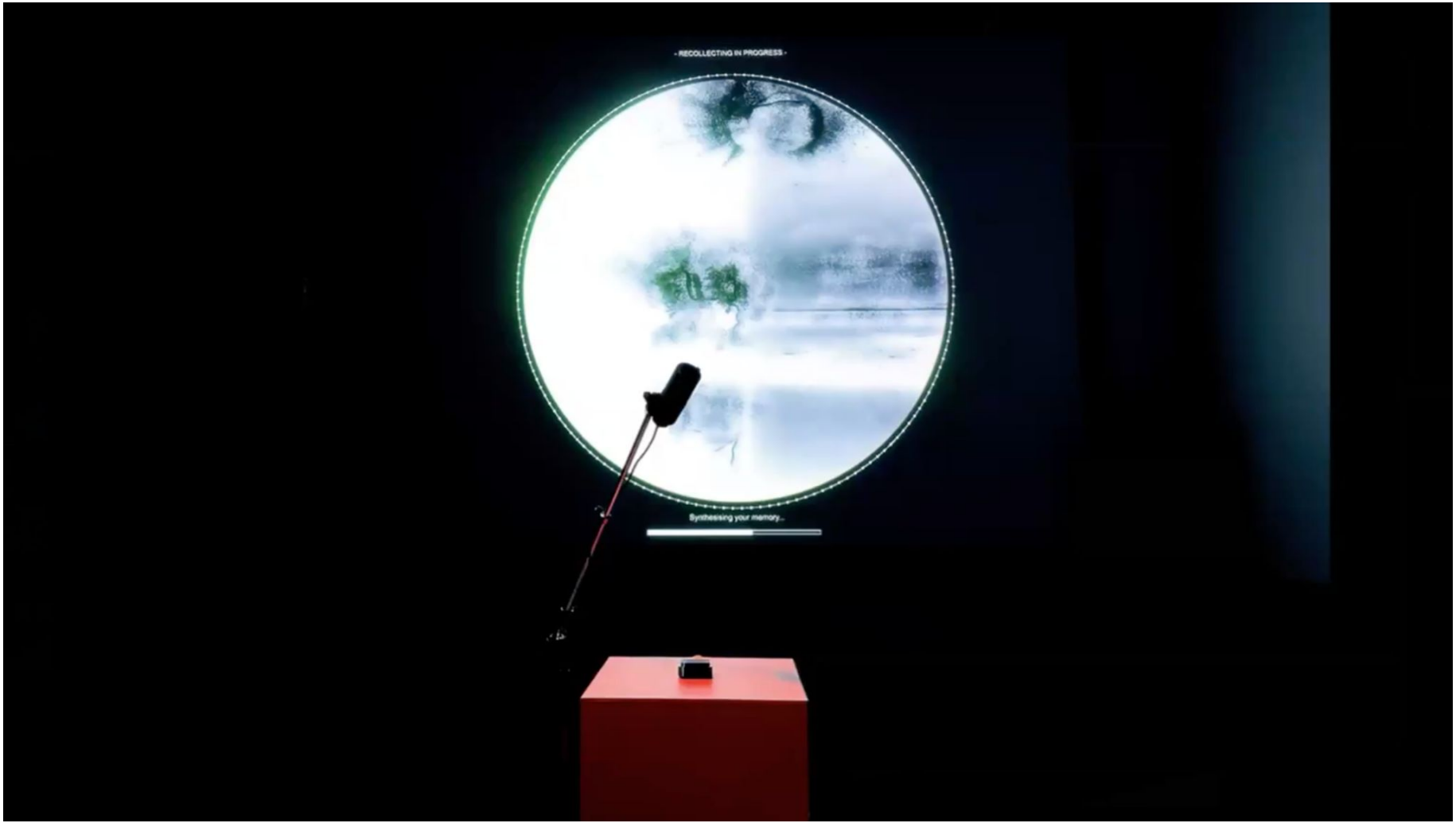
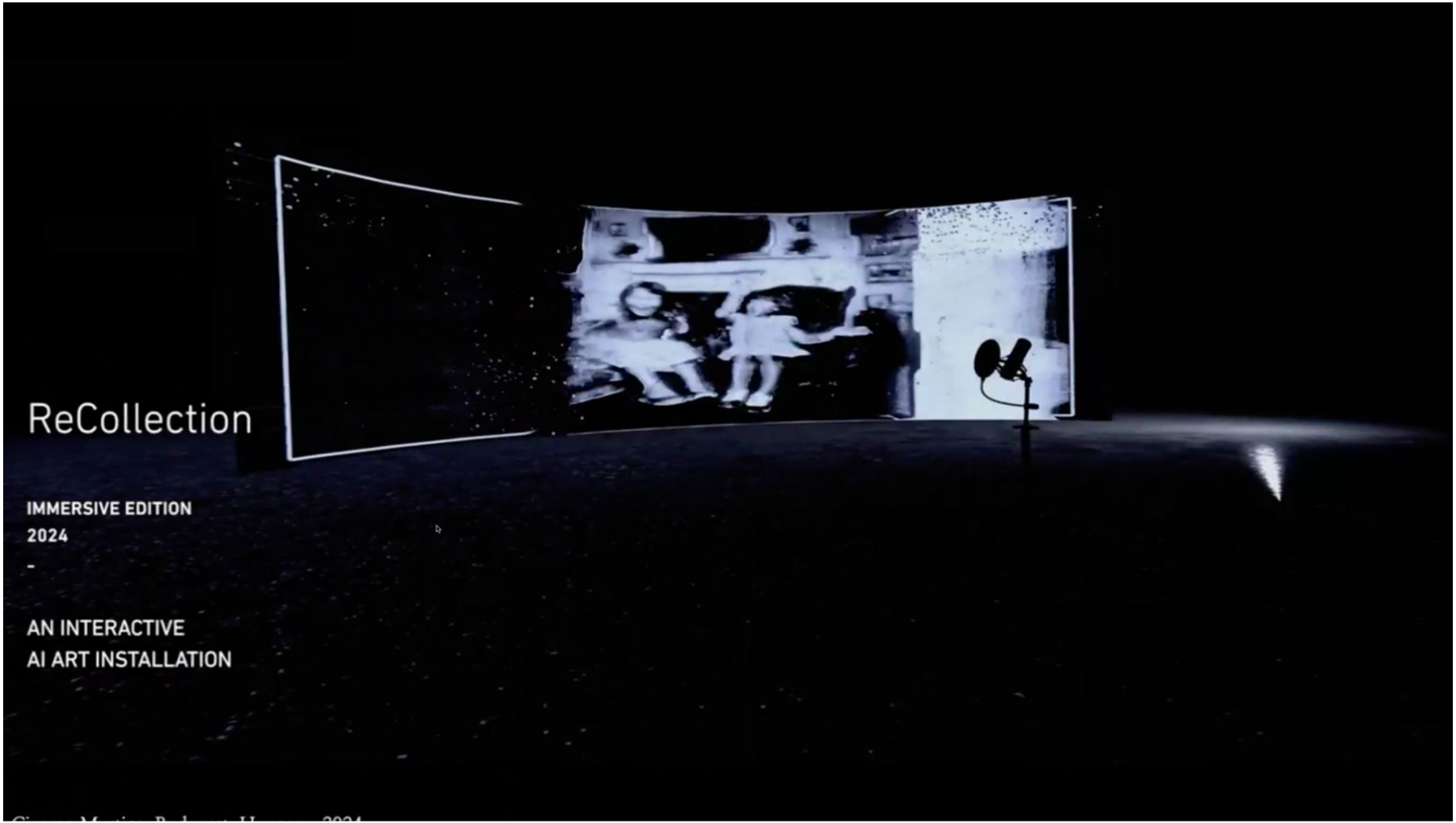


IMAGE DESIGN / SLIT SCAN


- RECOLLECTING IN PROGRESS -
Synthesising your memory...


ReCollection
IMMERSIVE EDITION
2024
-
AN INTERACTIVE
AI ART INSTALLATION

DAY 2: SESSION 1 (*FLASH* TALKS)

(ALPHABETICAL ORDER)

"ARTIFICIAL INTELLIGENCE IN A MULTI-SPECIES WORLD". DR LIJAOZI CHENG (UNIVERSITY OF SHEFFIELD)

In my flash talk, I will explore 'ReCollection,' an innovative art project by Weidi Zhang and Jieliang (Rodger) Luo. This project employs artificial intelligence (AI) to create visual representations of collective memories based on language inputs. Diverging from conventional memory retrieval approaches in dementia research, 'ReCollection' fuses memory with imagination, utilizing intelligent system design and experimental visualization. The presentation will showcase how 'ReCollection' employs AI as a dynamic, non-human narrative agent in collaborative worldmaking. I aim to discuss the project's artistic portrayal of memory and narratives, emphasizing AI's role in developing diverse and evolving self-perceptions, particularly within the context of dementia. Furthermore, the talk will critically assess the role and agency of AI in artistic endeavours. Drawing from Critical Dementia Studies, which challenges traditional emphases on narrative coherence and rationality in defining selfhood, as well as speculative posthumanism, I will explore imaginations of relationships between AI, humans, and other entities within a more equitable ecosystem.

