MINGLING SPACES

IEEE VIS 2022 ARTS PROGRAM
https://visap.net

Oklahoma City, USA (Hybrid)
October 16-21, 2022

Program at-a-glance

	Tuesday October 18	**Wednesday** October 19	**Thursday** October 20
9:00 AM to 10:15AM		**Session:** **VISAP Papers I** **Room:** **Mistletoe**	**Session:** **VISAP Papers II** **Room:** **Mistletoe**
10:45 AM to 5:00 PM			
6:00 PM to 8:00 PM	**VISAP Opening Reception Oklahoma Station 4-5** **Art Exhibit: Automobile Alley**		

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10 YEARS

IEEE VIS Arts Program Anniversary

This year, the VIS Arts Program (VISAP) celebrates its 10th anniversary. VISAP presents works at the intersection of visualization, art and design since 2013. But even years before this—since 2008—the VIS Art Show, initially chaired by Golan Levin, Fernanda Viégas, and Ben Fry, provided a platform at the VIS conference (VisWeek at the time) for such works to be discussed and for interdisciplinary collaborations to form. The below reflections by previous co-chairs of the VIS Art Show and VISAP provide a glimpse into the past 10+ years, also reflecting on the contributions that these have brought and continue to bring to IEEE VIS.

Daniel F. Keefe
University of Minnesota
VisWeek Art Show Co-Chair 2011 & 2012

In 2011, David Laidlaw, the general chair of IEEE VisWeek 2011 in Providence, RI, asked Bruce Campbell and I if we would be interested in organizing a VisWeek Art Show. After a lot of discussion with David, we settled on a program that consisted of a juried show, located in a beautiful rotunda space within the Providence Conference Center, and a special, invited exhibition of the convention-defying underground railway maps designed by Maxwell Roberts. More than 25 maps were exhibited on easels throughout the conference center and attendees often gathered around these between sessions. Meanwhile, Anya Belkina's 12-foot tall suspended inflatable sculpture, MOSTON, was the centerpiece of the juried show in the rotunda.

It was critical to us that the standards for the juried show were high, matching that of the conference as a whole but through the lens of contemporary art. Thus, we recruited from our circles to invite practicing artists to submit their work and to form a strong jury.

VISAP continues to be the top program at VIS for expanding participation in our community. I think this and the relationships formed at the event are the most special aspect. For example, the 2011 Art Show brought artist, Francesca Samsel, to VIS for the first time, and in the years since we have become close collaborators, both in exhibiting artwork and conducting visualization research. Francesca probably never imagined she would one day be a Co-Principal Investigator on a National Science Foundation project, but these are the types of lasting, interdisciplinary relationships that are formed at VISAP.

Despite a fantastic showing, we knew that conference budgets are always tight, and Bruce and I were not sure if there would be support to continue the program the next year. However, when we approached the General Chairs of VisWeek 2012 in Seattle, we were thrilled with their support, and we became more confident that the Art Show might become an annual event. We invited a new co-chair, Lauren Thorson, a 2011 exhibiting artist and graphic designer for the 2011 (and eventually 2012 and 2013) Art Show Catalogs, to join in 2012. That year, the Art Show was still quite new. We thought that the most important change was to create more opportunities for VisWeek attendees to meet the artists. I remember an idea was floated

to treat the Art Show similar to the posters sessions, but we wanted a bit more prestige for the artists. So we arranged for an evening Art Show opening, which was timed to coincide with the VisWeek banquet. The opening remains one of the most fun aspects of the annual VISAP program, and the place where many new introductions are made.

In 2013, Bruce and I rotated off as co-chairs, and Lauren continued on with new co-chair Angus Forbes who had also exhibited in the 2011 Art Show. Their ingenuity and leadership in 2013 was especially significant. They not only introduced the first dedicated Art Papers track, but also introduced the first annual theme, Art+Experimentation, and renamed the combined events, the VIS Arts Program.

I think that everyone I have mentioned continues to follow VISAP closely and contribute in various roles. It is wonderful to see how the community has grown, and how the vibrant program has expanded to include a keynote address, pictorials, and other activities that often bring attendees to VIS as first-time participants. Happy Birthday, VISAP!

Bruce Campbell
Rhode Island School of Design
VisWeek Art Show Co-Chair 2011 & 2012

Ten years can seem to pass quickly, but time becomes easier to track through impressions of visual mile-

stones. Thanks to everyone involved in the last ten years' worth of VISAP's informatics-inspired art that has left indelible imprints on our collective memory. How wonderful to be part of a broader legacy that tracks back through the rise and fall of civilizations to a Lascaux Cave. Best of luck on the next decade of contributions.

Angus Forbes
Purdue University
VISAP General Chair 2013 - 2017,
VISAP Steering Committee

I worked together with Lauren Thorson to establish the IEEE VIS Arts Program in 2013, continuing the organizational efforts of Bruce Campbell and Daniel F. Keefe, and inspired by previous InfoVis exhibitions curated by Golan Levin, Fernanda Viégas, and Benjamin Fry. Those early days were a labor of love—frantic last minute trips running to hardware stores and the print shops, staying up all night hammering together installations, building tables, fixing broken projectors, and once chasing away thieves in the midst of pilfering laptops—yet it was an exhilarating process to transform a few carpeted rooms in a hotel's conference center into a vibrant space for showcasing interactive artworks, all within a timeframe of one or two days. A turning point occurred in 2015 when, with the generous support of VIS General Chairs Maxine Brown and Michael E. Papka, we secured dedicated gallery space at the School of the Art Institute of Chicago located across the street from the main conference halls at the Palmer House. That year, over 1,000 conference attendees showed up to VISAP's Tuesday evening "opening night," which featured live performances, interactive demos, artist presentations, and also provided free drinks, and this celebratory event has continued each year since. Now on its 10th year anniversary, I am thrilled that the VISAP has grown into the largest Associated Event at VIS, and that it continues to attract creative practitioners and innovative scholars working across various media who explore the aesthetic possibilities of data representation, who create speculative designs that investigate novel uses of tangible interfaces, sonification techniques, virtual reality environments, and data physicalization, who embrace and interrogate the use of computer vision, natural language processing, and machine learning algorithms, and who provide a critical perspective highlighting the often hidden political ramifications of data collection and data analysis. VISAP provides a forum—*a mingling space*—that facilitates dialogue between the various members of the VIS community, which from its inception has supported computer scientists, statisticians, psychologists, cartographers, artists, and designers working to build bridges across disciplines. I'm grateful to be part of this community, and thankful for the efforts of all the participants and organizers who make the Arts Program a success. I look forward to seeing how VISAP evolves over the next ten years!

Fanny Chevalier
University of Toronto
VISAP Co-Chair 2014 - 2016

Dear VIS Arts Program,

Ten years. Ten years of delightful collections of works that blend arts and visualization science in an exhibit that we adore wandering about. Ten years of a vibrant rendez-vous, where we, visual art lovers, love gathering to share, exchange, connect, and vibrate in an eerie environment where colours, lights, and soundscapes play together in harmony. Ten years that you enchant us, with evermore creative pieces... and that you move us, with powerful works raising awareness of serious issues in our world. Ten years that you've tirelessly provided a playground to redefine the way that we approach data visualization. From a modest art show that many fell in love with, you have grown to the unmissable experience to be had at the conference. And together the community grew. With you. Through you.

Dear VISAP, I couldn't be prouder of having had the privilege to be part of the team who contributed to your mission, together with the most wonderful co-organizers (special mention to Angus!) and all the artists and creators alike who joined throughout these ten years. I couldn't be prouder of being part of this wonderful family and common history that you built for us. Dear VIS Arts Program, you've done so much for all of us... yet, you've got so many years ahead of you. Happy birthday, dear Arts Program, I look forward to many more decades of your spectacle. Continue to put up the greatest show!

Maria Lantin
Emily Carr University of Art + Design
VISAP Co-Chair 2019 & 2020;
VISAP Steering Committee

It is so wonderful to take a pause and look back at the efforts of so many to bring VISAP into existence and keep it going and flourishing! The role of the arts in any technologically-inflected field is so important. I saw this early on in my career in CS – artists were having the most fun and had a different lens on future uses of the technologies being developed. Highlighting artists' work and thought at events like VISAP is more important than ever because the pace of technological development is quickening. We need the guidance and courageous questioning that artists bring.

It has been my distinct privilege to be involved as co-chair and as a member of the Steering Committee. It's not easy to run an exhibition and program on a small budget but we learn from each other and keep going. My sincere wish for VISAP in the future is an increasingly strong presence at the IEEE Vis conference that reverberates throughout the community. Here's to another 10 years of creative poking and jostling!

Mingling Spaces

The works and performances featured in the hybrid exhibition and documented in this catalog speak to the theme of *"mingling spaces."* We invited and received submissions that explore, re-interpret, speculate and reflect on the idea of mingling spaces;

For 10 years the VIS Arts Program, and before this the VIS Arts Show, have represented a mingling space, a space "to bring or mix together or with something else, usually without fundamental loss of identity" [Merriam-Webster]. VISAP is a mingling space where those who actively work at the intersection of visualization, the arts and design and those who appreciate and/or are inspired by the results of these works can meet, discuss, and exchange perspectives. However, across all these years, the meaning of "space" in the context of the conference has constantly changed and evolved and with it the form of mingling. VISAP as a mingling space has seen many different themes, disciplines, methodologies, techniques, formats, people, and locations, with the two most recent VISAPs that took place virtually, maybe representing the most drastic change to the ways in which works were presented and discussed.

Within this year's theme "mingling spaces" we invited visualization works that question how the ways in which we mingle have changed in response to technological, social, political, and economic factors (e.g., digitization, the rise of social media, the pandemic,

the climate crisis, the renaissance of nationalism and right-wing populism, etc...); how this has changed the concept of space, how our behaviour, our communication, and the ways in which we read and experience each other have changed in response to the digital and physical spaces in which we mingle; how personal data and their representation can facilitate, change, distort, feed off and/or inhibit the mingling of people, ideas, and spaces; and how mingling spaces can bridge physical, disciplinary, conceptual and ideological boundaries.

Now in its 10th year, VISAP continues to thrive as a proud associated event to IEEE VIS thanks to a large web of supporters. We are thankful for the ongoing logistical support of the IEEE VIS Conference Committee; the student volunteers; the VISAP Steering Committee and outstanding group of expert reviewers that form the Program Committee; and the willingness of our artists and designers to adapt their submissions to a hybrid format. We are grateful for the support from Autodesk, the University of Victoria and the University of Oklahoma— their sponsorship is vital to VISAP.

Special thanks first to Rebecca Ruige Xu and Pete Froslie, exhibition chairs, who made the physical/hybrid exhibition possible by spending countless hours synchronizing with artists and setting up the physical space.

