THE VISIBILITY OF RESEARCH

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Making as Methodology: Digital Design + Build Studio on the Atlanta Beltline

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ABSTRACT: The gap between the description of a thing and the thing itself has been the subject of inquiry dating back to the Platonic construct of the Ideal. In today's construction industry, this gap could also be understood in terms of the relationship between the design representations of the architect and the material constructs of the builder during the actualization phase: the act of translation from drawing to building. The traditional process of interpreting design intent into constructible form has long been established through the system of shop drawings, submittals and specifications. This process of interpretation and translation is a contested space riddled with perceived limitations, miscommunications, and ambiguities. It also represents a vast territory for research in light of the computational tools and technologies such as Building Information Modeling (BIM) and Computer Numerically Controlled (CNC) equipment that have emerged both in practice and academia. These tools are transforming the Architecture, Engineering, and Construction (AEC) industry and are creating new opportunities to increase creativity, quality, and efficiency in the built environment via shared representational frameworks, process protocols, and material implementations.

This poster will serve as a case study for a recent digital design + build studio in the CENSORED which engaged with the issues described above. This vertical studio was composed of graduate and undergraduate students who worked with the Atlanta Beltline Inc (the agency responsible for the design and implementation of Atlanta's new 22-mile transit corridor) to design, engineer, construct and install three full-scale structures that were parametrically design, digitally fabricated, and built from low-grade wood; all by the students. The projects each created a threshold condition on the Beltline marking a point of transition from one section of the corridor to the next, as well as created a unique tectonic construct made from very humble sustainable construction materials that underwent a type of digital alchemy in the way in which they were configured, detailed, manufactured and assembled. The students were required to take a project from 'concept to construct' in the span of a single semester. Each team moved quickly through the traditional design phases of site analysis, programming, and concept design and into design development and construction drawings with detailed shop drawings and digital cut files for a 5-Axis CNC router. The structures where then digitally fabricated in the CENSORED and assembled and load tested on site before being inspected and approved by the Atlanta Beltline Inc officials. These structures were all designed to be safe, stable structures within a very demanding public environment and all three structures performed well.

In structuring the pedagogy with such a strong emphasis on real construction materials, structural requirements, design detailing, logistics and assembly the students gained an extraordinary amount of experience and understanding for the art of building. The studio platform required the students to consider the material logic and construction process as integral to the design process rather than as an afterthought left to the engineer or builder.

Place as Scaffolding: Temporary Visibility / Permanent Imprint

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ABSTRACT: Every part of the world can be identified by the design and construction methods, developed over decades by its inhabitants in order to suit their place of belonging. These methods, in a sense, are taken as 'local', or vernacular to that place, culture and community. However, one construction technique remains unvernacularized, a method common to all human design and building processes throughout the entire world: scaffolding. With its analysis, one can start to understand how the purity of a skeleton built as architectural armature may have defined places, however temporary or 'invisible' the structure was. Scaffolding has always been an internationalized vessel, which brings infinite architectural possibilities to many parts of the world and, acting much like an imprint, leaving traces of its presence behind.

However, unlike the vernacular, the contemporary international style of architecture is undefined, yet quickly progressing. As the vernacular method begs for local materials, the contemporary style of architecture seen internationally tends to trade details made through local construction for the practicality and affordability of pre-fabricated parts. The scaffolding method, as place-maker in architecture for its interaction with permanent buildings and the process of making, has an intricate role and a legacy attached to these changes. Inferring that one could define the vernacular as permanent and the international as temporary, this research proposes that, to bridge the gap between vernacular and international architecture, scaffolding can be analyzed as metaphor between permanent and temporary architecture.

The research proposes a framework defined by the characteristics of tectonics, boundaries, and transition – these notions then are developed within three major relationship groups: cultural, spatial and material. Case studies such as inherited environments, vernacular methods and structural concepts provide specific, tangible details and the framework compares objects, interprets similarities, and extrapolates an architectural response implied by the historical evidence.

The objects analyzed are photographs and graphic representations of the exemplified case studies, images which become vessels for the understanding of cultural influence in architectural technique, and the comparison of scaffolding to the ways in which design is structured. As objects of analysis, they enlighten aspects of cultural influence, colonial and civil impacts, geographic characteristics, and so on – all factors which are influence to the legacy of scaffold in the architecture that followed, and made visible by the way it is build, used or represented.

Just as vernacular architecture differs from international style, and temporary visibility speaks to permanent imprint, in seemingly opposition there is a correlation between them embedded in the method of scaffolding. Our design thinking as architects can also be compared to scaffold itself - how do we as designers construct our thoughts, what is our own form of ‘bracing’? And if there is one, should it be made visible? Parallel to the concept of ‘temporary architecture’, scaffolding begs the question of whether or not the real permanence of architecture is in the deconstructed, the thorn-down, the non-solid; this poster explores the idea that buildings are reflections from the scaffolding with which they were erected.

Assembling Appalachia

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ABSTRACT: Assembling Appalachia is a research project that considers the interplay between text and image as a form of the production of knowledge. This poster and associated text recognize and seek to expand on the potential for images to propose new structures and points of access for research practices, allowing images to be integral to research, and not strictly the result of research. While recognizing the autonomy of the image, this work follows the philosophical position that works of art are their own forms of cognition and truth, and furthermore, are producers of context.

