

AT FULL-SCALE | FROM INSTALLATION TO INHABITATION

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Abstract

In 1999, the University of Kentucky (then the College of Architecture, now the College of Design-School of Architecture) established a Digital Design Studio to combine the strong tradition of handcrafting in the existing design program with those technologically sophisticated tools shaping the profession for the 21st century. Over a six-year period, this all-digital design studio has developed from a pedagogical model for developing new different ways of seeing and making architecture to a proof-of-concept real-world experience to coalesce state-of-the-art visualization techniques with current expectations of practice. Creating dynamic links between students, industry, and the profession has enabled the School of Architecture to provide leadership for practicing architects, to create an effective dialogue between industrial and design professionals, and to incorporate successfully leading-edge design pedagogy with the more technological applications that will shape the future of architecture practice. The materials presented here reflect a sequence of comprehensive digital projects produced under my direction from 1999 through 2005.

1. Introduction

The materials presented here reflect a sequence of comprehensive digital projects produced under my direction from 1999 through 2005. These projects varied in scale, site, context, and material and represented a broad spectrum of design execution, from experimental installations to permanent inhabitations. They offered students from architecture, historic preservation, interior design, business, agriculture, and engineering the chance to explore a variety of digital software media and, in a collaborative framework, address issues of design, fabrication, and assembly at full scale. Reflecting the realities of the profession today, these projects actively integrated advances in software into the design process, allowing students to move beyond basic representation and documentation of the design concept to an advanced analysis and understanding of fabrication concerns.

2. Digital Design Studio

In the fall 1999 semester, in response to the growing trends in architecture pedagogy, to move toward digital integration, the School of Architecture offered its first all-digital studio. As the faculty placed in charge of this course, I was free to interpret the educational direction for the program. This pedagogical initiative continues to develop, forging innovative relationships with local and

national industry, while challenging the conventional notion and role of upper-level design studios. The six-years of full-scale investigations shifted freely from research-based initiatives to philosophical ones. As follows are the chronologically listing, the length of the studio exploration, and a brief description of those studios. See Figure 1.

3. From Installation to Inhabitation Installation

3.1. Installation

Fall 1999| Transcendence and Digital Media

(A Fifteen-week design project) A digital installation that explored the perception of virtual environments on “A Day Devoted to Architecture, Place, and Space” Public art, at the scale of an urban park, resulted in a collaborative project between students and the community. The studio provided an innovative forum for creative interdisciplinary research in the arts. Students learned how to use new tools for artistic expression while focusing on the conceptual development and the production of individual and collaborative short-form animations. The synthesis between the production of digital images and the process of construction in turn heightened the perception of space. In doing so, the studio designed, fabricated, and constructed a light wall

that measured 6' wide x 44' long x 12' high.

Spring 2000| Virtual Raves in Synthetic Landscapes (A Fifteen-week design project)

A digital installation that created a virtual architecture that blurred both the projections of the interior and the exterior to highlight the spatial and temporal differences between public and private space. In order to narrow the boundaries between the digital environment and the construction process, students worked closely with local plastic fabricators using the synthetic material *plastic* which seemed *natural* to our process.



Figure 1: Synthetic Landscapes Installation on the University of Kentucky campus.

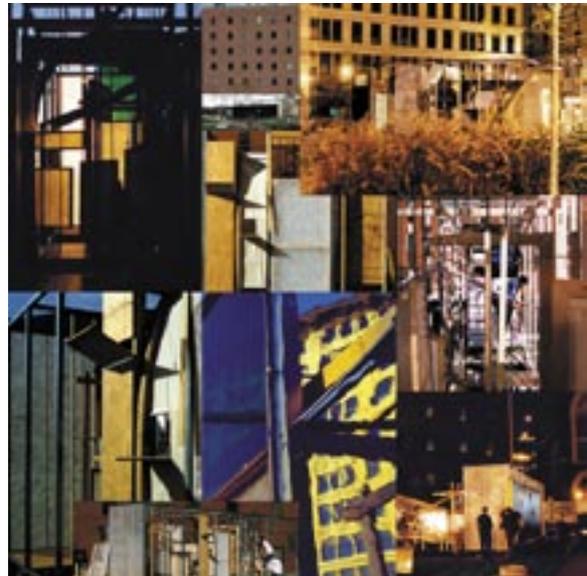


Figure 2: Synthetic Landscapes Installation at Founder's Square in Louisville, Kentucky.