Special thanks also to Bon Adriel Aseniero and Tommaso Elli who did a wonderful job at designing and implementing the VISAP website as well as this catalogue, and who kept VISAP at the forefront of people's minds with regular social media posts.
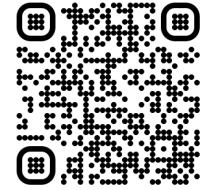
Charles Perin and Uta Hinrichs
VISAP'22 General Chairs

Rebecca Ruige Xu and Peter Froslie
VISAP'22 Exhibition Chairs

Bon Adriel Aseniero and Tommaso Elli
VISAP'22 Design Chairs

Online Exhibition

PICTORIAL

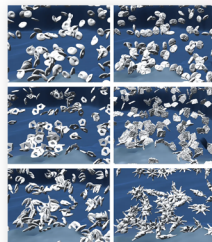**SkyGlyphs: Reflections on the Design of a Delightful Visualization**

PICTORIAL

Supersynthesis: A Communal Synthesis

ARTWORK

Tangled Tracks

PICTORIAL

Shifting winds: Gendered structures of academic mentorship

ARTWORK AND PICTORIAL

#MeToo Anti-Network

PAPER

ESSYS* Sharing #UC: An Emotion-driven Audiovisual Installation

ARTWORK

Diversity traces: an interactive lens on multi-racial families in America

ARTWORK

at the pump

ARTWORK

Beyond Human Perception

PICTORIAL

Wind from Bamboo: A Chinese Handwriting Interactive Installation based on Human-AI Collaborative Font Design

PICTORIAL

The memory of street - Hong Kong: history, culture, memory and post-humanism
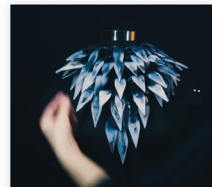
ARTWORK

SoftVoss

ARTWORK

OctoAnemone

ARTWORK

RAY

ARTWORK AND PICTORIAL

Quaran.tiles. Archiving expressive digital places from instagram during the COVID-19 pandemic

ARTWORK

NeuroKnitting Beethoven: visualizing emotional state through the knitting process

ARTWORK

Molecular Planets

PAPER

Affective, Hand-Sculpted Glyph Forms for Engaging and Expressive Scientific Visualization
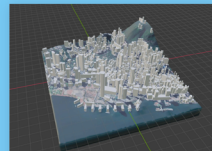
ARTWORK

Under the Green: Visual data storytelling the process of urban CO2 neutralization by forests
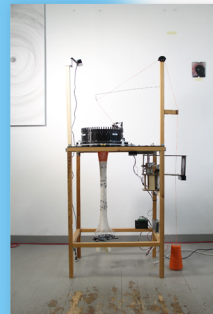
ARTWORK

PRESENTATION OF SELF IN MACHINE LIFE

ARTWORK

Sifting Strands

Exhibited Artworks

Tangled Tracks

Luiz Ludwig and Doris Kosminsky

The artwork Tangled Tracks consists of a set of 16 red and white ceramic tiles that register the real and virtual paths taken by the artist. As a way of exhibiting them, the tiles are available so the public can interact and rearrange them in their own way. In this manner, participants are invited to form their own paths, imagining and fabulating routes. In addition, through a projection mapped on top of some tiles, it is possible to know more features about the routes: origin and destination, what type of route it is and how the information was obtained.

The process of capturing the paths was done differently according to the type of path. The red ceramic tiles contain drawings of physical paths that were captured by the cell phone's GPS during the artist's walks and movements around the cities of Rio de Janeiro and São Paulo. On the other hand, the white ceramic tiles contain virtual paths that were traced considering the global information infrastructure networks and the locations where the headquarters of telecommunications and technology companies are based.

Without any colorant or glaze, the creation of the tiles is based on the use of two types of clay that are originally of different colors. The color of the clay distinguishes for the visitor the real paths from the virtual ones, serving as a key to understand the type of path that is being represented. After the paths were traced onto the clay, the tiles were fired at a high temperature respecting the traditions of pottery.

The installation is a participatory work of data physicalization that poses questions to the public about our presence in the real and virtual world today.

Year: 2022
Materials: Ceramic tiles and projection mapping
Dimensions: 16 ceramic tiles (15cm × 15cm each)

Santa Clara, US
Zoom Headquarters

Rio de Janeiro
Home

Virtual Path
Source: Optical fiber
backbone

Supermarket

Rocinha Favela

Home

...sical Path
...GPS via Strava

#MeToo Anti-Network

Kim Frederic Albrecht, Catherine D'Ignazio, Nicole Martin, and Matthew Battles

Cosmologists say that most of the universe is structured by antimatter. We postulate that social media is similarly structured by effects of the unobserved discourse and experience. The backbone of a movement such as #MeToo is not based on the most-liked and most-retweeted, but by the masses of unobserved tweets. Vast numbers of #MeToo tweets that had no retweets and no likes nonetheless constituted acts of quiet testimony or unassuming solidarity. Conventional measures of network science thus fail to capture the true relevance of #MeToo. As Black feminist Patricia Hill Collins says, "Most activism is brought about by ordinary people like ourselves."

From a distance, the graphics appear as abstract diagrams, similar to Bridget Riley's work. The beauty of each line contains a powerful request for a reordering of power within society. We present an opportunity to engage with each request—from individual people at individual moments within a collective movement that is not over. #MeToo is urgent, #InvisibleNoMore is urgent, #BelieveBlackWomen is urgent, #MMIWG2S is urgent, #SayHerName is urgent. We are still living in a crisis of sexual violence. So we invite you to ditch the networked metrics and listen.

Diversity Traces

Pedro Cruz

This visualization project shows the fringe couples and families who have a multi-racial identity, as a portrait of the intermingling of races. Each couple is represented as a colorful chromosome, enabling you to see the races within each family, their ages, sexes, and children.

When looking at diversity from a racial perspective, homogenous communities are still the norm, as they remain siloed not only locally, but in their very own households as well. This visualization project comes as a celebration of the fringe couples and families who have a multi-racial identity, effectively embodying the intermingling of races, and dissolving the systemic barriers put on their very own existence.

According to the census, there are only vestiges of these multi-racial families until 1960. Prior to that, the census enumerator was responsible for categorizing persons, while after 1970 race was reported by someone in the household. In 1967, Loving v. Virginia ended restrictions on multi-racial marriage. Only after 2000 people can identify as being of multiple races. More recently, there has been a surge of multi-racial families in the data, but they are still a rarity, still mere traces of diversity in America.

In this visualization you can see every registered multi-racial couple in America, for recent periods in 1-5% samples of the population, and for older periods in 100% samples of the population. Each couple is represented as a colorful chromosome, enabling you to

see the races within each family, their ages, sexes, and children. For each year, these couples are organized by rarest multi-racial group first, by ascending average age of the couple, and by number of children. This means that in each group you will first see couples with no children, but as you navigate towards the end a group, you will see couples with more children. In 2015 Obergefell v. Hodges ended restrictions on same-sex marriages. Only in recent years you will be able to see same-sex couples. In addition to race, individuals who identify themselves as latino/as are also marked with an L.

10.97% of couples in the United States are multi-racial

2020 2000 1980 1960 1940 1920 1900 1880 1860

visualizing **57,160** multi-racial couples
out of a total of **520,569** couples
in a **1%** sample of the U.S. population +info
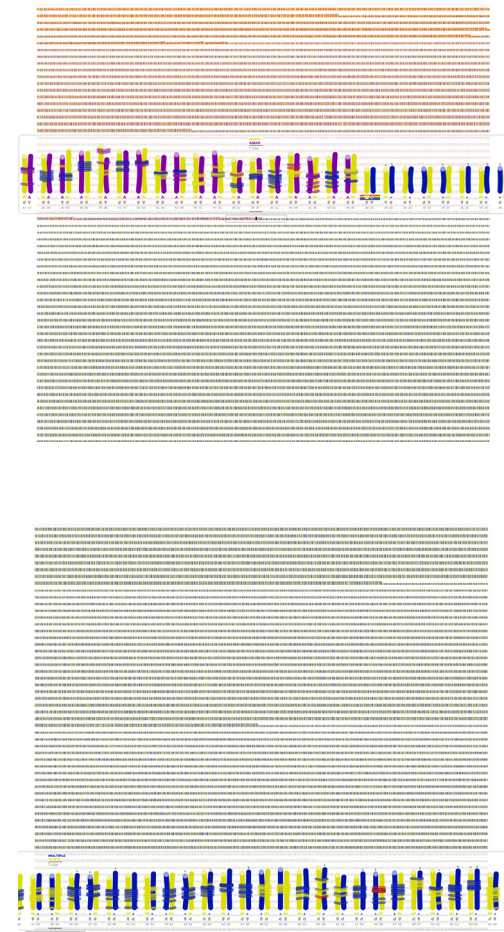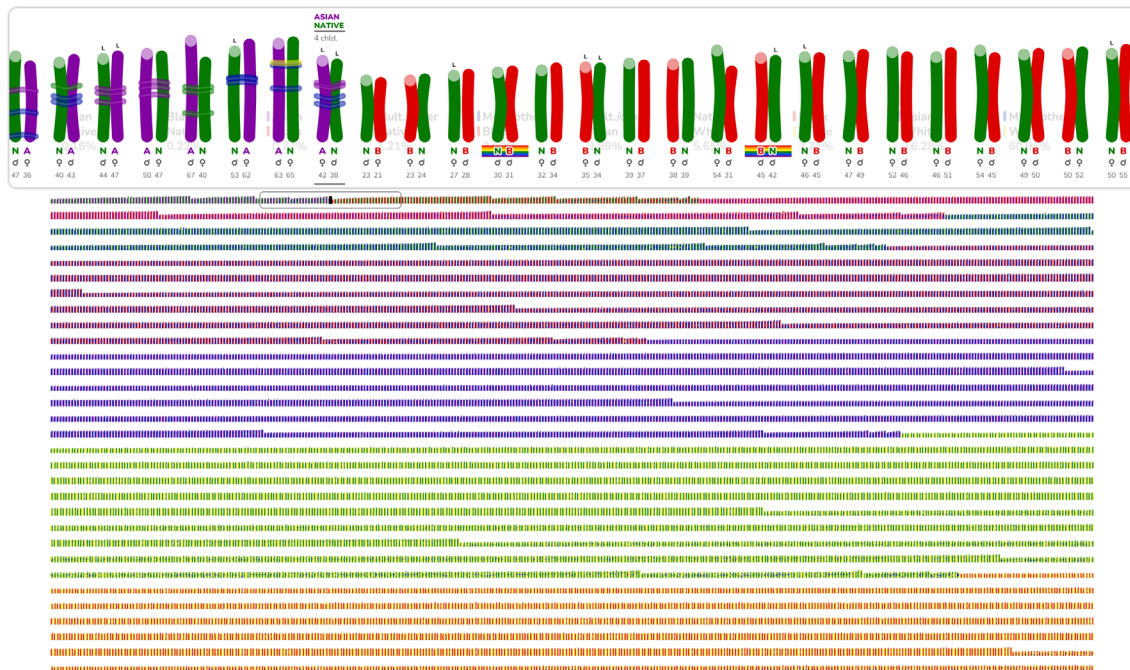
Diversity traces - an interactive lens on multi-racial families
in the United States, interactive web application

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At the Pump

Joseph A. Insley

What started as a curiosity turned into a habit. While stopped at a gas station one day to fill up my car, I noticed a pair of broken glasses on the ground near the pump, with a rusty paperclip nearby. I found it curious, so I snapped a picture. The next time I filled up, I saw a battery that had been partially crushed. I snapped a picture. I was intrigued by these things that were discarded and left behind. What was the story behind these items? Most were likely dropped accidentally. But did their owners know they dropped them, and didn't bother to pick them up? Or did they get home and wonder, where did I leave my comb? How many other people had walked past them? Did they even notice them, or give them a second thought? I started to seek them out. I noticed patterns. I would see similar objects at different gas stations, or the same object at the same station, weeks apart.

