

The first beginnings of things cannot be distinguished by the eye.
- De Rerum Natura (On the Nature of Things) by Titus Lucretius Carus

Rule 1 No more causes of natural things should be admitted than are both true and sufficient to explain their phenomena.
As the philosophers say: Nature does nothing in vain, and more causes are in vain when fewer suffice. For nature is simple and does not indulge in the luxury of superfluous causes.

- Isaac Newton, The Principia: Mathematical Principles of Natural Philosophy, the authoritative translation

SHAPING SPACE AS INFORMATION: A CONCEPTUAL FRAMEWORK FOR NEW MEDIA ARCHITECTURES

Contributions:

- 1 Creation of a new conceptual framework for the Media Arts: **New Media Architectures**
- 2 Advancing a research practice based on **New Media Architectures**
- 3 Creation of a historical foundational timeline tracing **New Media Architectures**

Gustavo A. Rincon
Ph.D. Defense Presentation
September 16, 2020 @ 09:00 AM
Presented virtually at University of California, Santa Barbara (UCSB)

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Title: SHAPING SPACE AS INFORMATION: A CONCEPTUAL FRAMEWORK FOR NEW MEDIA ARCHITECTURES

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3.2. Algorithms, Worldmaking, and Instrument Design || Four Eyes Lab

3.2. Algorithms, Worldmaking, and Instrument Design || transLAB

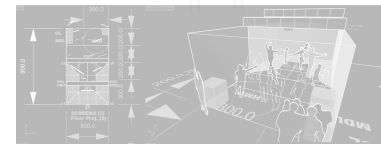
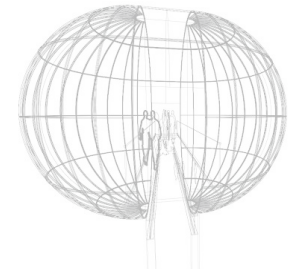
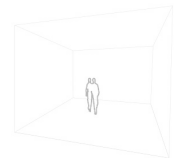
3.2. Algorithms, Worldmaking, and Instrument Design || Instrument Design

IV. Implementation - What is New Media Architectures?

PART III - New Media Architectures: A New Conceptual Framework

V. Conclusions & Future Directions: What is New Media Architectures?

Thank You!



0. Abstract What?

This dissertation is an investigation of a dynamic media architecture conceptual framework that focuses on information as the foundation of building form, shape, and structure.

Starting from the notion that every material object/structure **embodies** the information that **enables** its use, the computational platform facilitates exploring **generative** information **constructs** as ever-changing dynamic **structures**, comparable to the self-organizing systems found in nature.

A study of forms, patterns, and spaces has been undertaken for creating generative media artworks designed for **amplifying** the reciprocal relationship between an environment that shapes its content and content that shapes its environment.

A main focus of this research is the generation of unique forms of architecture using agent-based behaviors controlled by self-organizing systems. These unique forms of architecture determine, and are, in turn, determined by, the shape of virtual worlds/environments.

Another important focus of this research is the investigation of software platforms that **provide** the fundamental instruments that produce the content, **and that help make and shape** the virtual worlds/environments.

In a series of designs, exhibitions, and studies, a New Media Architectural Methodology **is** presented.

PART I - New Media Architectures: Inspirations

1. Introduction

The first principles of the universe are atoms and empty space; everything else is merely thought to exist.

- Diogenes Laërtius, Democritus, Vol. IX, 44 (trans. by Robert Drew Hicks 1925)

Introduction

1.1 Motivations

1.2 Problem Statement

1.3 The Methodology

1.4 Structure of the Dissertation

1. Introduction

1.1 Motivation

- Motivations of the field - the abstraction of the flocking & swarming algorithms into other disciplines to perpetuate self-organization of their content
- Personal Motivations - moving from an architecture of a spatial phenomenon to a spatio-temporal phenomenon

1. Introduction

1.2 Problem Statement

- The integration of these disciplines into a new field
- The integration of technological tools for a unified framework

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1. Introduction

1.3 Structure of the Dissertation

1. Introduction

2. Historical Background of New Media Architectures

3. Methodology: Investigations through Prototypes - The Fusing of 3 Areas that Shape Space as Information Forming New Media

Architectures: Algorithms, Virtual Worlds, and Instrument Design

3.1 Algorithms: From the Virtual to the Material

3.1.1 Computational and Biological Studies of Flocking & Swarming & Flocking & Swarming Generations

3.1.1.1 Flocking to Flocking and Swarming “Movimientos Hermosos”

3.1.1.2 Flocking and Swarming “Abrazos”

3.1.1.3 Flocking and Swarming Generations

3.1.2 Agent Based Behaviors in Quantum Systems 2016 to Present - Simulation to Fabrication

3.2 Virtual World(s) & Instrument Design - The Environment: Collaborations & Experiments

3.2.1 AlloSphere Facility | Environment to instrument 2009 - 2011

3.2.1.1 AlloSphere Instrument | Content - The Complexity of The Body 2010 - 2012

3.2.2 Four Eyes Lab | Instrument to Environment: Details in realism - 2011-2013

3.2.3 transLAB | Instrument intersecting with Environment: 2016 - 2019

3.2.4 AlloSphere Installations | Environment as Instrument 2016 - Present

3.2.4.1 Probably/Possibly?: The Wolf Museum of Exploration + Innovation (MOXI) installation

3.2.4.2 Etherial

3.2.4.3 Myrioi

4. Implementation - What is New Media Architectures?

5. Conclusion(s) & Future Directions A New Media Architectures

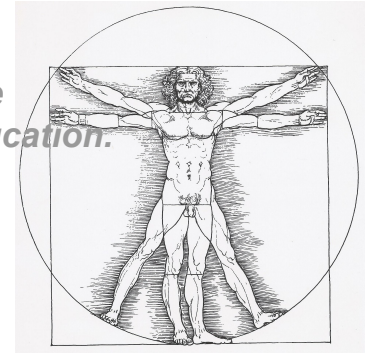
2 Historical Background of New Media Architecture

... natural events such as collision of hail or rain with hard surfaces, or the song of cicadas in a summer field. These sonic events are made out of thousands of isolated sounds; this multitude of sounds, seen as totality, is a new sonic event. This mass event is articulated and forms a plastic mold of time ...

Formalized Music: Thoughts and Mathematics in Composition, 1992 by Iannis Xenakis

I am interested in the rather singular goal of making the built environment responsive to me and to you, individually, a right I consider as important as the right to good education.

Soft Architecture Machines, 1975 by Nicholas Negroponte



2. Historical Background of New Media Architectures

2.1 New Media Architectures and shaping of spaces

2.2 Historical Research Areas:

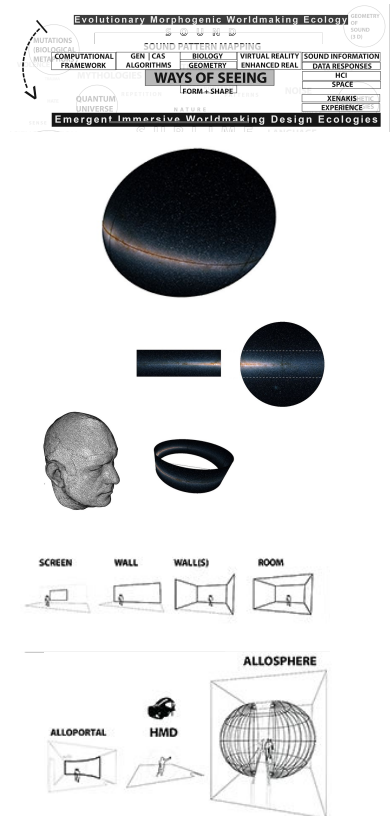
Algorithms, Worldmaking, & Instrument Design



2 Historical Background of New Media Architecture

2.1 New Media Architectures and Shaping of Spaces

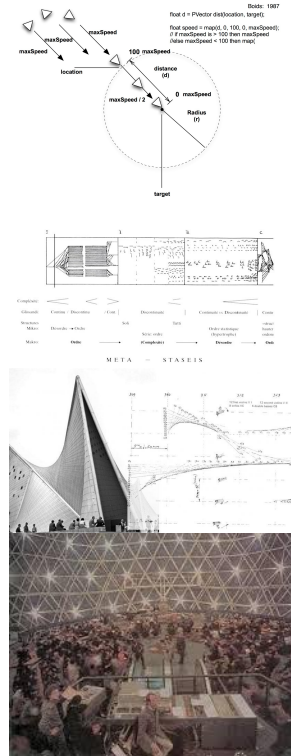
- Aristotelian physics of the concept of place
- The Euclidean notion of space as a geometric proposition (space is still a void)
- The modern notion of space (space as substance to space as a configurable network)



