IEEE VIS Arts Program

Enchantment
10.25–30.2020

The VIS Arts Program (VISAP) is a forum where visualization researchers, designers, and media artists come together to discuss topics in data visualization around an annual theme, intended to be relevant to art, design, and academic research communities. It is the biggest associated event in the IEEE VIS conference, and its main goal is to foster new thinking, discussion, and collaboration between fields.

VISAP welcomes a wide range of submissions, including interactive artworks, design projects, novel visualization tools and applications, art-science or artist-in-lab projects, evaluations of data visualizations, and philosophical meditations on the intersections between art and research. These can either be submitted to a paper track, or to an exhibition track (read the Call for Entries for details). Accepted works will be published on the official VISAP website and in a dedicated exhibition catalogue, and will be indexed in the IEEE Xplore digital library.

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Enchantment

The works and performances featured in the virtual exhibition and documented in this catalogue speak to the theme of Enchantment. While it may seem odd to speak of enchantment in this year of continuous upheaval (and we chose this theme during simpler times), in many ways enchantment is all the more needed and perceptible as a contrasting occurrence that can bring inspiration for the future. Our call for artworks asked designers and artists to enchant in all of the different meanings of the word from its root ("to sing into") to the myriad of meanings it has acquired since.

To enchant is to stop the mind for a moment, in surprise and curiosity, and connect with the extraordinary in the everyday. Enchantment breaks expectations and speaks to old memories or ancient truths in a way that makes us look again and more deeply. Some have suggested that modernity has stripped the world of enchantment because of its bias towards explaining, deciphering, stating, and categorizing. Indeed, many visualizations are designed around these principles. With this theme we have placed emphasis on our capacity to wonder as the doorway to curiosity, research, and engagement, and on the notion that enchantment can be something that we aim for when creating visualizations.

Data visualization is by its very nature striving to represent and translate one form of information into another to understand and influence. If the data itself is seen as objective, the visualization aims to preserve this quality while appealing to human senses which are prone to conditioned biases. Within this year's theme of enchantment we feature works in art and design which investigate how enchantment can be used to entice a first look and further create a sustained curiosity about what is being represented. We asked ourselves, how does one design for enchantment? Where does the intersection of objectivity and wonder lie? How has beauty been implicated in visualization, implicitly or explicitly? How will a new wave of visualizations incorporate the tension between the attention economy and the need to inform precisely and prompt action? Can one ever have too much art? What if the aim is not to precisely inform but to mirror an emotional state about the source of the data? How is success measured?

The artwork and performances represent a wide range of approaches to enchantment. Many ask us to pause and consider the story of others through encounters ranging from intimate audio and textual recordings, to remixed surveillance footage narrated by an alien intelligence. Some give us pause with sculptural objects that invite reflection on the coincident challenges of climate change and physical distancing. The natural world is also invited in as poetic inspirations featuring the colour of the sea and the migration of birds. In contrast, some take human-derived data and reinterpret it through the lens of machine learning, making strange our own perceptual landscape in a cascade of ever-changing environments. Throughout, the theme of enchantment is enacted through the lens of the current concerns of power relations, climate and environment, pandemic, and machine influence.

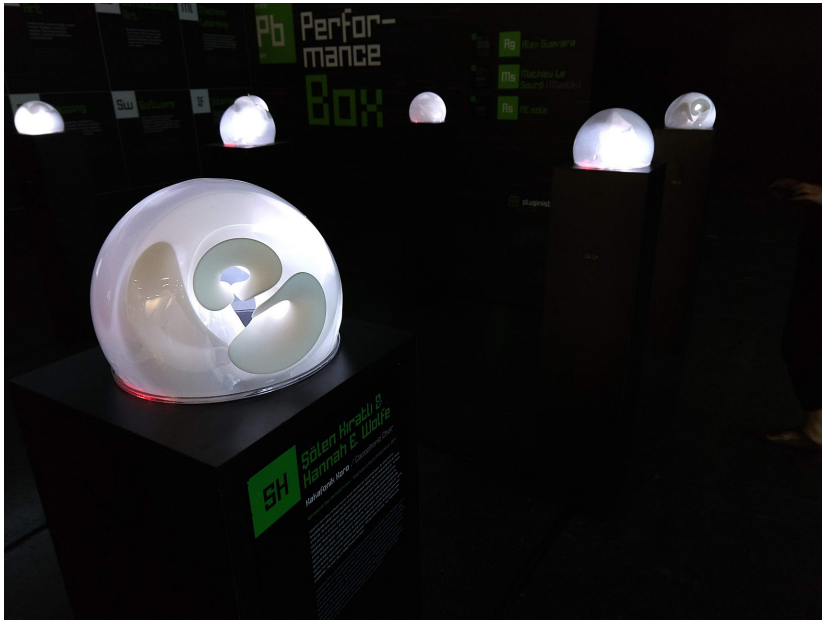
Now in its eighth year, VISAP continues to thrive as a proud associated event to IEEE VIS thanks to a large web of supporters. This year was an especially collective effort as we all dealt with the dual challenge of moving all events online and fiscal constraints. We are thankful for the ongoing logistical support of the IEEE VIS Conference Committee -- particularly the generous assistance of Valerio Pascucci, Will Usher, Gautham Chaudhary, Maria Valez, the Tech and Web Committees, and 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 very different situation. We gratefully acknowledge the students who stepped in to help us with the VISAP visual identity, web and social media presence: Kyuha Shim who designed the visual identity and website, Christy Cheung who designed the beautiful catalogue for this year's exhibition, and Bella Parkinson who kept VISAP at the forefront of people's minds with regular social media posts.

