

EXHIBITION | PERFORMANCES

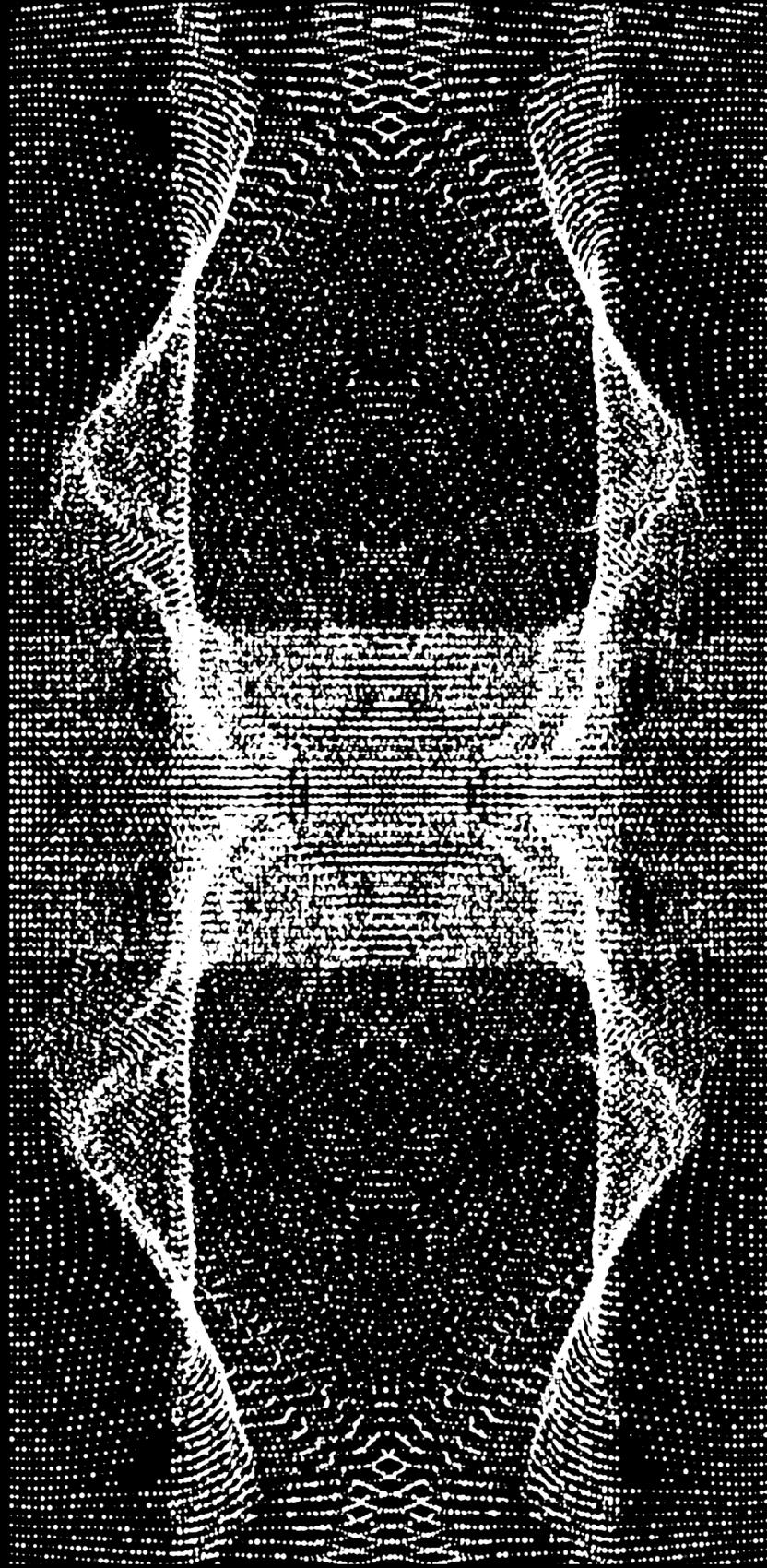
Friday · June 7th · 5 PM – 9 PM

Media · Art · Design · Engineering [at] UCSB

Website :: show.mat.ucsb.edu

Media Arts and Technology Program

California NanoSystems Institute (CNSI), UCSB



·M.A.D.E·

**MEDIA ARTS AND TECHNOLOGY <MAT>
AT UCSB**

is a transdisciplinary graduate program that fuses emergent media, computer science, engineering, electronic music, digital arts & design research, practice, production, and theory. The program resides both in the UCSB College of Engineering and the Humanities and Fine Arts division of the UCSB College of Letters and Science.

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<INTRODUCTION>

MADE [at] UCSB is the Media Arts and Technology Program's (MAT) End of Year Show at the University of California, Santa Barbara. Showcasing graduate student work that connects media art, design and engineering, MADE [at] UCSB represents the mission of MAT: to enable the creation of hybrid work that informs both scientific and aesthetic discourses.

The exhibition features over 50 installations, performances, concerts, and technical presentations by artists, scientists, and engineers from the MAT community and beyond. A diverse selection of work spans themes such as virtual reality, robotics, quantum physics, machine learning, electronic music and many other transdisciplinary subjects.

This year, two special tracks present work at the cutting edge of art and engineering: the *Artificial Intelligence* special track, curated by Fabian Offert, investigates the recent intersection of machine learning and the arts. The *Fabrication* special track, curated by Mark Hirsch, features new modes of fabrication with novel materials and machines. The exhibition also offers the opportunity to tour the AlloSphere: a three story, large-scale, audio and visual immersive instrument and laboratory.

As a pre-opening event on Thursday, MADE [at] UCSB is proud to present a guest lecture by Meredith Hoy (ASU), and a special panel discussion on *The Future of 1994: 25 Years of Second Wave Media Art*, featuring MAT Faculty and invited guests. Opening remarks will be given by department chair, Professor Marko Peljhan, who is currently representing Slovenia at the 58th Venice Biennale.



airMorphologies by Yin Yu

<MARK HIRSCH: EXPERIMENTS IN MATTER>

Fabrication - as a concept, practice, and technology - is an inextricable part of the media arts story. The desire for poiesis, for engineered tools to bring novel objects into existence, is a thread that can be traced from moments like the Experiments in Art and Technology (E.A.T.) of the mid 20th century to current practices in computational sculpture, 3D printing, soft robotics, and architecture. Today, the ubiquity of digital fabrication endows programs like Media Arts & Technology with as many 3D printers as 2D printers, if not more. While these tools have been a great boon for the democratization of fabrication for artists, they also encourage a type of uniformity that inevitably arises from a process monopolized by one system or method - in this case the FDM (fused deposition modeling) printer and its associated workflow: CAD modeling followed by layer slicing.

What then, in the context of media art, are the trends breaking this uniformity? In the context of MADE [at] UCSB, three trends in particular are represented in this body of work: unconventional materials, methods, and interactions.

<MATERIALS>

Fused plastics have proven their worth in layer-based deposition for countless iterations of 3D printer design. Through these iterations, the material properties of these fused plastics have been well characterized and utilized. Yet, all materials, to varying extents, dictate the forms that can be created with them - material constraints inform design constraints.

What affordances might unconventional fabrication materials promote in the design process? MADE [at] UCSB highlights two instances in which new forms are made possible by unconventional material choice. In *Biometric Visceral Interface*, Mengyu Chen and Jing Yan explore soft materials with low moduli to be utilized on the human body and create wearable devices that interact with the skin for the purpose of biometric data visceralization and affective interpersonal communication. They design a soft pneumatic choker structure, made from silicon based high performance rubbers, that is worn on the neck. The choker inflates and deflates based on air flow changes. In a second example, Mark Hirsch and his collaborators explore rapid, deposition-based 3D printing through the use of sodium acetate crystals in *Sodium Acetate Printing*. Non-toxic and inexpensive, these crystals can combine with water to create a supersaturated solution that crystallizes immediately upon contact with other sodium acetate in its crystallized form. The combination of crystallized bonds and lightweight component materials allows for the creation of structures, such as unsupported overhangs, that would be difficult or impossible to achieve with conventional deposition-based printing systems.

<METHODS>

Sometimes new approaches to fabrication are brought about by reimagining methods of the past. In their respective practices, Juan Manuel Escalante and Mengjia Zhu re-contextualize established fabrication methods. Escalante's *Diagrammatics (Making-Of)* highlights the way traditional fabrication methods (in this case carpentry in the wood shop) can situate a modern practice. The diagrams and behind-the-scenes video documenting the fabrication process of the exhibition suggests a relationship between manual practice and abstract ideas that is evolving, where one challenges the other and fosters a space for the immaterial to become material and vice-versa.