☆ Artificial intelligence in a multi-species world: tracing AI's material footprint through posthumanist inquiry

Lijiaozi Cheng (The University of Sheffield)

Send message to Author

Short abstract:

This presentation examines AI's role as a dynamic narrative agent in worldmaking in recent art projects. It then extends this exploration through speculative posthumanism, highlighting AI's potential to redefine interactions among humans, non-human animals, and the planet.

Long abstract:

This presentation delves into 'ReCollection', an art project by Weidi Zhang and Jieliang (Rodger) Luo, which employs artificial intelligence (AI) to transmute language inputs into visual narratives encapsulating collective memories. Beyond traditional memory retrieval methodologies in dementia research, 'ReCollection' innovatively merges memory with imagination, leveraging AI as a dynamic, non-human narrative agent in collaborative worldmaking. It vividly demonstrates AI's capacity to enable diverse and evolving self-perceptions through inter-embodied subjectivity.

The installation and user engagement of 'ReCollection' subtly open avenues to reflect on AI's material implications. While the project primarily showcases AI's potential in reshaping narratives and identities, the physicality of its installation — from the hardware running AI algorithms to the interactive interfaces facilitating user engagement — serves as a tangible manifestation of AI's presence in our material world, prompting an investigation into how technology-mediated experiences are deeply intertwined with the physical dimensions of AI's operation, including resource consumption and environmental impact.

Through the lens of speculative posthumanism, the discussion broadens, urging a profound reconceptualization of AI's role within our interconnected ecosystems. This perspective challenges the anthropocentric view of technology, advocating for an understanding of AI that recognizes its agency and entanglements in a web of relations encompassing humans, non-human beings, and the environment. Speculative posthumanism invites us to consider AI not merely as a tool or an extension of human will but as a participant in the broader ecological and social fabric, capable of influencing and being influenced by multiple actors within this network.

*Artificial Intelligence in a Multi-Species World*

Dementia in a Multi-Species World

*Artificial intelligence in a multi-species world: tracing AI's material footprint through posthumanist inquiry*

The 2024 quadrennial joint meeting of the European Association for the Study of Science and Technology (EASST) and the Society for Social Studies of Science (4S): Making and doing transformations

ReCollection presents an interactive art installation that captures participants' voice input, rendering an ever-evolving visual narrative. This process synthesizes memories from language input, blurring the distinction between **remembering and imagining.** It emphasizes the collective decisions of participants, machines, and artists, aiming to harmonize automation with artistic decisions. This work integrates AI system design with experimental data visualization, providing an art experience that is intimate, accessible, interactive, unpredictable, and immersive. Beyond its potential as a future therapeutic prototype for dementia groups, this work questions and reflects on imagining **collective memory** connects language with generative visuals in a poetic way, and provides a critical future ideation for **cultural reproduction.**

ASU Herberger Institute for Design and the Arts
Arizona State University

University of Sheffield | Healthy Lifespan Institute


Thank you for listening !
WEBSITE : www.zhangweidi.com
ART INSTAGRAM : @w.e.i.d.i
Email: zhangweidilydia@gmail.com
WWW.ZHANGWEIDI.COM

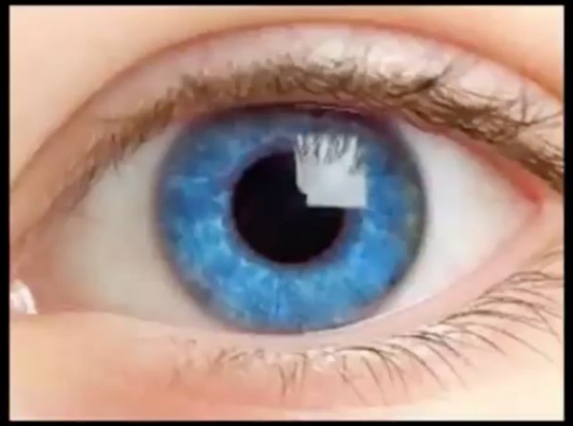
Yoon Chung Han, *San José State University*