Cacophonic Choir

Alex Bundy, University of California, San Diego
Şölen Kıratlı, University of California, San Diego
Hannah E. Wolfe, Colby College

Cacophonic Choir is an interactive sound installation which aims to bring attention to the first-hand stories of sexual assault survivors and the way such stories may be distorted by the media and in online discourse. Cacophonic Choir is composed of multiple agents distributed in space that each tell a story. From afar, their utterances are heard as an incoherent cloud of murmurs. As the visitor approaches an agent it responds responds by becoming more visually bright, semantically coherent, and sonically clear, thereby revealing the original anonymous testimony of a sexual assault survivor.

The work employs several digital media techniques, including machine learning, physical computing, digital audio signal processing, and digital design and fabrication. Using sonification as storytelling to explore the testimonials, the text changes the way that visitors interact with the data while also expressing the experience of a survivor inundated by media reports.



Materials: Silicon, Acrylic, PLA 3D-printed forms, Raspberry Pis, LEDs, Proximity Sensors
Software: SuperCollider, Python, Tensorflow, 15'x15'x15' Virtual Work:
Software: Unity, Javascript, Tensorflow

Canjie

Donghao Ren, University of California, Santa Barbara
Weuidi Zhang, University of California, Santa Barbara

Cangjie provides an immersive exploration in semantic human-machine reality generated by an intelligent system in real-time through perceiving the real-world via a camera [located in the exhibition space]. Inspired by Cangjie, an ancient Chinese legendary historian (c.2650 BCE), invented Chinese characters based on the characteristics of everything on the earth, we trained a neural network that we call Cangjie, to learn the constructions and principles of all the Chinese characters. It perceives the surroundings and transforms it into a collage of unique symbols made of Chinese strokes. The symbols produced through the lens of Cangjie, tangled with the imagery captured by the camera are visualized algorithmically as abstract pixelated semiotics, continuously evolving and compositing an ever-changing poetic virtual reality.

Interactive Installation / Experimental Visualization

Climate Continuum

Brian Barr, Data Design Co.
Taekyeom Lee, Iowa State University
Matthew Wettergreen, Global Medical Innovation

Climate Continuum is a work with a purpose. A visualization of the past 150 years in climate data, the piece blurs the lines between sculpture and performance, object and action. With distance from the center representing global average temperature, and time a month by month spiral from bottom to top, the trends present in the form are urgent, alarming, and unmistakable. It is the decision to render the form in a temperature sensitive material, however, that firmly grounds the piece in the present moment. As the piece is experienced, the presence of the viewer causes a color-change from purple to pink, echoing on a local scale the role the viewer is playing in the ecosystems driving the source data at a global scale.

Material: 3D printed PLA (Polylactic acid), Dimensions: 2 X 2 X 21.75 in

Electo Electro 2020

Mike Richison, Monmouth University

Electo Electro 2020 is an interactive installation combining audience participation, music, news footage, and politics. It consists of Diebold Accuvote voting booths, iMacs, iPads, and small speakers. A custom Max MSP Jitter patch makes it possible for participants to remix videos from political rallies, debates, and news in a structured sixteen beat loop. The video clips sample parts of words in order to build percussion tracks, resulting in a breakdown of language.