Zhu's fluidic fabric muscle sheets (FFMS) (*PenBall*) are composite fabric structures that integrate fluidic transmissions based on arrays of elastic tubes. These sheet-like actuators can strain, squeeze, bend, and conform to hard or soft objects of arbitrary shapes or sizes, including the human body.

Gustavo A. Rincon Jr.'s work also engages with established practices, but in a new light. *Ethereal - Blue Atom Sculpture* utilizes professional fabrication services to render dynamic forms into single-state structures.

<INTERACTIONS>

Digital fabrication is dominated by a conventional workflow in which a user designs an object in software, generates machine code to control the fabrication process, and waits for the results of fabrication to complete. MADE [at] UCSB exhibits work that expands the user-interface paradigm in digital fabrication by augmenting or replacing steps in the conventional workflow with processes that are more interactive, collaborative, and conducive to creative practice.

Tim Wood's *kinetrope:roots* situates the design interface of digital fabrication in an embodied and interactive experience. Central to this work is the question: "How does the body's movement leave traces of life, energy, sustenance in space?" To explore this, Wood creates an interactive system that connects the body's movement via motion tracking depth camera to a virtual world of growing root like plants.

Mark Hirsch takes a different approach to fostering interactive experiences in digital fabrication. The interface for *Sodium Acetate Printing* creates an environment that is intuitive, responsive, and provides a balance between direct manipulation and abstraction. To do so, the system employs a familiar sketch-based user-interface capable of abstracting 2D input gestures to 3D features. The rapid crystallization of the sodium acetate allows users to design and fabricate simultaneously in a 2D drawing scenario where input gestures on the tablet are mapped directly to the build area as well as abstracted to 3D dimensional parameters such as feature height based. The immediate response from the machine to drawn input creates a sketch-based approach to the construction of 3D forms. For creative practitioners, such as designers and artists, the familiarity of drawing makes for an expressive mode to explore interactive 3D fabrication in a way that is, as Golan Levin puts it, instantly knowable and indefinitely masterable.

Microsonic Landscapes, created by Juan Manuel Escalante, finally reimagines the fabrication workflow by replacing the generation of form through a prescribed geometry with a mapping of audio data to physical space. This conversion of sound to space can be traced in the resulting sculptures' radial form. The first track of each album can be located at the sculpture's center. From that point, the pieces starts to grow until the final track is placed on the outer ring.

<WORKS>

<JUAN MANUEL ESCALANTE>

Diagrammatics (Making-of) *1
Installation
2nd floor

A collection of never-seen-before sketches and scale models produced for the *Diagrammatics* exhibition at the Glass Box Gallery in 2018 (Art Department, UCSB). A 10-minute video shows the fabrication process for the exhibition's museography. It was recorded at different locations throughout the UCSB campus, including the Art Department's woodshop, the California NanoSystems Institute and San Clemente Villages Graduate Housing. The video features an electronic soundtrack composed with modular synthesizers. Special thanks to: Michael Matheson and The Systemics Public Program.

<MARK HIRSCH,
YON VISELL,
JENNIFER JACOBS>

Sodium Acetate Printing *2
Installation
2nd floor

Digital fabrication is dominated by a conventional workflow in which a user designs an object in software, generates machine code to control the fabrication process, and waits for the results of fabrication to complete. Recent work in the digital fabrication domain seeks to augment or replace steps in this workflow with processes that are more interactive, collaborative, and conducive to creative practice. This shift in the fabrication workflow gives rise to the challenge of creating an interactive environment that is intuitive, responsive, and provides a balance between direct manipulation and abstraction.

Sodium Acetate Printing addresses this challenge by creating a fabrication ecosystem in which rapidly-curing materials enable a familiar sketch-based user-interface that is intuitive, immediate, and capable of abstracting 2D input gestures to 3D features. In this system, a solution of sodium acetate and water is deposited from the end-effector of a robotic arm where, upon impact, it crystallizes immediately - often in unsupported overhangs that are difficult for many other deposition-based processes. This rapid crystallization allows users to design and fabricate simultaneously in a 2D drawing scenario where input gestures on the tablet are mapped directly to the build area as well as abstracted to 3D dimensional parameters - such as feature height based on pen pressure. The immediate response from the machine to drawn input creates a sketch-based approach to the construction of 3D forms

<TIMOTHY WOOD>

kinetrope:roots *3
Sculpture
2nd floor

kinetrope:roots explores a connection between the living forces within the body and the creation of lifelike forces within the virtual. How does the body's movement leave traces of life, energy, sustenance in space? What does the presence of a virtual creature growing with our bodies offer

to our imagination and senses, in the feedback processes of conscious movement? How can these creature's life processes be designed in a way to support our own creative impulses in moving and healing? How can these dances, these duets, these choreographies be captured as artifacts, talismans, or objects of remembrance and ritual?

The imagination is a feedback soup of the senses painting new pictures of new sensations. What we imagine becomes real to our experience, opening new ways of being, moving, seeing, and knowing. In the process of moving and searching with the body, we discover sensations, feelings, thoughts, information, and memories. What can be learned while listening and imagining with the virtual kinetrope life forms? Do they support a new way of creating, seeing, feeling, and knowing through exploring movement with them? A record of this process, a trace of the ephemeral dance in growing, offers a crystallization of the experience, a world to be remembered, a world worth remembering.

kinetrope:roots is an interactive system that connects the body's movement via motion tracking depth cameras to a virtual world of growing root-like plant creatures. The history of movement in the space accumulates and attracts the growth of kinetrope branches which are then captured and exported as a frozen choreography of 3D form ready to be fabricated.

<JUAN MANUEL ESCALANTE>

Microsonic Landscapes *4
Sculpture
2nd floor

Microsonic Landscapes is an algorithmic, spatial exploration of four music albums. An algorithm written in Processing parses audio data into a radial 3D space. This three-dimensional information is then modeled and 3D printed using a Makerbot Replicator. The sculptures follow a radial order. The first track of each album can be located at the sculpture's center. From that point, the piece starts to grow until the final track is placed on the outer ring. The *Microsonic Landscapes* pieces have toured Seoul, Barcelona, London, Paris, Lima, Los Angeles, Mexico City. They are shown for the first time in Santa Barbara. The project is supported by the National Endowment for the Arts (FONCA, MX).

<MENGYU CHEN,
JING YAN>

Biometric Visceral Interface *5
Installation
2nd floor

The concept of a *Biometric Visceral Interface* originates in the search for an alternative to the visual presentation of biometric data. Departing from the habit brought about by the spectacular society of seeing and understanding, biometric visceral interfaces challenge common practices of communication based upon visual memory and quantified abstraction of biological phenomena. The aim of such interfaces is to extend human perception of body information beyond visual paradigm and semiotic objects. A set of biomorphic designs of soft robotic prosthetics is introduced here to define a new human-machine interface. We describe how a multi-sensory immersive system can reconstruct a user's body schema in virtual space and visceralize biometric data into the user's body as a new way to perceive the presence of others.



Microsonic Landscapes by Juan Manuel Escalante

<MENGJIA ZHU,
ELLIOT HAWKES,
YON VISELL>

PenPenBall *6
Prototype
2nd floor

PenPenBall is a computer game with integrated haptic feedback. It constitutes part of a research project on hydraulically actuated textiles that can be worn on the human body. These hydraulically actuated textiles are known as Fluidic Fabric Muscles Sheets (FFMS), which are biologically inspired soft robotic fluid-based actuators that mimic the functioning of muscles and tendons to produce strong forces. The game serves to demonstrate the integration of textile actuators as part of a human-computer mediated system and as an exploration of non-traditional haptic feedback for use in media applications, with potential application for virtual and augmented reality applications. Special thanks to Karl Yerkes for his programming assistance.

<GUSTAVO A. RINCON JR.>

Ethereal - Blue Atom Sculpture *7
Sculpture
2nd floor

This fabricated sculpture is a prototype for a larger series of works on the hydrogen-like atom, created in collaboration with JoAnn Kuchera-Morin, Andres Cabrera, and Kon Hyong Kim that explores the observation and analysis of quantum forms. Virtual form, fabricated matter and embodied information are realized through the compositional language of *Ethereal*. Through the work, the visitor is invited to touch the untouchable, to understand and know what is real but cannot be seen and to experience it; to truly experience immateriality as substance, form, and shape that is dynamic, transformative and truly alive, constantly changing but continually unchanged, the vibration of waveforms intermingling as one form, one shape one spirit, into a myriad of forms.