# Exploration on Micro-Macro Human Body:

## Biometric Data Art and Designer Baby Art Installation

**Yoon Chung Han**
yoonchung.han@sjsu.edu, yoonchunghan.com
Instagram: @artofyoonhan

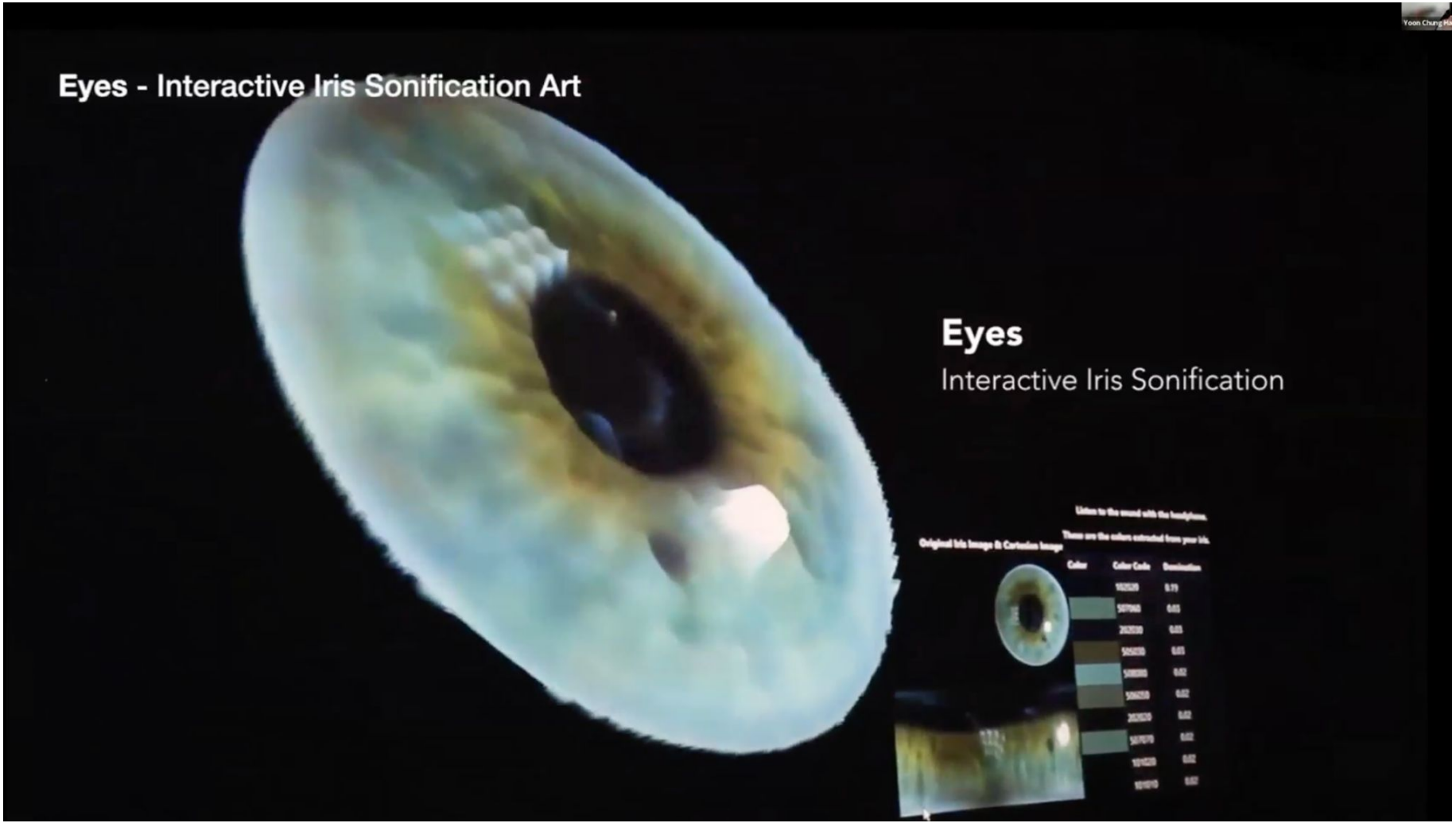
# Biometrics in Micro scale



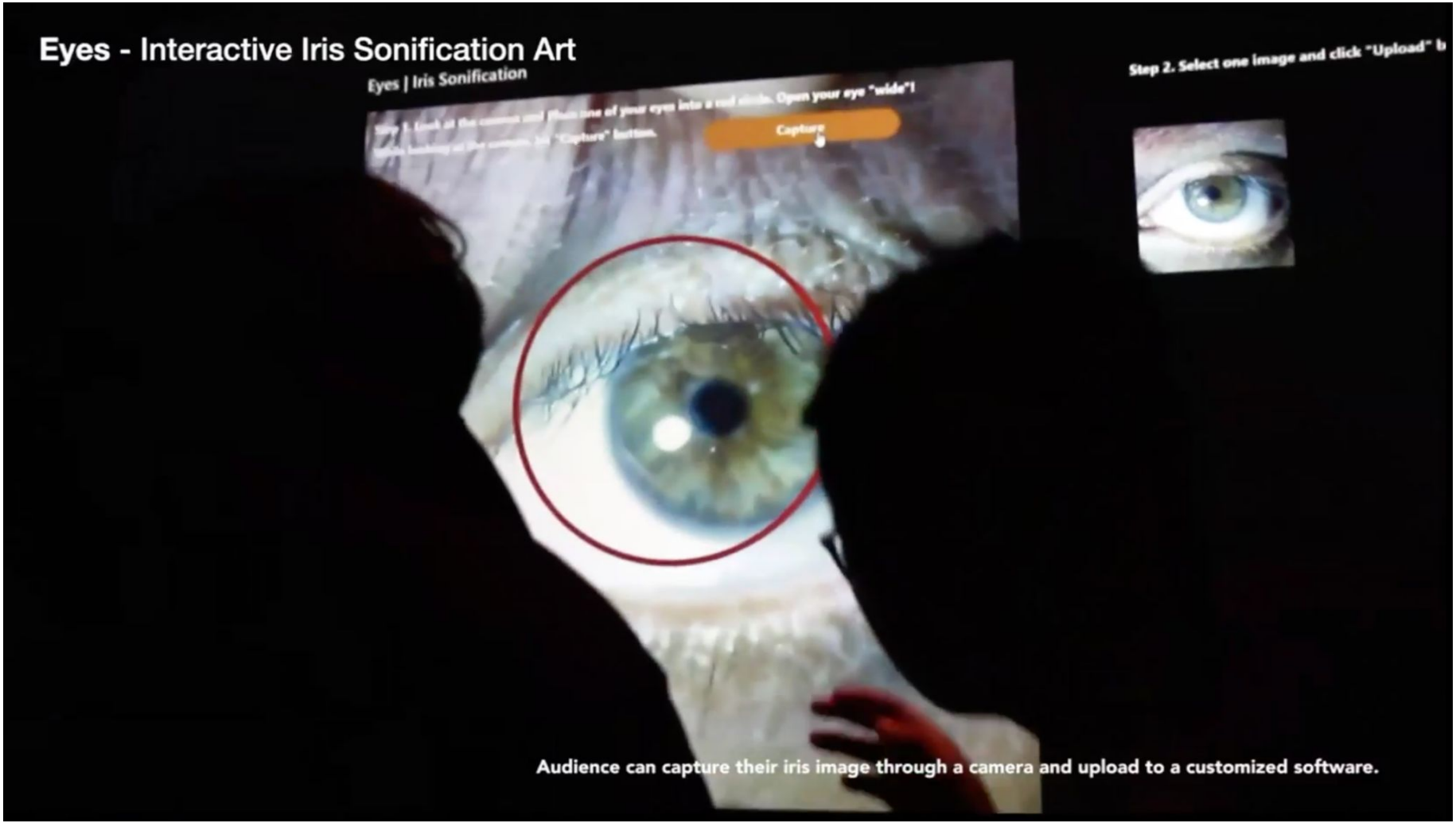

Digiti Sonus - Interactive Fingerprint Sonification Art


Digiti Sonus - Interactive Fingerprint Sonification Art

# Eyes - Interactive Iris Sonification Art



# Eyes - Interactive Iris Sonification Art




Audience can capture their iris image through a camera and upload to a customized software.

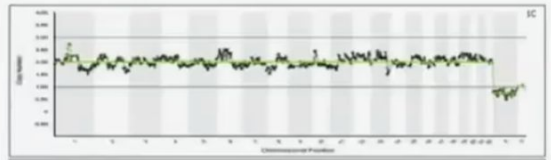
**Roads in You** - Interactive Vein Data Visualization


Plastic Landscape
-The Reversible World

# Chromosomes to Human Babies (Micro to Macro)

a

| Sample Number | Chromosome Results | Interpretation |
|---|---|---|
| 1C | Could be mosaic (~68%) for partial trisomy 1 | Mosaicism: Further counseling is recommended |
| 2C | -14, could be mosaic (~51%) for partial monosomy 19 | Aneuploidy: Monosomy 14 |

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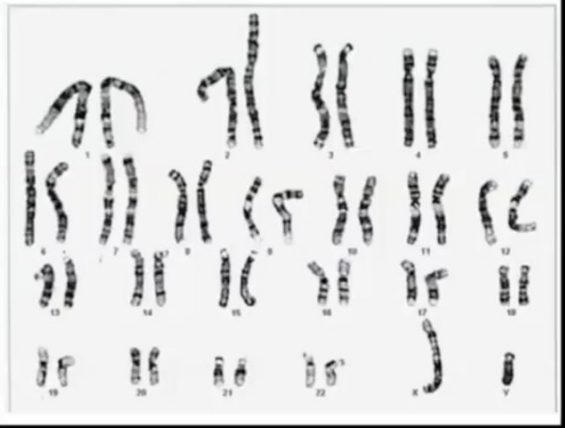
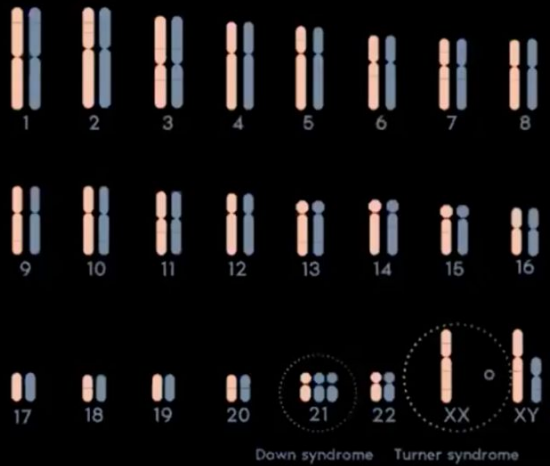
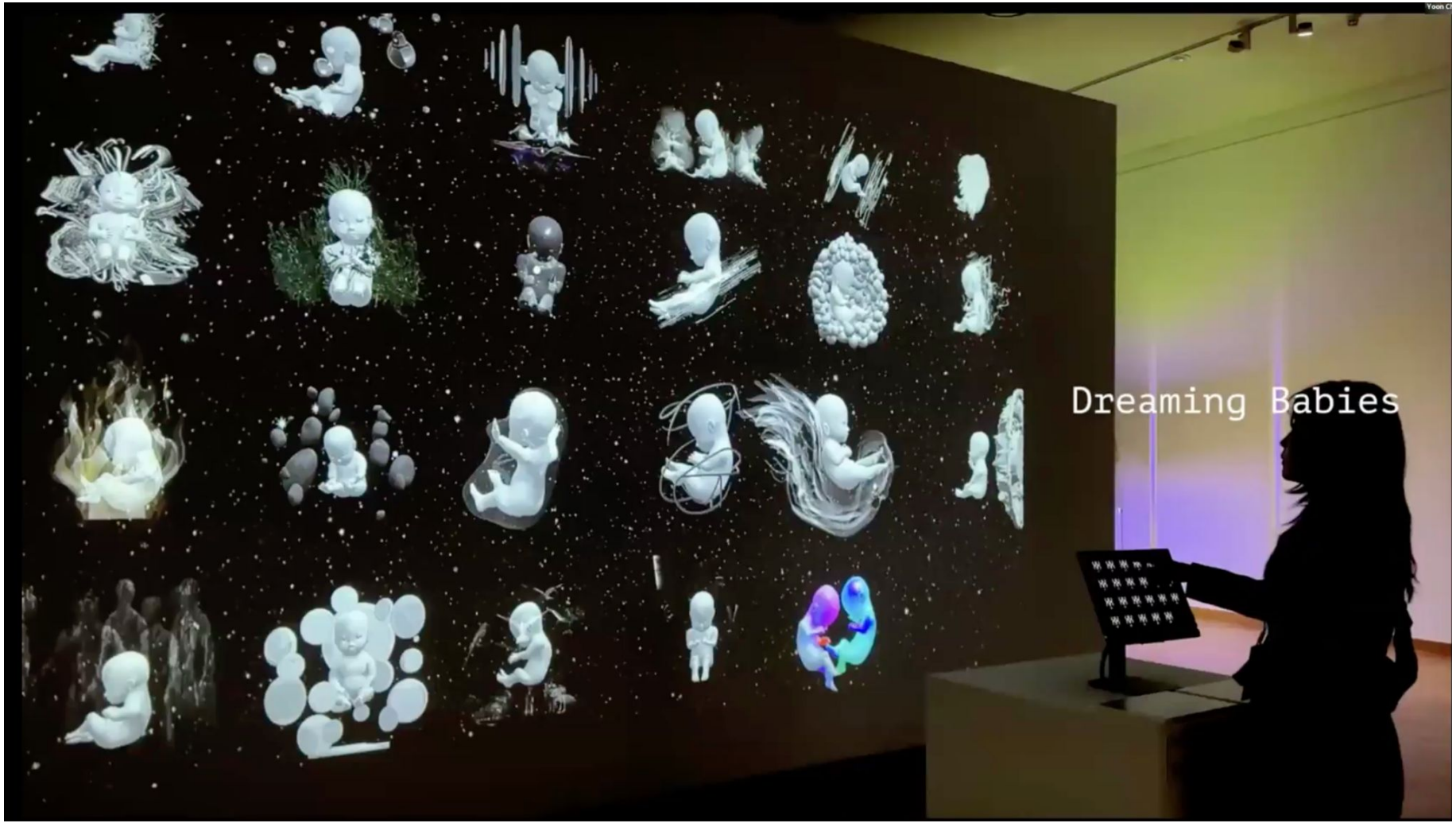


Extra or missing chromosomes leads to health and developmental problems:




Dreaming Babies

## Chromosome 1

Narin blossomed forgotten memories like flowers, casting light on those who had lost something precious.