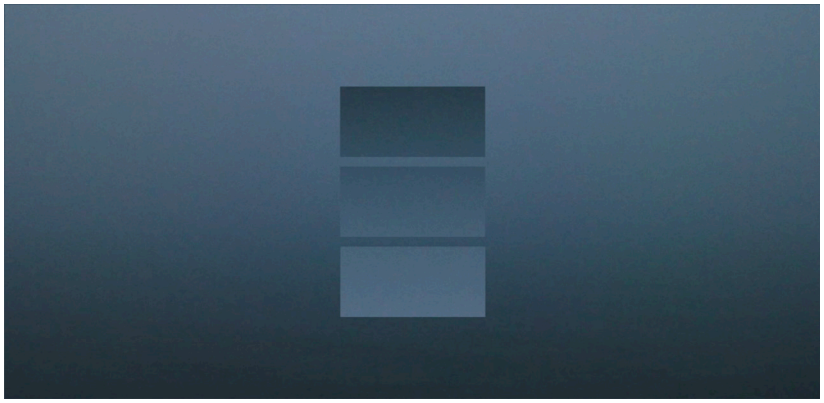
The touchscreen design is a parody of the touchscreen system employed by the Diebold Accuvote, a voting system that is difficult to audit and susceptible to hacking. The parody continues into the format of the installation itself which will resemble a polling station. The interactive graphic user interface is also a reference to musical devices such as the Roland TR 808 and other drum-machines and electronic musical instruments.

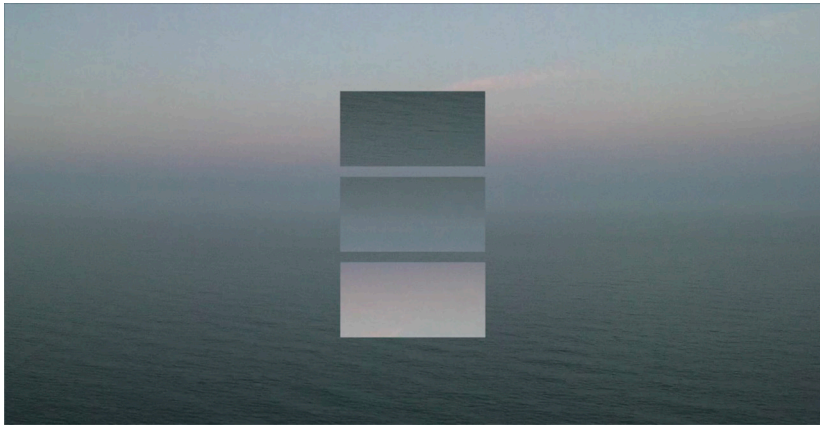
Diebold Accuvote TS voting booths, iPad, iMac, custom software, wood.

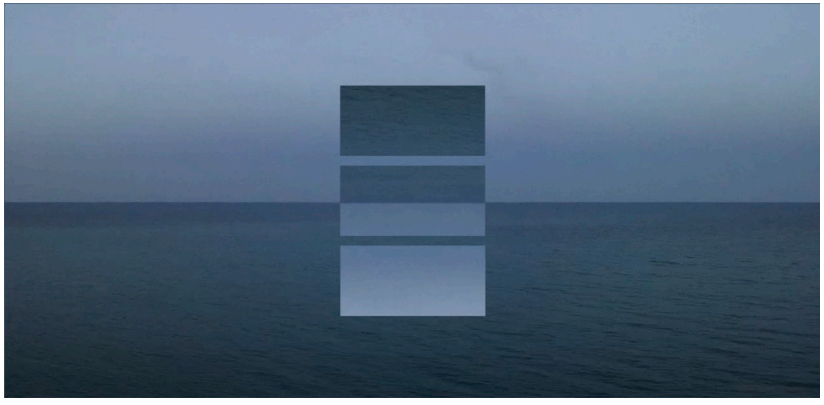
Leander

Lawton Hall, Chair Company

Leander is an experimental film that sonifies color data to generate its musical soundtrack. The colors of Lake Michigan, captured in time lapse video, constitute ever-changing probability vectors that govern the behavior of musical sound-events over time. This stochastic, or probabilistic approach to data sonification imagines the musical experience as movement through a virtual possibility space, rather than the end result of a causal process. Created in 2020 using Processing and SuperCollider.