Lavin by Weidi Zhang and Jieliang Luo

<FABIAN OFFERT: EXHIBITIING AI ART>

On October 25th, 2018, a GAN-generated image created by the French collective Obvious, sold at Christie's for a price of \$ 432,500. A previous version had been sold to a private collector for a price of \$ 10,000 some weeks prior. This created a massive outrage within the AI art community, mainly because the image in question was generated using source code created and published by others. While at the present moment the legal implications of this are unclear, an extensive debate about the integrity of the transaction started to unfold and, at the moment of writing, is still ongoing. All this suggests that the notion of AI art is currently being re-negotiated between different stakeholders: established media artists (e.g. Pierre Huyghe), emerging media artists (e.g. Helena Sarin), computer scientists with artistic ambitions (e.g. Alexander Mordvintsev), established protagonists of the "art world" like Christie's, and finally investors, collectors, and people simply exploiting a blockchain-like money-making opportunity (Obvious). This negotiation takes place outside of any aesthetic considerations. The main discursive contribution of AI art, the question of machine creativity, is overwritten by the important but mundane question of attribution.

We could of course treat these issues as the growing pains of an emerging media art form that eventually will develop proper modes of authorship and monetization, much like video art had to find ways to reverse its own subversion of the art market by means of producing limited editions of technically un-limited works. We could also attribute them to what has been called "GANism" (François Chollet), the over-utilization of one specific technical approach (generative adversarial networks) by many AI art protagonists. I would like to suggest, however, that these issues point to a deeper structural problem that not only affects AI art but many media art forms: the problem of display. How can we exhibit AI art - and other media art forms - without imitating the modes of display of more established art forms, for instance by literally displaying a GAN-generated image in a golden frame.

One reason for the problem of display is a lack of critical vocabulary suited to describe the relation between complicated technical artifacts, for instance the relation between a computer and an image, or, more generally, the relation between a thing and another thing. Hence, recent philosophical frameworks addressing the object-object relation could be said to indirectly address the problem of display as well. Specifically, object-oriented ontologies, if we take them seriously and literally (and with a grain of salt), can serve as a speculative principle for exhibition design, notably for the design of AI art exhibitions. In particular, I think it is worthwhile to consider the notion of "alien phenomenology" that I take from Ian Bogost's practice-oriented flavor of object-oriented ontology. Bogost derives the concept of alien phenomenology from Thomas Nagel's idea of an "objective phenomenology", developed in his famous essay *What It's Like To Be a Bat*. The goal of an objective phenomenology, Nagel writes, would be to "describe, at least in part, the subjective character of experiences in a form comprehensible to beings incapable of having these experiences." The only way to accomplish that, Bogost adds, is by means of analogy: "The bat [regarding its ability to perceive the world by sonar] is like a submarine." This is, of course, the easy way out. The analogy conveniently releases us from the burden to think the unthinkable by letting the trope do the heavy lifting. We are reminded of the fact that, as Andrew Cole says, we might just as well "consult [our] local analytic philosopher, who will tell [us] that metaphysical mistakes are mistakes in natural languages."

I would like to argue, however, that the analogical approach simply does not go far enough. That it does have merit if we approach the concept of analogy from a more technical perspective, a perspective more appropriate for our object of interest, the computer. The goal would be an alien phenomenology which is alien in the Brechtian sense, a defamiliarized, technical perspective which nevertheless has something to say about both itself and the real world. In fact, the latent space sampled by a generative adversarial network could be described as an analogical space where the produced literal images are also analogical "images" which, as a set, constitute an analogy of the machine's perspective on the world. Unlike in the analogy "the bat is like a submarine," instead of shifting all the complexity to the trope, a multitude of images empirically approximates the machine's perspective on the world.

For AI art this suggests that we have to embrace the latent space: a work of AI art, through the lens of alien phenomenology, can only consist of the entirety of a latent space, of all the images we can produce from such a space: hundreds and thousands of images, interesting images, boring images, mode-collapse images, adversarial images - all of them. In other words: exhibiting AI art, or more precisely, solving the problem of display for AI art would mean finding a practical way of exhibiting entire latent



Modern Art Latent Space by Fabian Offert

spaces to make tangible the machine's perspective on the world and thus raise the question of machine creativity. A side effect of this approach will be exactly the impossibility to repeat the Christie's scandal. If we can push the curatorial consensus that single samples from a latent space are not equivalent to a work of AI art, passing those samples as proper aesthetic artifacts will be, if not impossible, then at least much harder.

This is why the Artificial Intelligence special track within the MADE [at] UCSB exhibition showcases recent, contemporary work that goes beyond samples from latent space. Its interactive installations, virtual environments, and novel methods point to an emerging AI art practice that is much broader than portrayed by the media, and much more technically complex than recent AI art exhibitions (for instance the 2019 show at the Barbican in London) suggest.

Mark Hirsch, in *3.34*, for instance, treats material as images and vice versa. His computer driven robot operates on matter according to machine learning principles, and produces immediate effects in the real world. Fabian Offert, in *Modern Art Latent Space*, presents a recent GAN architecture trained on the collection of the Museum of Modern Art (MoMA) in New York, which not only generates appealing new proposals for the MoMA collection but also shows the potential of GANs as a method of dataset exploration by capturing the essential formal features of a collection. Gregory Reardon's *Shell* takes this potential even further by operating on a completely synthetic dataset of abstract mathematical forms, exploring the discovery of mathematical relations through latent space images. Mengyu Chen, Mert Toka, and Anshul Pendse utilize both reinforcement learning and GANs in their combined immersive environments *GANesis* and *Eccentric Nature* to bring the visitor even closer to the machine's perspective on the world by taking its place for a while. Weidi Zhang and Rodger Luo, on the other hand, explore the necessarily limited nature of this machinic perspective in *Lavin*, by constantly re-interpreting the visitor's surroundings in terms of a neural network's knowledge of the world: the world in 100 daily objects. Jungah Son presents a potential artistic use of style transfer, a machine learning algorithm used to date almost exclusively to "van gogh" family photos, i.e. transfer well-known styles to less-than-artistic images. Finally Ehsan Sayyad, in *Deep Dive*, explores the reconstruction of depth from single images using artificial neural networks trained on synthetic data, potentially enabling the virtual reconstruction of memories from photos. The limited machinic perspective on the world is put to use for the exploration of a similarly unknown territory: one's own past.

<WORKS>

<MARK HIRSCH>

3.34 *8
Installation
2nd floor

"Accidental are the features which are due to a particular way of producing the propositional sign. Essential are those which alone enable the proposition to express its sense [...] A particular method of symbolizing may be unimportant, but it is always important that this is a possible method of symbolizing. And this happens as a rule in philosophy: The single thing proves over and over again to be unimportant, but the possibility of every single thing reveals something about the nature of the world." Ludwig Wittgenstein, *Tractatus Logico-Philosophicus*, 3.34.

3.34 is an exploration into the space between explicit calculation and unforeseen emergence. Within a robotically actuated system of string-like agents, the end point of each agent is cast into a continuous, self-organizing steady-state. While the three-dimensional position of the end point is explicit, the algorithm is blind to the shape created by the remaining body of the agent. The resulting form is both an essential condition of the prescribed algorithm as well as an unexpected sculpting of passive agents. This tension between explicit control and accidental form invites a meditation on the relationship between logical calculation and unexpected consequences. To what extent are we blind to the auxiliary effects of decisions in our own lives? And what does it mean to be mindful of them and treat them with as much care as those explicit decisions we make every day?

<FABIAN OFFERT>

Modern Art Latent Space *9
Installation
2nd floor

Modern Art Latent Space is an interactive installation based on a generative adversarial network (StyleGAN) trained on approximately 50,000 images from the Museum of Modern Art, New York, collection. The network has picked up a wealth of features typical of modern art: photographs, sketches, abstract expressionist works, and cultural artifacts (such as album covers) all coexist in the same latent space. Interpolating between points in this space enables the production of novel, hybrid works of art that nevertheless have all the attributes of a MoMA-worthy piece. In the installation, the latent space of the network is traversed in real time, based on the movement of visitors in the immediate vicinity of the work.