Fall 2000| The Space of an Idea: Ideas for Living (A Fifteen-week design project)

A digital installation that sought to reveal the tension between the private experience and the public's perception of that space. To investigate new methods of architectural assemblage, the studio challenged students to transform the philosophical questions pertaining to digitalization into an operative condition that could adequately address the issues of contemporary living spaces.

Fall 2001 | Idea Factory

(A Ten-week design project)

A digital installation that used the concept of synectics to form an operative framework that would promote creativity. Synectics means the joining of different and apparently irrelevant elements into a unified whole. In this context, students interpreted the gravity-less space of the computer to explore design options for a conglomeration of business incubators known as the Idea Factory. A key concept that relates to synectics is the application of various trigger mechanisms to existing conditions that would allow the emergence of new thoughts, designs, and inventions. The students used this



Figure 3: Spaces for Rave (Student design by Aaron Anderson).

process as departure point to understand and develop office spaces and common “theater” spaces inside an abandoned commercial space in downtown Lexington.

Fall 2002 | Deep-Time Probe Wood Fabrication/Alabaster Stone Carving

(A Three-week design project) A digital installation called the Deep-Time Probe, Investigations in Light-Architecture explored the use of an optically active-SETI experiment that centers on the thematic of time, vision, and movement through space. The design for the structure, the accompanying information wall, and the overall placement of the exhibit, structured the physical and psychological experience of the visitors including them as part of the spectacle.

(A Six-week design project) A manual-to-digital installation conducted, in one weekend, under the guidance of a nationally acclaimed stone sculptor, the students created a 3-dimensional alabaster artwork. Afterwards, each student digitized their sculpture, extracted the derivative point cloud data, and then modeled them using the Rhino modeling program. Within two weeks of faculty-led workshops, the students had produced visualizations, scaled stereolithographic

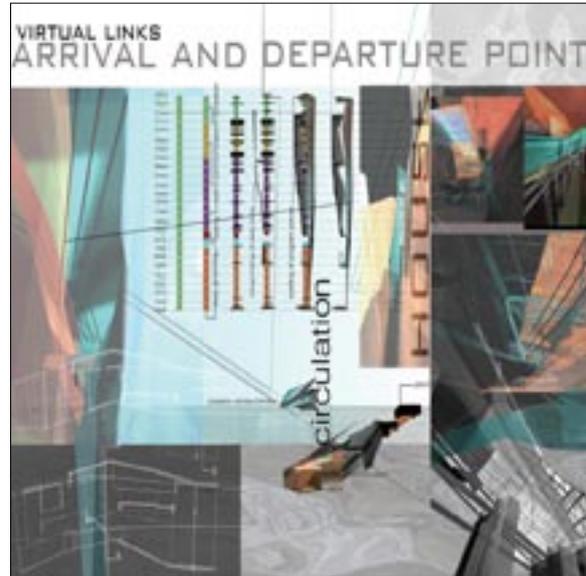


Figure 4: Virtual Arrival and Departure Points (Student design by Lisa Neidhardt).

models of their original stone piece, and developed a solid understanding of the software. Using the scaled models as an intermediary, the students then designed and fabricated full-scale wood bases in the school woodshop.