The images link themselves to the sense of some country undiscovered, and to something formerly hidden. Without revealing everything, they also sponsor an expansive dialogue. The work of Assembling Appalachia locates affinities through the range of media that fill out the cultural landscape of Appalachia, and grounds the work in a series of images that will become the reference through which the region is explored, and contemplated.

This poster presents a single image, caption, location of image, and supporting text in order to weave together and construct the context of a research project in its early stages. The work presented considers the ways in which images and text may be co-involved in the development and articulation of research agendas. This particular project advocates for the involvement of images, especially in the early stages of research to be significant contributions to the shift in perception that ideally accompanies any work of research. The project is fundamentally about creating the access to underlying orders and the opening and shifting of perception afforded by images, the making of images, and the questions that arise in this dialogue.

At this stage, the images fall into three categories: order, preconception, and contingency. It is through the relationships and overlaps of text and image that the complexity of discoveries that are to be found in the

region begin to be suggested. For example, the interplay between the single word, order, next to the title, the primitive hut, next to the image, a nylon and aluminum framed tent covering the trace of some gathering, suggests a way of seeing and thinking about the place that is at once specific and open. The photographic manifestation of the work finds a reference through the existence of traces, outcomes, and projections of architecture's participation in this contextual production.

The work advocates for the potential of visual research to contribute to the more broad discourse on architecture and culture, not standing in as props, or literally increasing the visibility of research per se, but of acknowledging that the multiple ways in which the complex and emerging patterns of culture may be understood, are in part at least, accessed through visual literacy and the models and modes of thinking that resonate with the activity of research itself.

Affordable Housing with SIPs - A Design-Build Project in Historical Frenchtown, Tallahassee, FL

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ABSTRACT: The SIPs house design presented herein is a Design-Build project initiated by the School of Architecture of Florida A&M University to draw attention to energy-efficient solutions for low-income housing. The goal of this project is to demonstrate the merits of using Structural Insulated Panels along with simple and efficient design concepts in the cost sensitive market of affordable housing.

The design presented responds to the requirements of an existing vacant site located in the Frenchtown District, a historical and low-income neighborhood in Tallahassee, Florida. This design-build project is being developed in partnership with the City of Tallahassee and the Frenchtown Community Development Center, a not for profit group involved in building affordable housing projects. The Frenchtown CDC is providing an existing site ready to receive the first house prototype. The design-build component of this project presents an opportunity for students and faculty to share design ideas and also physically participate in the construction of a house. The design featured on the poster only presents the design component of the overall project. The construction phase has not started as of yet.

The three-bedroom house sits on a 0.1 acre lot and features 1200 sf of conditioned space along with a single car garage. The main space combining living, dining and kitchen forms the core of the house and opens to a south-facing porch while the garage and bedrooms create a buffer to the west and north. The wrap-around porch while a historical feature of the Frenchtown District also helps shade the west façade.

Space planning strategies include maximizing open living spaces, reducing hallways and bedroom sizes while allowing adequate storage space. Sustainable features include increased insulation values (R20 walls, R38 roof) which made possible the installation of a smaller high-efficiency heat pump system. The southern exposure of all living spaces allows daylight harvesting with views to the outside. Our approach with regards to materials focused on issues such as recycled content (fiber cement siding), low VOCs (paint, formaldehyde free SIPs panels) and simple construction detailing (sealed concrete slab on grade).

This project will help illustrate the competitiveness of SIPs with regards to hard costs while accepted studies have demonstrated significant long-term savings due to lower energy consumption.

In addition to its flexibility and speed of installation SIPs panels provide a high quality building envelope which increases energy efficiency, indoor air quality and acoustical comfort. It also supports a variety of cost efficient exterior finishes requiring limited maintenance. As a consequence and as our cost analysis will show, building affordable housing with SIPs presents unique advantages especially when it comes to meeting the challenges posed by increasingly stringent energy code requirements associated with publicly funded housing programs.

Standard Visualizations of Architectural Concepts in Support of Architectural Education

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ABSTRACT: Although Building Information Modeling (BIM) is widely accepted as a powerful tool for architectural production, explorations indicate that it can also be used to aid conceptual design by producing standard diagrams, drawings, and expository views. Students often struggle with how to present their architectural ideas, constraining the time available to explore alternatives and develop more complex ideas. Naïve presentations can often intrude upon recognition and assessment of complex and sophisticated ideas. BIM can be used to focus upon architectural issues by "factoring out" graphic arts issues that often confound the evaluation and assessment of architectural design quality.

Diagrams have been used at the beginning of design and after design. The concept of graphic thinking employs diagrams to isolate ideas and has been suggested as an essential part of design cognition. (Laseau 1989). Diagrams have been used to isolate concepts in the description of architecture, a "post-design" analytic function (Clark and Pause 2012). In the BIM-assisted process, the diagram is automatically generated simultaneously with architectural design, leaving the designer solely with the challenge of interpreting, understanding and assessing the diagram and ideas expressed in it. The research is a provocation to those who ascribe extreme importance to diagramming during an early conceptual phase of design. In this approach, the diagram is a mere by-product of explicit architectural thinking and modeling.