<GREGORY REARDON>

Shell *10
Installation
2nd floor

In this work, a generative adversarial network (GAN) was trained on images generated from mathematical equations which define surfaces that exist in high-dimensional ambient spaces. Thousands of these surfaces, known as Fermat hypersurfaces, were produced and then projected into two-dimensional space in order to construct a dataset upon which the GAN was trained. *Shell* is an audiovisual projective piece that is concerned with investigating the

latent space generated by these images of projected Fermat hypersurfaces. It serves not only as an exploration into abstract mathematical spaces from which we can begin to gain an intuitive understanding of through visualization, but is also concerned with the form produced by these manifolds and how said form relates to our concepts of beauty and harmony. Audio is generated by sonifying the structural relations between constituent parts of the images. The work is self-sufficient; the latent space naturally unfolds without user input. Oculus Touch controllers are provided which allow for some limited control over the speed of movement through and location in the latent space with which users can interact.

<MENGYU CHEN, MERT TOKA>

GANesis *11
Environment
2nd floor: 2005

GANesis is an artificial intelligence mediated immersive space where all the visual forms and content are computed and generated in real time by a 3D generative adversarial network (3D-GAN). By training a generator capable of producing voxelized shapes and point clouds of plants, everyday objects, mathematical geometries, and human bodies, we are able to produce a fictional virtual environment filled by variations of abstract, natural, and artificial objects.

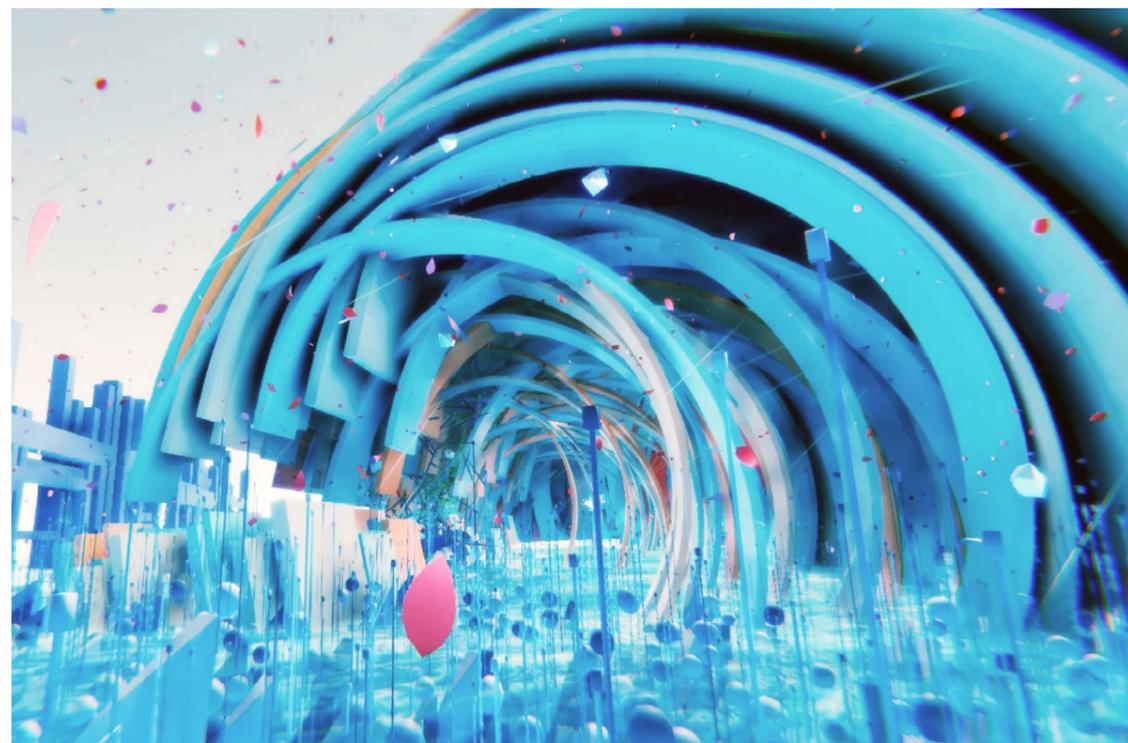
A GAN consists of two neural networks: a generator which produces synthetic data and a discriminator which is tasked with discriminating between the synthetic data produced by the generator and real data. The dataset we use to train the discriminator is curated to contain various types of objects that imply life forms. By doing this, we can let the generator create a metaphorical narrative as a perpetual machine that constantly tries to turn itself into a conscious being. At the same time, the visual narrative of *GANesis*, though partially defined by our methods of point cloud rendering and visualization, is frequently changing with no preset form, as all these generated artificial objects can interpolate from one type to another in the latent space learned by the generator and formulate new environments. The audience can thus navigate the borderless space, diving into the deep mind of artificial intelligence.

<MENGYU CHEN, ANSHUL PENDSE>

Eccentric Nature *12
Environment
2nd floor: 2005

Eccentric Nature is a multisensory immersive art installation that challenges our anthropocentric perception of reality by considering the viewpoints of networked entities such as micro-organisms, forests, marine life, cities, and artificial neural networks. Mediating and interpolating between the visions of different entities, *Eccentric Nature* searches for an alternative to the singular human perspective rooted in the Anthropocene.

This project starts with the exploration of two key terms: eccentricity and nature. Eccentricity describes a state of movement off from the central axis, and implies the tilted, imperfect, and sometimes turbulent geo-political climate that is constantly drawing unpredictable boundaries in our life. Its broken form, "eccentricity," denotes a collective state of being eccentric in the public domain, a culture that



Eccentric Nature by Mengyu Chen & Anshul Pendse

is deviating from the centripetal governing force.

Nature, on the other hand, provides a systemic and ecological perspective, questioning and examining the intra-activity among different biological species, artificial objects, emergent machines and humans. For the sake of better symbiosis, instead of leveraging and exploiting nature with power, we link ourselves with the entities beyond our perception, converse and empathize with them in a new sensational network.

Eccentric Nature, therefore, is about the creation of a state of being networked with other non-human entities. We create multi-level and multisensory immersive VR worlds to turn our audience into part of the emergent network. We use genetic algorithms and reinforcement learning to simulate behaviours of various artificial and biological species, such as microorganisms, forests, and AIs. The virtual worlds we are building blend and interpolate between each other, moving and shifting from one modality to another, and creating multisensory experiences.

<WEIDI ZHANG, JIELIANG LUO>

Lavin *13
Environment
2nd floor: 2611

This VR project is a conceptual response to the concept of "ground truth" in the AI age. From a neural network (NN) trained to recognize thousands of objects, to a NN that can only generate binary outputs, each NN, like a human being, has its own understanding of the real world. *Lavin* provides an immersive, responsive experience to

visually explore one understanding of a NN in which the real world is mapped to less than a hundred daily objects. Lavin constantly analyzes the real world via a camera and outputs semantic interpretations.