3.2. Inhabitation

Fall 2003 | Single-family, Affordable, Infill Development Strategies

(A Fifteen-week design project) The intent of the project was to design a range of cost-effective, energy efficient, affordable houses that articulated the unique relationship between the urban east-end landscape, the community’s history and culture, and construction techniques that are specific to the State of Kentucky. Students further developed these projects into a series of modifiable house plan alternatives that stemmed from strong community and neighborhood involvement in a series design charrettes that aligned with an ongoing Housing and Urban Development-Community Outreach Partnership Center (COPC) grant.



Figure 5: Idea Factory (Business Incubator) installation for the Kentucky Science and Technology Corporation (KSTC).



Figure 6: The Deep-Time Probe, Investigations into Light Architecture.

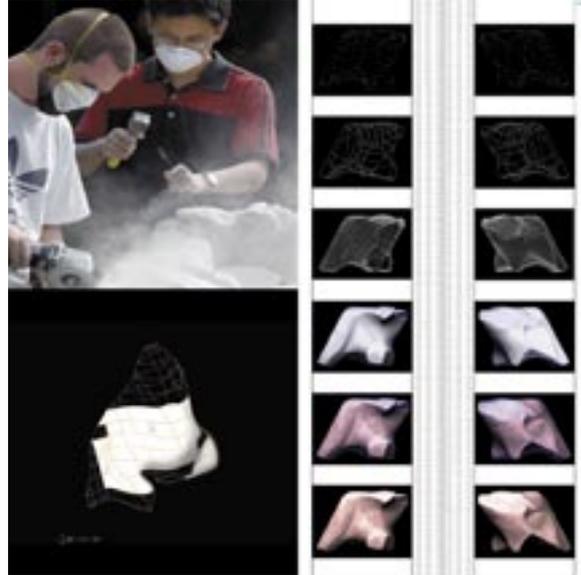


Figure 7: Hand-carving Alabaster Workshop with digital re-creations and visualizations used to translate the actual stone through point cloud data into digital models.

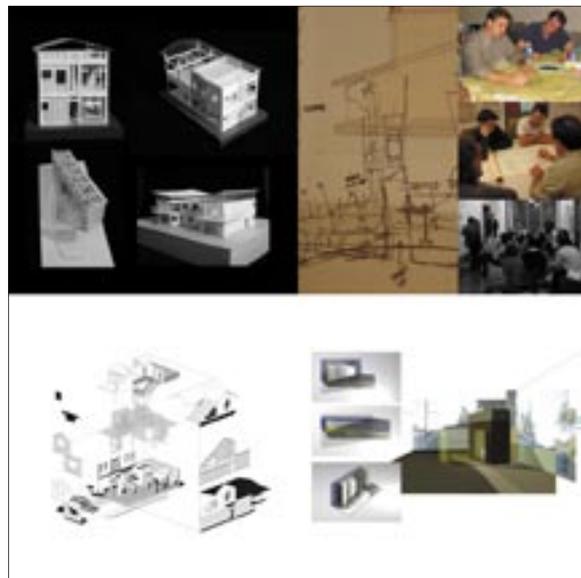


Figure 8: COPC investigations looking at potential strategies for developing affordable, modular construction.

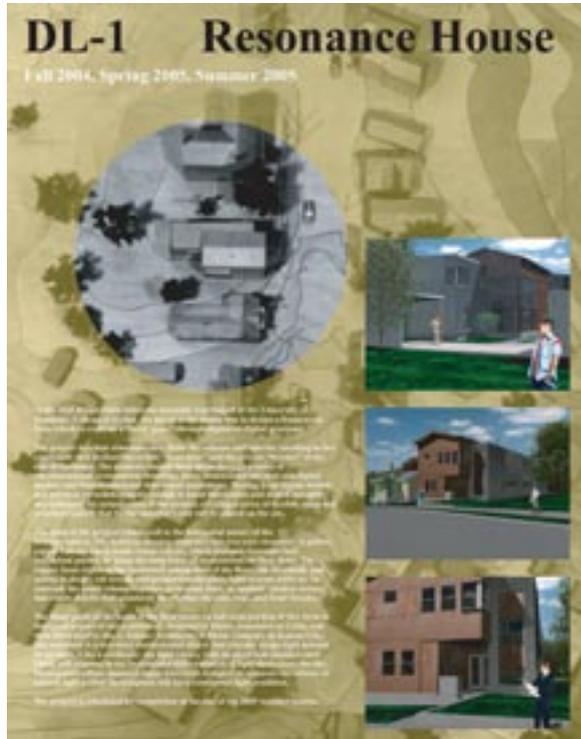


Figure 9: Digital-to-Digital fabrication studio project, DL-1_Resonance House®.