The gas station is a common shared public space that many people move in and out of, often without giving a thought to those that are there before or after them. By focusing on these items that were left behind, we raise awareness that we are not here alone. And while we may not know or ever directly encounter these other people, our actions can leave an imprint on them, and the environment.

The digital print includes 110 images that were collected over the course of about three and a half years. Along with the photos themselves are plots of associated data. Including information related to when the photo was taken, and data related to the content of the image.

Year: 2018-2022
Materials: Photos and data, composited with custom Python scripting
Dimensions: 360" w × 10" h

Insect	Black Cat	Sphere	Hole	Drive Shaft	Legend of Zelda	Soil	Ball	Sport
2019:02:27	2019:02:27	2019:02:27	2019:03:07	2019:03:13	2019:03:18	2019:03:18	2019:03:18	2019:03:18

Above
Previous installation at Northern Illinois University Art Museum, January 18 – May 14, 2022.

Left
Detail of full printed piece.

Beyond Human Perception

María Castellanos and Alberto Valverde

The artwork is a video installation that allows the audience to visualize and compare the reactions of humans and plants to a common stimulus; live music. It aims to erase boundaries into the communication and understanding between both living beings by highlighting the immediate reactions of plants to their surrounding changes.

The installation is the result of several sessions where the brain activity of humans was measured, through the EEG registered wave. Electrical oscillations that are happening in plants were measured using a sensor developed by the artists which is able to detect immediate changes in plants.

Through the use of mathematics, by using the Fast Fourier Transform, the data generated by humans and plants become comparable. This data can also be displayed graphically thanks to an algorithm developed by the artists that allows the audience to see this data in the form of little spheres that are moving within the geometric shape of torus. Each little sphere represents a data point registered. The graphic representation of human and plant data can be seen simultaneously in a video allowing the audience to find patterns by comparing both living beings' reactions to the live music.

Through this artistic research we aim to know more about the secret language of plants. Shedding light into the plants' language and behavior will allow us to know more about nature, and thus, to better understand our environment. In the long run, this work could have an impact in other fields such as climate change, which is a reality happening now; the more we know about our environment and the living organisms that are living with us on Earth, the more we can do to try to improve the situation. Plants could give us a lot of information that we cannot understand yet. This installation can help formulate new questions.

Beyond Human Perception, still of the video installation, 2020
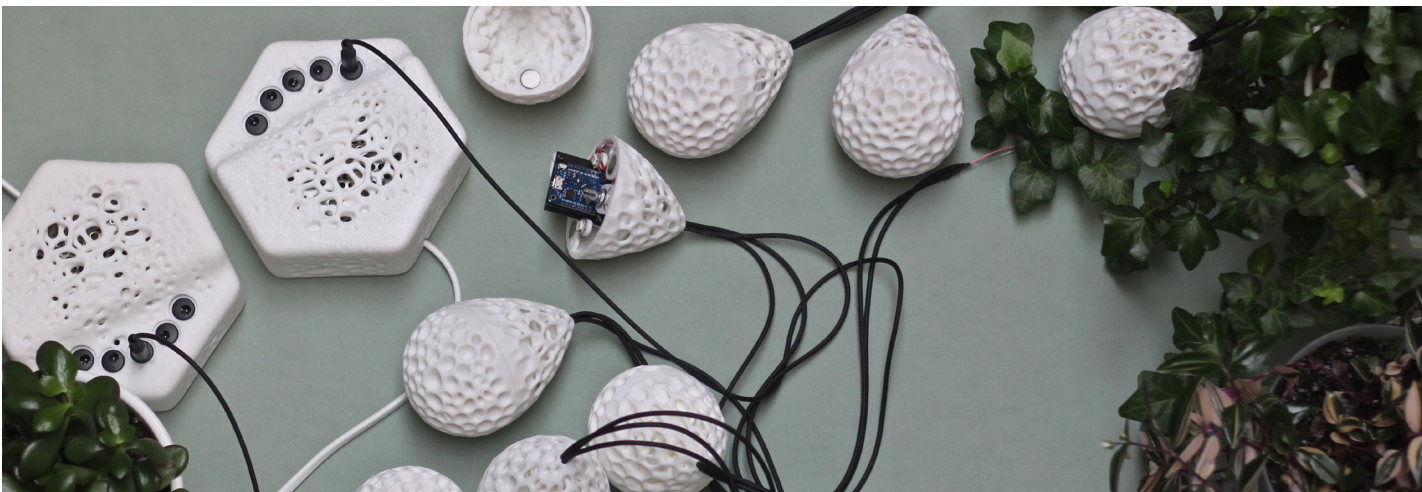
Beyond Human Perception, detail of the sensors to measure the electrical activity of plants, 2020

Quaran.tiles

Andrea Benedetti, Beatrice Gobbo, and Giacomo Flaim

"Quaran.tiles" is the physical representation of a collection of expressive geotags created on Instagram in 2020 as a response to quarantines during the first wave of infections of COVID-19. Due to the lack of vaccines and cures for the illness, the reaction of various local governments was lockdowns of multiple scales that forced people to stay at home. On social media platforms like Instagram, which offer UI affordances to tag photographs in various places globally, this became impossible for many people due to lockdowns

People in lockdown started to re-appropriate these UI affordances not to locate themselves in a specific place but instead in a fictional place that reflected their condition instead of geographic coordinates. A series of posts tagged in places named "Quarantine" started to appear.

Due to how the platform is structured, these non-existent places are often associated with real-world coordinates, creating a mingling layer where digital aggregations of data and real-world features meet. After a first mapping that provided an archive of these places directly on Instagram (@quaran.tile), the ephemeral nature of the content on the platform required a physical archival effort to preserve the constructed dataset.

This assemblage results in a catalog of places scraped from Instagram as of summer 2020. Various levels of information can describe each place. The first layer is the one available on Instagram: the name is found on the platform, along with latitude and longitude, when available. The address was automatically obtained through reverse geocoding to emp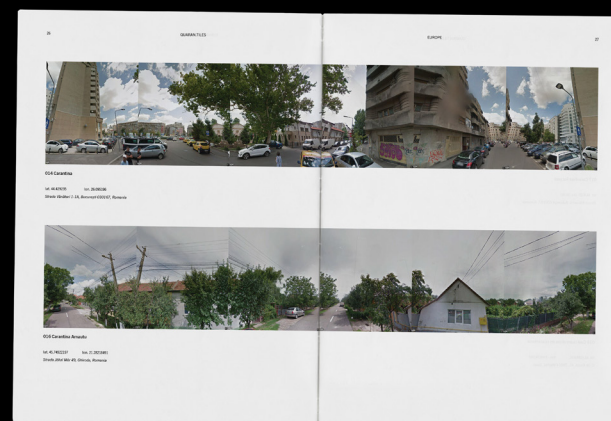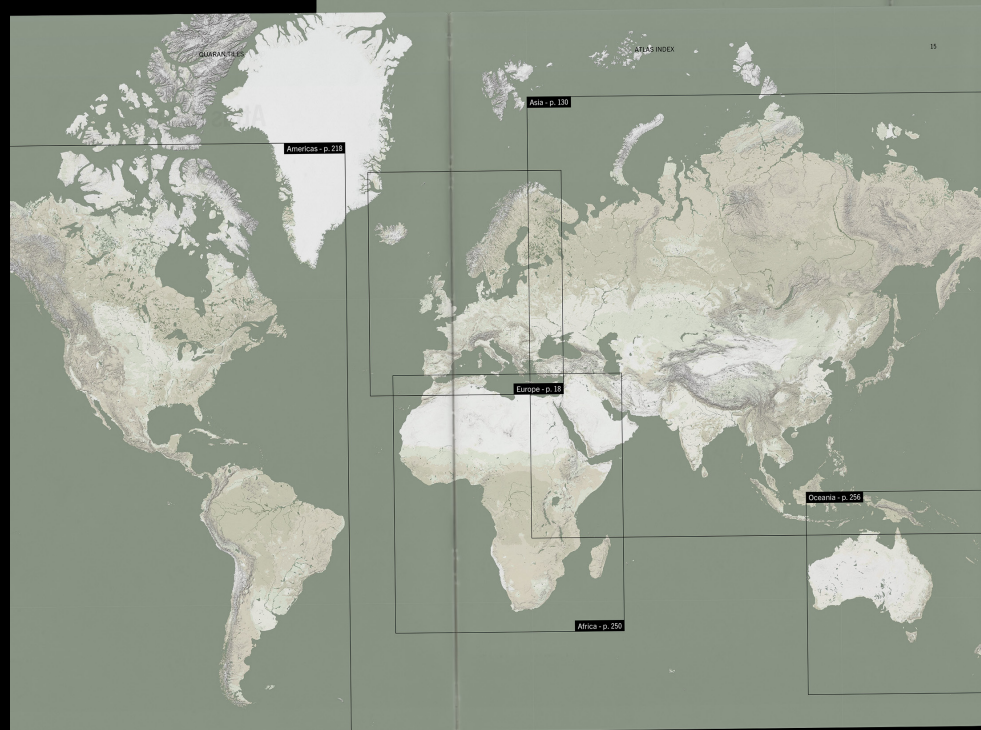hasize the relationship between these digital places and real-world locations. A collection of images from Google Streetview was downloaded as an additional layer of information.