<JUNGAH SON>

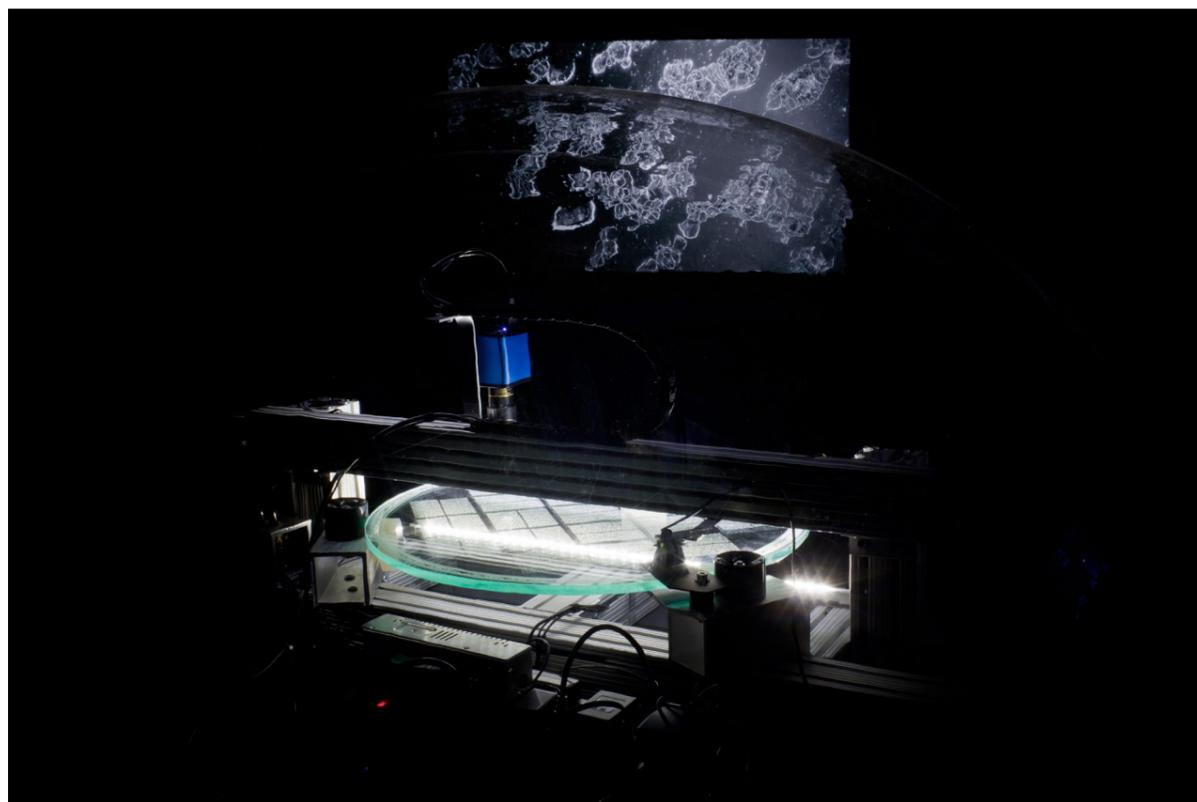
Style Transfer of Complex Images *14
Prototype
2nd floor: 2611

Style transfer is a machine learning technique for transferring the "style" of a source image onto a target image, while preserving the content of the target image. So far, existing applications are limited to images trivial in content and structure. In this project, we investigate how style transfer can be applied to images that contain more complex objects, such as George Legrady's *Urban Nature* series.

<EHSAN SAYYAD, TOBIAS HÖLLERER, PRADEEP SEN>

Deep Dive *15
Environment
3rd floor

Deep Dive is a set of experiments in predicting depth from a single image using deep neural networks. A randomized dataset of textured 3D scenes and corresponding surface structures is created in different styles and is used to train multiple convolutional neural networks. This piece exhibits the dataset, learning process, and final results in a 3D real-time experience.



Somnium, exhibited from 8 June –8 July 2017 at Kapelica Gallery in Ljubljana, Slovenia. The opening coincided with the international symposium "Earth Without Humans II" hosted by Kapelica Gallery. (Photo: © Miha Fras)

<GENERAL EXHIBITION>

<AARON ANDERSON>

Light Breeze
Installation
Outside Elings Hall *16

Small lights are distributed throughout the bamboo grove just outside of Elings Hall. Each light is wind-activated and operates independently; the stronger the force of wind on each bamboo plant, the brighter the attached light will shine. Through this limited agency, spatial gestures emerge as wind passes through the bamboo. This process makes visible the unseen force that causes the bamboo to dance at night.

<XINDI KANG>

Ring Modulation Visualizer (RMV)
Installation
1st floor *17

Sound can be visualized in a number of ways. It can be expressed in the time-domain, as a function of its amplitude over time, or in the frequency-domain, via a Fourier transform, as a function of its frequency and phase content. These forms of representation are typically used as analytical tools in the context of scientific inquiry. Ring Modulation Visualizer (RMV) is an audio-visual installation that allows the audience to interact with (ring-modulate) a waveform with their own voice through a microphone, and experience both the acoustic and visual results. The audience is encouraged by the visual feedback from the waveform and the audio feedback from the ring-modulation filter to produce more interesting results with their voice. With more experimenting, the audience can deduce certain patterns hidden in the algorithm of the visual pattern and gain control over them.

<OSCILLOSCOPE WORKS FROM THE 2019 VECTORHACK WORKSHOP>

1ST FLOOR *18

<SIHWA PARK>
Brand Logo Sonification

<YOU-JIN KIM AND ANZU KAWAZOE>
Physical Dimension Communicator (PDC)

<RODNEY DUPLESSIS>
Mysterium Cosmographicum

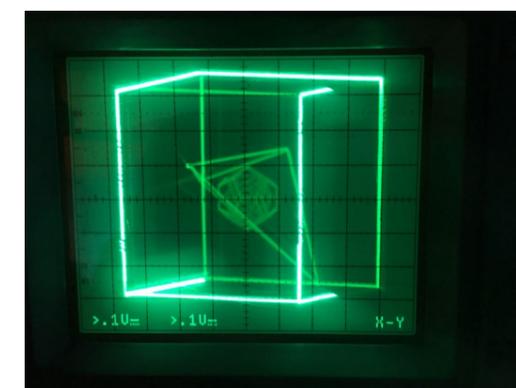
<AARON ANDERSON>

Embedded Surfaces
Installation
1st floor *19

Embedded Surfaces highlights and exaggerates the relationship of sound, time, and space. The immersent's search for appealing sonic gestures through movement within the space forms a dance, choreographed by human curiosity and the underlying system. In addition to an emphasis on the relationship of sound, time, and space, *Embedded Surfaces* offers an approach to translating high-dimensional math into a potentially more comprehensible form. Participants wear a SUBPAC (a subwoofer backpack)

and a 5 inch speaker on each hand. Spatial trackers are attached to each of these speakers. As participants move throughout a predefined space, a portion of a four-dimensional sound field is revealed. Each point in real 3D space has a unique timbre and movement through this space creates repeatable sonic gestures.

The four-dimensional soundfield is generated mathematically. Every audio sample is calculated in real-time using the real 3D position and a low-frequency signal generator (controlling position in a fourth dimension) as input. This signal is broadcasted through an FM transmitter and picked up wirelessly on the participant using an FM receiver. Due to the lightweight and relatively small preamplifier and speakers on the participant's hands, they are not capable of producing low frequency content. Low frequency content is therefore sent to the SUBPAC, allowing these missing low frequencies to be felt in lieu of being heard.



Mysterium Cosmographicum by Rodney Duplessis

<LASER WORKS FROM THE 2019 VECTORHACK WORKSHOP>

2ND FLOOR: FREIGHT ELEVATOR

<YIN YU> *20
Laser Architecture

<MERT TOKA>
Sonic Vectors

<YIN YU> *21

airMorphologies
Installation
2nd floor

Humans, as social beings, use language to communicate. The human voice, as a biometric authentication mechanism, is constantly used throughout daily life applications, such as speech recognition, speaker verification, and so on. Currently, language-based communications mainly fall into two categories: voice over air, and voice over internet protocol. Can we add a new dimension for voice communication such as a wearable material? If so, how could we shape matter in order to physicalize vocal information?

airMorphologies is an interactive installation that uses soft materials (such as silicon, fabric, and air) to realize these physicalizations. The human voice controls the actuation of a soft wearable structure, changing the appearance of the human body.

<ALEXIS STORY CRAWSHAW>

the bad news is that you previously missed the importance of this event

Installation/Performance *22
2nd floor

the bad news is that you previously missed the importance of this event is a series of imagined exhibition titles, generated in collaboration with a predictive keyboard through botnik.org. The predictive keyboard was fed a diet of the *New Media Reader*, aeronautical terminology, mathematical terminology, meteorological terminology, and a list of common animals. This semantic buffet was so curated to not only parody media art speak but to anticipate how a hypothetical, MAT-enmeshed David Bowie might source materials for the task of AI cut-up title-ogony. The composition of the words was constrained by the suggestions of the keyboard, but also benefited from a degree of human selection - an effort to adhere to some English grammatical norms, to pepper the titles with some of the more singular terms within the dataset, and to maximize the comic effect. Through the multi-format presentation of the project, this work invites meditation onto how and where meaning and narrative arise between the creative process and artistic exhibition/interpretation.

<MOON MOONS> *23

2ND FLOOR: 2615

TIM WOOD,
MERT TOKA,
ANSHUL PENSE,
DIARMID FLATLEY,
ALEXIS CRAWSHAW,
NATHAN WEITZNER,
WEIDI ZHANG,
CINDY KANG,
MENGYU CHEN,
GUSTAVO A. RINCON JR.,
AARON ANDERSON,
MARCOS NOVAK

This collaborative project is an immersive ritual and interactive performance that pilots participants on a composed spatiotemporal journey through a system of imagined multisensorial other-worlds. The artists employ a range of cutting-edge platforms and displays including VR, AR, vibrotactile wearables, spatial audio, and a robotic chair, in order to extend participants' sensoria to include somatosensation (through touch and kinaesthesia) as they explore the alien ambiances of each environment. Compositionally and thematically, this collection of worlds - a journey through the eclectic and composite mind of the transTEAM - explores ideas of liquid architectures, navigable music, worldmaking (in fact, fiction, and action), information aesthetics, the transvergence of poetics and rhetoric, and the thermodynamics of civilization.