2 Historical Background of New Media Architecture

2.2 Historical Research Areas: (Algorithms, Worldmaking, & Instrument Design)

- Algorithms
- Worldmaking
- Instrument Design



PART II - New Media Architectures: An Idea

3. Methodology: Investigations through Prototypes How?

Investigations through Prototypes - The Fusing of 3 areas that shape space as Information forming New Media Architectures: Algorithms, Virtual Worlds, and Instrument Design

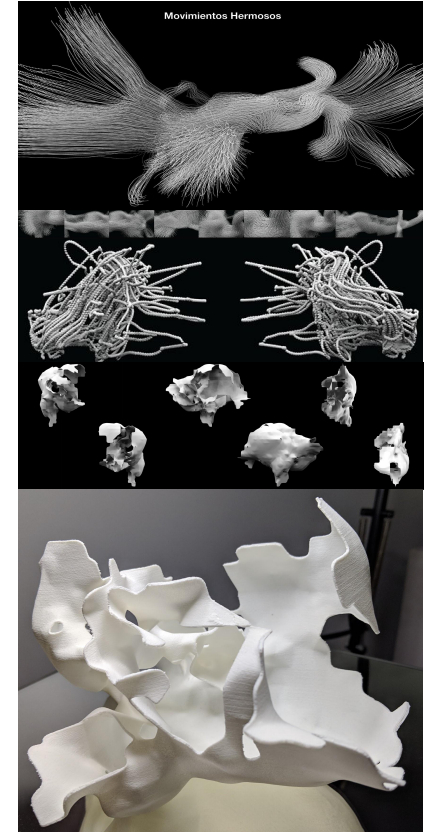
3.1 Algorithms: From the Virtual to the Material

3.2 Virtual World(s) & Instrument Design - The Environment: Collaborations & Experiments

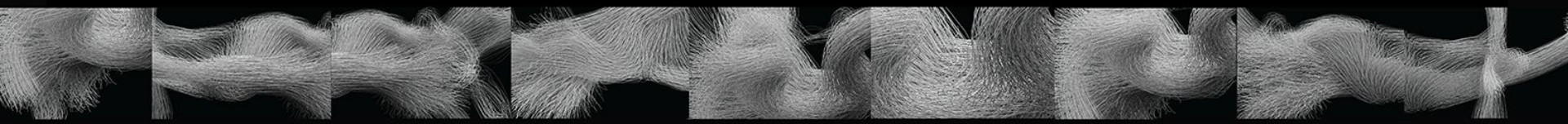
3. Methodology: Investigations through Prototypes How?

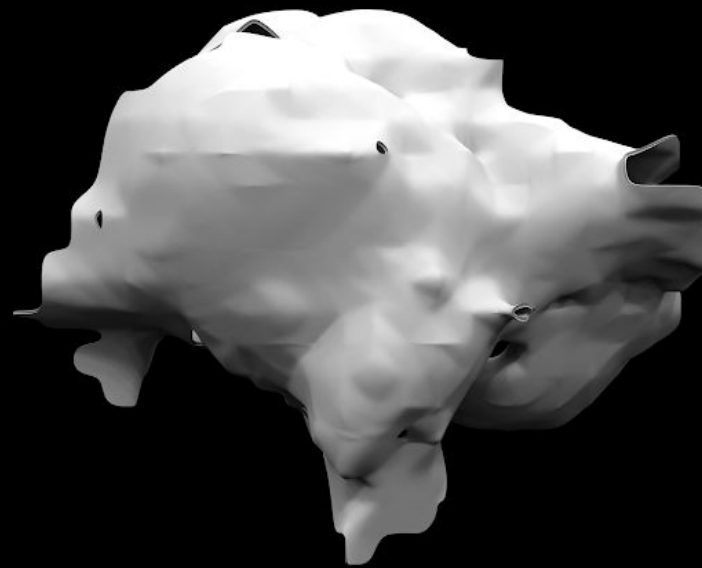
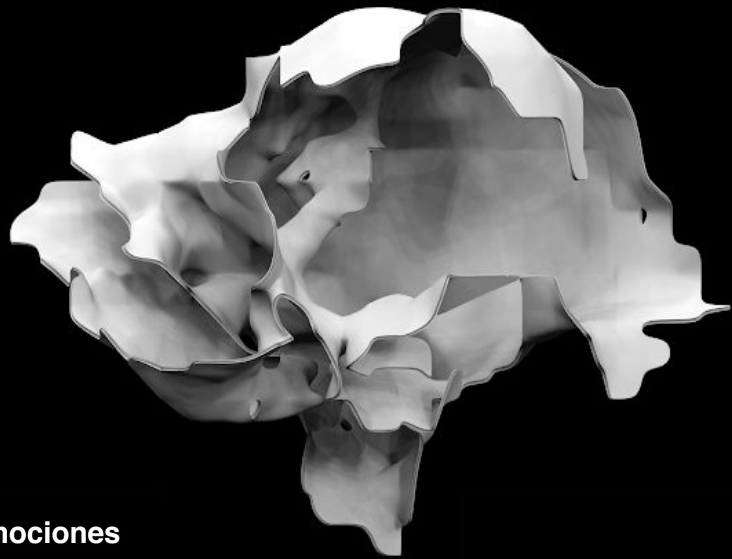
3.1 Algorithms: From the Virtual to the Material

- **Flocking and Swarming/Predator Prey**
 - full resolution
 - each point
 - creation of a surface
 - creation into material

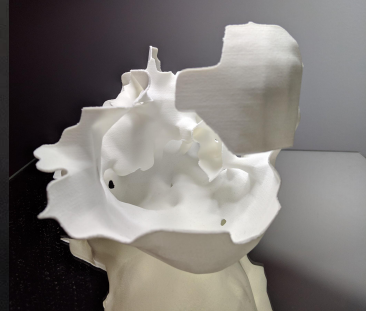
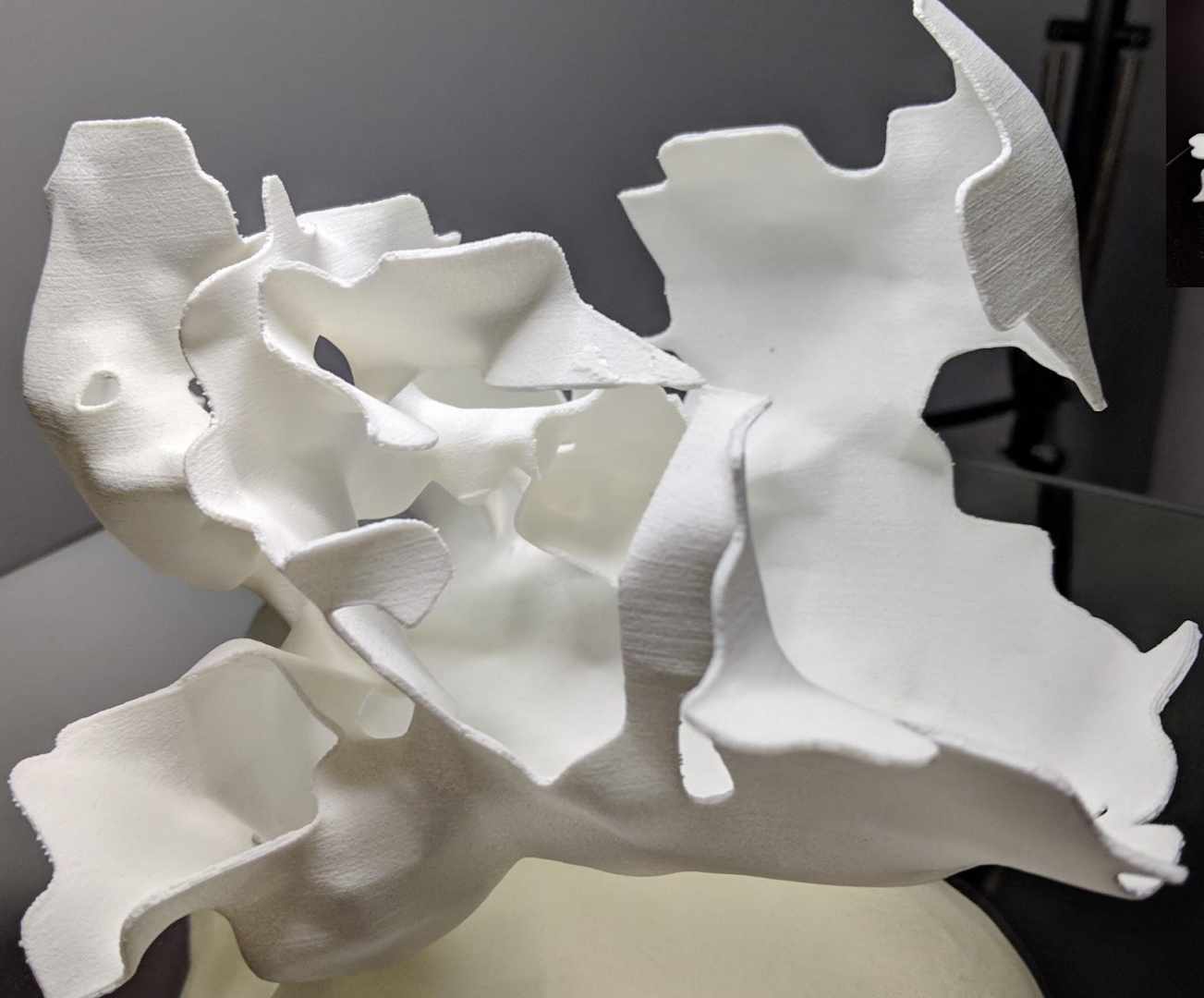