In this study, students in sophomore design studios were provided with template files created for Autodesk Revit BIM software to structure their production of printable sheets describing architectural designs. The technique relies upon parameters encoding concepts from architectural theory and standard visulizations. The students developed 3D models in the BIM environment and provided parameter values to express design intent. Although other parameters can be used, example parameters are shown in Table 1.

By applying room plans, area plans, filters to override default graphic qualities, and visibility graphics settings, the software isolates particular concepts and portrays them diagrammatically. As the student produces a design within the BIM environment, visualizations such as diagrams, plans, sections, elevations, perspectives and renderings are produced automatically or with a small amount of effort.

Thus far, the researchers have only devised the diagrams and templates and tested them in several design studios. The method is easy to use and effective in enabling all students to reach a similar high level of quality. The students are better able to focus their time and attention on architectural issues rather than drafting and graphic arts issues. Projects can be evaluated more objectively because the graphic design and drafting is held to a constant high quality, removing graphic design as a confounding variable in architectural design assessment.

Arguably the technique may act as a "crutch" that enables students to avoid thinking carefully to portray their design concepts. However, comparison of design ability of the students who use the technique versus students who use conventional techniques is confounded by too many factors to be achievable. Resolution of the conflicting viewpoints about this approach may only be achieved through many years of experimentation. Researchers at many schools could exchange templates and perhaps even build a standard template for portraying issues in architectural theory. The idea behind this research, that issues in architectural theory may be incorporated into a BIM and visualized automatically by software, may open a new and stimulating direction for further research.

Responsive City

Susannah Dickinson, David Gonzalez, Kyle Szostek
University of Arizona, Tucson, AZ

ABSTRACT: William Mitchell, in 'E-topia' wrote that because of the digital revolution of 'bits' traditional urban models were no longer valid. He defined the new urban condition as "lean, green cities that work smarter, not harder. Their basic design principles may be boiled down to five points … 1. Dematerialization, 2. Demobilization, 3. Mass customization, 4. Intelligent operation and 5. Soft transformation." This poster shows the work of a student research proposal from the University of for a desert city set in the year 2087 that would incorporate Mitchell's design criteria. The project, 'Isomorphic City,' develops a truly customizable and ever-adapting built environment which was shaped by environmental issues, virtual reality and social media. While conventional land use is rigid, the proposed relationship of physical and digital space allowed for a dynamic environment that could meet the direct needs of the inhabitants, in real-time, during the course of each day. 'Programmable matter' was utilized as the building block for the community, (digitally) creating form-finding aggregation. City dwellers would have direct control over the programmatic functions of their city while at the same time the environment would set parameters limiting the excessive and negligent use of resources. This allowed the city and its inhabitants to become symbiotic within the natural ecosystem of the desert. The vision predicted that digital designers, programmers, developers, architects, and environmental experts would constitute the main demographical work force required to maintain the city. "If you want adaptability, responsive software beats reconfigurable hardware…..it is no longer the architectural programmer who controls space use, and thereby expresses power; it is now the software programmer." (William Mitchell, Me++: The Cyborg Self and the Networked City, 2003)

The design anticipated that a more advanced form of transportation would emerge for individual transportation. Traditional streets take up space and damage the environment. Roads within the 'Isomorphic City' would recalibrate and manifest as they were needed, and their matter would be repurposed when not in use. A Diffuse Limited Aggregation System (DLA) was used to digitally generate a new street grid for the centralized cores. The digital plaza, the new hub of the city, would allow for virtual and surrogate travel; eliminating the need to travel far distances by means of connecting a local space to a long distance digital space.

The poster discusses developments in digital methodologies that incorporate real-time, live data into the parametric model rather than using simulated datasets or archived data that most projects use to date. Form was the result of live information verses the making of form in an 'object-like' fashion. Going from a rule based way of simulating the complex urban condition to a more human agent-based approach based on collective data, which is more appropriate in our information age. "It is becoming increasingly necessary, and increasingly possible, for the form-maker to re-immerse himself in the form-giving dialogue." (John Frazer, An Evolutionary Architecture, 1995)

A Platform for Architecture: Hacking the Franchise Landscape

Sara Dean
College for Creative Studies, Detroit, MI

ABSTRACT: The aesthetic of the franchise landscape is that of flatness, blankness, and horizontality. It is a surface logic; constructed of container structures, predictive repetition, asphalt, surfaces that are truckable or not truckable. Our experiences in this landscape are predictive. They are indifferent to geography, time and proximity.

Although this landscape has proliferated for half a century, I contend that it isn't until now, with the ubiquity of digital platform space, that we are able to respond to the franchise landscape as an architectural act with spatial logics of its own. The spatial apparency of this landscape, and the design potentials of predictable, repeating systems, can be found in its digital counterpart.

Aggregate platforms encompass our digital experiences. Aggregate platforms do not produce content; they are systems for receiving and directing content. The architecture of these systems is their mode of operating, apathetic to scale, program or subject. As a physical counterpart, the franchise landscape can be seen as a similar set of priorities. One-of-a-kind design, icon architecture or monumental acts disappear in a space designed to valorize temporality, accumulation and flexibility.