Year: 2022
Materials: Book (hardcover), paper
Dimensions: 20cm × 27cm (closed),
40cm × 27cm (open)

Placeless Quarantines

QUARAN.TILES

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Europe - p. 18

Oceania - p. 256

Africa - p. 250

Europe

NeuroKnitting Beethoven

Varvara Guljajeva and Mar Canet Sola

NeuroKnitting Beethoven was developed to celebrate Ludwig van Beethoven's 250th anniversary. It re-visits the composer's classical compositions from an interdisciplinary viewpoint. While playing Beethoven, a musician's emotional state (in Seoul, it was a monk's) is represented through the movement of a circular knitting machine installation, visuals, and plotted pattern. The pianist's affective response to music is captured every second and memorized in the knitted textile pattern, which is sprayed on the yarn before being knitted. High attention level results in a dense pattern, and the knitting machine's speed follows the meditation level. All these processes are real-time and take place simultaneously. Furthermore, the sound-responsive AI-generated visuals are created and displayed alongside the data visualization to accompany brain data visualizations.

This artwork demonstrates how NeuroKnitting Beethoven – as part of an interactive on-stage performance – became a telematic project during travel restrictions. EEG data was transmitted over the distance from a concert hall to the artists' studio, where the knitting machine (Circular Knitic) was located. The knitting process was controlled by real-time biometrical data that was streamed over UDP. In return, the multiple viewpoints of the knitting process were streamed to the concert venue.

NeuroKnitting Beethoven is an excellent example of how creative technology can save cultural programs and offer novel formats that were initially not planned. As a result, the telematic nature of artwork brings together multiple spaces in a creative and novel way allowing the audience to experience how brain data can affect physical matter and processes at a distance.

In short, the artwork explores how a human affective state could influence the mechanical process of knitting and offer a different interpretation of classical music.

Year: 2020
Material: Python code for EEG processing, Processing code for EEG visualization and visuals, EEG headset, custom-made knitting machine Circular Knitic control by arduino, StyleGAN2 generated visuals.
Dimensions: telematic concert performance (3m × 2m × 3m in demo settings)
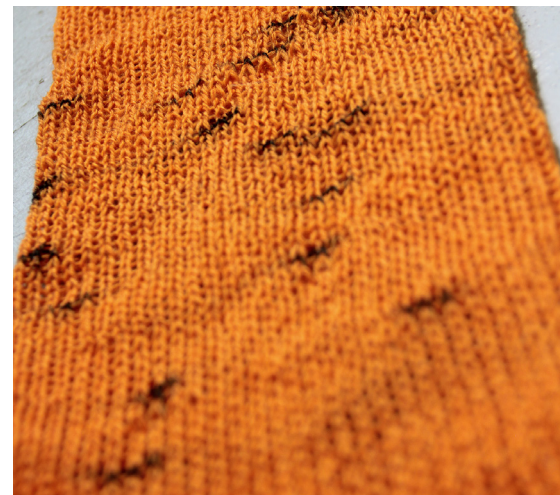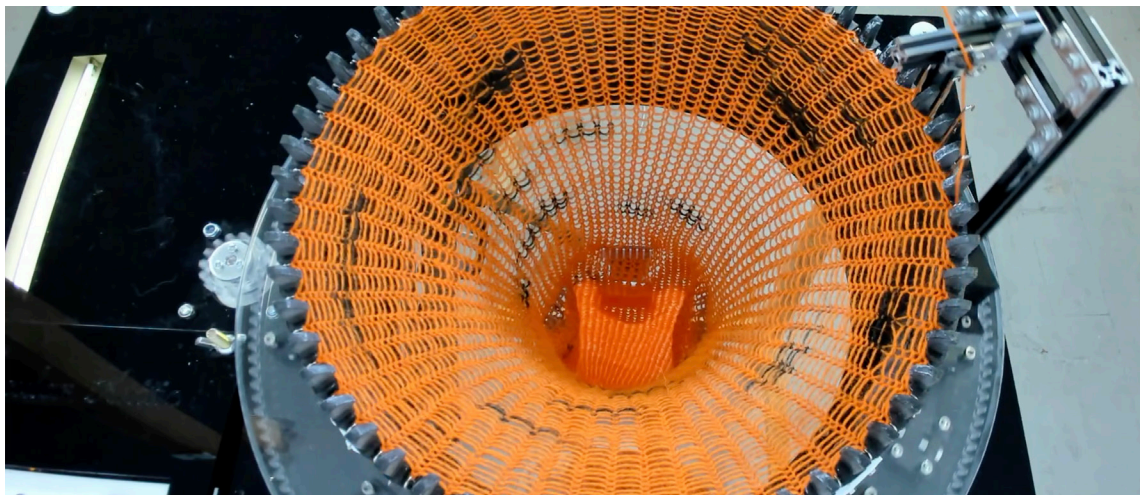
SoftVoss

Yin Yu

Human skin exchanges real-time energy with its surrounding space, such as temperature, humidity, and pressure. What if our skin can listen? SoftVoss is a morphing artificial skin that changes its appearance by real-time sound.

SoftVoss brings sound material into an architectural body space that perfectly represents the show's theme--Mingling Spaces. In general, skin, as the outer layer of a body, protects our inner body from the environment. SoftVoss responds to the space through a new dimension of senses: aural. SoftVoss becomes a medium for visual communication with the soundscape as an artificial skin.

SoftVoss used the information of sound morphology–the transformation of sound material–to change the appearance of a body.

The realization of SoftVoss has three main components: sound materials, a control system, and a soft structure. Sound material, captured by microphones, is the input data to control the piece. The four channels of sound materials activate the four layers of feathers using real-time data input. The sounds captured from different source directions activate the specific layer of the feather. SoftVoss visualizes sound information through a 3D morphogenesis of wearable art.

Year: 2021
Material: Sound, silicone rubber, and electronics.
Dimensions: 5'4" h × 1'4" w × 11" d
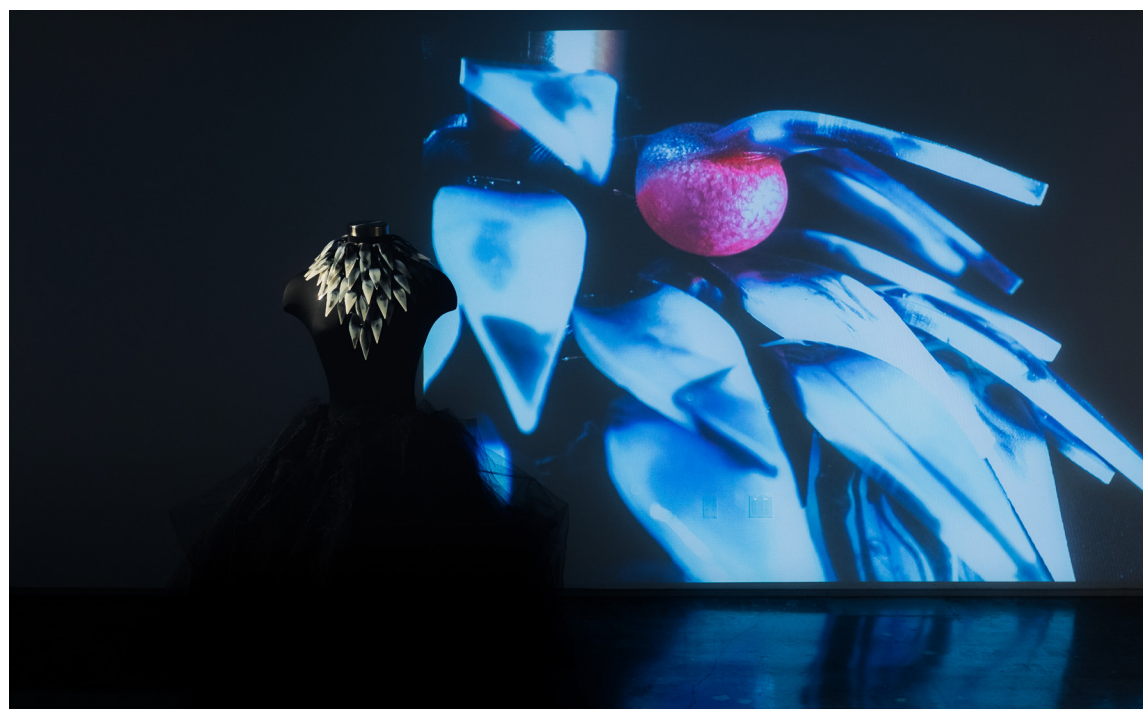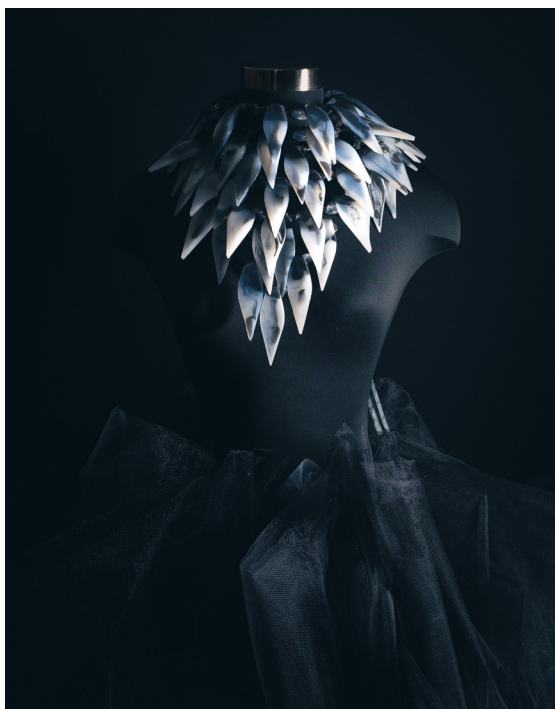
OctoAnemone

Yin Yu

OctoAnemone is an interactive sculpture that explores the morphologies of artificial anemones for the post-Anthropocene era. This project imagines the evolution of artificial life forms and their intelligence – a speculative design for a yet unknown species. A group of deep organisms open and close like sea anemones. How do humans communicate with artificial creatures like OctoAnemone? In this project, a pre-trained machine learning model of human hand gestures allows the audience to interact with deep organisms using their hand language captured by a camera.

OctoAnemone resonates deeply with the show's theme-Mingling Spaces. On the one hand, the design of each creature mimics deep-sea organisms. The sculpture creates a space like people diving in the ocean. On the other hand, the sculpture was physically displayed in human habitat space. Visitors could use hand gestures to interact with the sculpture. OctoAnemone suggests blending two spaces of deep sea and habitat with one of the human identity-hand gestures.

OctoAnemone creates a novel way to present an artificial creature using a pneumatic control system to change its shape and color. When observing the performance of OctoAnemone, visitors experienced a diving-like ocean exploration. OctoAnemone physically realized biological life from the deep sea.