*Nervous system development, lipid metabolism*
***Alzheimer's, breast cancer***

## Chromosome 2

Jiwoo made water dance in moments of thirst, sharing life with others.

*Growth and development, nervous system function*
***Tuberous sclerosis, breast cancer***

## Chromosome 3

Sena spread the wings of her senses, piercing through invisible secrets and distant whispers.

*Immune system regulation, vision*
***Neurodegenerative diseases, hearing impairment***

## Chromosome 4

Seonghoon wielded shadows like hands, moving the world with darkness and halting the enemy's steps.

*Skeletal formation, insulin regulation*
***Huntington's disease, polymorphic hemorrhage***

## Chromosome 5

Hyunsu soared on the wings of thought, reaching desired destinations in an instant, leading adventures

*Growth and development, cell proliferation*
***Spinal muscular atrophy, blood cancer***

## Chromosome 6

Hayoon brought life to her fingertips, washing away pain and healing the wounds of her friends.

*Immune response regulation*
***Autoimmune diseases, kidney diseases***

## Chromosome 7

Minseo read the voices of hearts, enveloping worries and sorrows, offering warm solace.

*Growth factors, calcium metabolism*
***Cystic fibrosis, Williams syndrome***

## Chromosome 8

Haena breathed life into seeds, setting a bountiful table on the parched island.

*Growth and development, mental health*
***ALS, retinitis pigmentosa***

## Chromosome 9

Seojoon donned the veil of transparency, delving into the abyss of secrets through the crevices of danger.

*Cell growth, blood sugar regulation*
***Chronic myeloid leukemia, muscular dystrophy***

## Chromosome 10

Jaemin traversed the island with the breath of lightning, engraving light of salvation in the gaps of crises.

*Nervous system development, metabolism*
***Tumor suppressor gene mutation, Parkinson's disease***

## Chromosome 11

Jisoo built a fortress of her own, shielding her body and soul from all external threats.

*Blood formation, immune response*
***Sickle cell anemia, Wilms tumor***

## Chromosome 12

Junho transcended the boundaries of form, gifting laughter and crafting chaos in moments of peril.

*Metabolic regulation, immune response*
***Phenylketonuria, somatic mutation***

## Chromosome 13

Taemin illuminated the island's night warmly with the dance of fire and filled the air with the aroma of cooking.

*Cell division, DNA repair*
***Breast cancer, pediatric cancer***

## Chromosome 14

Dain made weight dance freely, lifting heaviness and creating defense through lightness.

*Immune system regulation, growth and development*
***Prader-Willi syndrome, metabolic disorders***

## Chromosome 15

Eunsu brushed past walls as if gliding, unveiling the secrets of hidden spaces.

*Immune response, sensory nerve function*
***Prader-Willi syndrome, Angelman syndrome***

## Chromosome 16

Bora, with the clear eyes of truth, uncovered lies and built bridges of trust.

*Metabolic regulation, cellular signaling*
***Polycystic kidney disease, obesity***

## Chromosome 17

Yuna tamed the wind, harmonizing the island's weather and guiding voyages.

*Nervous system development, DNA*
***Breast cancer, ribosomal disorders***

## Chromosome 18

Jimin unveiled time's truths in the heart of time, dispelled storms, and embraced others.

*Growth and development, nervous system function*
***Edwards syndrome, Parkinson's disease***

## Chromosome 19

Daon unraveled the threads of memory, erasing the threats of enemies and fading sorrow into obscurity.

*Metabolism, immune regulation*
***Alzheimer's disease, insulin resistance***

## Chromosome 20

Sian wrapped time around his fingertips, planting laughter in mischief and salvation amidst crises.

*Metabolism regulation, immune response*
***Type 1 Diabetes, Crohn's Disease***

## Chromosome 21

Hae-eun read the hearts of animals and found secrets and assistance within their trust.

*Nervous system development, growth*
***Down Syndrome, Progeria***

## Chromosome 22

Na-rae broke the boundaries of language and breathed life into the unspoken truths hidden within silent walls.

*Immune response, neurological function*
***DiGeorge Syndrome, Schizophrenia***

## Chromosome X Y

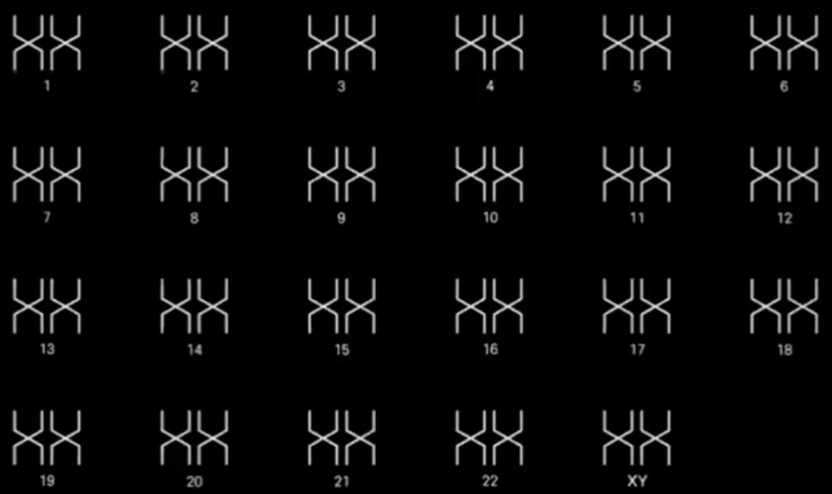
Su-ho painted dreams over reality, sparking wonder and tilting reason.

*X: Sexual development, reproduction*
*Y: Male sexual development, sperm production*
***X: Hemophilia, Turner Syndrome***
***Y: Klinefelter Syndrome, Azoospermia***

Chromosome

Story

*Functions*
***Diseases***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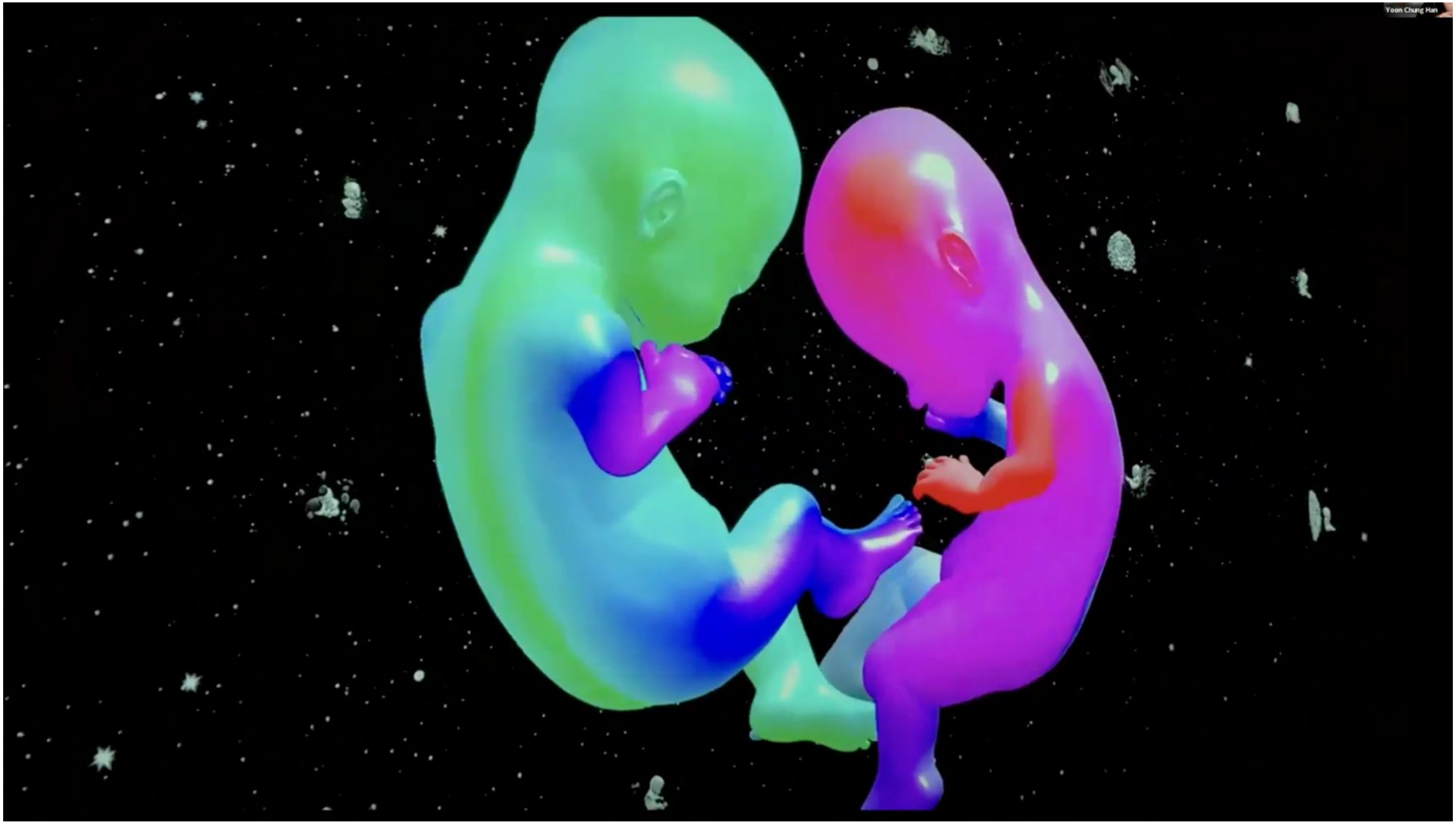
Yoon Chung Han