Digital aggregate platforms make their operations apparent. They broadcast their system logics through related content, trends, views, likes and dislikes. And the apparency of the system leaves them open for opportunistic intervention. To engage architecturally with the franchise landscape, we must similarly take on an aesthetic apparency, using the visual language and cues of the system as our design tools. In a system that neutralizes content and variation, the most potent tools are those that seem to be part of the fabric of the space; that misdirect through their transparency and camouflage. Architecture can have agency by taking up the uncanny valley of surface logics, asphalt and utility structures, to leak, misdirect and hack the space. Agency is found through the understanding of thin, sprawl space as an operational system rather than a spatial condition.

Staging: Making Visible

Peter P. Goche
Iowa State University, Ames, IA

ABSTRACT: Our experience as occupants of a particular setting begins with the impulse to instantaneously scrutinize everything. This impulse is sustained through an often precisely choreographed threshold. As architect and artist, my goal is to assist the occupant in maintaining their initial ontological wakefulness through staging, often-temporary assemblies within a host space and thereby enhance its topographic fidelity.

In this photo-essay, I will illustrate the role of staging as a means to reveal the experiential nature of lived space using a series of video stills developed in effort to document and study the situation of people with respect to Water Hutch, an ethno-specific research assembly designed and constructed by Peter P. Goché. Reminiscent of the many waterways that meander through the Midwest, the work consists of a sinuous line made up of three oxbows. The constituent forms are constructed of built up dimensional lumber. The set of parts serve as an ambiguous measure by which people situate themselves. It might best be understood as a set of objects or trace that indicates the presence of, and makes clearly recognizable, its context as referent rather than source or setting. It operates metaphorically as an open set of shelves onto which people, and thereby, memories accumulate. This work might best be understood as a set of objects or trace that indicates the presence of, and makes clearly recognizable, its context as referent rather than source or setting.

Each inquiry is part of a process by which the humanity and sensual experience of a particular setting is revealed. The resultant staging yields what Joan Simon calls a socio-graph, a support system for the occupation of an environment. To this end, the act of making visible assists in cultivating place-based knowledge. It is an embodiment of an interdisciplinary agenda that embraces the artist as craftsman, choreographer and scribe in an effort to cultivate the cultural essence of lived space.

SOS: The Unnatural Disaster, the Architect, and the Built Environment

Vaughn Thomas Horn
Tuskegee University, Tuskegee, AL

ABSTRACT: Since 2005, “unnatural” disasters caused by inadequate response to weather events and gentrification have unearthed socioeconomic inequities on a global scale. More specifically, the need for shelter in response to such calamity has been grossly inadequate, and at times apathetically dissonant.

In this poster, I argue that events like the “informal” housing crisis of Blikkesdorp in South Africa and the aftermath of Hurricane Katrina which disproportionately affected African Americans, renters, people with low incomes, and the elderly both posed missed opportunities for architects to act as second responders in hazard response. Essentially, how then can the practice and pedagogy of architecture protect every citizen’s right to durable and satisfactory shelter amid widespread destruction of the built environment cased by conflict or natural disaster?

As a full-time professor of architecture at Tuskegee University, I was inspired by an ingenious solution by Tina Hovespian, an alumnus of the University of Southern California, who created Cardborigami, a recyclable cardboard shelter intended to shield displaced citizens from the elements. In her research, Hovespian focused on the residents of Los Angeles’ Skid Row district, characterized by its squalor, drug use, mental and physical health disorders. As a result, I dove-tailed the theme of displacement with the subsequent fall semester in third-year design studio. My students addressed the socioeconomic impact of hazard response through two design problems. First, I challenged my students to construct full-scale, renewable, and water resistant shelter prototypes. These prototypes emphasized privacy, atypical of evacuation shelters. Second, I merged the cap-stone design problem with ongoing research for mass evacuations by the Alabama Rural and Urban Design Action Team (RUDAT) in the wake of the North Alabama Tornadoes. In this poster I examine how architectural pedagogy can supplement governmental initiatives and affect policy making.

Whether a refugee, or evacuee, or displaced resident, theses adjectives describe humans who are victims of circumstance, and I argue that architects should be driven by a higher humanitarian calling to provide adequate living conditions for them in the face of catastrophe. This poster is written to promote collaboration among architects, academics, planners, and government agencies to be proactive against future “unnatural” disasters. These guiding principles address the specific needs of internally displaced persons worldwide.

The Book Stacks at the New York Public Library

Andrea Hunniford
University of Waterloo School of Architecture, Ontario, Canada

ABSTRACT: The New York Public Library, overlooking Bryant Park at 5th Ave and 42nd Street and built just over a century ago, is currently the centre of attention in the ongoing debate of the future of libraries in our increasingly digitized world. Current renovation plans call for Foster + Partners to reimagine the closed book stacks - the seven level book storage system - as a new publicly accessible circulating library, incorporating a book collection, group workspace and greater computer access. The renderings of this space, released in late December 2012, show the complete dismantling of the existing stacks and the creation of several mezzanine levels and a new central staircase, all oriented towards Bryant Park.