Movimientos Hermosos





Un Abrazo Repulsivo de un Rebaño de Emociones



3. Methodology: Investigations through Prototypes How?

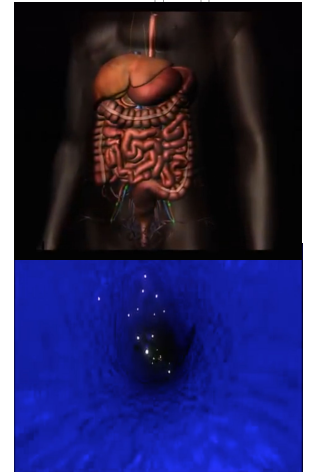
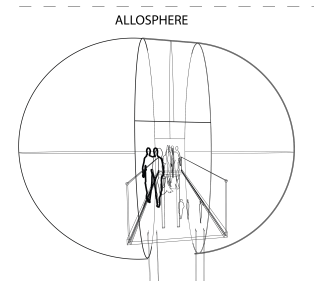
3.2 Virtual World(s) & Instrument Design

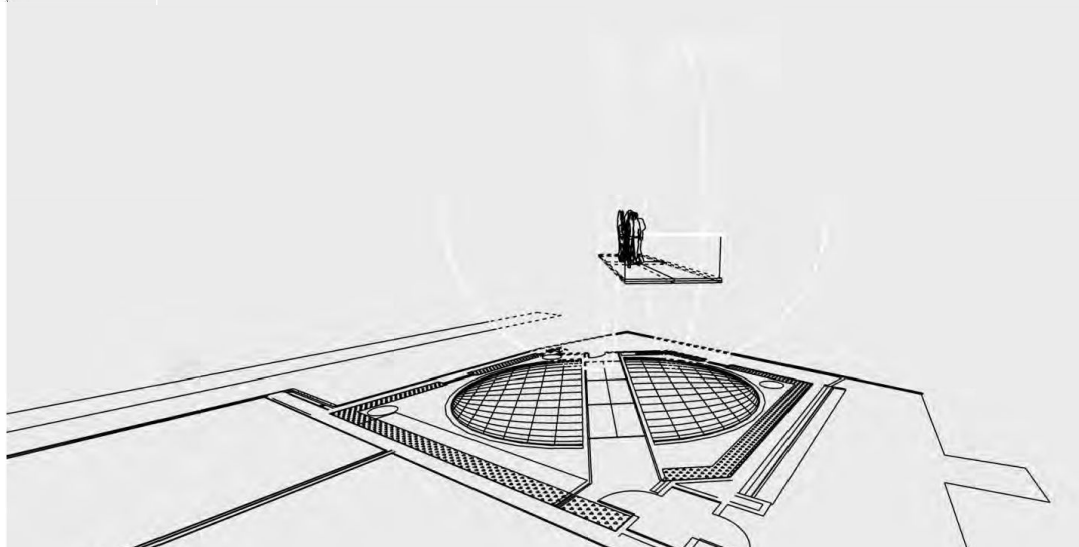
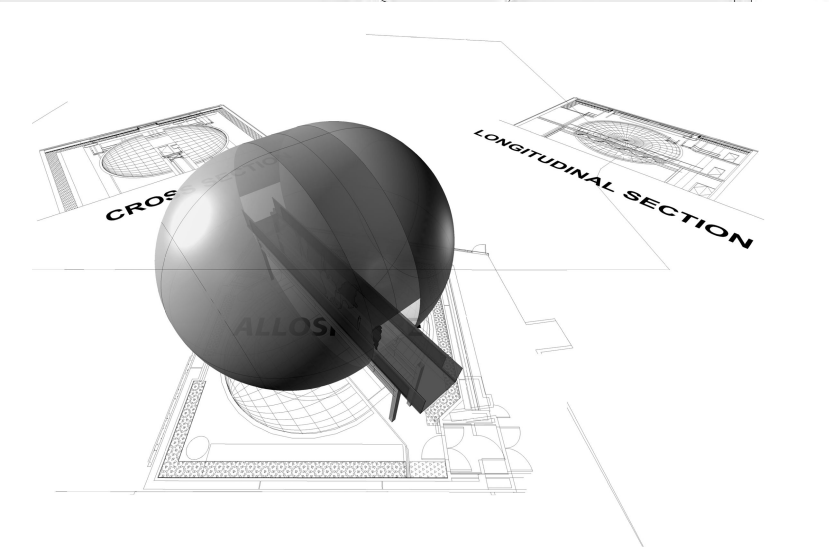
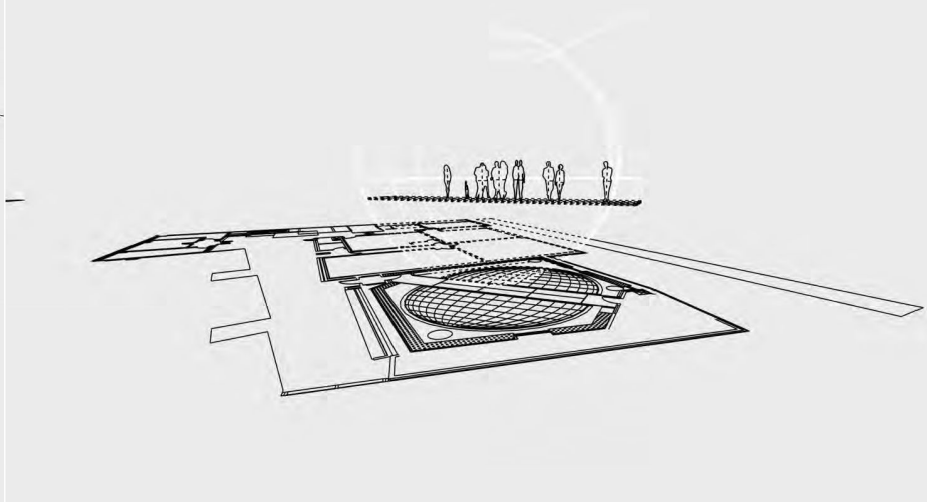
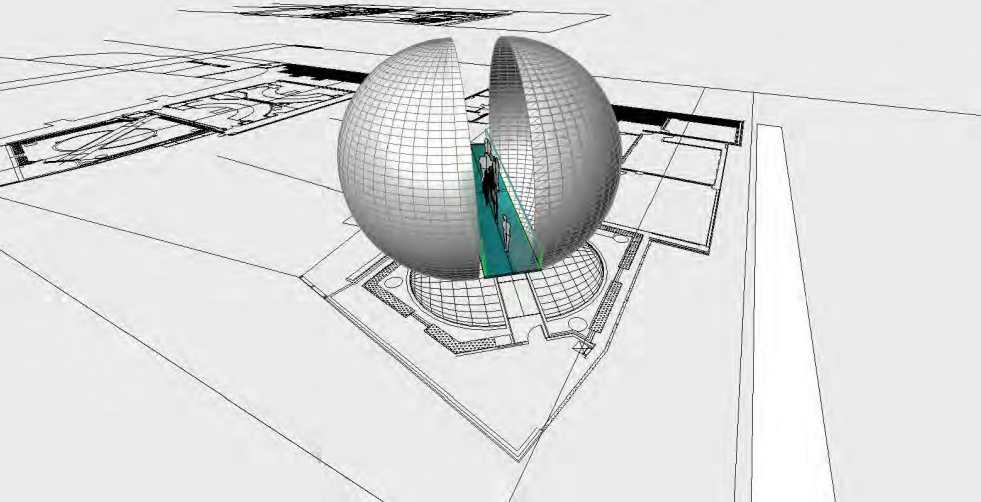
The Labs: Allosphere, Four Eyes, & transLAB