Year: 2021
Material: Silicone rubber, metal structure, camera, and electronics.
Dimensions: 3' h × 3' w × 3' d
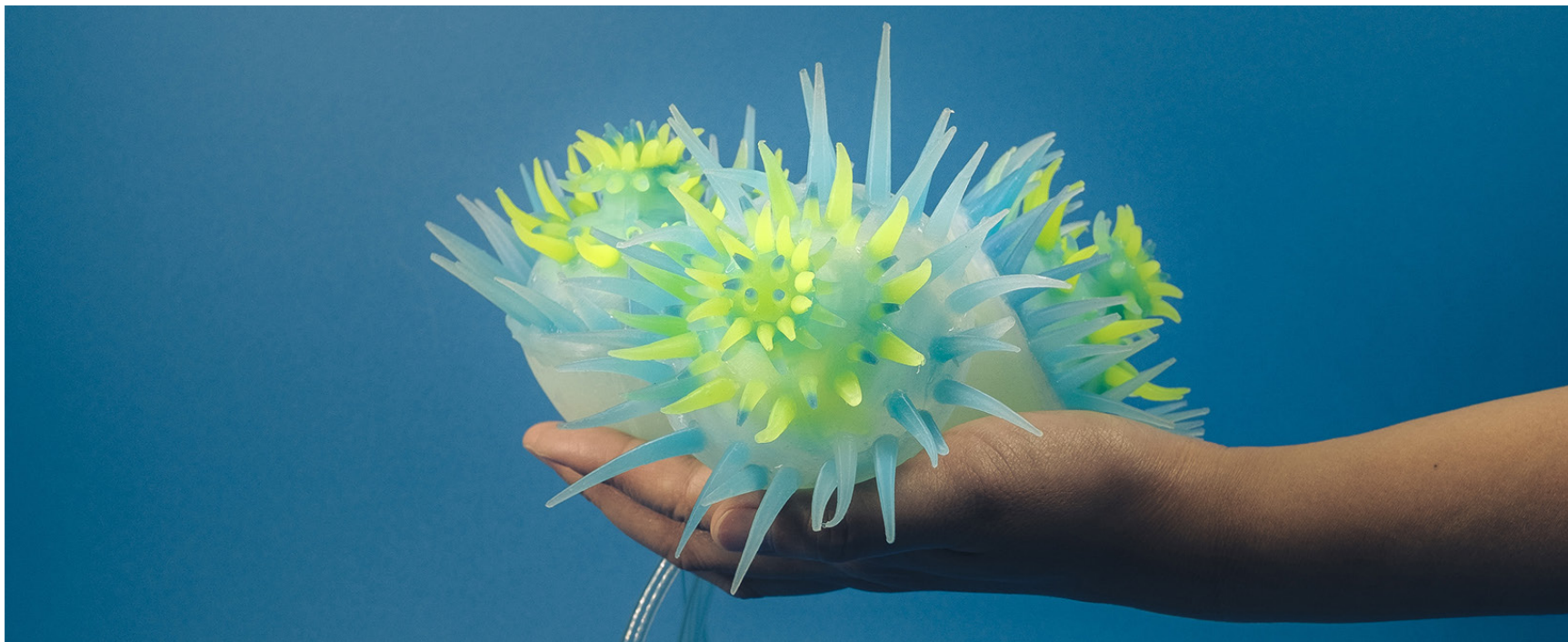
RAY

Weidi Zhang

www.zhangweidi.com/ray

RAY provides a responsive art experience that re-interprets Rayograph (photogram) – a 20th Century cameraless image-making technique – in the perspective of Artificial Intelligent (AI) surveillance and the changing ontology of images. The system implements Image-to-Image Translation with Conditional Adversarial Networks and a computer vision system to translate human portraits into new images of Rayograph with semantic meanings, which are further developed algorithmically through visualizing in the aesthetics of light painting. RAY bridges intelligent visualization with cameraless photography Rayograph to engage audiences with an interactive poetic experience that conveys meanings.
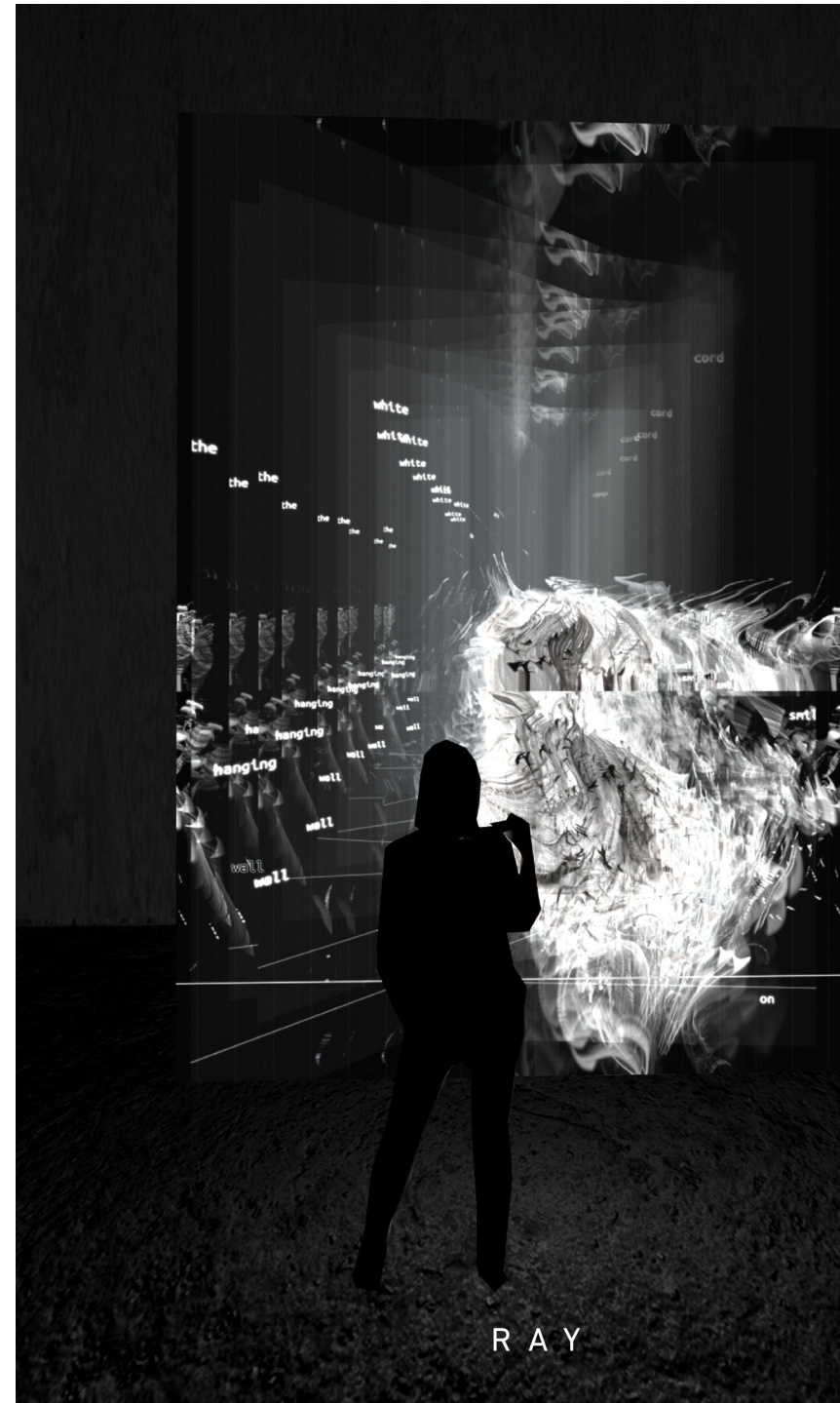
RAY
2021
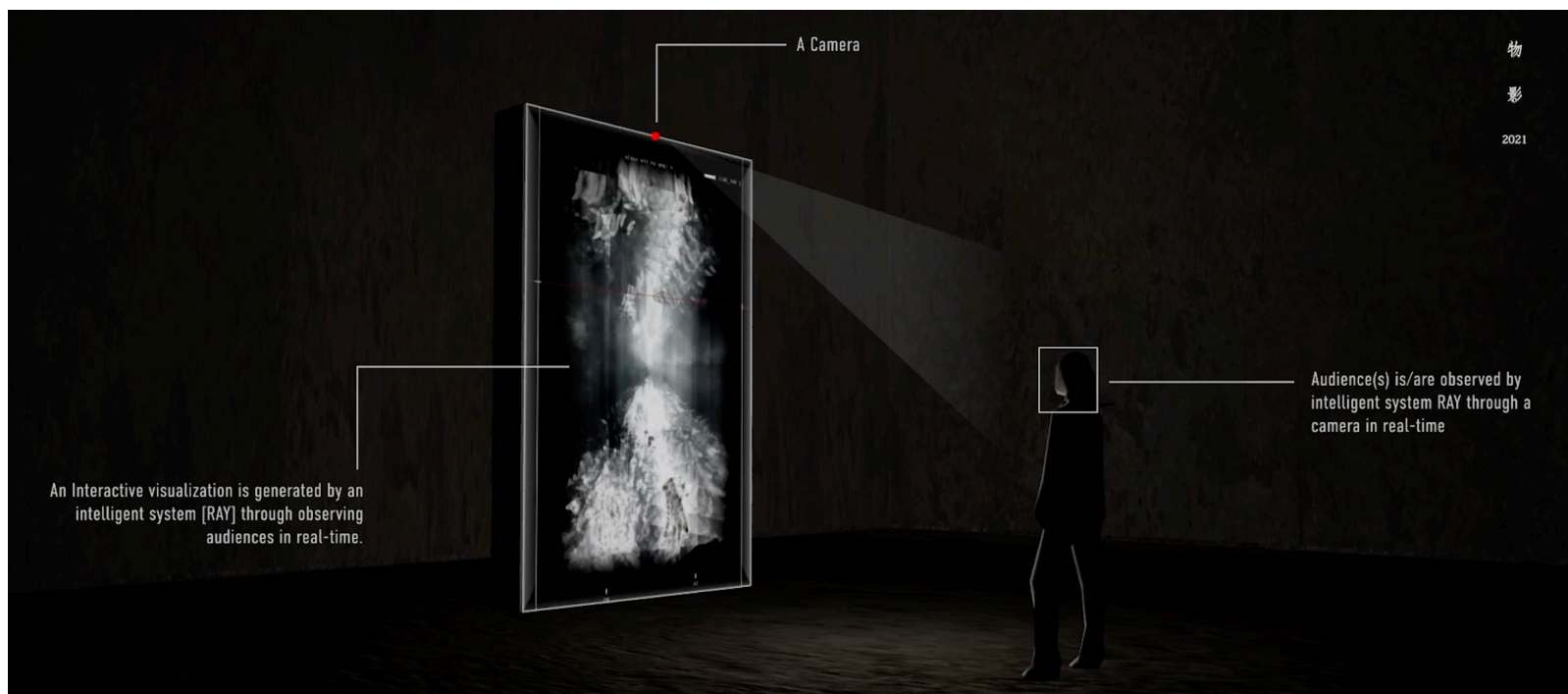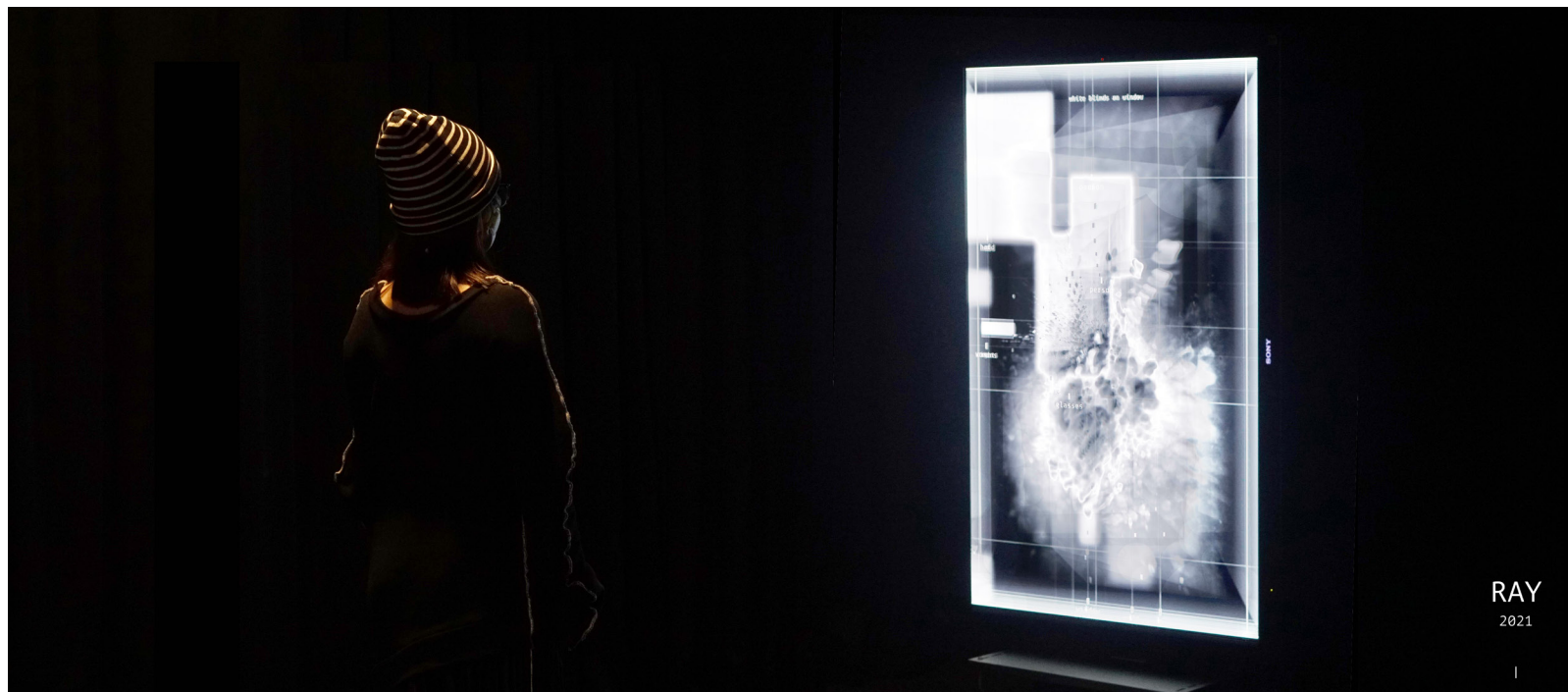
物
影
2021