Discussions of the dismantling of the book stacks at the New York Public Library raise interesting questions about the architectural importance of this unique example of book storage and retrieval infrastructure. I am interested in how architectural research can be used to tell the story of a space. Drawings, photographs and words can illuminate qualities that may have been taken for granted, can bring to the fore issues that may have been invisible. This story becomes even more interesting as the space in question is on the verge of destruction, transforming from physical reality to existing only in memory. At this point, research can take into account both what is and what has been.

Prototyping for the Homeless: Design-Build as Research

David Kratzer
Philadelphia University, Philadelphia, PA

ABSTRACT: “Architecture is not the first thing that most people think of when they consider how best to help the homeless.” (Sam Davis, Designing for the Homeless, Berkeley: University of California Press. 2004, p. 13). Fourteen architecture students of a socio-political + design-build studio at Philadelphia University were given the task of programming, designing, and prototyping twenty-five new dorm stations for a women’s safe haven homeless shelter in Philadelphia administered by Project HOME, the largest homeless agency in the region. The fabric covered office partitions used for privacy were removed after repeated bed bug infestations. The lack of privacy caused agitation amongst the residents. It was becoming more and more difficult to maintain an orderly and safe environment.

Through initial research methodologies such as client interactive workshops, prototype mockups, and interview of facility staff and residents, three primary design dichotomies emerged. The students were to:

1. Create an “insect unfriendly,” easily cleanable, environment while providing a “person friendly” place.
2. Create durable, cost effective constructions while providing comfortable, appealing places.
3. Create a visible, safe environment for residents and caregivers while providing opportunities for respectful privacy.

The client added the requirement that the dorm stations were purposely not to be too “nice.” If the design was too comfortable residents would not want to leave. Current trends in homeless services support “rapid re-housing,” a national best practice of moving the homeless quickly into permanent housing instead of emergency shelters. Simply providing a “home” does not solve the problems of homelessness and it became apparent that much research would be necessary to tune the designs to the realities of the homeless condition.

Utilizing evidence based design methodologies through prototyping in a workshop format, the project team was able to gather a generous amount of research on the subtle effect the dorm stations have on the behavior of the residents and staff. For example, the area around the resident’s head became a very critical area for impressions of safety, respect, visibility and privacy. Residents complained of the disturbing sensation of waking to find someone watching them. Resident storage areas became markers of territory and the most valuable items are stored at the headboards in drawers or under on the bed. Residents felt safer when others could see/ hear them from a distance while the partitions translucency offered a minimal amount of privacy.

This poster chronicles the “design-build as research” methodologies the studio utilized to understand this problem, program the client’s needs and prototype a solution. The Project HOME client team included the facility director, a social case worker, the director of Project HOME facilities, the VP of property and asset management and a few residents. The interdisciplinary design team included Philadelphia University architecture students, graduate occupational therapy students, and an industrial design thesis student. The stations are currently in fabrication and will be installed by January 2013.

On the Visibility of Computation in the Design Studio

Dave Lee
Clemson University, Clemson, SC

ABSTRACT: This poster addresses the problem of the computer being simultaneously ubiquitous and underutilized in architectural education as a beginning design principle. The current problem is not the lack of accessibility or use of computers, but the task of making visible computational thinking[i] in the education of the design student.

In both cases the computer (and its software) are seen as a passive design tool.[ii] This is because the image is being privileged over design quality – the 'money shot rendering camp - or as an elitist subculture fetish – the robo-para-generative-digifab group – on the fringe of architecture. Further, they remain to be viewed as pen and ink were before digital technology, as merely tools used to make ideas visual.

Learning how to use a computer, or to think computationally, is often misunderstood with learning how to operate within the parameters of a software package. A computer, in this case, is reduced to a technical device incapable of becoming an integral part of a design process and only useful in 'aiding'[iii]. For this reason, architecture schools have pushed computer learning away from the design studio – where design fundamentals are introduced – and into elective coursework where it is thought of as secondary to one's education.
The fundamental design principles of the information age, however, now include computation at their core. It is important to introduce computation early in a design education because of the cumulative learning implications provided by a foundation in computational understanding.[iv]

This poster presents a novel approach to teaching computational thinking in the delivery of a foundation level studio where students are introduced to computing without the use of digital technology. By removing the 'laptop' from the design setting, students and faculty are able to approach topics such as constructing an algorithm without fear or preconception of technological implications.
By incorporating analog computing at this early stage of design education, students become more capable of 'designing with' as opposed to 'making with' when introduced to computer software because they understand how and why the tools they are using work. They are able to resolve problems that are incredibly complex, right away, whereas with digital tools a significant amount of technical learning must occur. Additionally, problems often overlooked when beginning a design strictly in a digital setting, such as the structural intimations of material properties across scales, are made tangible and approachable in a studio setting.

[i] Senske, Nicholas. "A Curriculum For Integrating Computational Thinking" in Cheon, Janghwan, Steven Hardy and Tim Hemsath, ed. ACADIA Regional 2011: Parametricism SPC. University of Nebraska Lincoln, College of Architecture, 2011: 94-95.
[ii] Akin, Ömer (1990) Computational Design Instruction: Toward a Pedagogy, The Electronic Design Studio: Architectural Knowledge and Media in the Computer Era [CAAD Futures '89 Conference Proceedings, Cambridge (Massachusetts / USA), 1989, pp. 302-316
[iii] Maeda, John. Design by Numbers. Cambridge: MIT Press, 1999.
[iv] Author, 2012.