# Yoon Chung Han

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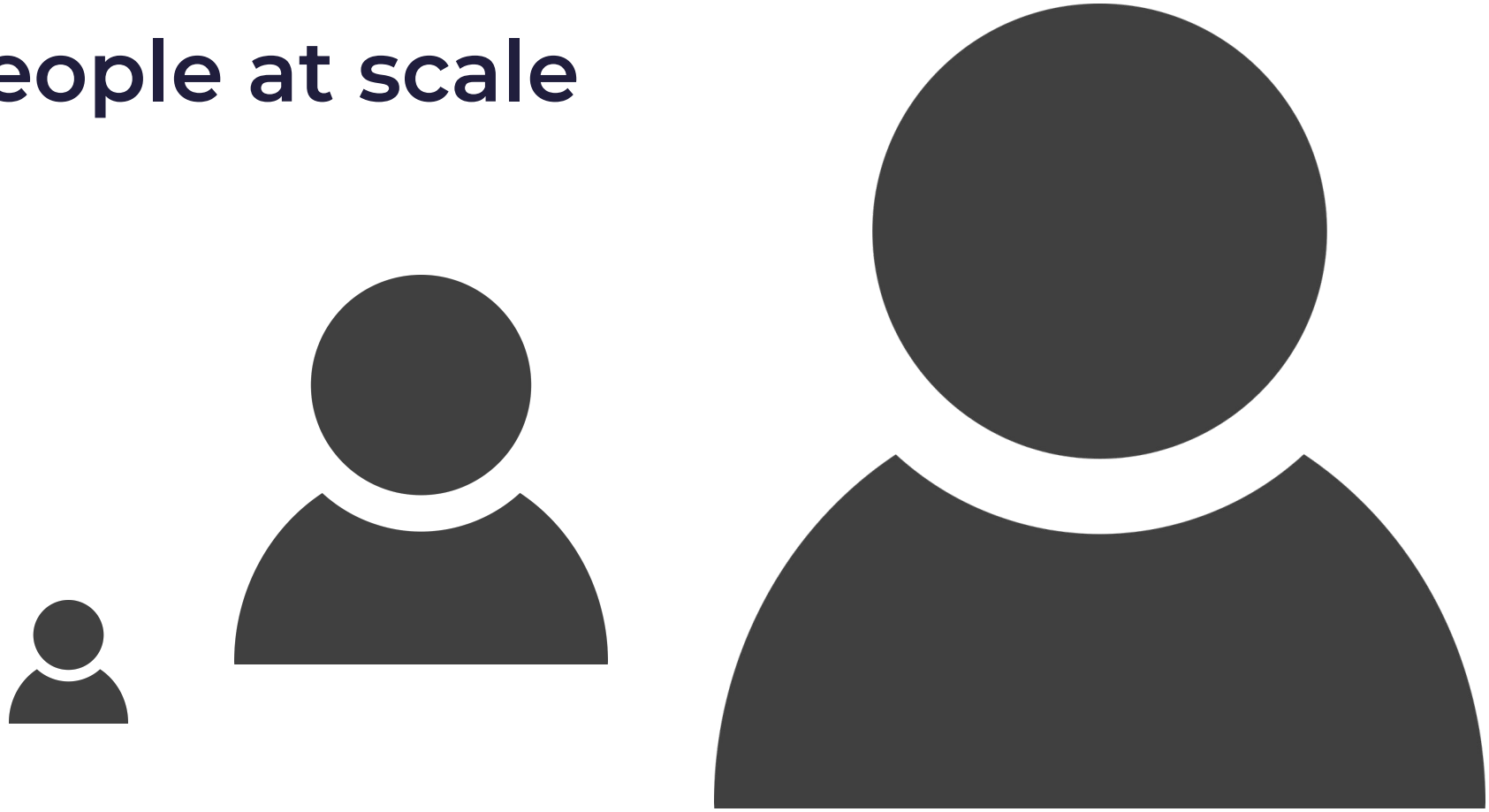
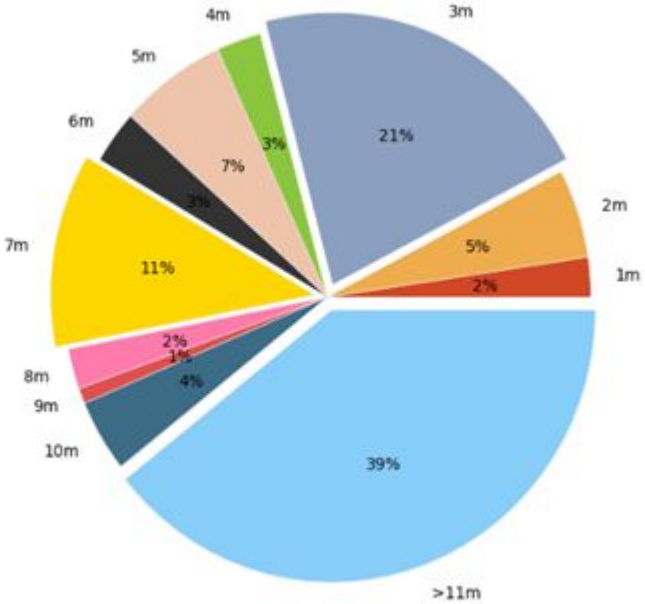
Instagram: @artofyoonhan

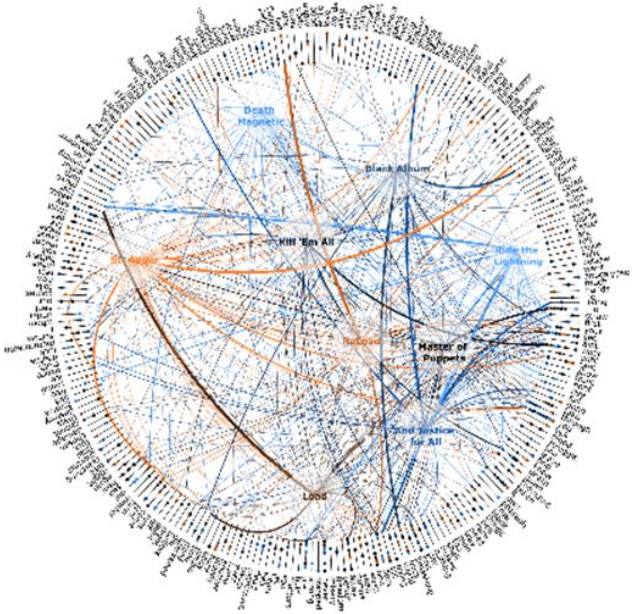
# Joe Heimlich, *Center of Science and Industry*

# People at scale



# A few things we know...



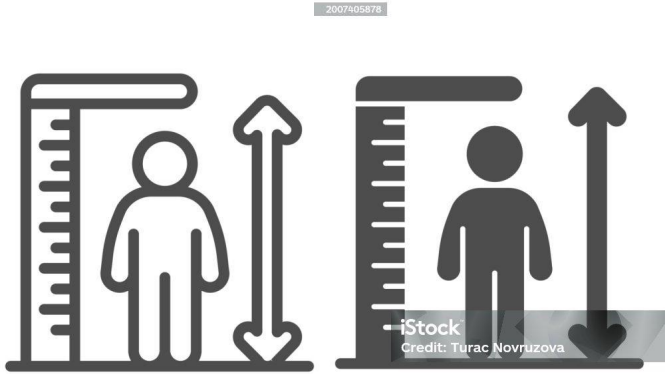
# And generally....

Icon by zero_wing

# Estimation skills

# Such as


iStock
Credit: Zdenek Sasek


2007405878
iStock
Credit: Turac Novruzova

# Example 1 - Distance

1,370,000,000


WOW!