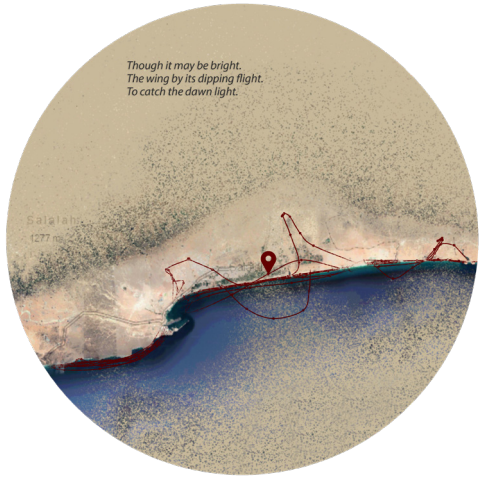


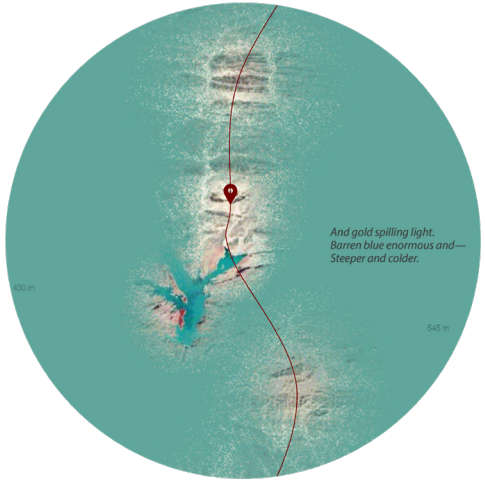


Omana's Seven Days in April

Rebecca Ruige Xu, Syracuse University
Sean Hongsheng Zhai, Deep Orange Data, LLC

This project translates a bird's migration journey from South Arabian Peninsula to North Asia into a series of map images in traditional East Asian landscape painting style with haiku poems generated from the flying and environmental data. Omana is a juvenile Heuglin's gull, who flew an impressive 2890 miles in seven days in April 2020. This non-stop flight was recorded by the satellite tracker Omana wears, and visualized as artworks bearing the geographical information, in which immeasurable distances were conveyed through the use of blurred outlines, mountain contours disappearing into the mist, and impressionistic treatment of natural phenomena. The accompanying haiku is also computationally generated based on the data collected, where the three lines are linked to the three principles of ancient philosophy: heaven, earth, and human being, to express the view of how human life and society could be integrated with the order of the natural world.





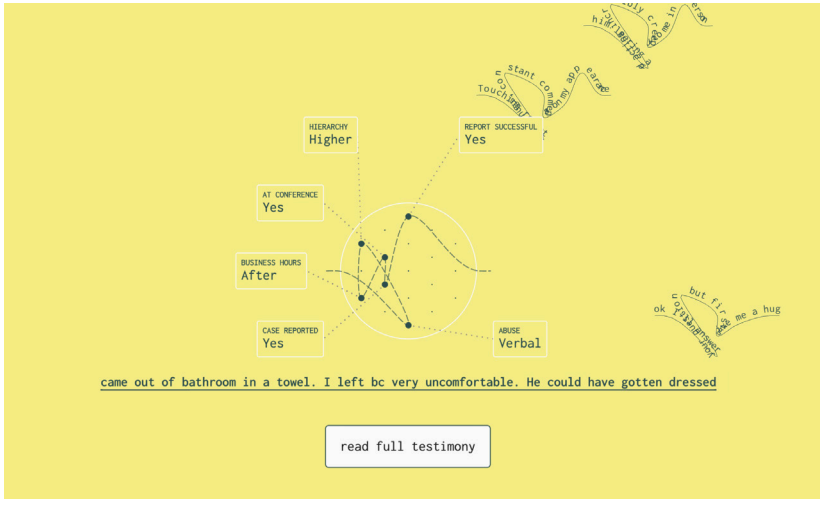
Software: Python, Textblob, CMUdict, Folium, QGIS, threejs
Tracker: Debut, Dimensions: 16 x 16 inches

The Academia is Tied in Knots

Adam Bailey, Ontario Tech University
Christopher Collins, Ontario Tech University
Tommaso Elli, Design at Politecnico di Milano
Zachary Hills, Ontario Tech University
Uta Hinriches, University of St Andrews
Karen Kelsky, The Professor Is In

“The Academia is Tied in Knots” is an interactive visualization based on personal stories reported by people who have experienced sexual harassment in academia. The aim of this visualization is to give visibility to these highly personal testimonials in a way that is both sensitive and empowering. With our visualization we aim to raise empathy and reflection on this and related ongoing issues in Academia. Influenced by the feelings of reading the aforementioned stories, we designed and implemented a custom visual model that depicts individual voices as knots of text shaped based on the content and character of testimonials. “To have a knot in the stomach” is indeed a colloquialism used to depict disheartening feelings that also appears in the survey. Our project is built around this visual metaphor, used to connect the visual display of data with the feelings of the people behind it.