Superthickness: A Genealogy of Architectural Control in Interiors from Surface to Volume

Andrew Santa Lucia
Oakton Community College Skokie, IL

ABSTRACT: This poster argues that there is a contemporary practice within the domain of interior space that architects are actively mining for new disciplinary possibilities. I call this graphically derived volumetric practice within the interior, Superthickness. The three iterations of Superthickness on which I will focus are textured/extruded graphics on wall surfaces, ambiguously defined furniture/walls/volume and spatially derived graphic signage outside of traditional way finding. This study will show how a genealogy of graphic oriented surfaces finds origins in the commercial Victorian era, the early 20th-Century Arts and Crafts, and in the 1970's pop-cultural practice of Supergraphics. In both effect and realization, Superthickness pushes graphics out of flat, decorative and/or abstract surfaces, creating physical volumes within interiors. As a contemporary condition, architects are doing more with interior surfaces than purely dividing spaces. In this practice of activating surfaces volumetrically, architects have enhanced the scope of their cultural production through disciplined transactions with interior decorating, interior design and graphic design.

This focus on surfaces emerges through three different points in modern history. First, Ornate Graphic appliqués and organic patterns on interior walls become mainstay during the late Victorian era between 1890-1915. (fig.1) Second, the Total Graphic of the Arts and Crafts movement during the beginning of the 20th century showed an attempt to graphically control the room in totalizing ways, both visually and

physically. (fig.2) Last, during the late 1960s and 1970s, Supergraphics became emblematic of a pop-sensibility that used larger-than-life graphics on wall surfaces to achieve faux-spatial effects. (fig.3) This genealogy will show how the development of autonomous and highly stylized interior surfaces developed, at points trying to emulate architectural effects and at others trying to create new ways to affect the overall interior volume. Superthickness emerges within the last 10 years and has pushed the disciplinary identity of architecture to include techniques and strategies outside of normative practice, yet steadfast in an ultimately spatial commitment. (fig.4)

There has been a recent resurgence of architects pushing the disciplinary boundaries of what they do through interior experimentation. In this sense, Superthickness operates as another entrance point for architects to interject themselves back into the popular discourse on the interior and create a new visibility for contemporary practice in a broader cultural sense. As a result, this study is integral today because it will shift the focus of the interior from surface to volume, and bring the discourse back into the realm of architectural production.

Good Enough for Government Work: Conservation Based Residential Design Criteria for Affordable, High Performance Dwellings in Central Vermont

Matthew Lutz
Norwich University, Northfield, VT

ABSTRACT: Approximately eighty-two percent of households in Vermont earning under $41,000 annually[1] direct more than one-third of their income toward mortgage and housing costs. Couple this statistic with the fact that Vermont ranks sixth highest in the United States[2] in terms of annual heating demand and it becomes clear that the challenges of home ownership for lower-income households can be overwhelming. In addition to the lengthy, sometimes severe heating season, approximately eighty-five percent of Vermont's forty-eight billion BTU's for residential heat demand[3] comes from petroleum-based products. Globally influenced price fluctuation of these products is a financial planning wildcard for households operating on thin margins.

As one of twenty houses planned for exhibition in the United States Department of Energy's Solar Decathlon 2013, this project took the challenge to design, develop, and build a one-thousand square-foot high-performance, solar-powered prototype house that can be afforded by households earning eighty percent of Vermont's median income. With a construction cost estimated at $145,000 and a building integrated photovoltaic array, the prototype house was designed to achieve a net-zero-annual-total of primary energy demands and eliminate dependence on off-site utilities for electrical, heating, and cooling demands.

Using the six basic Passive House U.S. performance characteristics as targets for energy performance, and designing an envelope system that corresponds to factory-based modular housing assembly line conventions, a multidisciplinary group of faculty and students developed an alternative to conventional low-income single family dwellings. The product of this effort, a prototype called the ΔT90 House, will be on public exhibit in Irvine, California during Solar Decathlon 2013. During the competition, the ΔT90 House will demonstrate the scientific, financial, and architectural benefits of exercising a conservation-based approach to residential design.

Energy performance modeling software like Therm 6.2, WUFI 5.0, and PHPP 2007 show fine-tuned balancing of up-front cost and long-term energy conservation and allow for a deliberate, informed approach to the architectural decision making process. Thus, this poster ultimately examines specific building science as well as broad architectural aspirations in an effort to produce widely available affordable high-performance dwellings.

[1] 2007
[2] 2009
[3] ibid

Lessons Learned: Using an Electronic Drop Box to Disseminate Student Originated Research

John McDermott, Mitch Stepanovich
University of Texas at Arlington, Arlington, TX

ABSTRACT: Hard pressed people usually look for available and ubiquitous alternatives to their declining resources. Eons ago when people figured out that wood was more valuable as a cooking fuel than as a building material they responded with mud bricks. Today resources like funding for higher education are scarce. One way for enterprising faculty, staff and students to deal with their two most critical declining resources - money and time is to seek to stem the rate of decline by looking beyond the known potential of search engines to some of their other features. This proposed presentation will focus on the "Lessons Learned" from a one year experiment in using a student initiated and managed "Drop Box" as a learning resource in a fourth year undergraduate architectural design studio.