Fall 2004 | DL-1 Resonance House®: Infill Designs for Historic Neighborhoods

(A Fifteen-week design project) As the first design-build-fabricate-assemble experiment at our school, the intent of the studio was to design a framework from which to examine a “lived space” through digital-to-digital processes. Moving from digital models and physical stereo lithographic models to hand-fabrication and digital assembly allowed the students to move from creation to completion. As part of our holistic design process, the studio fabricated almost all components for the project.

4. Conclusion

In analyzing the previous years’ work, the project investigations define three bodies of work: the use and properties of materials, how digital technology challenges the conventional notions of space, and lastly, the occupation of that space. Collaborative design reviews internally and externally vetted the solutions to

determine the feasibility and economics of a particular project. Individual investigations or team explorations often resulted in exhibitions that involved digital media experts and students ranging from engineering to architecture, and the fine arts. The capstone projects from those listed above include the Transcendence Light Wall (Louisville), the Rave Temporal Occupations of Industrial Ruins (I-75), and the Deep-Time Probe-Investigations in Light Architecture (Lexington). In these case studies, the projects respectively represented the first design/build experiment at the school, the first use of digital fabrication, and the first permanent installation of student-driven collaborative design work. The lessons learned from these investigations have helped enable a focused endeavor on subsequent “digital-to-digital” projects including the DL-1_Resonance House® in downtown Lexington. The necessity of full-scale investigations coupled with industry support, multi-disciplinary collaboration, and corporate sponsorship has greatly enhanced the studio experience for my students. Not only do the students explore the use of materials in design, but they also understand how the visualization and the documentation of their projects has shifted away from what from what the project looks like to focus more closely on how their architecture is structured, assembled, and illuminated. These answers often challenge the selection of materials, the use of color,

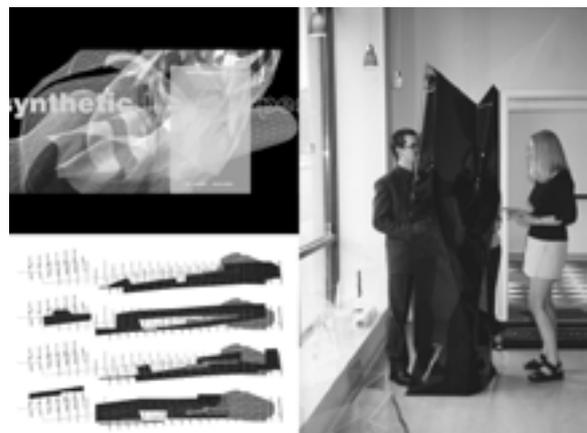


Figure 10: (a) Synthetic Landscapes Studio, Publication Cover, (b) Spaces for Rave – Temporal Occupations of Capitalist Ruins (Student design by Aaron Anderson), (c) Plastic Fabrications (Courtesy Regal Plastics).

and the designation of light, shadow, and the reading of the space not only inside the work, but also outside in the immediate context. Over a six-year period, this all-digital design studio has developed from a pedagogical model for developing new ways of seeing and making architecture to a “proof-of-concept” experience that blends state-of-the-art visualization techniques with contemporary expectations of practice and construction. In doing so, the studio investigations from 1999 to 2005 have successfully built a definitive foundation for future projects.



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Areas of Interest include Design, Fabrication, Historic Preservation, Photogrammetry, Flexible System Design, Visualization, Architecture, and Urban Design.