Software. Web application made with D3js, PIXIjs, ReactJS



The Gaze: The Machine without Eyes

James Hughes, University of Utah in Salt Lake City
Ha Na Lee, University of Utah in Salt Lake City

The Gaze: The Machine without Eyes is an audio-visual artwork exploring conceptual issues around ‘the border’ - race, identity, the political geography of surveillance, and manifestations of power. The piece is composed of three intertwined elements: surveillance camera footage, stories generated by artificial intelligence, and headshot footage of silhouettes of Asian people. The pandemic is amplifying our exposure and engagement with social media and bombarding us with video and images from mobile phones. Incidences of racism and xenophobia - reinforced by the political narrative around the origins of COVID-19 - are spilling into the streets to be captured by the ubiquity of cameras. The intersection of AI, surveillance footage, and human performers is an investigation into complex systems, streaming data, and visualization as storytelling. The piece attempts to engage a moment in history.

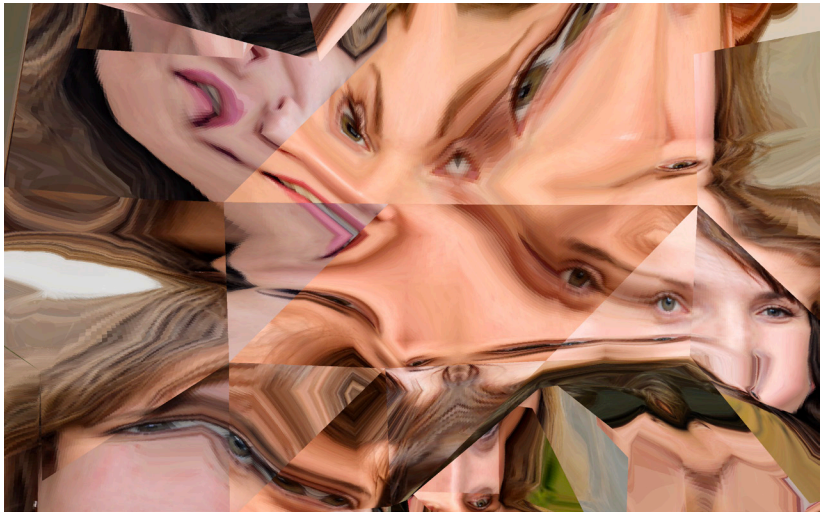
Experimental audio-visual with Surveillance video and generative storytelling
Material: Neural Storyteller, Python and video editing software

Uncertain Facing

Sihwa Park, Media Arts and Technology at the
University of California, Santa Barbara

Uncertain Facing is a data-driven, interactive audiovisual installation that aims to represent the uncertainty of data points of which their positions in 3D space are estimated by machine learning (ML) techniques. Uncertain Facing visualizes the real-time clustering of fake faces in 3D space through t-SNE, a non-linear dimensionality reduction technique, with face embeddings of the faces. However, unlike the original purpose of t-SNE that is for objective data exploration, it represents data points as metaballs making two or more faces a merged face when they are close, to reflect the uncertain, probabilistic nature of data locations the algorithm yields. Uncertain Facing also sonifies the change of the overall data distribution in 3D space. Uncertain Facing allows the audience to take a picture of their face as new data and to find their face being merged with similar fake faces, raising concerns about the unintended use of ML with synthetic/fake data.

Material: Software: custom software written in C++, Python, and Javascript,Hardware:iPad, Others-fake face images pre-generated from StyleGAN2 a pre-trained FaceNet model



Unfinished Farewell

Jiabao Li, Apple

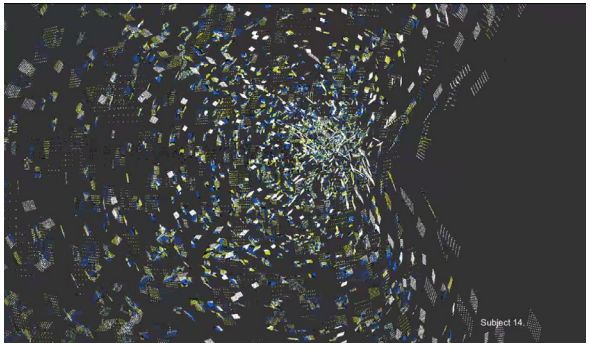
As COVID-19 spreads across the globe and death numbers continue to rise, the heartbreaking experiences are being replaced by collective mourning. “The death of one man is a tragedy, the death of millions is a statistic”.When we look back at the help-seeking posts of those lost, those who waited to die because of unconfirmed testing; those who committed suicide out of despair; those non-COVID patients whose life-saving medical treatment was foregone... None of them were included in the death toll, and are likely to be forgotten over time.