A Camera

An Interactive visualization is generated by an intelligent system [RAY] through observing audiences in real-time.

Audience(s) is/are observed by intelligent system RAY through a camera in real-time

Under the Green:

Visual Data Storytelling the Process of Urban CO2 Neutralization by Forests

Linqi Wang, Fengzhou Liang, Fang Liu, Boai Yang, and Junyan Lv

We express the conflict between industrialization and ecological civilization through Cyber Aesthetics and interactive web pages. We popularize the originally cryptic knowledge of Forest Ecology to the public through common visual metaphors and interactive effects. With this work spreading online, we hope to attract more people to join the construction of ecological civilization and pay tribute to Forest Ecological Scientists. There are already some scientific research results on forest carbon fixation, and a large amount of scientific data has been generated. However, these achievements and data are highly specialized, detached from daily life, and subsequently receive rare public attention. The physical space humans depend on is strongly interconnected, and forests and cities seem separate but mingling. The production and living of people produce lots of greenhouse gases, which need to be consumed by forest plants through photosynthesis, fixing CO2 in the form of organic carbon in the soil and biomass to ensure the carbon cycle. Industrialization has led to excessive CO2 emissions, causing severe disturbances to the carbon cycle process. At the same time, nature is constantly warning humanity, accompanied by frequent occurrences of extreme weather. Therefore, natural forest conservation and plantation forest management are crucial for future ecological civilization.

All data supporting our creation are from China Huitong National Forest Ecosystem Research Station (HTF).

Year: 2022
Material: Web pages
Illustration: Adobe Illustrator
Edit tool: Pycharm, VSCode
Language: HTML5, CSS, Javascript
Browser: Chrome

Dimension: 1920px × 1080px

Forest absorb this **CO₂** from the atmosphere through **photosynthesis**.
Then forest plants accumulate **biomass**.

microorganisms   biomass   organic carbon

Under the Green   Macro   Micro   **Mingling**   About

Optimal mixing ratio.

While managing Chinese fir plantation, the mixture with 20% macclure michelia shows
a greater SOC sequestration capacity and better growth of the plantation.

Legend
Carbon Density **in groups** *(t/ha)*

Chinese fir
plant organs, *per 1t/ha*

Macclure Michelia
plant organs, *per 3 t/ha*

litter, *per 1t/ha*

nutrients, *per 0.005t/ha*

SOC Density (t/ha)

65.35 t/ha

30.07 t/ha

0-20cm

20-40cm

40-60cm

Age
5 yr

12

13 yr

100% Pure
Chinese fir plantation

80% Mixed
Chinese fir plantation

50% Mixed
Chinese fir plantation

General Trends

126.23   118.94 t/ha

decreasing year by year

159.18   159.49 t/ha

staying flat

164.09   168.72 t/ha

increasing slightly

Presentation of Self in Machine Life

RAY LC and Mizuho Kappa

The world has been driven apart by recent events, making long distance performative mingling difficult to achieve, especially those employing in-person collaboration between humans and machines. How shall we reclaim a tangible exchange with other parts of the world that has presence and meaning, as opposed to impersonal virtual interactions? We created and choreographed an art technology performance that allows viewers in Oklahoma City to immerse themselves in a collaborative narrative space between a dancer in the US and a robot arm in City University of Hong Kong's Studio for Narrative Spaces. The performance is shown in either online or offline form to audiences, who witness the narrative of a dancer and a robot who communicate with each other through movement, sometimes leading one another, sometimes frustrating each other, as if each are present to the other across a 12 hour divide. The dancer invites the machine to dance with her, but the machine quickly realizes that while it is not human, it can do things even the human dancer cannot accomplish. However the dancer is eager to control the technology she has invited, and will stop at nothing to get it to do what she wants to do. Without viewing the machine directly, the dancer relies on limited perspectives and sounds to enable bi-directional communication. The outcome is a narratively driven art-technology-based performance that attempt to overcome the space and time separation between humans and their technology in order to establish a presentation of the extended self.

Year: 2021
Material: Robotic arm, Zoom, distanced performance

Sifting Strands

Oskar Elek, Weston Mossman, and Angus G. Forbes

Sifting Strands is an interdisciplinary art project which arose from a collaboration between astrophysicists and computational researchers at the University of California in Santa Cruz in the effort to develop a functional meta-model of the cosmic web. Its core technical component is the MCPM algorithm that builds on a computational model of Physarum polycephalum slime mold. Using this methodology, we built the first accurate density map of the cosmic web, detected the contributions of intergalactic medium to the signal from a fast radio burst, explored novel 3D printing designs, developed a physically realistic visualization of volumetric slime mold networks, and explored language embedding models.

Sifting Strands presents an interactive performance that transforms the MCPM algorithm to a more expressive formulation that is also music, video, and scene reactive. Our simulation responds to acoustic transients by spatial distortions of the simulation domain, and uses the video and scene geometry capture inputs as additional signaling modalities to steer the virtual agents. The resulting generative patterns have a mesmerizing organic, fractal nature.

We have performed different adaptations of this work within a series of collaborative art events in Santa Cruz, California titled Liminal Space. In one version, the simulation reacts to the live performed music as well as the video recording of the room and the resulting visuals are projected on the wall. In another, we projected the simulation onto a surfboard which the participants could draw on, creating a feedback loop dialogue between the people and the simulation. In another, we used Microsoft Kinect to detect the motion dynamics of the audience and used that to steer the simulation. For VISAP 2022 we present an amalgam of these performances.

Sifting Strands explores how computer-generated art and live audience collaborate in the creative act. People appreciate the opportunity to participate in the performances, whether this is through drawing, modulating and steering the generative system in real time, or simply having stimulating cross-disciplinary conversations. For us researchers this presents a unique opportunity to get feedback and spread knowledge of complex systems through the performances as an outreach activity.

We believe this work in its own way demonstrates that artistic exploration and scientific research can inform each other, and participatory artistic presentations can make scientific research more accessible and interesting to the general public, with the added benefit of strengthening local art communities.

