

## Research Statement

### Introduction

New Media Architectures (NMA), as defined in my dissertation, represents a new hybrid research field intersecting the disciplines of art, architecture, and media arts exploring the spatial constructs of space as information between the physical and digital domains. This field reflects my hybridized creative professional practice, which seeks to unify arts, design, and science through a research trajectory deeply rooted in exploring space in all of its forms. My work explores Immersive Virtual Environments (IVE's) and speculative world-making, engaging in collaborative research projects and curatorial event spaces. Inspired by Architecture my research practice in the Arts and Sciences, explores generative worlds, immersive virtual environments, and experimental installation spaces driven with advanced computational technologies.

Over the years, my work with the AlloSphere Research Group at the University of California, Santa Barbara, has expanded my perspective, integrating computer and material sciences with experimental interactive applications. This experience shapes my exploration of the full potential of AI in real-time immersive environments, and future artworks inspired by imaginative narratives of storytelling to the mathematical abstraction of Quantum space. Consulting with potential company sponsors, collaborative partners, and artistic researchers has yielded many opportunities to share our Immersive Virtual Environments installations throughout the world. All with the potential to redefine space within the Arts & Science fields of experiential knowledge creation within a continued migration to an even larger AI Services and online economies.

### Research Background

My practice is motivated by critically exploring space in all of its forms. Addressing the challenges inherent within complex systems science, finding answers and discovering the limitations of our digital era between aesthetics in art, language in research, and pattern recognition in design/science. Attempting to contend with big data problems by using design as a tool/framework to embody the acute senses developed in the arts leads to inventing virtualized real time systems as instruments. As a researcher, I aim to redefine space across disciplinary modalities, starting with artistic exploration of computational forms into scientific visualized abstractions to physical/virtual worlds. My involvement with the AlloSphere team has been pivotal, exposing me to interdisciplinary collaborations in arts, sciences, and engineering. This team-based practice has exposed me to different modalities of research between the arts and engineering, augmenting my leadership skills in curatorial programming in expanded embodied data representations at different scales from gallery to integrated urban city life.

Throughout my academic research career, I have investigated computer languages and software platforms fundamental to creating immersive environments: AI tools, AlloLib C++ library, Animation Software, CAD, and gaming software, including physical installations, and virtual spaces. These experiments have resulted in customized prototype works that address questions of composition, computational system logic, and speculative design narratives. Collaborations with other labs at UCSB, the Four Eyes Lab (Computer Science) and TransLab (Architecture/Media Arts)

have provided foundational experiences in research-driven design. My work includes creating compositions, fabricated objects, real-time data-driven visualizations, and immersive virtual worlds – engaging complex systems science.

### Research Methodology and Practice

My work integrates art, architecture, and media arts through computational tools and immersive environments that look at the unique spatial problems in arts/science identifying different narrative graphical languages to enhance experiences. In the AlloSphere, data representation is customized for 360-degree visual and audio experiences, enabling interdisciplinary embodied experimentation. This platform presents unique challenges, including deployment and adoption within wider research communities. My research prioritizes the development of architectural spaces and interactive instruments that investigate human-computer interaction and immersive design.

Key methodologies include:

- Designing generative media artworks that amplify the relationship between environment and content
- Leveraging agent-based behaviors and self-organizing systems to explore speculative design architectures and worldbuilding narratives
- Developing UI/UX frameworks for immersive virtual environments, including headset, screen-based, and projection installations
- Collaborating across disciplines to ensure artistic, scientific, and engineering approaches that compliment one another in achieving research goals

### Current Work

Another of my research focuses lies in speculative architectures shaped by agent-based behaviors, AI-driven formulations, complex systems theory and contemporary postmodern philosophy. These projects investigate relationships between system components and collective behaviors, aiming to make chaotic structures more knowable. Examples include:

- Teaching (Online Design Studio & Curatorial Practices): Exploring AI-generated spatial forms for immersive virtual world environments
- DigitalFUTURES Intl. (Online ParaEducation): Co-directing a transnational educational platform with millions of views, fostering accessible, online lectures and tutorial content, and hosting global conference events
- Scientific Visualization (AlloSphere Research Group): Collaborative projects integrating UI/UX design and material fabrication to develop intuitive interfaces for visualizations for both Art & Science
- Curation in the Digital Arts (ACM SIGGRAPH DAC): My curatorial practice includes enabling exhibitions, events, and online talks - yearlong programming for the ACM SIGGRAPH Community, along with the continued exploration of New Media Architectures as a research topic . These initiatives including the Synaptic Time Tunnel research project for ACM SIGGRAPH, LA highlights the intersection of immersive virtual environments, arts, and sciences while emphasizing collaborative innovation within an online community context

### Future Research Directions

Looking ahead, my research focuses on advancing NMA exploring the challenges of embodying new AI tools in immersive knowledge discovery within immersive AR,VR, XR frameworks. I am actively investigating the following:

- Exploring AI for real-time immersive environments in arts/design education and scientific visualization contexts
- Developing collaborative frameworks for interdisciplinary projects that bridge gaps between art, design, and science, such as partnerships focusing on activating urban areas
- Expanding the accessibility of immersive technologies engaging contemporary cinema, performance, theater, and music – sound works

Investigating NMA as a speculative design framework has the potential to address more clearly our existing societal challenges, including equity in education, immersive narrative creation, and sustainable design planning of information in AR, VR, XR media spaces.

#### Broader Impact

The interdisciplinary nature of NMA fosters innovative approaches to redefining space and knowledge creation. By bridging arts and sciences, my work with the AlloSphere has addressed real-world challenges, such as climate change, through data-driven, collaborative experimentation. Quantum composition works interpolating into Quantum objects forming a spatial language is explored at different scales. Educational reform remains central to my practice, advocating for knowledge as a fundamental right. Supporting DigitalFUTURES International Initiatives have established a global perspective, promoting inclusivity and accessibility in education, as well as working with ACM SIGGRAPH DAC has created a platform for yearlong dialogue in the Media Arts Research and computational arts global community. Moreover, my work with speculative architectures and complex systems theory provides new frameworks for understanding and navigating our interconnected world through my individual consulting practice with NMA. This research encourages exploration of novel spatial representations and interactions, contributing to advancements in technology, design, and culture in broader Arts communities.

#### Conclusion

New Media Architectures represents an evolving field at the intersection of art, design, and science. My research trajectory aims to push the boundaries of Immersive Virtual Environments, generative arts/design, and technology driven media works while fostering interdisciplinary collaboration and societal impact. Through experimental frameworks and global outreach, I seek to shape the future of NMA and contribute to a more inclusive, accessible knowledge driven world as an advocate for “Research as a Human Right.”