<DATA VISUALIZATION EXPLORATIONS>

Installation *24
2nd floor: 2611

YOKO EBATA
Feng Shui Prevalence in the Seattle Public Library

SUSAN BURTNER
Multi-Layered Network of Map Collections at Seattle Public Library

YICHEN LI
Winter Blues

WILSON MUI
3D Checkout Duration Visualisation

CHANTAL NGUYEN
Food and Drink Words

SANDY SCHOETTLER
Checkout Changes by Weekday and Day of the Year

MEILIN SHI
Language Learning Interest at the Seattle Public Library

JIAHENG TANG
Most Popular Items by Checkouts 2006-2018 in the Seattle Public Library

SARAH WELLS
Exploration of the Sciences: Dewey Class 500

3D interactive data visualizations realized with Seattle Public Library data of the analysis of the circulation of books, movies and cds, a research project under the direction of George Legrady. Interactive menu presentation created by Tongji University visiting researcher Ye Lu.

JUNXIANG YAO
Visualizing Time-oriented Data in a Virtual Reality Environment

<ANZU KAWAZOE, YON VISELL> *25

Touch Echo - Tactile Painting
Installation
2nd floor

We present a wearable system for augmenting tactile interactions with objects. Similar to the auditory phenomena of echoes that are produced during speech inside a reverberant space, like a large cave, *Touch Echo* is a tactile display device concerned with capturing the signal generated during free-hand touch interactions and applying signal processing (e.g. delay, gain amplification, filtering, etc.) to said signals before returning them to the finger; this produces an echo effect. Using tactile echoes, we can expand the possibilities of tactile experience for virtual and augmented reality applications. The specific application being presented is known as *Tactile Painting*, which enables users to paint on a touch screen with traditional gestures such as tapping, sliding, and pressing. Through these gestures, multisensory feedback (i.e. tactile, audio, and visual) is generated. Using the *Touch Echo* system of touch signal capture and reproduction, we can produce a multitude of unique tactile signals which engage users and encourage them to interact with the touch screen and explore the space that composes that virtual application. In this sense, we augment the sensory experience of making art, a practice which is already deeply tactile, acoustic, and visual.

<WEIHAO QIU>

Abstracting Photographs with 2D-3D Conversion and Photorealistic Rendering
Prototype *26
2nd floor

<KIO GRIFFITH>

algorithm counter *27
Installation
2nd floor

algorithm counter is a "chance operation" machine formulating various matrices of words and language associations randomly arranged and contextualized by ascending and descending letters in flux. It is a language calculator, a stream of consciousness timer, and an interminable messaging billboard. The concept evolved from an idea of reading time and space by means of communication and translation. Translations are realized as cross-referential intertextualities of the Japanese *katakana* writing system, which is the stand-in phoneme for the roman alphabet and the actual roman alphabet. This work is also a process of shuffling information to find meaning. In a world of self journalism, in which documentation has become a daily activity of sharing texts and images, the general idea of "reading" has changed. Reinvention and newly invented languages, truncated communication techniques, the relative associations and the reading between the lines, faces, spaces and the air surrounding us - we continue to interrogate our positions.

<DANNY BAZO, MARKO PELJHAN, KARL YERKES>

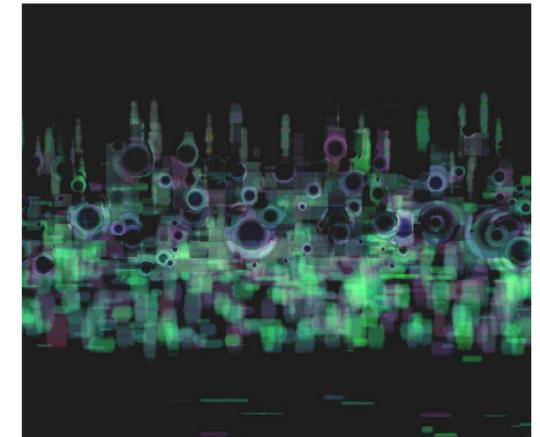
Somnium *28
Installation
2nd floor: 2003

Somnium is a robotic and audiovisual installation that provides visitors with the ability to contemplate and experience exoplanetary discoveries, their macro- and microdimensions and the potential for life in our galaxy. At the center of *Somnium* sits a round glass disc that has been laser etched with an image captured by the Kepler Space Telescope (KST). The image contains hundreds of thousands of stars. A robotic microscope slowly travels the surface of the disc, displaying the microscopic view to visitors using large-scale wall projections. The exact location of the microscope within the starfield is tracked and correlated with luminosity measurements taken by the KST. These measurements, called "light curves," are converted into sounds that immerse visitors in an ever-changing wash of audio corresponding to the stars they see projected around them.

<MERT TOKA, CINDY KANG, MENGJIA ZHU>

LuminTAG *29
Installation
2nd floor

When an artistic work is exhibited in a gallery environment, the interaction between the piece and the audience



Wavefront by Keehong Youn

becomes critically important. *LuminTAG* is specifically concerned with exploring the relation between audience and artistic work. We invert the traditional interaction paradigm: the audience becomes the artistic work and the artistic work becomes a passive observer. In the work, a placeholder object is placed on a pedestal and the audience is tracked through wearable LEDs, designed as a collar. Each collar contains a specially designed LED marker, that allows for the localization, identification, and pose estimation of the audience. The inherent illumination from the LED matrix on each collar provides ambient lighting to the placeholder object, and the interaction parameters feed an audio synthesizer that sonifies this whole process.

<MYUNGJIN LEE>

AlloCation *30
2nd floor: AlloSphere

<KEEHONG YOUN>

Wavefront *31
2nd floor: AlloSphere

<TIMOTHY WOOD>

Terrarium Environment *32
2nd floor: 2809

Terrarium is an interactive installation where viewers become immersed in a living virtual ecosystem. The ecosystem is a simulated environment consisting of growing trees, shifting earth, flowing wind fields, swarming insects, and other small creatures. Viewers can interact using their bodies where they may become a part of the landscape, as a tree, a rain cloud, the wind, or a swarm of bees.

The ecosystem evolves over time. Everything is connected through resources like water, carbon, oxygen, and nitrogen. Plants and animals are born, grow, die, and go through different stages of development and expression both visually and sonically. Time progresses through various seasons, temperature begins to shape the life and the weather. In the absence of water and other resources, life may become sparse and the landscape may begin

to resemble a desert biome. In the case of abundant resources, the landscape will become lush with abundant plant and animal life.

As visitors enter into the space of the world, their bodies are reflected as figures in the virtual world. Where they put their attention and how they move through space begins to affect the environment by shaping plants and animals through movement, or by generating resources to feed creatures in the world, or by becoming forces of nature like wind or weather systems that also shape the behavior of creatures. By being present with the world you change it.

<KEEHONG YOUN>

*33

Balanced Movement
2nd Floor: 2809

Balanced Movement is a visual experimentation on a stochastic process. Inspired by the work of Iannis Xenakis, it is an attempt at utilizing the dynamic equilibrium of a stochastic system for visual composition. A three by three matrix can constitute a Markov process, with each row of the matrix defining a transition probability from a given state to any of the other three states of the system. A single transition between states is a random process, but given a large number of transition events, a dynamic equilibrium emerges. When visualized, this produces a unique texture with different patterns at different scales. Given the dynamic nature of the system, the textures are constantly moving and changing. But, this occurs on the microscopic level, while the macroscopic behavior of the system retains a singular character, balanced by the hidden governing system.

<KON HYONG KIM, JOANN KUCHERA-MORIN, ANDRES CABRERA, GUSTAVO A. RINCON JR.>

*34

Etherial 0.9
Installation
2nd floor: 2809

Etherial 0.9 is a minor iteration of the artwork that is going to be showcased at ISEA 2019 in Gwangju, South Korea. It is based on the hydrogen-like atom. *Etherial* brings the quantum form into the material, through virtual reality, spatial augmented reality, and material form. The work consists of two windows into the virtual that will control the various visual/sonic quantum forms. Two controllers allow performers to sculpt quantum mechanics in real time in total synchrony with one another and the virtual environment.