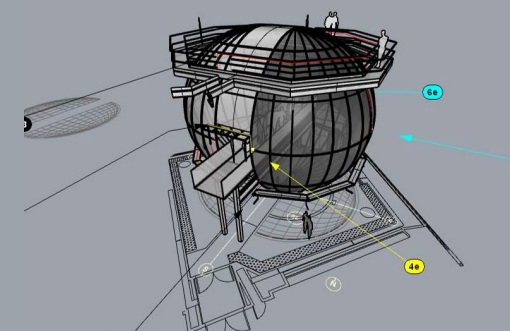
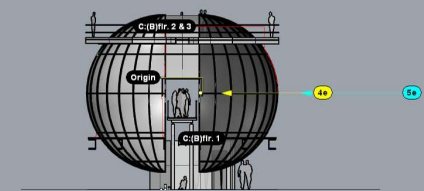
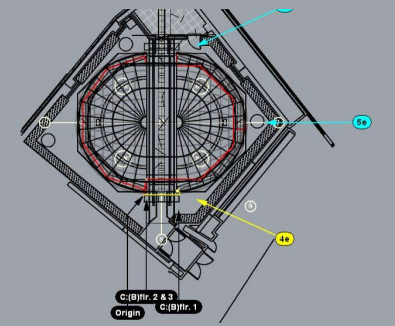
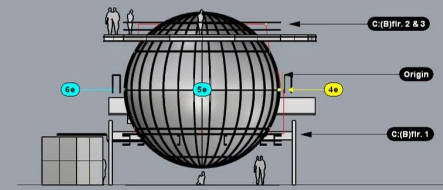
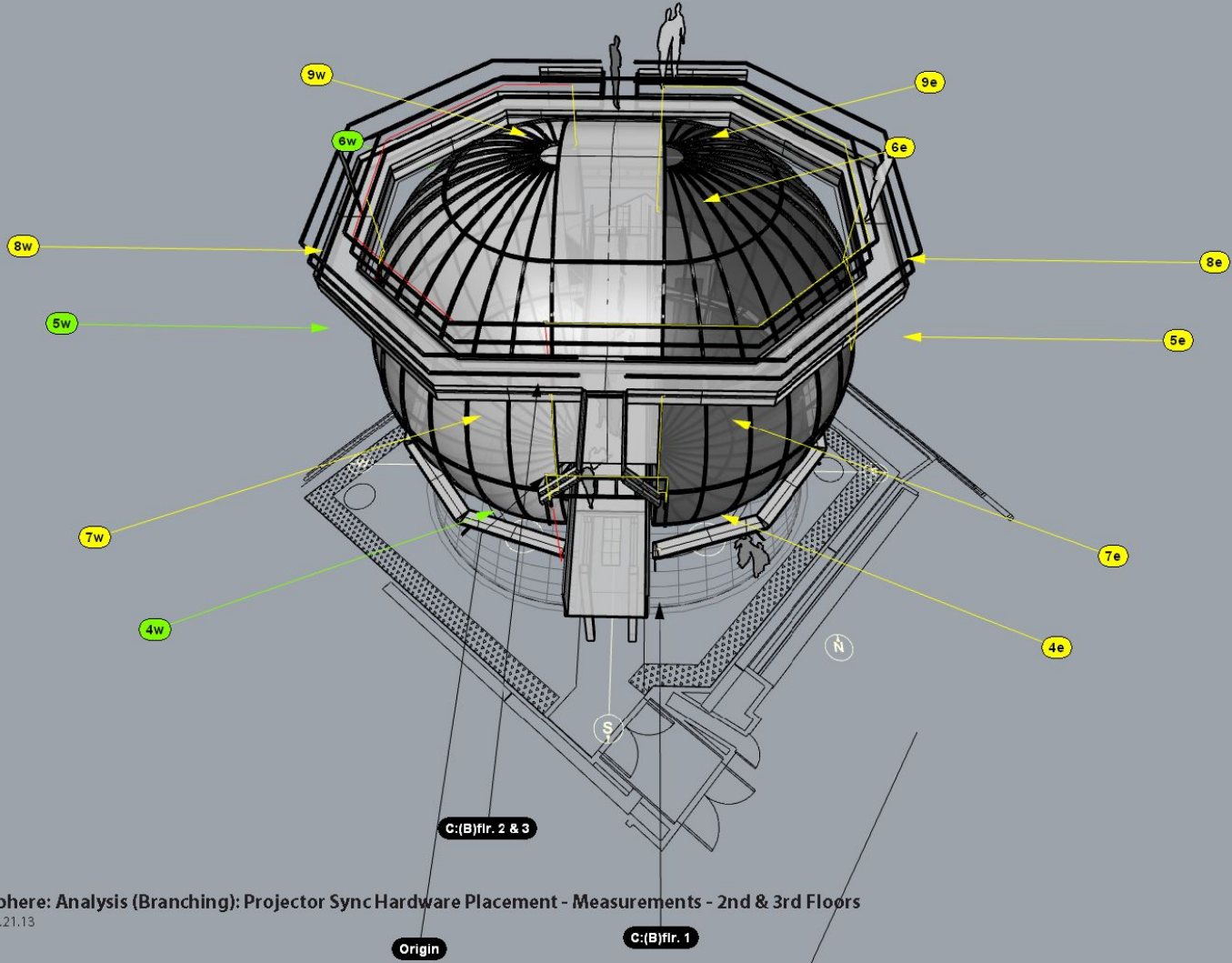
- **The Allosphere**

- As-builts of the AlloSphere instrument

- The CNM project with Dr. Jamey Marth

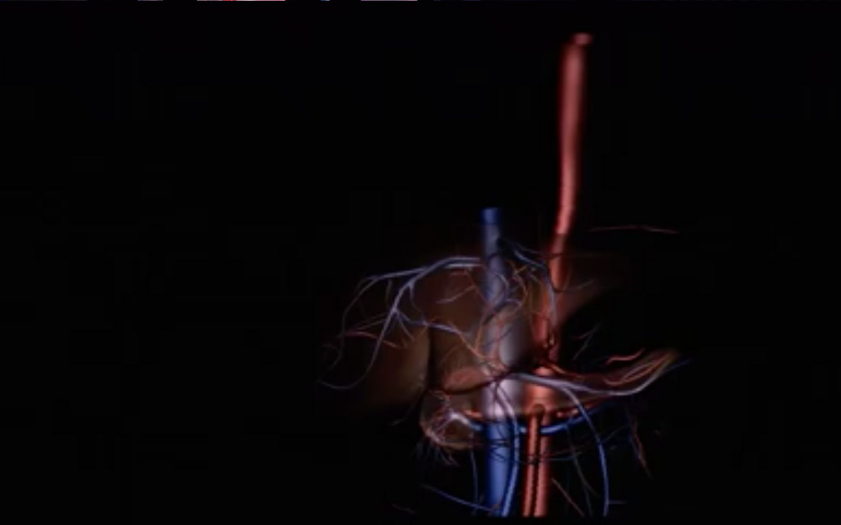
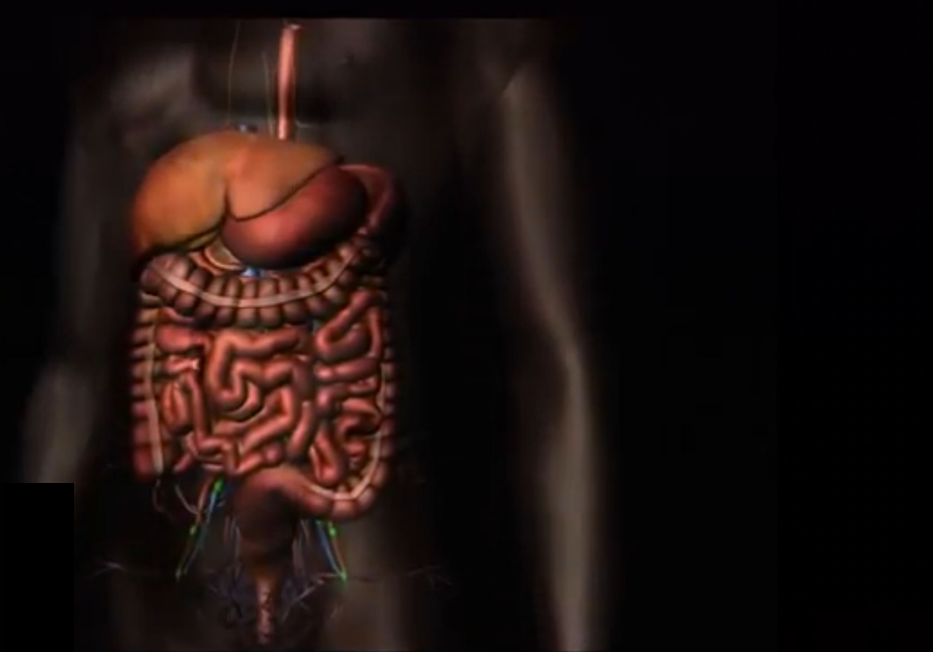