This drop box unlike the traditional afterhours book return collection box outside every library door is a dynamic informational repository with a continuously updated supply of primary and secondary research outcomes as well as other course related information. It functions as a library without a librarian and it operates as the primary means for sharing information on a just-in-time basis. While it is a ubiquitous 24-7 electronic environment outside the physical limits of the architecture library, it invites student scholars and library staff to check-out its contents at their convenience. Because the librarians are better informed about student research interests they often add to the drop box holdings. Like e-mail and other social media, the contents of this drop box are dynamic and reading them may even be addictive. It was one of several aspects of an architectural design studio course designed to engage a variety of disparate student cultures by means other than over-the-desk criticism and jury review as the primary means of teaching and learning. The instructional design of the course is intended to empower students to address the premise that managing seasonal resources like sun and wind is central to achieving sustainability. The course enables them to undertake self-directed original research, to share the outcomes of that research with classmates and to think critically about these outcomes by comparing them with the work of classmates; and finally, to clearly express their critical thoughts visually as architectural designs in electronic media.

Excessive Variety: The Material Air of Eero Saarinen

Kevin Moore, Robert Sproull
Auburn University, Auburn, AL

ABSTRACT: Differences matter, and this study of twin libraries is a search for meaningful variety. In proposing a renovation of nearly identical buildings, the work of this undergraduate design studio respects each branch library as a vital public institution with a loyal constituency. Located in diverse neighborhoods—one affluent, the other underserved—the proposed renovations enrich subtle physical differences to address critical differences in local culture.

As a form of design research, the studio visited several buildings designed by the office of Eero Saarinen. Saarinen coordinated a huge variety of scales including furniture, architectural surfaces and landscape materials. At Concordia College in Fort Wayne, IN, for example, the campus is structured as a village. A custom brick developed for the project creates a recognizable family of buildings with variations in section and lighting. The Irwin Union Bank also integrates interior and landscape effects. The shallow uplit domes are unmistakably analogous to the surrounding tree canopy specified by landscape architect Dan Kiley. The Miller House in Columbus, IN, too, is a sophisticated collaboration—between Saarinen, Kiley and interior designer Alexander Girard. Although Saarinen is well known for integrating materials at multiple scales, his simple expressive forms have suppressed the thermal, acoustic and luminous variety of his work.

Like the Irwin Union Bank and Miller house, the existing libraries are a basic 100'x100' plenum of air. Unlike the libraries, however, the Saarinen projects structure a complex and unfolding variety. Field sketches and large plenum models help students visualize these experiential effects and propose a similar material

richness. Here, meaningful variety between and within the two libraries is studied as qualities of air—heat, sound, and air-scattered light. A challenge to draw, air is often indistinct. But a cool quiet alcove awash in soft light is a noticeable delight, especially for several hours of summer blogging. A quick tutorial or a weekly meeting may require distinctly different qualities of air. In search of such qualities, students have developed an informed position on interior and exterior materials by further researching lighting, ceramic tile, furniture, curtains and trees. Rather than ignore an adjacent scale or abandon it to a related discipline, material knowledge is approached opportunistically by a single designer.

The civic identity of each library is now redefined as a quality of air. While each project proposes a new image, the icon-making of Eero Saarinen concedes to renovations that are more similar the direct physical experience of his work. Excessive materials create public places with a renewed identity beyond imagery. In this way, contentious differences between the libraries are approached optimistically and obliquely as invisible yet profound effects of air. As final incentive to reimagine the twin libraries, the design research of the studio was exhibited in both branches, making the identity of each visible to the other.

Drafting Standards of Sustainable Stadium Design in Studio: How Scholarship Shares Societal Concern for Health, Safety, and Welfare

Glenn Nicklaus, Peter Nowak, Rory Heggie
University of Nevada Las Vegas, Las Vegas, NV

ABSTRACT: Stadia are among the most visual icons of the built environment. Their capacity for community engagement make them ideal candidates to empower the public with regard to not only aesthetic preference but expectations of building performance. Alternative standards are presented addressing the environmental and social sustainability potentials of stadia design; an archetype that is typically overly consumptive and underutilized. Balance between business acumen and design aesthetic was considered with the former enabling better quality design.

The importance of sustainability in architecture is essentially common knowledge. However, research that only furthers understanding of environmental sustainability misses the opportunity for design to be seen as an integral part of achieving economic and programmatic sustainability (and perhaps even emotional longevity). This poster chronicles the process that unraveled in a graduate studio. The project began as a critique of local developers' proposals for various stadia around town. The studio wanted to contribute to the public discourse with more critical considerations of who could be served by these civic structures and how they might they be built. Green architecture principles familiar amongst smaller archetypes were extrapolated and calibrated to the larger scales of stadia and urban redevelopment. As estimated, costs associated with the integration of environmental considerations rose exponentially due to substantial project size.