Year: 2022
Material: Software simulation, projection mapping, color and depth cameras, physical media
Dimensions: 4m w x 4m l x 2m h
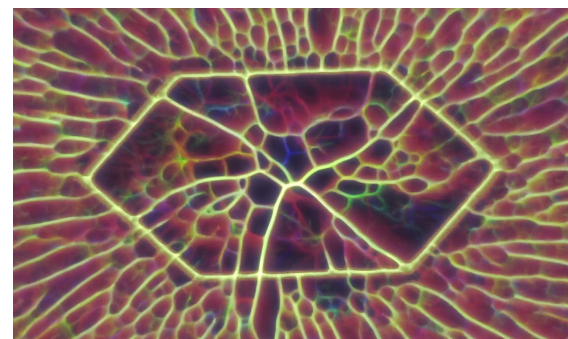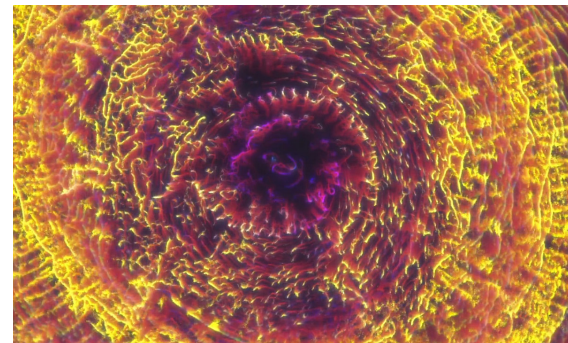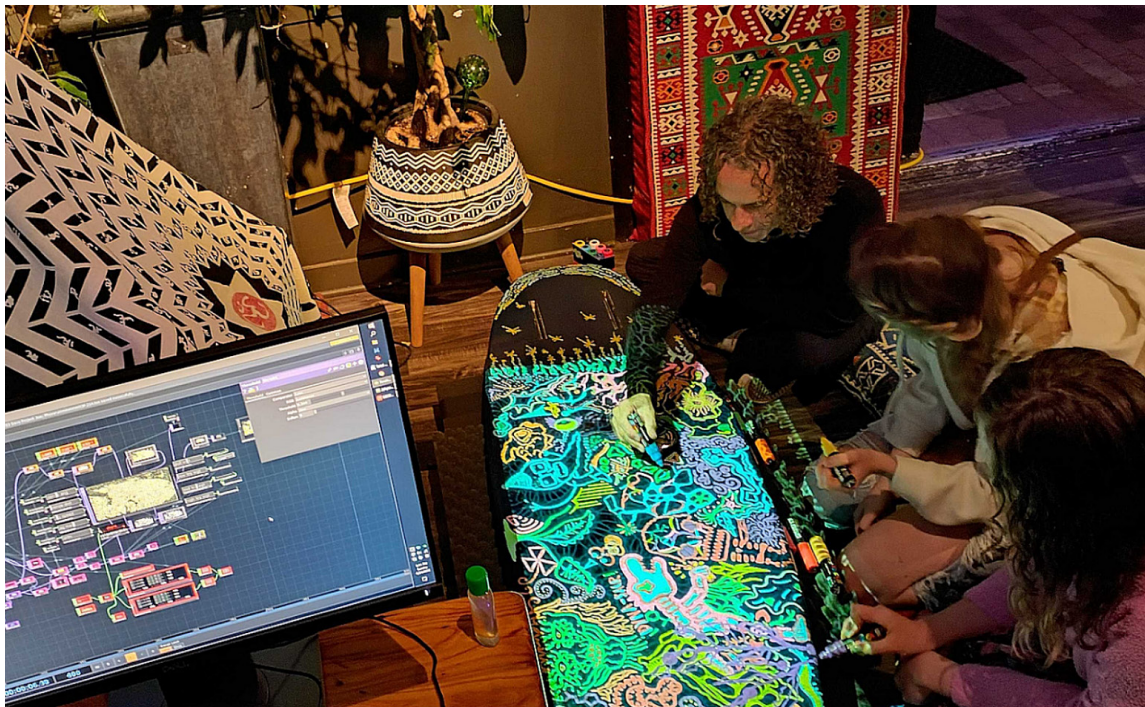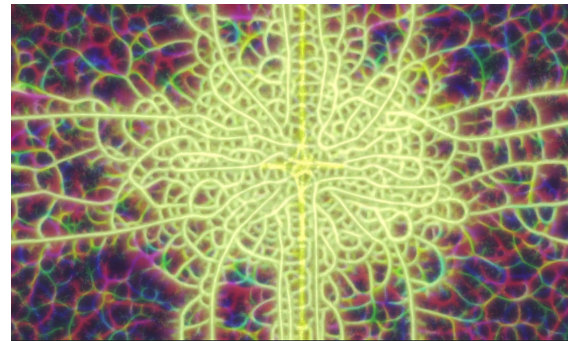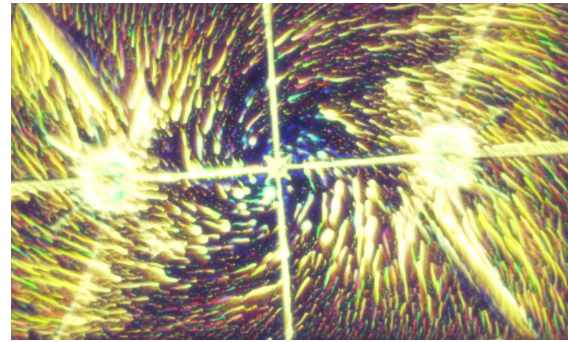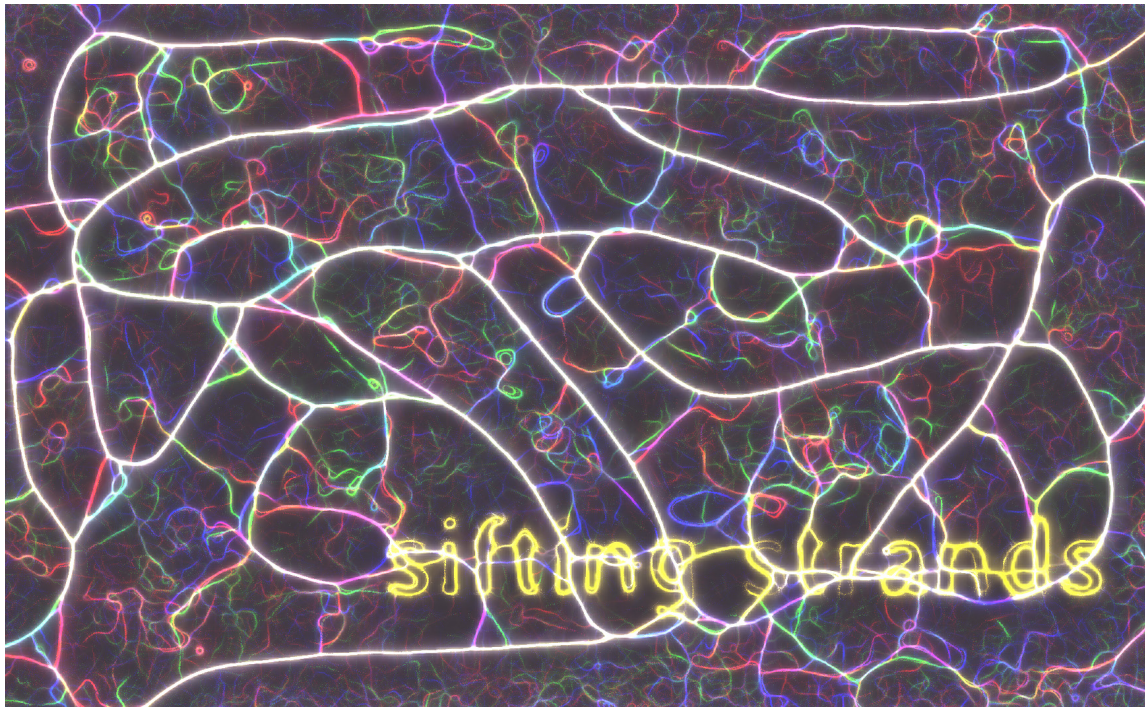
Molecular Planets

Christoph Müller, Karsten Schatz, Florian Frieß, and Michael Krone

The molecular world is always in motion – molecules are never stationary, atoms are constantly vibrating due to thermal energies and external forces. This ongoing motion is the reason for our installation being a mobile. The ever-moving elements of the molecular space are invisible and their shapes are of purely theoretical nature. Visualisations make them visible in virtual space using representations such as molecular surfaces, which portray the interface between a protein and its environment. Even more abstract are molecular surface maps, which project the complex, three-dimensional molecular surface to two dimensions via an intermediate: the eponymous Molecular Planet. Our installation not only makes such visualisations transcend into our three-dimensional, tangible space, but also mingles all intermediate mathematical spaces that the idea of molecular surfaces traverse to reach their visual representation into one object.

The elements of the mobile are printed in full-colour sandstone to physically create the shape and colour of the molecular surfaces and the Molecular Planets. This colouring is borrowed from geography, depicting the original elevation of the molecular surface. Consequently, the binding site of the molecule, which is a palpable valley in the surface, is a blue area. The 3D prints float over the molecular surface map. The Molecular Planet of the lipase hangs on one side of the main bar, while on the other side, another bar balances the molecular surface and the fat below its Molecular Planet, both in red. The equilibrium of the molecular world – like the one of planetary systems – might seem natural, but is fragile. The balance of the mobile is artificial and a man-made, careful combination of elements, bars, and strings, providing a metaphor for the topic. The mobile is hanging in a brass arch fixed on a wooden plate in which the printed molecular surface map is embedded in epoxy.

Year: 2022
Materials: Sandstone 3D print, brass, wood, paper, epoxy
Dimensions: 44cm × 50cm × 35cm

Papers & Pictorials

Papers

ESSYS* Sharing #UC: An Emotion-driven Audiovisual Installation
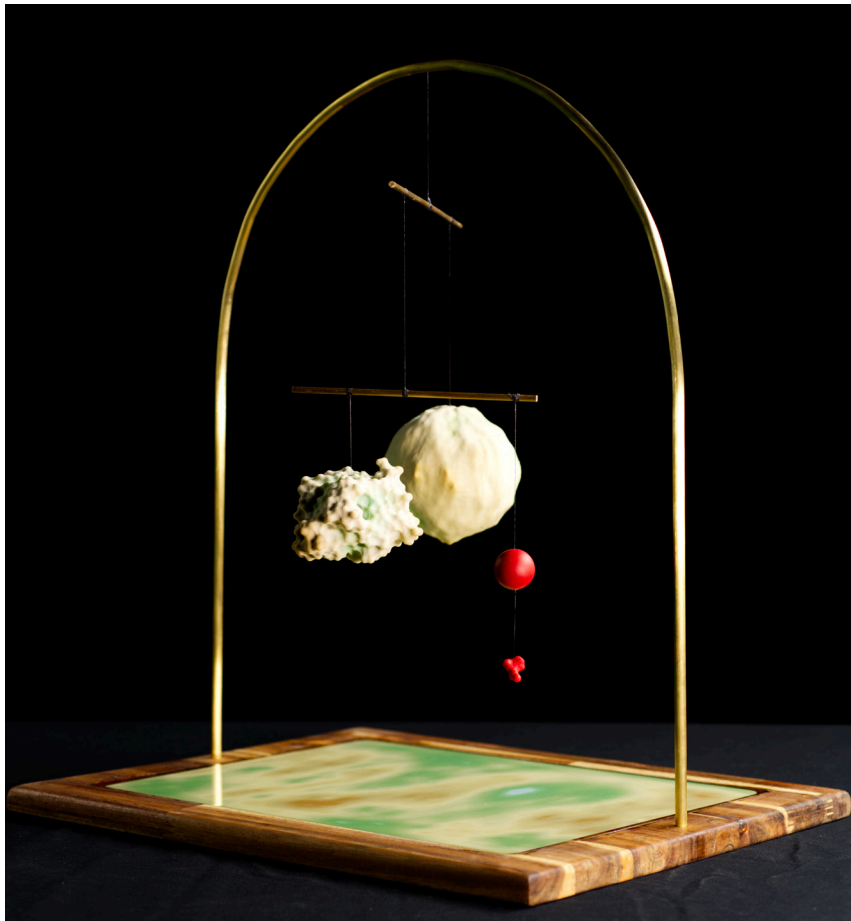
Sérgio M. Rebelo, Mariana Seiça, Pedro Martins, João Bicker, and Penousal Machado