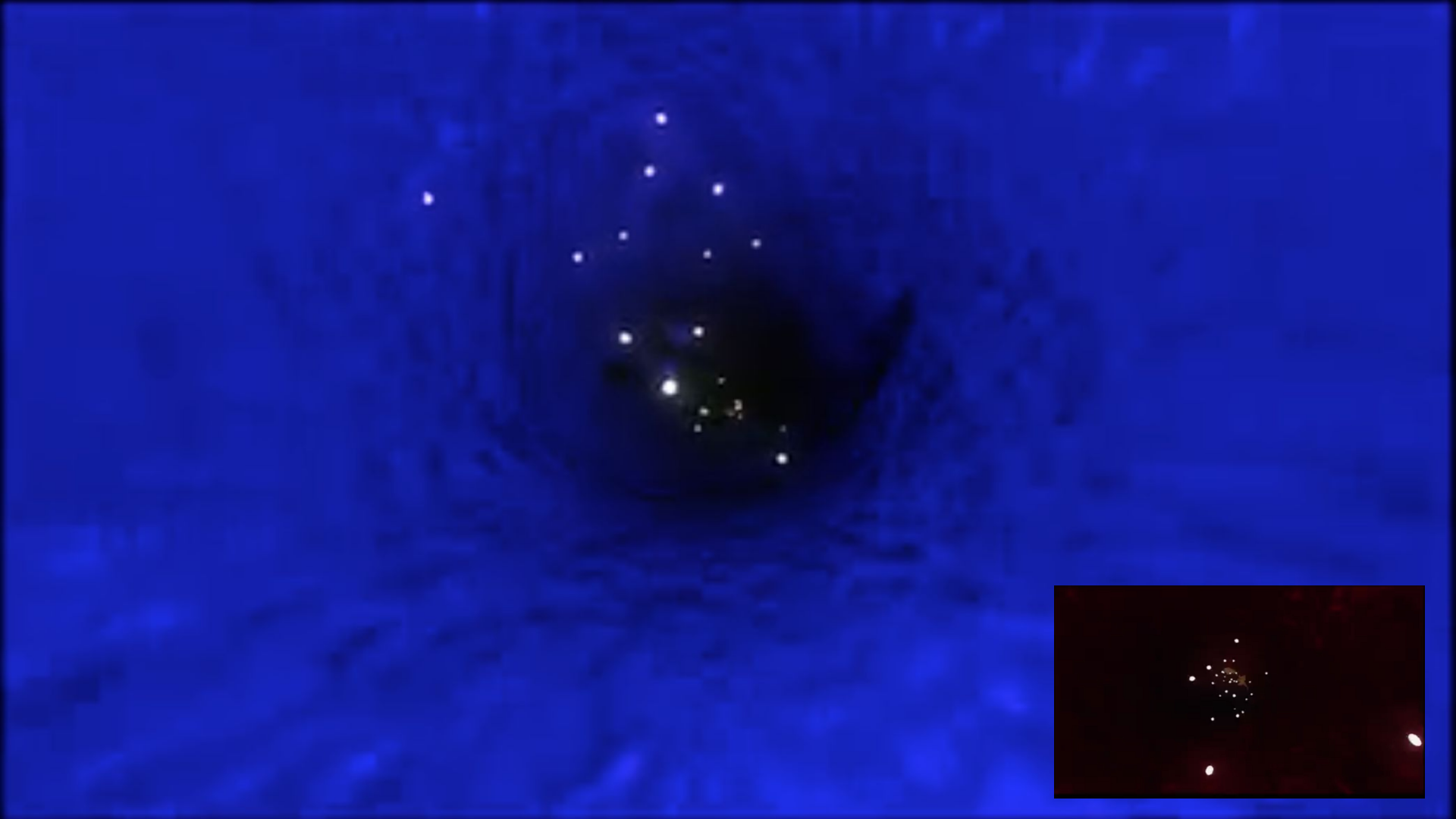




Sphere: Analysis (Branching): Projector Sync Hardware Placement - Measurements - 2nd & 3rd Floors

08.21.13



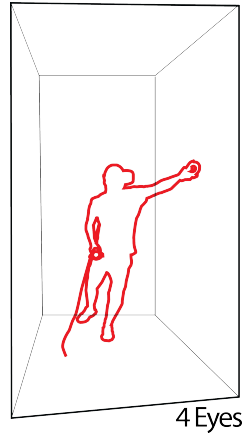


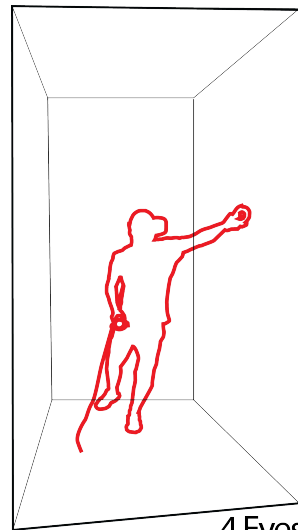
3. Methodology: Investigations through Prototypes How?