Huh?!

# Example 2 - Weight

# Example 3 - Height


# Language we use and scale

| Really tiny or small | Really big or large |
| --- | --- |
| Town of very few households | Shaquille O’Neal |
| Small print or typeface | African elephant |
| Cell | Blue whale |
| Atom | Jupiter |

# Does it mean the same thing here?

| **As a human** | **At scale** |
| --- | --- |
| Knowledge I hold | Knowledge a cell holds |
| Communication I have | Communication among trees |

# So the bottom line

1. Does the **scale matter**, or does the information within the scale matter?
2. Provide a constant comparison
3. **Use language carefully** - where else or how else is a descriptive term used by individuals
4. Acknowledge that beyond certain points in scale (up and down), **people cannot make a distinction** ...and that's ok
5. People don't need to have the **absolute of the scale difference**

# Katy Börner, *Indiana University*

# *Inspired by Nature* Exhibit

The *Inspired by Nature* exhibit at Luddy Hall features works by local artists and other experts.

Many of the pieces were inspired by data and visuals associated with the Human Reference Atlas (https://humanatlas.io) that aims to map the human body across scales with the long-term goal of it serving as a source of harmonized data that can be used to better understand health and disease, guide pharmacological development, and increase our understanding of how human bodies function.


Inspired by Nature
CNS - Indiana University Bloomington
651 followers
1d •
Exciting New Event: CNS presents "Inspired by Nature Exhibit" on the 4th floor of Luddy. Don't miss this amazing showcase starting November 18- December 15th! CNS, a Luddy School research center, has spent the last 7 years engage ...more
INSPIRED BY NATURE
EXHIBIT
November 18 - December 15
Fourth floor atrium of Luddy Hall, 700 N Woodlawn Ave., Bloomington, IN 47408
Free, all are welcome
CNS
HuBMAP

# *Capillus Linus (Hair Line)* by Carrie Longley 2009

The piece, made from clay, wire, pig intestine, and wax, shows a playful shifting between our traditional ideas of scientific specimen and art object. Longley's work celebrates the mystery of the natural world.

**Carrie Longley** is a studio artist and educator. She is currently an Assistant Professor of Fine Art at Indiana University East. She holds a BA in Studio Art from Wittenberg University and a MFA from Indiana University in Bloomington, Indiana. She exhibits her work extensively throughout the United States and has received numerous awards including "Emerging Craftsman" from Ohio Designer Craftsman, "The Bobby Kadis Award" at the Penland School of Crafts, MCACD Individual Artist Fellowship, and the $10,000 William and Dorothy Yeck "Young Sculptor's Award." - Artaxis Organization Inc. 2005-2024

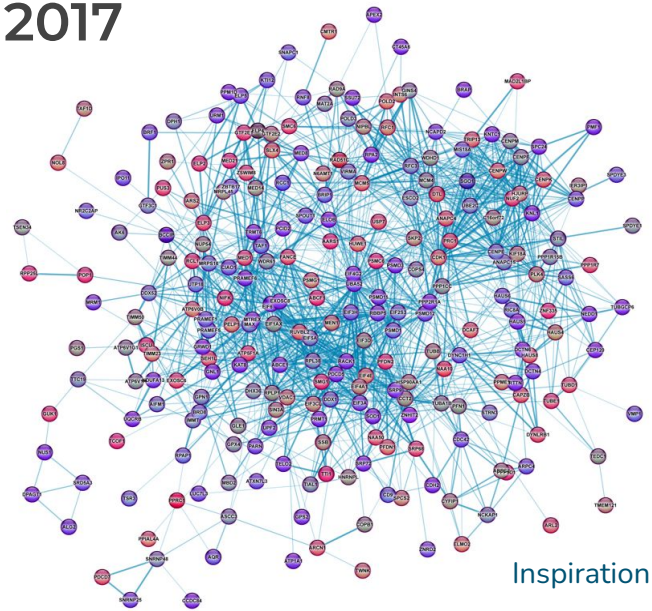
# *Tabula Floris* by Luke Nikolov
# 2024



Tabula Floris analyses the diversity of cells that build up the different floral organs and how they form and function during development. Of particular interest are the genes which instruct these processes and how their functions diversify across species.

**Dr. Luke Nikolov** is an Assistant Professor of Biology at Indiana University Bloomington. He is a Postdoctoral Fellow from the Max Planck Institute for Plant Breeding Research, holds a Ph.D. in Biology from Harvard University, and received his B.A. in Biochemical Sciences from Harvard University as well. His research specializes in plant development and evolution, transcription factors in floral development, and single-cell genomics.

# *Molecular Galaxy* by Beata Edyta Mierzwa 2017

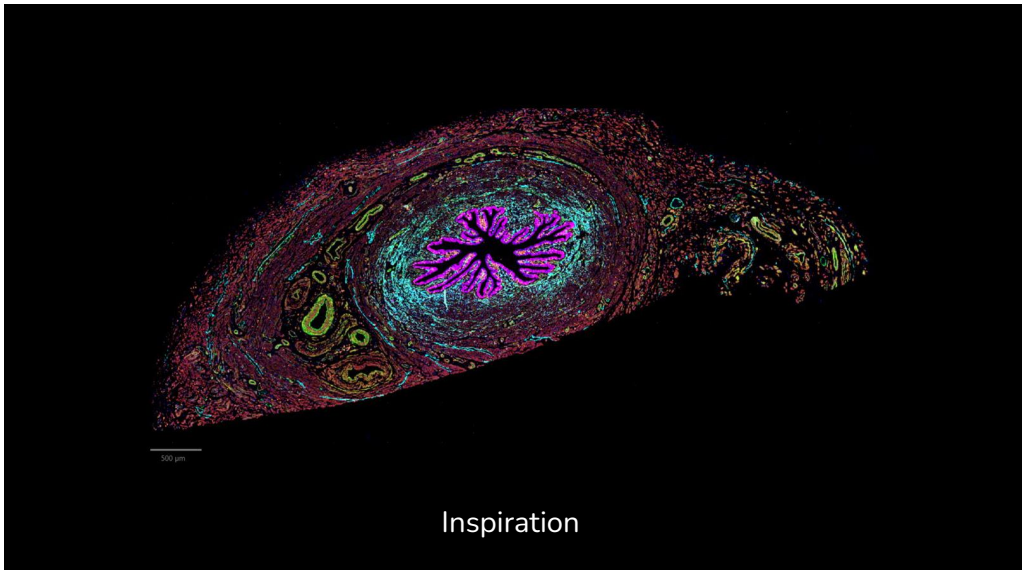




This work is inspired by protein-protein interaction networks that represent physical and functional interactions between proteins in the cell. It highlights diverse cellular structures, like the mitochondria.

**Dr. Beata Mierzwa** shares the beauty of science through art, fashion, and interactive media. Her postdoctoral research aims to advance the world's understanding of cell division and improve cancer therapy. Beata also creates science-themed drawings and clothes. She also created a science video game, Microscopya, that invites players to explore the beauty inside our cells. For more information, please visit www.beatascienceart.com or follow @beatascienceart on social media.

