

# Synthetic Research

*Phillip Anzalone, Technical Director  
Avery Digital Fabrication Laboratory  
Columbia University Graduate School of Architecture*

Synthetic Research insinuates a relationship of a meticulous process of discovering truth contradicted against a fabricated, as in concocted, reality. It is important to recognize the logical aspect of synthetic when examining what synthetic research can provide for architectural discourse. Synthesis contrasts with analysis in that its primary methods involve recourse to experience; it is experience that is at the heart of synthetic research. The synthesis of theory, architectural constructions, technological artifacts and computational techniques requires experiencing the results of experimentation. Synthetic digital architecture necessitates a discovery process incorporating creation that allows for experience, be it virtual reality, full-scale prototyping or spatial creations; provided experience is a truthful one, and not disingenuous and thereby slipping into the alternate definition of synthetic.

Research's experimental arm, as opposed to the analytic, relies on tinkering - implying the unfinished, the incomplete, the prototype. Examples of this are everywhere. Computer screenshots are a strikingly literal example of synthetic

research when used as a means of experiencing a process. Performance mock-ups of building assemblies are a method of synthetic research in that one experiences a set of defined performances in order to discover and redefine the project. The watchmaker craft is an exercise in research/experimentation where material properties are inherent in function and aesthetics; consider how the components interact with the environment - motion, gravity, space-time, temperature. Efficiency at this point is predominantly structural and physical. Decorative or aesthetic elements are applied or integrated in later iterations along with optimization of performance, marketing and costs.

What is an architectural research? How can research synthesize the wide range of possibilities for the trajectory of architecture when engaged in digital and computational techniques? The goals, techniques, documentation and other methods of research production have a place in architecture that must be explored, particularly as it related to computation. As in other fields, we must build a legitimate body of research

whereby others can use and expand upon, such that digital architectures evolve in innovative as well as prosperous paths.

The traditional duality of discovery and application are reflected in the partitioning of the Synthetic Research node into Theoretical and Technical threads, focusing similar methodologies while engaging a crossover relationship. In the case of the works of the ACADIA 2006 Conference, technical research focus on abstract applications of predicting reality. Theory on the other hand explores technical constructions through an abstract filter. This reflexive duality speaks about the schizophrenic nature of research, while in all cases highly technical functions are explored through the theoretical use of technology.

The paper “Bidirectional Interoperability Between CAD and Energy Performance Simulation through Virtual Model System Framework” explores a merger between two important concerns, the integration of BIM into Architectural practice and the need to address sustainability at a technical level. Simulation and modeling becomes a theoretical approach to predicting reality. In a comparable method, “Shape Change in Responsive Architectural Structures - Current Reasons & Challenges” develops performative design techniques through the use of an innovative structural system (tensegrity) embedded with operational controls. Predictions of a future of architectural construction acknowledge a real application involved in active structures. In “Revitalization of Existing Buildings through Sustainable Non-Destructive Floor Space Relocation”, the author develops a predictive method of design modification through the use

of computational optimization search techniques. Methods of predicting optimized spatial configurations through abstraction of computer simulations allows for the testing of, or tinkering with, architectural space.

The theoretical thread includes the paper “Aesthetic Interaction: A Model for Re-thinking the Design of Place”, where embedded technological devices are theorized as an integral aspect of architectural space. The integrated computational elements are abstracted such that there is a fluid continuum in design and experience. Similarly, in “Flatness through Camera: The Implications of Camera Movement in the Digital Reconstruction of the Diamond Museum” the author dissects a computational construct in order to explore the relationship of space and time to the design. Here the technical abstraction of the camera actively engages our subjective perception of space. “Making Space Content Specific: Interactive Architectures for Information Presentation” builds an architectural interface in the computational abstraction of the digital machine. The interface of human and computer interaction is made flexible and spatial to provide a natural environment of interaction.

In both threads of the Synthetic Research node, the idea of research incorporates a bidirectional engagement between theory and technique such that the exercise exists in a state of permanent flux and fluid permanence. The art of production in experimentation - tinkering - unfolds into its own dialog such that multiple avenues of engagement are opened for the reader to use in their own thinking.