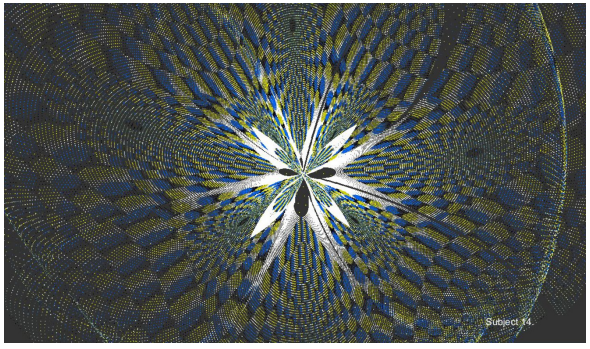
http://www.jiabaoli.org/covid19

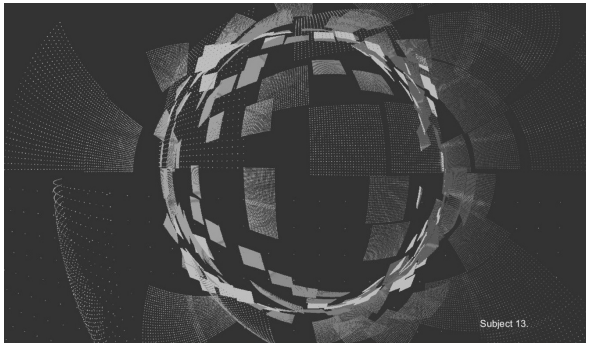
Visum: beyond the physical eye

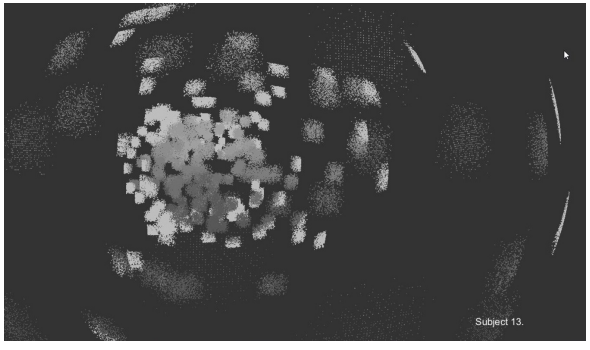
Lena Mathew, University of California, Santa Barbara

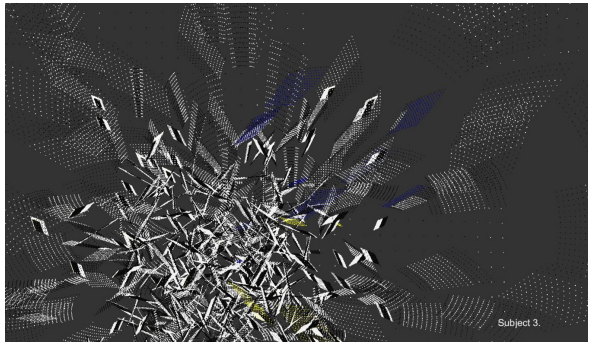
Visum is a data-driven audio/visual artwork based on Visual Evoked Potential (VEP), triggered by optical illusions. A VEP is an electrical potential, that is, a specific brainwave pattern captured from a specific area of the human brain following the presentation of a visual stimulus. This artwork sets out to transform VEP data into sonic output allowing audience members to listen to brain sounds that they may not normally be aware of.