3.2 Virtual World(s) & Instrument Design

The Labs: Allosphere, Four Eyes, & transLAB

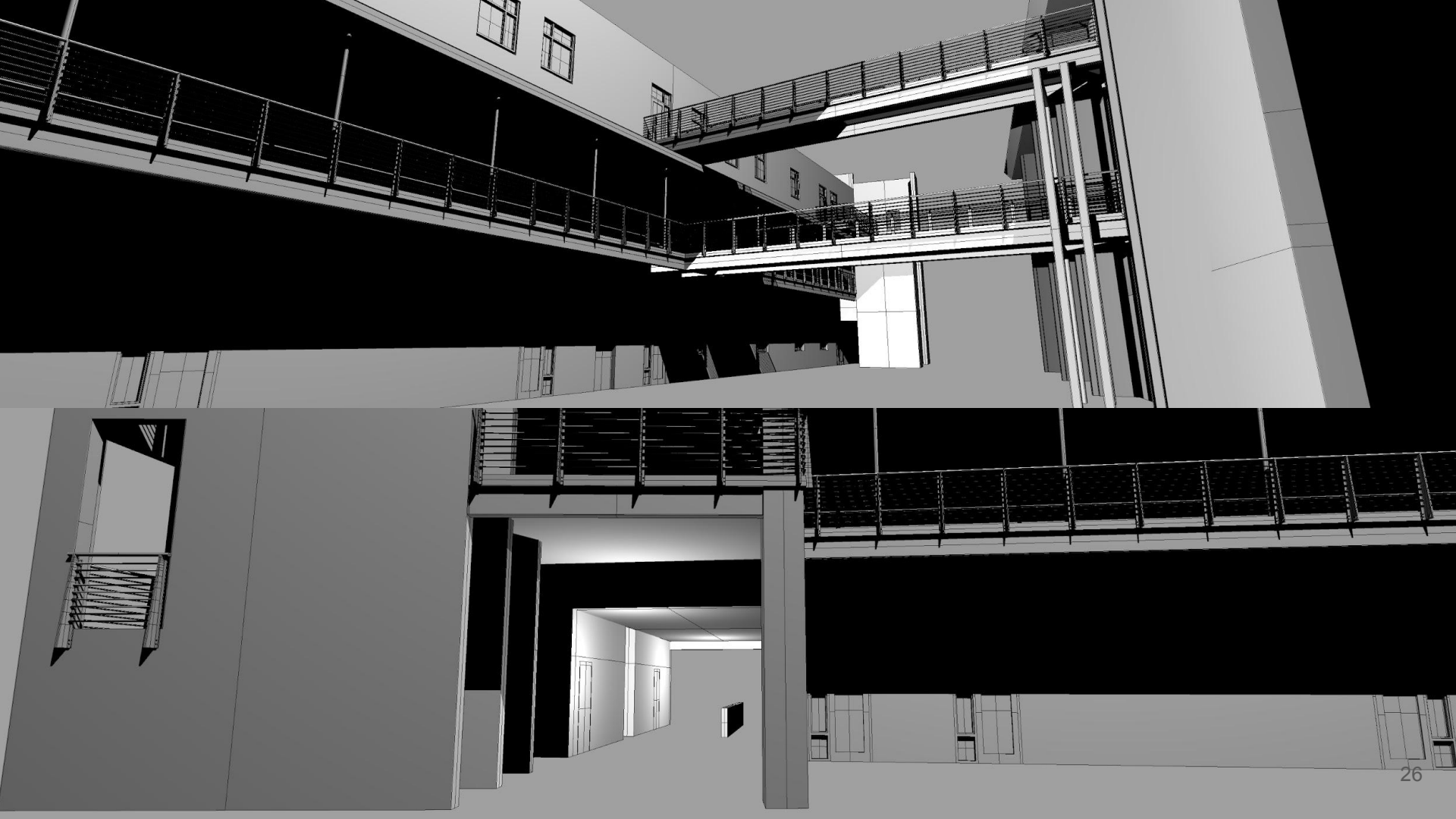
- **The Four Eyes Lab**
 - HMD as instrument
 - A user study





4 Eyes



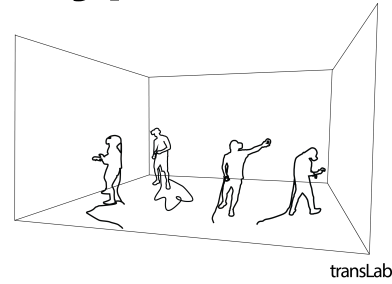


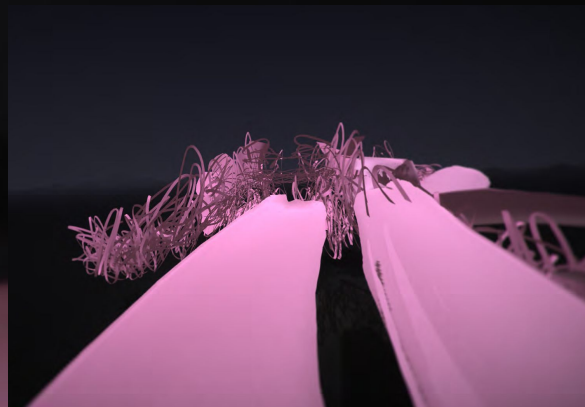
3. Methodology: Investigations through Prototypes

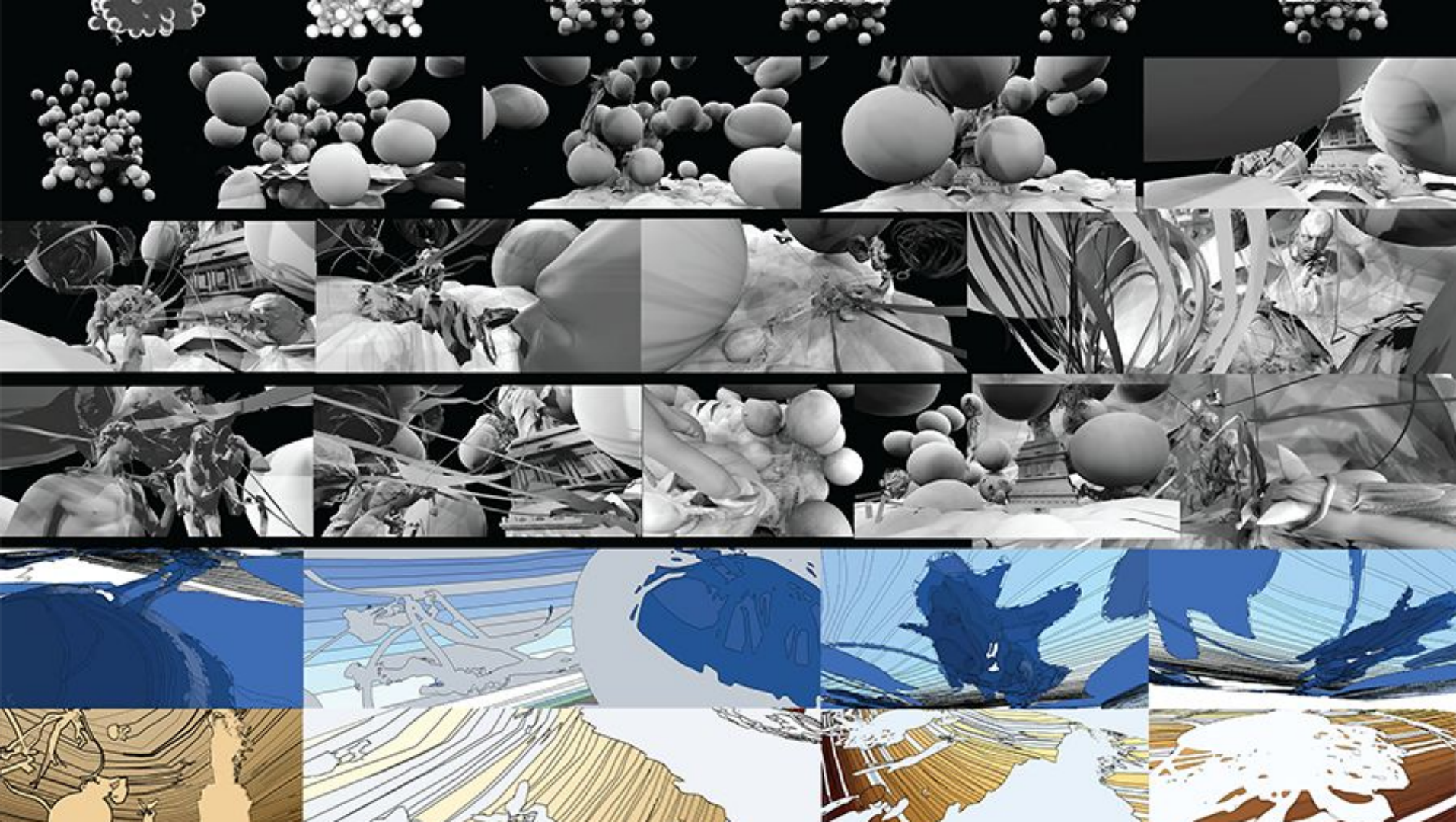
3.2 Virtual World(s) & Instrument Design

The Labs: Allosphere, Four Eyes, & transLAB

- **The transLab**
 - HMD & Agent-based systems research
 - Group collaborative projects in a projected space











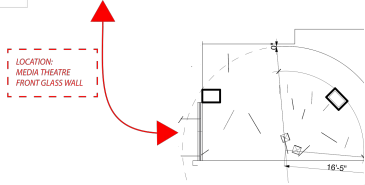
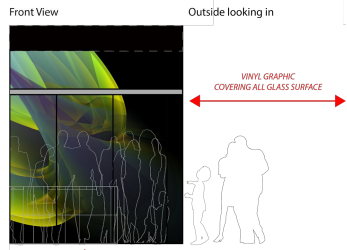
3. Methodology: Investigations through Prototypes How?