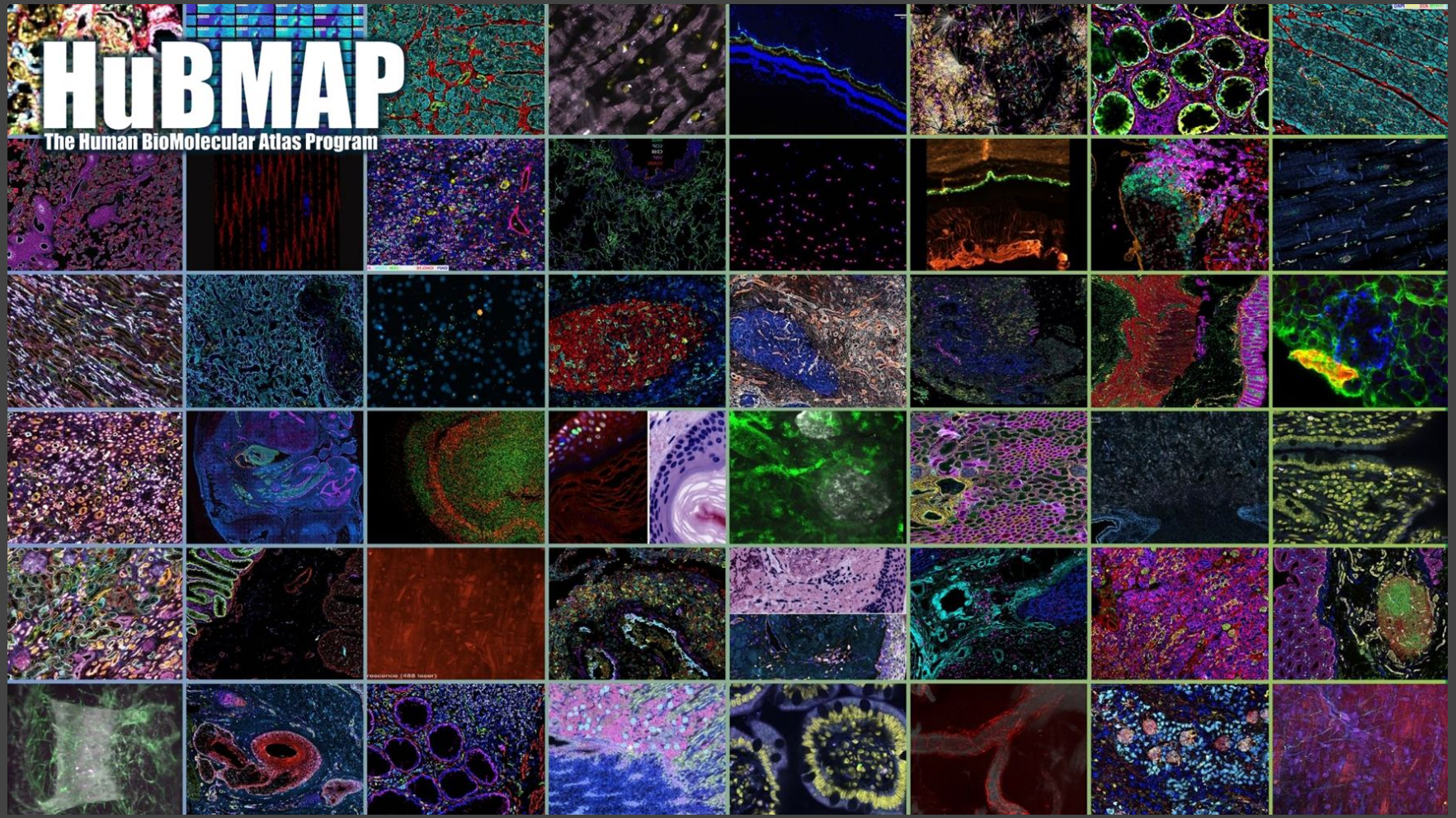
# *Beauty is Everywhere* by Angela Caldwell 2024





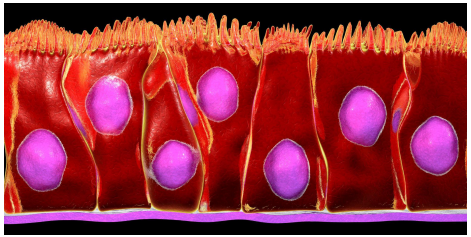
Caldwell's work was inspired by a CODEX image of the isthmus, a short, muscular, rounded section of the fallopian tube. Struck by its beauty, she created a beadwork piece, using a medium typically attributed to women.

**Angela Caldwell** is a visiting professor in metalsmithing and jewelry design, with an M.F.A. from Indiana University.

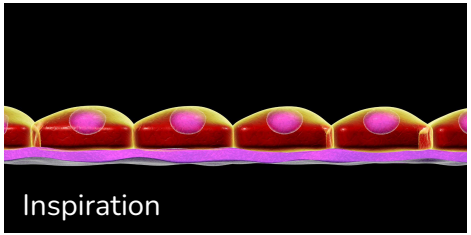



https://hubmapconsortium.org/image-of-the-week

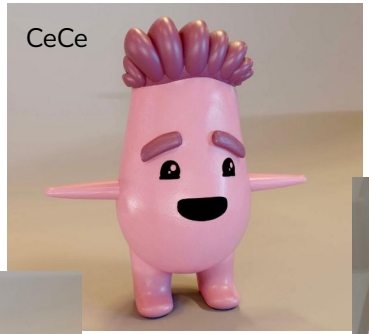
# CeCe and Squiggy
# by Shouvik Maiti, Melanie B. Goldstone, and Todd N. Theriault
# 2024



A ciliated columnar epithelial cell -> CeCe



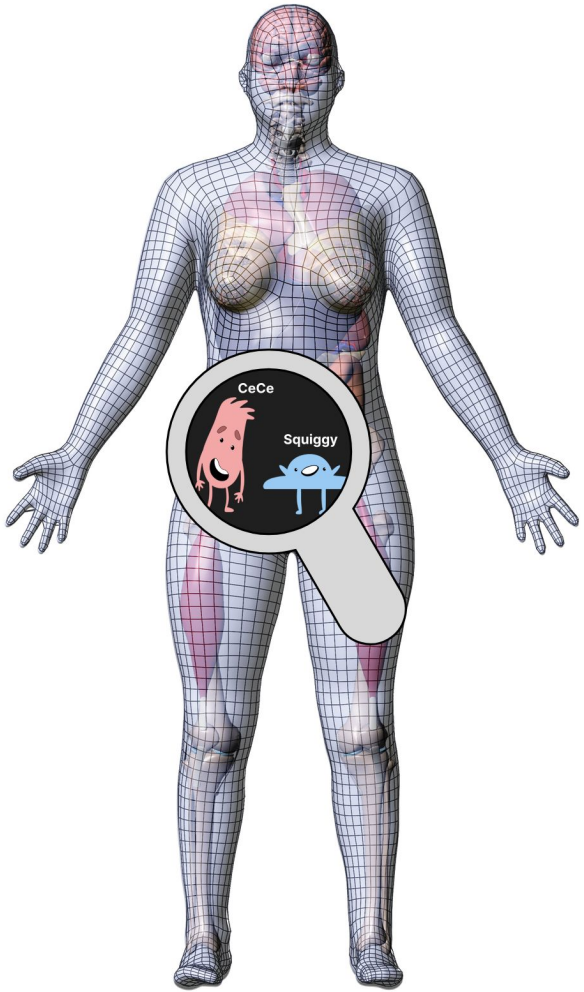

A simple squamous epithelial cell -> Squiggy

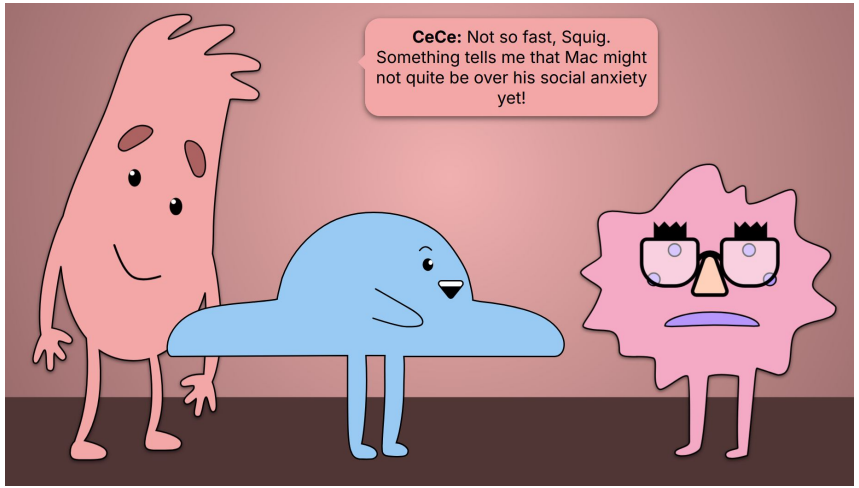


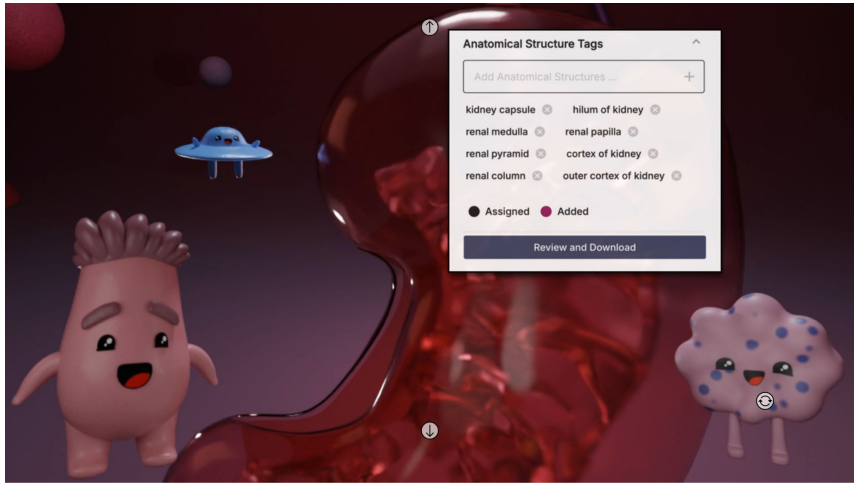



CeCe and Squiggy are friendly tour guides introducing readers to key tools and services of the Human Reference Atlas. Watch them in storytelling action by scanning the QR code on the right.

**Shouvik Maiti** is an IU Data Science student. **Melanie B. Goldstone** is a freelance UX designer in Germany. **Todd N. Theriault** is a technical writer for the Cyberinfrastructure for Network Science Center. He has an M.A. in English from the Miami University of Ohio and a B.A. in English from the University of Wisconsin, Milwaukee. He has taught classes on poetry, fiction, and creative students at Miami University, University of Cincinnati, Xavier University, and Indiana University.


