

DISSERTATION ABSTRACT - LONG | Date: 2023.03.30@1925

Shaping Space as Information: A Conceptual Framework for New Media Architectures

New Media Architectures (NMA) will be introduced as a new field of research. In a series of designs, exhibitions, and studies, a New Media Architectural methodology is presented as a conceptual framework that will draw upon the strengths of the disciplines of art, architecture, media arts, and the sciences to form a new hybrid discipline. From those fields, three subareas of research form the field of *NMA*: Algorithms, Worldmaking, and Instrument Design.

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. Everything is information. Space is information. Complex Systems are information. Our world outside of our understanding is information; all movement around information links all of humanity together, commerce, the internet, and telecommunications. The use of self-organizing systems as a research challenge is a true reflection of how our world functions through our contemporary understanding of the sciences.

The problems that are engaged within the computational platform as a tool, the formal computational mathematical languages and structures are not used as a new spatial sensory paradigm for discovery. One question: at the dawn of a new era of Artificial Intelligence and Quantum computing, how will we shift the paradigm from the current limitations in domain specificity of the software, accommodating this new field of *NMA*? Additionally, how will we accommodate the spatial environment encompassing multi-dimensionality of dynamically varying data as information in the various sensory modalities (sight, sound, and the other senses). Each of the arts research areas has its own unique problems to solve, but focusing on how each one produces patterns and space in time reveals opportunities to explore and make new discoveries benefiting humanity as a whole.

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. As part of my practice in the media arts, I used the domain knowledge of architecture to tackle problems of art, engineering, and science to reveal form and shape.

The primary 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. This dissertation draws from the concept of complex systems to investigate relationships between the systems' parts and their whole and how the systems' parts give rise to its collective behavior. This notion of complex systems theory will be applied to the making of this new field. While the computational platform that controls our world uses information as data and has changed our societal progress, currently, the algorithm is the tool that generates the content and the model and makes the world and the information that resides within it. Complexity becomes an essential key for shaping space as information.

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. Revealing these manmade and natural systems requires a new conceptual framework for an emergent research field, an evolution of a series of investigations that combines artistic and lab investigations creating experimental works and prototypes. The challenges of each artistic immersive work or scientific visualization problem build on each other to probe questions of composition, narrative, and computational system logic. My independent experiments leveraging projects from the Four Eyes Lab and TransLab will be highlighted. The work with Dr. Kuchera-Morin and the AlloSphere Research Team will be cited as part of my contributions which are:

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