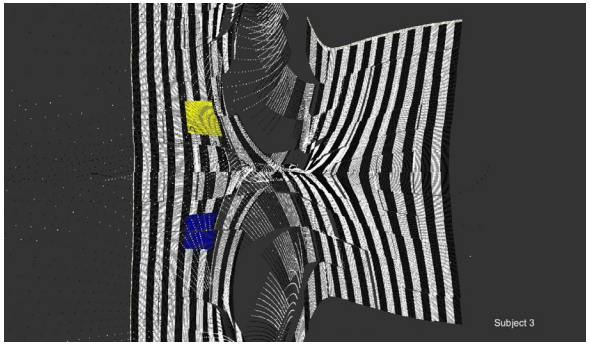










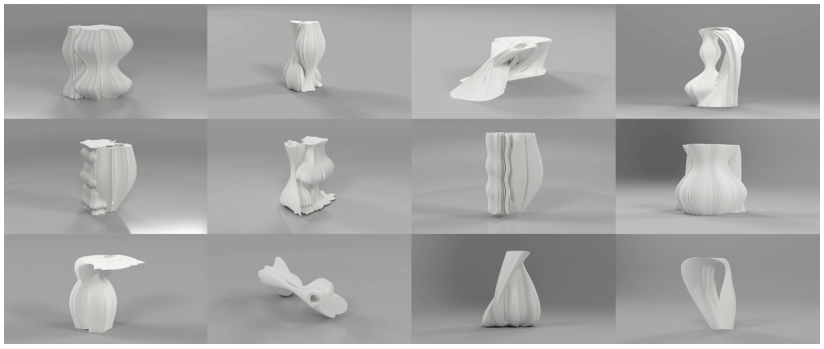


Volume of Voids

Weidi Zhang, University of California, Santa Barbara

Volume of Voids is a set of generative artifacts that represent the volume of the voids between objects and human bodies. Inspired by the current COVID-19 pandemic situation, people are keeping social distancing to overcome the invisible enemy - Coronavirus. It influences the way people live, communicate, and social in a profound way.When people keep the distance from objects and other people, what is the volume of voids between them?

This project incorporates the techniques of photogrammetry, algorithmic design, and 3d printing. The organic artifacts are not only a poetic representation of the invisible border between people, but also a critical response to the transformation of human networking under a historical pandemic. The volume of voids aims to provide a collective feeling of alienation between different beings.



Data-driven 3D printed artifacts, each object is approximately 150x150x200 mm

Concept & Direction: Jiabao Li, Laobai Wu Design: Jiabao Li
Development: Wenying Wu, Min Zhu, Amo Sound: Lu Wang (dk)

Program

Online Exhibition

Online Opening Reception
Tuesday, October 27, 2pm-3:15pm

Schedule:
2:00pm Introductory remarks
2:10pm VISAP Fast-Forward artwork previews + website walkthrough
2:20pm Three Artist Performances (Performance artists: Mike Richison, Lena Mathew, Weidi Zhang, Donghao Ren)
2:45pm Q&A with artists and performers

Papers and Pictorials

Session 1
Wednesday, October 28, 8:00 am-9:30am, Online

Representation Matters: Mapping Gender and Sexuality on Twitter (Keynote)
Sarah Sinwell

HeartBees: Visualizing Crowd Affects (Paper)
Chao Ying Qin, Marios Constantinides, Luca Maria Aiello, Daniele Quercia

Tsuga Convictio: Visualizing for the ecological, feminine, and embodied (Paper)
Cathryn A Ploehn, Molly Wright, Daragh Byrne

Infranet: A Geospatial Data-Driven Neuro-Evolutionary Artwork (Paper)
Graham Wakefield, Haru Hyunkyung Ji

Live Q&A for Papers and Keynote

Invited artist talks: Hannah E. Wolfe, Sölen Kiratli, Alex John Bundy, Weidi Zhang, Jiabao Li

Live Q&A for Artist Talks

Session 2
Thursday, October 29, 8:00 am-9:30am, Online

Printmaking, Puzzles, and Studio Closets: Using Artistic Metaphors to Reimagine the User Interface for Designing Immersive Visualizations (Paper)
Bridger Herman, Francesca Samsel, Annie Bares, Seth A Johnson, Dr Greg Abram, Daniel F. Keefe

Tied in Knots. A Case Study on Anthropographic Data Visualization About Sexual Harassment in the Academy (Pictorial)
Tommaso Elli, Adam James Bradley, Christopher Collins, Uta Hinrichs, Zachary Hills, Karen Kelsky

Leander: Navigating musical possibility space through color data sonification (Pictorial)
Lawton Hall

Live Q&A for Papers and Keynote

Invited artist talks: Rebecca Xu, Ha Na Lee

Live Q&A for Artist Talks

Papers

HeartBees: Visualizing Crowd Affects
Chao Ying Qin, Marios Constantinides, Luca Maria Aiello, Daniele Quercia

Affective sharing within groups strengthens coordination and empathy, leads to better health outcomes, and increases productivity and performance. Existing tools for affective sharing face one main challenge: creating a representation of collective emotional states that is relatable and universally accessible. To overcome this challenge, we propose HeartBees, a bio-feedback system for visualizing collective emotional states, which maps a multi-dimensional emotion model into a metaphorical visualization of flocks of birds. Grounded on Affective Computing literature and physiological sensing, we mapped physiolgical indicators that could be obtained from wearable devices into a multi-dimensional emotion model, which, in turn, our HeartBees can make use of. We evaluated our nature-inspired interactive system with 353 online participants, whose responses showed good consensus in the way they subjectively perceived the visualizations. Last, we discuss practical applications of HeartBees.