CeCe
Squiggy


**CeCe:** Not so fast, Squig. Something tells me that Mac might not quite be over his social anxiety yet!


Anatomical Structure Tags
Add Anatomical Structures ...
kidney capsule
hilum of kidney
renal medulla
renal papilla
renal pyramid
cortex of kidney
renal column
outer cortex of kidney
Assigned
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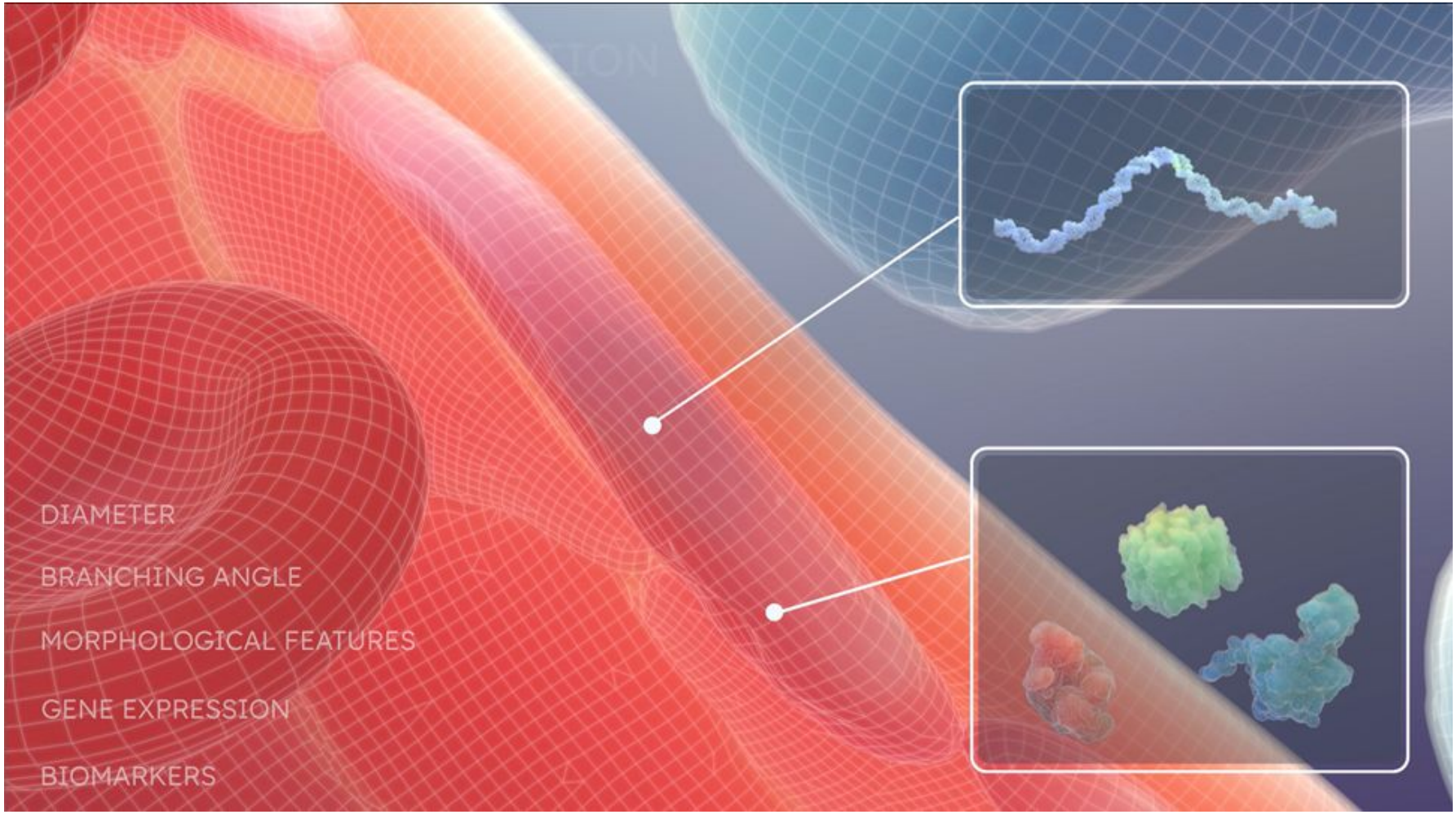

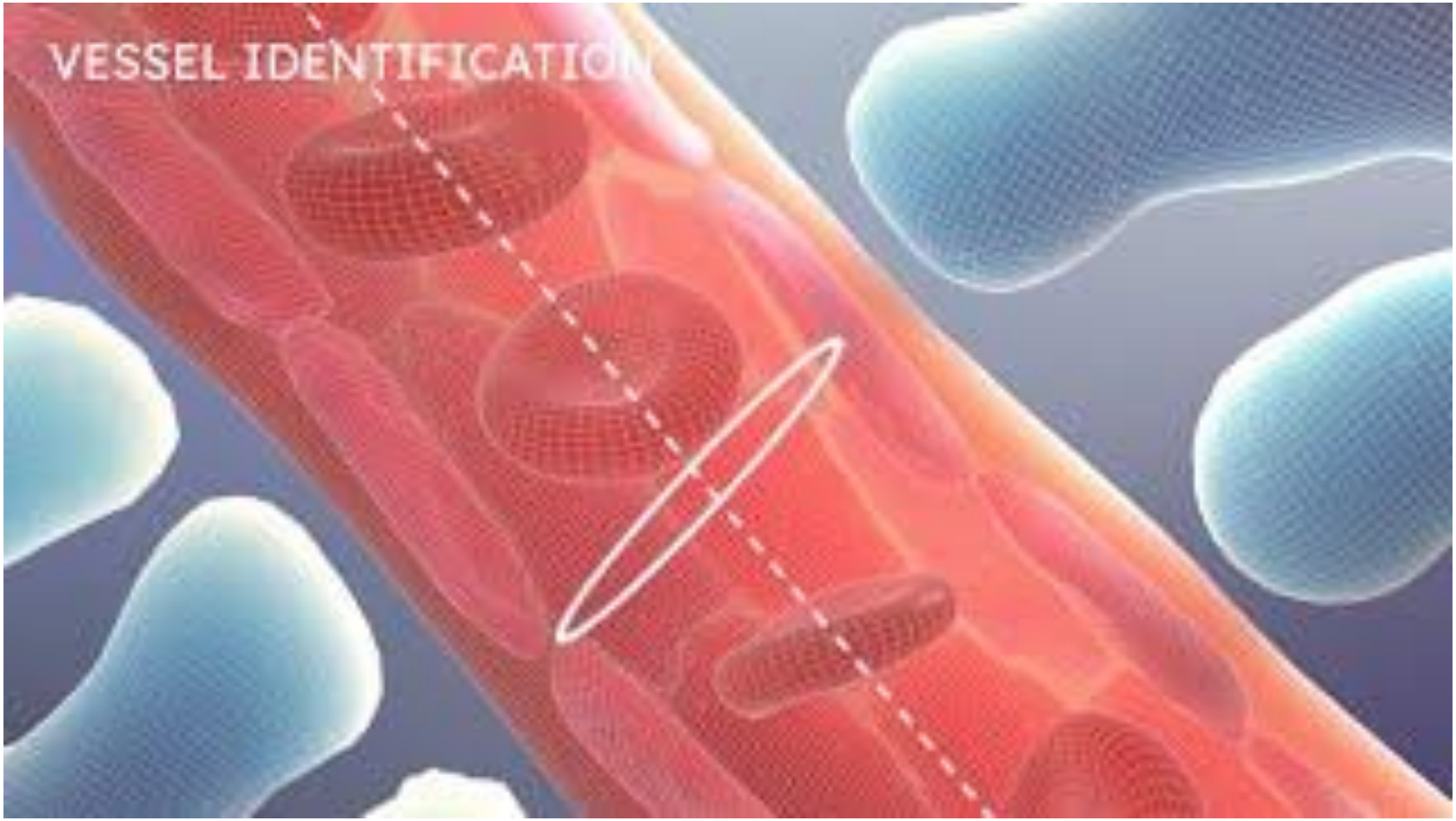
VESSEL IDENTIFICATION

# Q&A

https://humanatlas.io/events/2024-24h

# First Questions

- If we are thinking of multiple scales, an important question is: how do cells “know” how to form entire organs, whether a limb, or a liver?
- What is the language of cells, how to they talk to each other and decide who should do what and when?
- In school we are taught that there are 2 kinds of cells, animal cells and plant cells, Are all cells really different? and if so how?
- If microbiomes are essential to our survival, and there are actually more microbe cells in the human body than actual human cells, how do they relate to one another? Do they talk to each other just like human cells?
- How might a "Human Body Visitor Center” address such questions?
- Science museums often need to convey complex information about scale with visitors - things like how small is that microbe, how large is the sun and how far is it from the earth, how much faster can a cheetah run than a human being. What techniques have museums and /or artists used to communicate with visitors about scale and how might these be useful in communicating scale in the Human Reference Altas?
- What metaphors do you employ or find thought provoking when representing the human body or biological processes?

# Thank you