We present ESSYS* Sharing #UC, an audiovisual installation artwork that reflects upon the emotional context related to the university and the city of Coimbra, based on the data shared about them on Twitter. The installation was presented in an urban art gallery of Círculo de Artes Plásticas de Coimbra during the summer and autumn of 2021. In the installation space, one may see a collection of typographic posters displaying the tweets and listening to an ever-changing ambient sound. The present audiovisuals are created by an autonomous computational creative approach, which employs a neural classifier to recognise the emotional context of a tweet and uses this resulting data as feedstock for the audiovisual generation. The installation's space is designed to promote an approach and blend between the online and physical perceptions of the same location. We applied multiple experiments with the proposed approach to evaluate the capability and performance. Also, we conduct interview-based evaluation sessions to understand how the installation elements, especially poster designs, are experienced by people regarding diversity, expressiveness and possible employment in other commercial and social scenarios.

Affective, Hand-Sculpted Glyph Forms for Engaging and Expressive Scientific Visualization

Stephanie Zeller, Francesca Samsel, and Lyn Bartram

As scientific data continues to grow in size, complexity, and density, the representation scope of three-dimensional spaces, data sampling methods, and transfer functions have improved in parallel, allowing visualization practitioners to produce richer multidimensional encodings. Glyphs, in particular, have become an essential encoding tool due to their versatile applications in co-located multivariate volumetric datasets. While prior work has been conducted investigating the perceptual attributes of computationally-generated three-dimensional glyph-forms for scientific visualization, their affective and expressive qualities have yet to be examined. Further, our prior work has demonstrated the benefits of artist hand-created glyph forms in contrast to commonly-used synthetic forms in increasing visual diversity, discrimination, and expressive association in complex environmental datasets. In order to begin to address this gap, we establish preliminary groundwork for an affective design space for hand-created glyph forms, produce a novel set of glyph-forms based on this design space, describe a non-verbal method for discovering affective classifications of glyph-forms adopted from current affect theory, and report the results of two studies that explore how these three-dimensional forms produce consistent affective responses across assorted study cohorts.

Pictorials
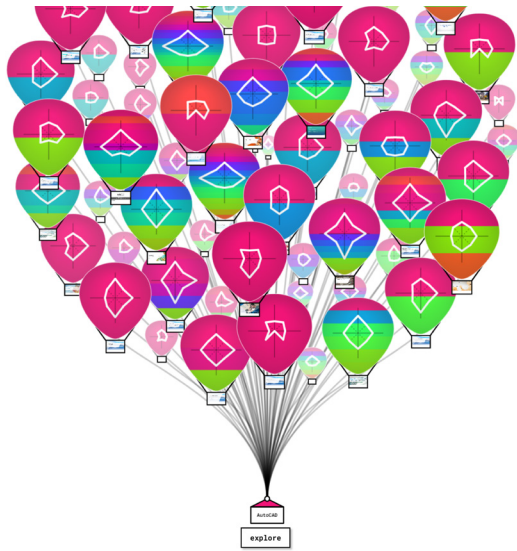
SkyGlyphs: Reflections on the Design of a Delightful Visualization

Bon Adriel Aseniero, Sheelagh Carpendale, George Fitzmaurice, and Justin Matejka

In creating SkyGlyphs, our goal was to develop a data visualization that could possibly capture people's attention and spark their curiosity to explore a dataset. This work was inspired by a mingling of research including serendipitous interactions, visualizations for public displays, and personal visualizations. SkyGlyphs is a non-conventional whimsical visualization, depicting datapoints as animated balloons in space. We designed it to encourage non-experts to casually browse the contents of a repository through visual interactions like linking and grouping of datapoints. Our contributions include SkyGlyphs' representation and our design reflection that reveals a perspective on how to design delightful visualizations.

Supersynthesis: A Communal Synthesis

Amay Kataria

This pictorial presents the journey of a light and sound installation called Supersynthesis, which collects data from its users through an interactive digital interface and expresses it through the physical installation. It begins by going over historical works and methodologies that align with this project, goes over the design decisions behind the sculptural form and its software architecture, and finally analyzes its function through the lens of a "performative object" to draw connections with the theme of Mingling Spaces.
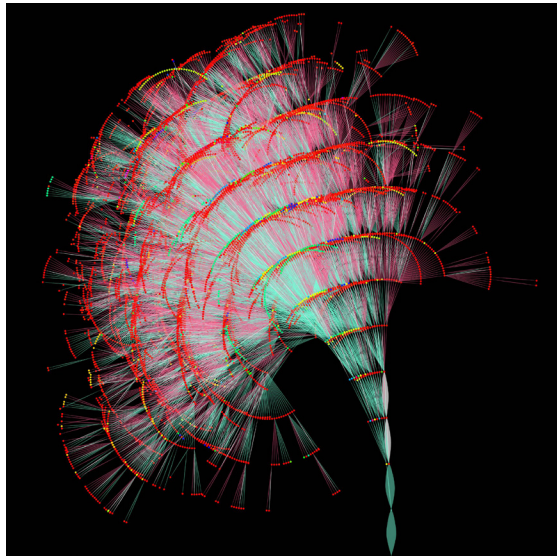
Shifting Winds: Gendered Structures of Academic mentorship

Jiabao Li, Houjiang Liu, Jilie Zeng, Di Wu, Ying Ding, and Alec McGail

www.mentortrees.com

Every researcher alive today had their mentors, those who helped assimilate them into a life of scholarly work. And in turn they each had their mentors, and so on to the dawn of knowledge. In the same way, each researcher's mentees take their perspectives and methods to future mentees, and to their mentees, etc. These comprise the roots and branches, respectively, of the academic tree of a single researcher. If we let these ancestors' and descendants' genders affect these trees like a "wind," most curl nearly to the earth. We depict and describe the structure of these trees, and how this wind has changed over the decades. To set these trees growing upright again we visualize giving differential weight to male and female researchers.

Wind from Bamboo: A Chinese Handwriting Interactive Installation based on Human-AI Collaborative Font Design

Zhen Zeng, Jie Wang, and Nan He

In the era of information, the feeling that the pen tip rubs against the paper is getting farther away, and the way of writing Chinese characters with strokes is gradually alienating. In response to this problem, this work tries to help people relive the touch of handwriting through the mingling of real and virtual experiences. The designer collaborated with AI to design a Chinese font that integrates bamboo leaves' shape and Chinese characters' structure. Based on the font, an interactive installation was set up to start a virtual Chinese poetry bamboo forest scene through real handwriting behavior.

Quaran.tiles. Archiving Expressive Digital Places from Instagram During the COVID-19 Pandemic

Andrea Benedetti, Beatrice Gobbo, and Giacomo Flaim

During the spring of 2020, COVID-19 limited contact between people, preventing them from meeting and aggregating in real places. Many had to stay at home while others had to spend time in quarantine facilities. In this context, virtual aggregation has increased at the expense of in-person aggregation. Expressive geo-tagging, namely the practice of creating locations with fictitious names to express an emotional condition, became worthy of attention. Grounded on anecdotal evidence, fictitious digital locations on social media such as "Quarantine" began to proliferate, which, despite not having a name that could be traced back to an existing place, still carried geo-referenced information with them. Starting from this concept, we present the book Quaran.tiles, an archive of 364 expressive digital places collected from Instagram in April 2020 and enriched with information from Google Street View, which aims to give space and dimension to the resulting collection of fictitious and mingling user-generated places.
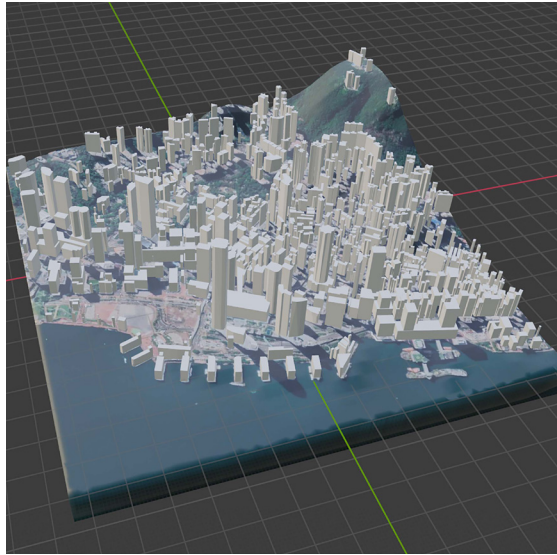
The Memory of Street - Hong Kong: History, Culture, Memory and Post-Humanism

Chunxi "Tracy" Liu and Wai Lam "Noah" Luk

In this annotated portfolio, we present a post-humanist idea of defining mingling spaces with microorganisms. Using this approach, we explored and extended the current boundary of cultural concerns of human beings. Human landmarks, such as buildings, streets, and cities, are usually named after famous people, important events, religious symbols, or a piece of collective memories. From Alexandra (named after the Macedonian King) to Hong Kong (meaning "fragrant harbour"), names of places are lyrical codenames that connect human emotions to a physical space. However, while these names last, the stories they tell often get forgotten. In this work, we propose a new, posthuman narrative for naming places. Microorganisms, the invisible lifeforms that pervade every micrometer of air, water bodies, and land on earth, coevolve and interact with the changing environment of the place they inhabit, accumulating genetic traits along the way. Just like gut microbiota that are unique for each individual human, the composition and genetic variations of the microbes in each location are also unique to that place, shaped by millennia of adaptation. Microorganisms narrate another kind of story, told through their genomes, where "collective memories" are a natural history in which anthropological activities play only a small part. Bacteria, the witness of human kings and heroes, wars and revolutions, ascent and extinction, are the rightful "namesake" of places. Using four landmarks in Hong Kong, a city tossed in endless political and cultural tides in the past 150 years, as our point of departure, we contemplated on the use of bacteria as a new narrative for the posthuman stories associated with places. Alongside the philosophical articulations, we also visualized this idea by fabricating an installation through the interdisciplinary use of 3D printing technology and microbiological procedures.

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