Tsuga Convictio: Visualizing for the ecological, feminine, and embodied
Cathryn A Ploehn, Molly Wright, Daragh Byrne

A good data visualization opens up space for good conversations. That is, a data visualization is a starting point in a discussion of a shared understanding of the world, a way for us to know together. Consequently, our practices as data visualization designers—through collecting data and portraying them visually—create (or reinforce) ways we can understand the world, and thus move through it—it's ontological. Alarmingly, there is an emerging sense among new media artists and scholars that our practices of collecting and visualizing data can create rigid, harmful understandings of the world; ontologies of control. In particular, D'Ignazio and Klein argue in their book, Data Feminism, that our current practices of data science can lead to the "silencing, extraction, monetization, or invisibility" of people (or other living things) that the data represent [9]. In response to this violence, they assert that we need to make visible those who are creating the data, and those who are represented by the data. In other words, we need to "bring back the bodies." This research interrogates how we might recenter the embodied, situated nature of data through the design of Tsuga Convictio, an experimental data collection process and a data visualization to support the conversations critical to our future—the reflective community conversations that help us belong to our human and ecological communities. By designing for these conversations, we discovered fluid, feminine, and embodied ways to create—and (re)enchant data visualizations. Along the way, we begin to answer some of the fundamental questions designers implicitly (and explicitly) answer when they make data visualizations. Most profoundly, we (re)imagine what visualizations can do—data visualizations are more than just tools of control; they are tools for imagination and transformation.

Printmaking, Puzzles, and Studio Closets: Using Artistic Metaphors to Reimagine the User Interface for Designing Immersive Visualizations
Bridger Herman, Francesca Samsel, Annie Bares, Seth A Johnson, Dr Greg Abram, Daniel F. Keefe

We, as a society, need artists to help us interpret and explain science, but what does an artist's studio look like when today's science is built upon the language of large, increasingly complex data? This paper presents a data visualization design interface that lifts the barriers for artists to engage with actively studied, 3D multivariate datasets. To accomplish this, the interface must weave together the need for creative artistic processes and the challenging constraints of real-time, data-driven 3D computer graphics. The result is an interface for a technical process, but technical in the way artistic printmaking is technical, not in the sense of computer scripting and programming. Using metaphor, computer graphics algorithms and shader program parameters are reimagined as tools in an artist's printmaking studio. These artistic metaphors and language are merged with a puzzle-piece approach to visual programming and matching iconography. Finally, artists access the interface using a web browser, making it possible to design immersive multivariate data visualizations that can be displayed in VR and AR environments using familiar drawing tablets and touch screens. We report on insights from the interdisciplinary design of the interface and early feedback from artists.

Pictorials

Tied in Knots. A Case Study on Anthropographic Data Visualization About Sexual Harassment in the Academy

Tommaso Elli, Adam James Bradley, Christopher Collins, Uta Hinrichs, Zachary Hills, Karen Kelsky

With this pictorial we present the design process of “The Academia is Tied in Knots”, an interactive visualization based on sensitive and qualitative data, namely personal stories reported by people who have experienced sexual harassment in academia. We discuss how we approached the task of visualizing sensitive, uncomfortable, yet important topics in terms of data-mapping and visual representation, including the appropriateness of computational vs. manual approaches to help foreground relevant themes. We also describe the design process behind the visualization and we discuss it from a feminist data visualization perspective.

Leander: Navigating musical possibility space through color data sonification

Lawton Hall

Leander is an experimental film that sonifies color data to generate its musical soundtrack. The colors of Lake Michigan, captured in time lapse video, constitute ever-changing probability vectors that govern the behavior of musical sound-events over time. This stochastic, or probabilistic approach to data sonification imagines the musical experience as movement through a virtual possibility space, rather than the end result of a causal process. This pictorial describes how color data guides the various musical parameters at play in Leander through weighted chance.