<KON HYONG KIM>

*35

Fractal 3.1
Environment
2nd floor: AlloSphere

Fractal 3.1 is a real-time simulated artwork of deterministic fractal systems shown in 3D. Users can interact with the system using various devices, which allows them to easily create and transform deterministic

fractals that are rendered using ray-casting.

The artwork is based on the application of the same name, which was designed to allow artists to easily create deterministic fractals. Deterministic fractals, such as the Mandelbulb, Julia Sets and the Mandelbox, gained popularity in the late 2000's due to their ability to generate amazingly detailed structures from just a series of simple transformation algorithms. Due to the chaotic nature of fractals, even the smallest change in a parameter can result in a drastically different fractal landscape.

However, in order to interact with these fractals, one needs deep knowledge of the specific math in order to manipulate the algorithm to produce a desired form, and advanced programming knowledge of graphics hardware to generate such fractals in a timely matter due to their high computation cost. The system created in this work, aids the user by providing a structure that handles the graphics hardware so the user can focus on the algorithms, which the user can intuitively learn by exploring the application's interface. The backend system uses GLSL to achieve real-time ray-casting by allowing most of the required computation to run on the GPU, which takes advantage of the high parallelization inherent in the algorithm. By allowing the rendering to happen in real-time, the user can instantly see the new forms that arise from the parameter changes they make.

<KON HYONG KIM, STEVE TRETTEL, DENNIS ADDERTON>

*36

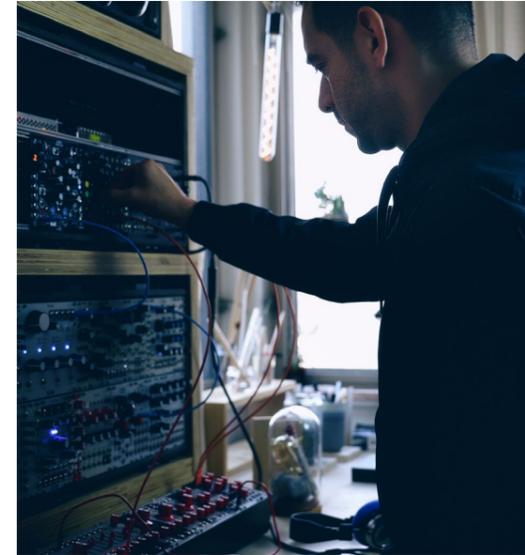
Three-Space
Environment
2nd floor: AlloSphere

The geometry of curved three dimensional spaces plays an important role in modern geometric topology. However, as the notion of "straight-line" becomes more complex when space itself curves, it becomes difficult to visualize these spaces. Instead, mathematicians typically sacrifice visual accuracy for computational simplicity and work in a highly distorted model of the space.

One of the chief difficulties of learning the mathematics of curved spaces is that they defy our intuition, intuition that was built out of day-to-day experiences in the flat space we live in. If we had access to an immersive, three dimensional environment which accurately modeled the curved space of interest we could retrain our intuition and hopefully refocus our mind on the properties and questions relevant to that world.

In *Three-Space*, we focus on producing perspective-correct models of the interior of the two simplest curved three dimensional spaces - the three dimensional sphere and hyperbolic space, using the AlloSphere. Immersive views of the Hopf fibration and the hyperbolic honeycomb are used as a demonstration of the experimental mathematics capability of the AlloSphere as well as showing the beauties of geometries relevant to the geometrization program, which led to the proof of the Poincaré Conjecture.

Immersive models for these spaces could not only act as an introduction to the beauties of high dimensional geometry but lead to some novel mathematical work, including the accurate modeling of the intrinsic geometry of the spaces known as Nil, Sol and SL(2,R).



<JUAN MANUEL ESCALANTE> *6PM & 8PM*

*37

Icarus
Performance
3rd floor: 3005

Icarus is a 15-minute piece inspired by the physics of flight, using electronic sounds. An array of different digital and analog devices will be used throughout the performance. A modular synthesizer (in the Eurorack format) will be used as the central instrument.

<JULIA DORNER, TOBIAS HÖLLERER>

*38

Tangible VR with Spherical Displays
Prototype
3rd floor

Displaying information on 2D rectangular screens is unnatural and limiting for humans. The interaction with a 2D screen via touch or a mouse is distinct from using and manipulating real objects. For various 3D data like panoramic photographs and 360 degree videos we require a better way for displaying this information. Virtual reality and curved or even spherical displays were developed to circumvent this problem. Museums, planetariums and artists use spherical displays to reach and educate people in public spaces. Due to its spherical shape continuous information can be displayed both vertically and horizontally which makes its content borderless but finite. This allows users to face each other and keep eye-contact while interacting with the display.

A drawback of spherical displays are that their construction costs increase the price of commercially available products. Virtual Reality offers a cheaper solution by simulating spherical displays, in lieu of building them. This introduces another issue though, as VR controllers are not built for tangible interaction by default. In this project, we created a design space to test different paradigms for interaction with a large spherical display. As a tangible sphere we used an acrylic glass ball with a VR Tracker mounted inside.

<SIHWA PARK>

*39

ARLooper
Environment
3rd floor

ARLooper is an AR-based mobile interface for multi-user sound recording and performance that aims to explore the possibilities of AR for the creation of novel musical interfaces and collaborative audiovisual experiences. *ARLooper* allows the user to record sound through microphones in mobile devices and, at the same time, visualizes and places recorded sounds as 3D waveforms in an AR space. The user can play, modify, and loop these recorded sounds with several audio filters attached to each sound. Since *ARLooper* employs ARKit's tracking technique called visual-inertial odometry to track the real world and a correspondence between real and AR spaces by combining information from camera sensor data with the device's motion sensor data, multiple users can connect to the same AR space in which recorded sounds are shared and can see each other's activities, such as selection and manipulation of sound waveforms.

<INTAE HWANG>

*40

Through the Eyes of a Painter
Environment
3rd Floor

Jeong Seon (1676-1759, 鄭勳, 정선) was one of the most innovative painters in Korean history. His attempts to directly observe nature and capture it in his paintings spawned the so-called "true-view" art movement (jingyeong, 眞景, 진경) that dominated in the late Joseon period (ca. 1700-1850). Despite its name, Seon's style was not only the result of realistic observation but also a considerable shift away from traditional painting subjects. Seon's methods for simulating Korean landscapes have been the subject of much debate, but most of the discussion surrounding his work has been evaluating the similarity between the paintings and their subjects. For this reason, Seon's unique perspective style has yet to be clearly defined. This project presents clear answers about Seon's extraordinary perspective skill based on computer graphical analysis.

<YOU-JIN KIM, TOBIAS HÖLLERER, MATTHEW TURK>

*41

Spatial Orchestra
Environment
3rd floor

Spatial Orchestra is a deeply immersive, augmented reality (AR) application for the Magic Leap headset that allows audiences to experience the wonder of an interactive spatial sound piece. Immersents explore a rich diversity of habitats composed of numerous augmented bubbles which consist of music notations. The augmented space becomes transformed into an instrument, where the augmented bubbles the viewer encounters and interacts with generate harmonious and orchestrated sound. All of this is in search of spatial exploration. Altering the spatial composition provides an interesting way for users to interact with space. This concept of registration and positioning, while simple, can be powerful as it taps into the user's pre-existing relationship with space. This is at the heart of *Spatial Orchestra*.

<CONCERT>

1ST FLOOR: 1601, 9PM

<TIMOTHY WOOD>

from the child
10'

This performance is a remembering, a return to playfulness, innocence, and joy of the child within. Through an improvised shaping, looping, and sculpting of voice and acoustic sounds captured live, I search for my own heart and let it become visible in the room. This is a practice of becoming transparent to myself and to the space. I hope to inspire others to feel the softness of becoming playful, while facing the challenges of any shadows that lurk in the past. There is a voice that claims our own power in relationship to our past and our present. There is a voice that claims the feelings to be felt, that transforms shadows in the mind to lightness in the present - there is an opportunity to be all that you are, now - knowing and becoming what you want to be.

The performance instrument is custom built software that focuses on capturing and manipulating audio loops. The looping audio is shaped to create polyrhythmic sound environments that hold space for the voice to explore freely.