3.2 Virtual World(s) & Instrument Design

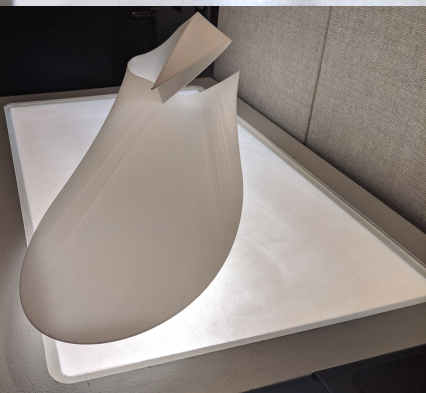
- **The Quantum Composition Installations**

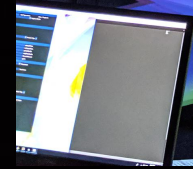
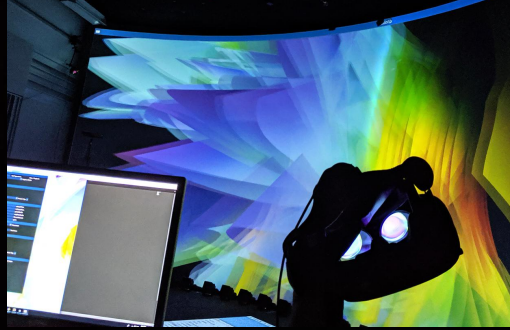
- Probably/Possibly?
 - 3D-rendered form
 - Installation - a curved screen design
- Etherial
 - 3D-fabricated form
 - Installation wall/floor/HMD design











4. Implementation: What is New Media Architectures?

A liquid architecture, an architecture of relations, an architecture in which the final built object is wrested from an infinite continuum of possible variations. The creation of systems of relationships and the assignment of specific values becomes the foreground of the architect's activity and invention. Novak, 1988.

This widespread interest in biological computation reflects a strong intuition that the notions of information and information processing are building blocks that will shed new light on how living systems operate and the common principles underlying their operation. Melanie Mitchell, Biological Computation 2010.

4. Implementation - What is New Media Architectures?

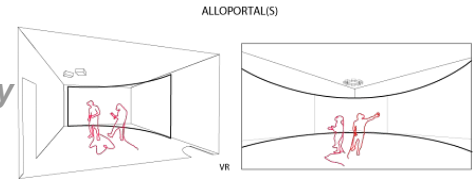
- **Bringing Complexity theory into Architecture**
- **Shaping space as information**

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**PART III - New Media Architectures:
A New Conceptual Framework**

5. Conclusion(s) & Future Directions

Human beings, viewed as behaving systems, are quite simple. The apparent complexity of our behavior over time is largely a reflection of the complexity of the environment in which we find ourselves...(Simon. 1969)



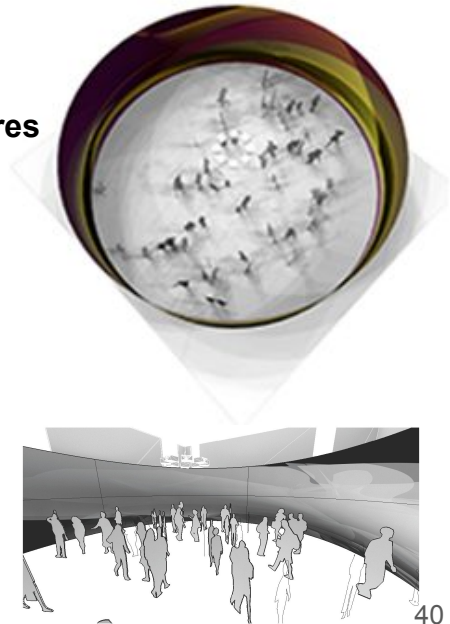
Conclusions: (Shape as information | Algorithms + Worldmaking + Instrument Design)

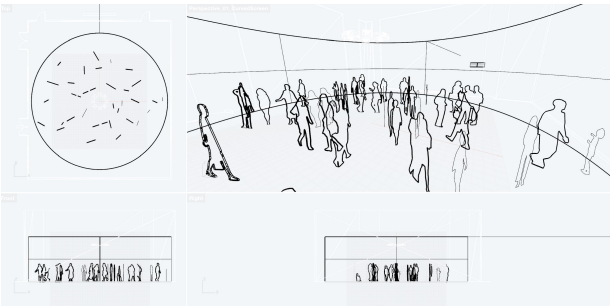
Contributions:

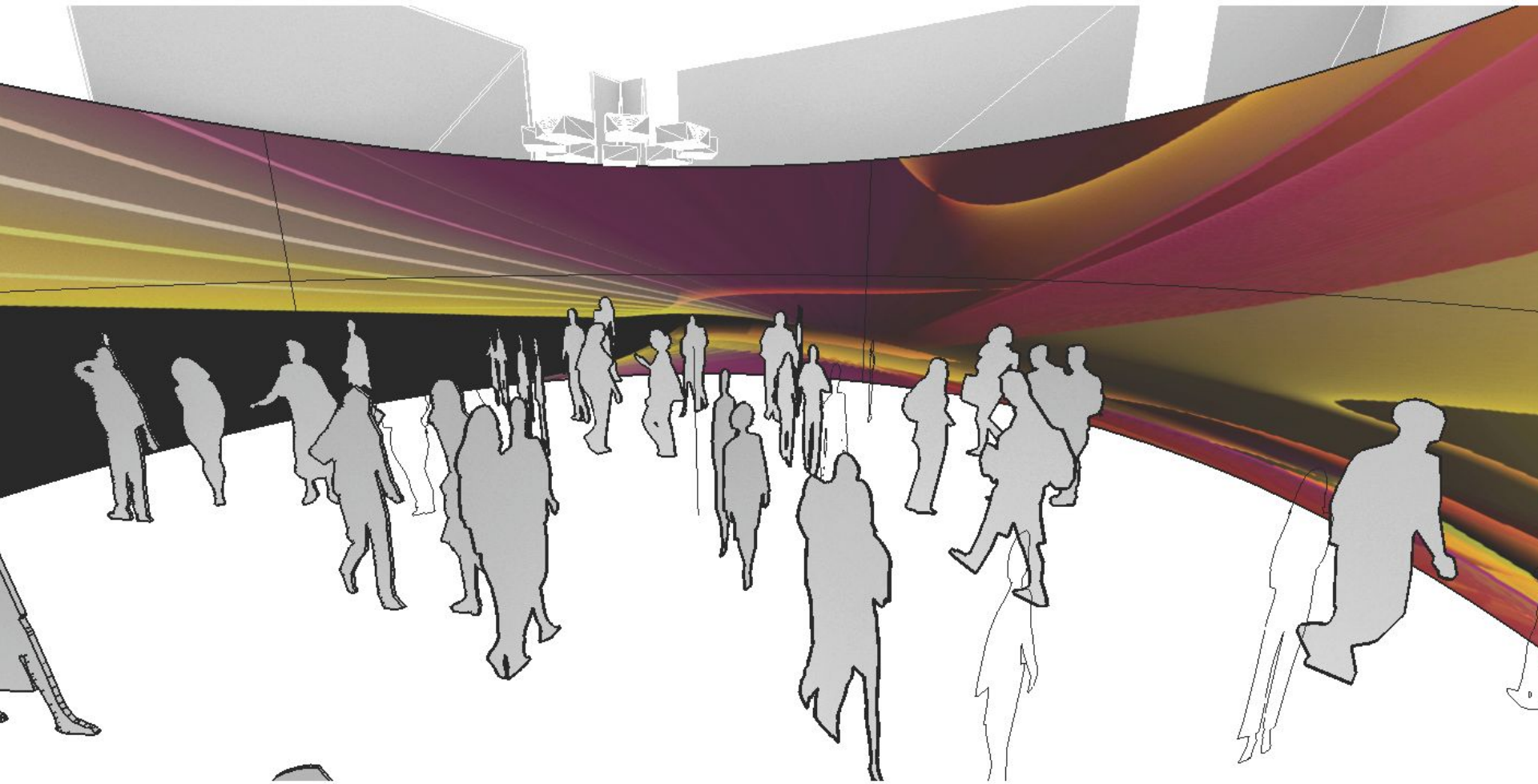
- **Creation of a new conceptual framework for the Media Arts: New Media Architectures**
- **Advancing a New Media Architectures practice-based research**
- **Creation of a historical foundational timeline tracing New Media Architectures**