<CREATE ENSEMBLE>

- 00:00:13.760 | PAPER PUPPET CHARLIE CHAPLIN
- 00:00:21.240 | WOMAN SWINGING
- 00:00:33.160 | FAST SEQUENCE OF IMAGES
- 00:00:39.040 | HAT
- 00:00:40.960 | SMILE
- 00:00:53.280 | SPINNING WHEELS BLACK AND WHITE
- 00:00:59.080 | WOMAN SWINGING UPSIDE DOWN
- 00:01:06.280 | REFLECTIVE PENDULUM
- 00:01:12.600 | KALEIDOSCOPE EFFECT
- 00:01:21.000 | THE LETTER Y
- 00:01:24.840 | KALEIDOSCOPE EFFECT
- 00:01:34.720 | SEQUENCE OF COLORFUL SHAPES
- 00:01:40.880 | KALEIDOSCOPE EFFECT
- 00:01:45.080 | KALEIDOSCOPE GEARS
- 00:02:05.760 | WOMAN EYES
- 00:02:13.320 | WEIRD RANDOM GUY
- 00:02:35.040 | BIRD IN KALEIDOSCOPE
- 00:02:38.640 | KALEIDOSCOPE LETTER Y
- 00:02:41.720 | SEQUENCE OF COLORFUL SHAPES
- 00:02:50.120 | LOTS OF RANDOM SHIT
- 00:02:54.000 | KALEIDOSCOPE PENDULUM
- 00:03:20.200 | WOMAN EYES
- 00:03:37.760 | REFLECTIVE PENDULUM
- 00:03:49.600 | SMILE
- 00:03:55.520 | GIRL ON CARNIVAL
- 00:03:58.640 | BORING CARNIVAL SHOTS
- 00:03:58.640 | WHEEL OF FORTUNE
- 00:04:01.840 | WHEEL OF FORTUNE
- 00:04:05.160 | TURNING SURFACE WITH PEGS
- 00:04:11.360 | GOING DOWN A SLIDE

- 00:04:16.160 | BOOTS WALKING
- 00:04:17.880 | CAR COMING AT US
- 00:04:22.560 | TILT A WHIRL
- 00:04:26.400 | SPINNING MACHINE
- 00:04:35.920 | SEQUENCE OF COLORFUL SHAPES
- 00:04:40.360 | SLIDE SHADOW FROM ABOVE
- 00:04:43.520 | WEIRD PISTON THING
- 00:04:56.600 | SLIDE SHADOW AGAIN
- 00:05:00.440 | PISTON AND ROD
- 00:05:06.400 | NO IDEA WHAT THIS IS
- 00:05:07.240 | KALEIDOSCOPE EFFECT ON ENGINE
- 00:05:25.240 | SEQUENCE OF COLORFUL SHAPES
- 00:05:30.760 | KALEIDOSCOPE EFFECT ON ENGINE
- 00:05:41.120 | INDUSTRIAL PRESS
- 00:05:44.240 | SPINNING WISK FUNNEL
- 00:05:48.440 | THREE LITTLE WHISKS
- 00:05:53.960 | COMPLEX LARGE MACHINE
- 00:05:59.800 | FROM A DIFFERENT ANGLE
- 00:06:07.360 | RAPID FACE SHOTS
- 00:06:13.200 | ENGINE COMPLEX MOTION
- 00:06:20.560 | EYES WIDE WOMAN
- 00:06:22.160 | ENGINE CRANK TURNING
- 00:06:29.040 | ENGINE CRANK TURNING
- 00:06:34.880 | WOMAN WALKING UP STAIRS
- 00:06:52.280 | MOUTH SMILING WOMEN
- 00:06:58.200 | WOMAN WALKING UP STAIRS
- 00:07:17.720 | BLACK THEN KALEIDOSCOPE ZERO
- 00:07:23.760 | ON A VOLE DE FIVE MILLIONS
- 00:07:28.880 | DANCING ZEROS
- 00:07:35.680 | ON A VOLE
- 00:07:36.680 | BACK TO DANCING ZEROS
- 00:07:46.280 | DE FIVE MILLIONS
- 00:07:47.440 | BACK TO DANCING ZEROS
- 00:07:52.880 | ON A VOLE
- 00:07:54.000 | BACK TO DANCING ZEROS
- 00:07:56.760 | UN COLLIER DE PERLES
- 00:07:57.880 | BACK TO DANCING ZEROS
- 00:08:04.360 | DE FIVE MILLIONS
- 00:08:05.520 | EYE LOOKING AROUND
- 00:08:08.120 | MORE ZEROS
- 00:08:11.360 | BIZARRE TOILET SEAT THING
- 00:08:24.360 | WORDS FROM BEHIND PROJECTION
- 00:08:34.200 | ZERO COMING AT US
- 00:08:43.680 | ZERO TURNING AROUND
- 00:08:53.920 | WOMENS HEAD TURNING EYES CLOSED
- 00:08:59.400 | UNCLE SAM COMES AT US
- 00:09:04.200 | FLASHING SPHERE COMES AT US
- 00:09:07.560 | KALEIDOSCOPE WOMANS FACE
- 00:09:17.240 | WOMANS HEAD TURNING
- 00:09:21.920 | KALEIDOSCOPE WOMANS FACE
- 00:09:29.080 | SEQUENCE OF COLORFUL SHAPES
- 00:09:35.280 | NESTED PASTRY PAN SWINGING
- 00:09:42.320 | FLASHES BLACK AND COOKING STUFF
- 00:10:04.240 | EYE LOOKING AROUND
- 00:10:06.840 | POTS AND PANS
- 00:10:21.560 | WHATEVER THIS IS

- 00:10:26.120 | STACK OF SPINNING FUNNELS
- 00:10:32.360 | PASTRY PANS WITH ROGUE LADLE
- 00:10:38.720 | POTS AND PANS WITH ROGUE FUNNEL
- 00:10:45.920 | DARK GREEN SPHERE COMES AT US
- 00:10:49.280 | BOOK STORE WINDOW
- 00:10:53.560 | DARK COLORFUL SPHERE
- 00:11:06.800 | DANCING LEGS
- 00:11:24.640 | SPINNING REFLECTIVE SPHERES
- 00:11:27.880 | FLASHES BETWEEN HAT AND SHOE
- 00:11:43.880 | WOMANS FACE IN KALEIDOSCOPE
- 00:11:52.760 | WOMANS HEAD TURNING
- 00:11:56.800 | RAPID FACE SHOTS
- 00:11:58.840 | DANCING BOTTLES
- 00:12:24.160 | PAPER PUPPET CHARLIE CHAPLIN
- 00:12:30.280 | WOMAN FONDLING PLANT
- 00:12:39.920 | PAPER PUPPET CHARLIE CHAPLIN
- 00:13:03.600 | BLACK THE END
- 00:11:58.840 | DANCING BOTTLES
- 00:12:24.160 | PAPER PUPPET CHARLIE CHAPLIN
- 00:12:30.280 | WOMAN FONDLING PLANT
- 00:12:39.920 | PAPER PUPPET CHARLIE CHAPLIN
- 00:13:03.600 | BLACK THE END

<AARON AND THE MAGIC ROD>

Del Norte
6'

Aaron and the Magic Rod (Rodney DuPlessis and Aaron Anderson with guest member Xindi Kang) is a live electronic music collaborative ensemble. Aaron met Rodney in the innermost depths of an ice cavern in the north-most reaches of Canada. The rest is history. King Kang, with her royal authority, decreed that we shall collaborate in a most blissful and unsolicited performance. This is that performance.

<CURTIS ROADS>

Always
7'

The sound world of the mid-century modern electronic music is a reference point for me. As a child experimenting with my father's tape recorders, I was fascinated by the charm of sounds played fast, slow, and backwards. As a student composer, I was drawn to the otherworldly allure of tones submerged in plate reverberation made in studios long ago and far away (Cologne, Milan, Paris in the 1950s and 1960s). I brought this listening to the composition of my work *Always*.

Reuse is central to the construction of *Always*. This composition continues my research on nth-order sound granulation, spawning new material by pulverizing sounds from the past. The origin of the sound material in *Always* can be traced through four stages of granulation to a single impulse:

impulse (1999) → Volt air III (2003) → Now (2003) → Never (2010) → Always (2013)

In terms of form, *Always* is a polyrhythmic work in which many details are made out of replications of transformed parts of itself. I designed the work in two distinct sections, with a dissipating first section that sets the stage for the high-contrast fireworks of the second.

·M.A.D.E·