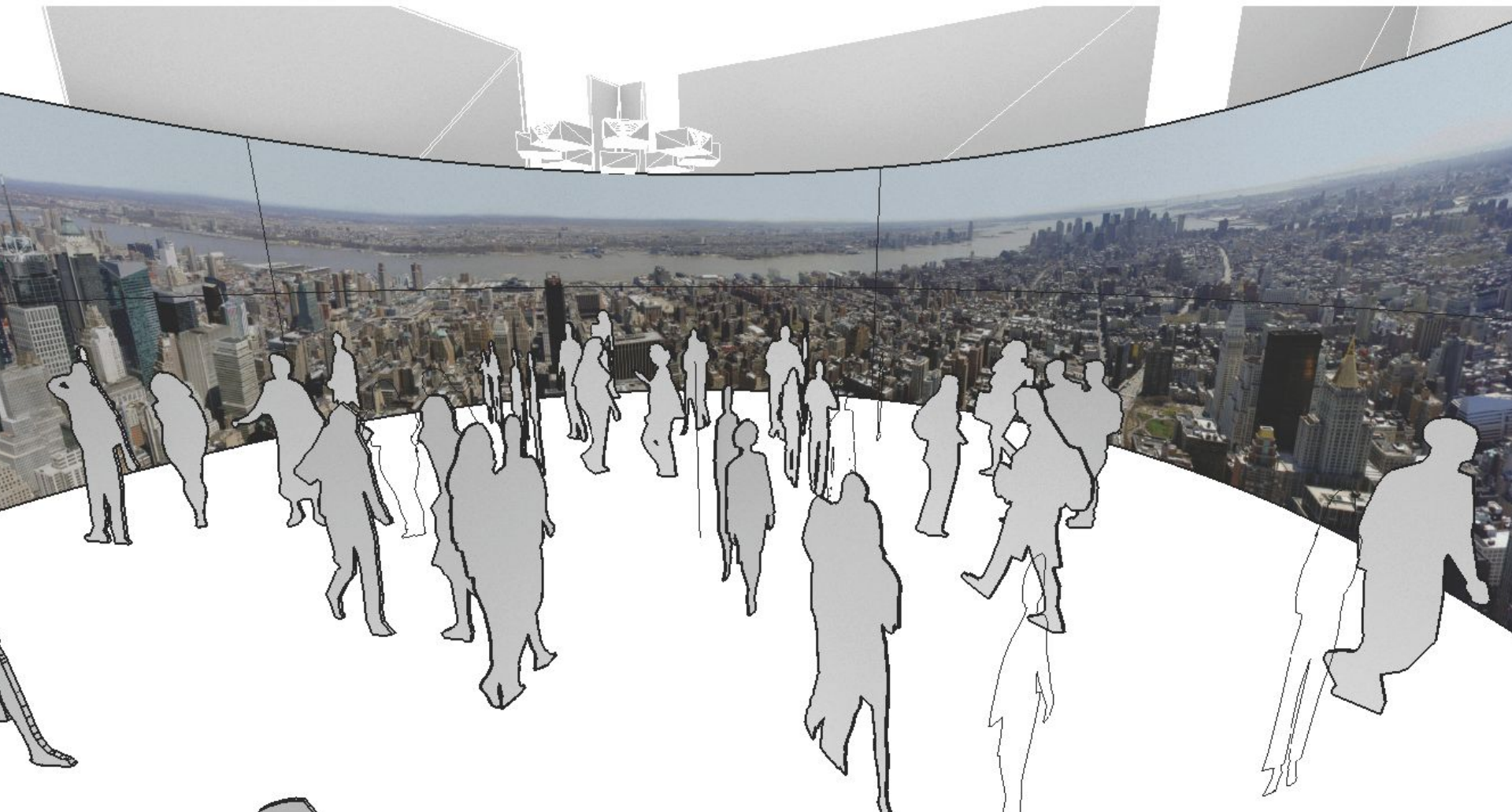
Future Directions:

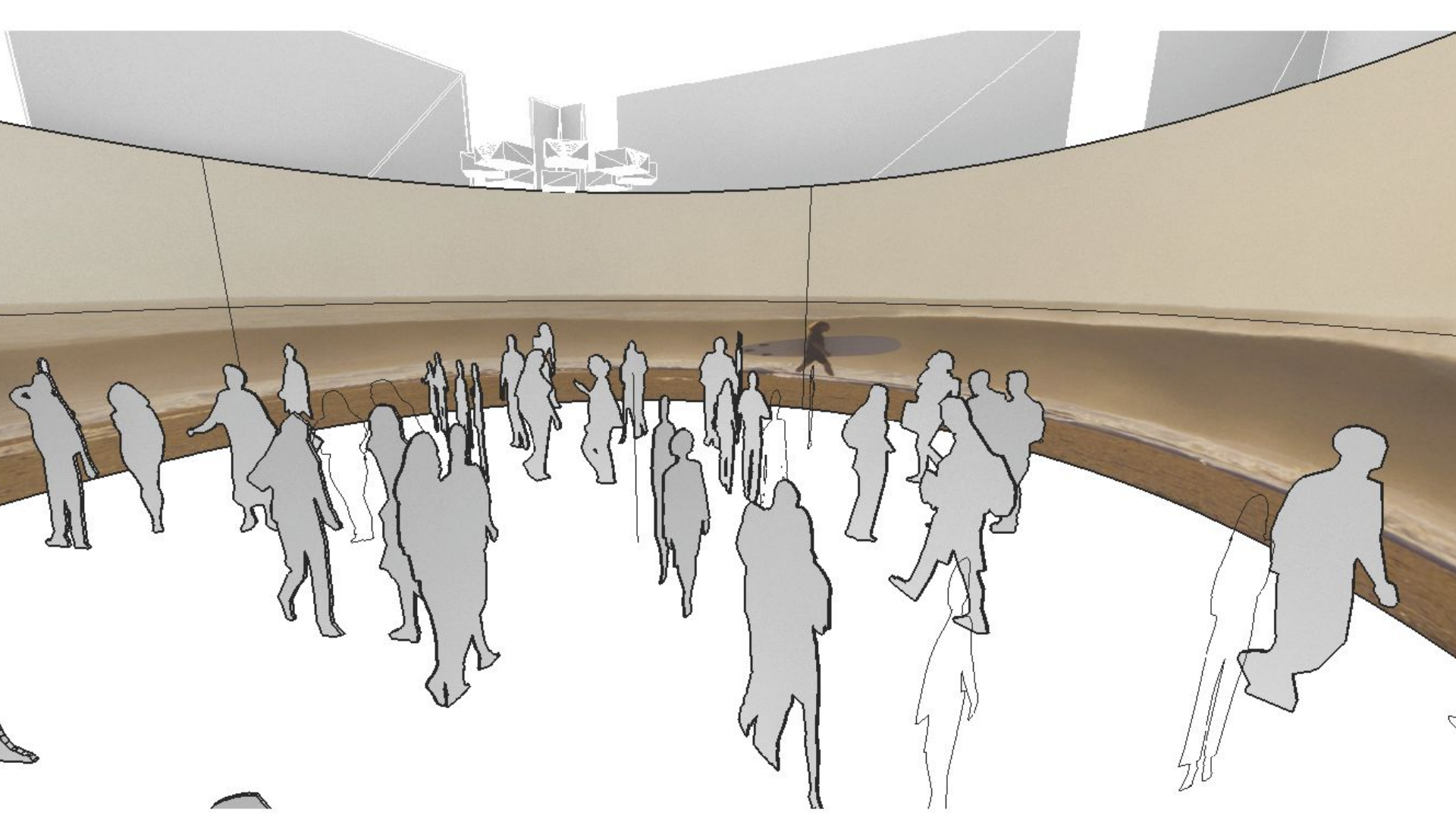
- **Building a new installation “Allo2”**
- **How do you make a 100 degree into a 360 degree curved screen?**
- **Experimentation & realizing of fabricated forms (small to large scale)**











Thank You!

Committee:

JoAnn Kuchera-Morin (Co-Chair)

Marcos Novak (Co-Chair)

Marko Peljhan (The Rock)

*Special thanks to all who extended countless kindnesses
& inspired me through the years.*

*The MAT community, The AlloSphere research group, &
The transLAB research group.*

Finally my deepest gratitude goes to all of my family & friends



Questions?