The project evolved from a more traditional and authoritative study to a more participatory investigation that saw the integration of community input, consideration of developer investment (thinking like the client*), and larger institutional interest. Efforts to achieve higher standards of environmental design were actually achieved through rethinking programmatic and infrastructural design ideas that drastically improved the return on investment timeframe. Instead of simply concluding, "developers should do this…" the studio effectively communicated findings on how programmatic sustainability (multi-use, continuous occupancy, contextual integration, etc.) could deliver economic and environmental sustainability.

The entertainment capital of the world has the opportunity to learn from stadiums around the globe. While Las Vegas, Nevada continuously seeks the ideal location and funding model for some sort of major sports facility, this poster searches for inventive design solutions for how stadiums (Las Vegas and elsewhere) can take advantage of their location and rethink programming to become environmentally, socially, and financially sustainable. The 330 days of sunshine and 24-hour culture give Las Vegas the opportunity to set a new precedent in ecologically conscious design and integrative programming. Through analysis of several exemplary projects and advanced modeling of potential design solutions, this poster presents an evolving set of standards to which new (and rehabilitated) stadiums could be built. The major impetus of this research stems from observations of these iconic buildings that unfortunately sit idle for extended periods of

time. Rethinking included components could add yearlong vitality to the architecture. Additionally, the shear size of the structures and their sites suggest that renewable resources could be harnessed to help offset energy demands. The presentation includes examples of how multiple cities could adapt stadium designs to reach higher standards of sustainability with design research emphasis on Las Vegas.

*Murray, Christine "Architects Must Stop Doing More for Less" AJ Buildings Laboratory, EMAP Publishing, March 2012

Specialization and Spectacle

Glenn Nicklaus, Peter Nowak, Yissa Renteria, Joshua Moser
University of Nevada Las Vegas, Las Vegas, NV

ABSTRACT: Architecture makes some of the most complex integrations of ideas visible. For research situated on the periphery of the profession, the application of the research is critical in expanding architectural discourse and by extension, visibility. Applied research of topics on the margins is often applied within the narrow context supposed to be the most appropriate. This poster examines two complementary strategies for addressing the dilemma. First, commodification of research is demanded in terms of the broadest relevancies of obtuse architectural concepts being studied. And second, in the cases of mainstream issues, means of testing the theses are conducted through unconventional applications to increase awareness and the feedback loop associated with the work.

Case Study 1:
Adaptive Reuses of the Mega-Resort: architectural anomalies and their creative adaptations addressing national issues and community concerns – Germane to this process was a desire to illustrate that the issues concerning public education and the architecture of American academics could be every bit at home on "The Strip" as it could be "on Main Street". Where, if the challenges of delivering a quality education could be solved in one of the more distracting or forbidding environments for young people, it could contain lessons for all.

When challenges with old ideas and major voices (ex. classroom design in public education) are the topics of research, the incremental progresses become less visible while the problems may be expanding exponentially. To make visible (and to jump start new ideas) design experiments that introduce independent variables from the margins have the capacity to bring minor voices into the larger discussions on the dependent variables.*

* http://www.uncp.edu/home/collierw/ivdv.htm

Case Study 2:
New archetypes and emerging social acceptances: architecture's role in negotiating complex realities.
This evolved into a study of macroeconomics surrounding impending decisions to illegalize prostitution vs. legitimize the profession. The process began as a general inquiry about the progression of architectural programing surrounding taboo topics.

What was once marginalized (ex. gambling/casinos), is now practically mainstream (ex. resorts becoming hubs of several communal activities: bowling, movies, restaurants, etc. & more and more states welcoming such establishments into their built environment).* Those ideas or emerging archetypes that are considered on the margins, today, must be envisioned and fully explored as a potential forefront topic of the future… else architect does not make visible but reacts to what everyone else already sees.

* http://www.spectrumgaming.com/trends/

Research and the Future of Architecture Education in East Africa

Mark Raphael Owor Olweny
Uganda Martyrs University, Nkozi, Uganda

ABSTRACT: This poster reports on the implementation of research based teaching in an architecture program in East Africa. This is in light of a global shift from undergraduate to postgraduate professionally accredited architecture programmes following recommendations of the Bologna Declaration (1999). Emphasis on research is required to ensure the professional degree in architecture measures up to the standards associated with Masters level scholarship and research, which increasingly calls for a major thesis as the terminal project. In the context of East Africa, this suggests a change in the approach to research in architecture education, as the traditional tried and tested approach may no longer fulfil the needs of the new teaching paradigm. Nowhere is this more evident than in the requirement for architects to continually adapt to constantly changing circumstances, and be able to address issues for which they have not been explicitly trained.

Research in architecture programmes in East Africa has been presented in stand-alone research methods courses that espouse specific research methods and methodologies (an explicit approach). It could be argued that this has created a research monoculture with a polarisation of research in particular areas. This could be juxtaposed against a broad-based approach in which research is presented as component within specific courses, introducing different research paradigms, methods, methodologies and tools to students (an implicit approach).

The transition from a graduate entry Bachelor of Architecture degree, to a Master of Architecture professional degree also required a fundamental shift in the approach to research at the undergraduate level. The poster presents details of the transition and its implication on student output in design and research, and highlights some challenges faced in the transition to research teaching and learning for both students and faculty.

Solid Surfaces: Innovations in Materials and Construction Visualization

Andrew Phillip Payne
Savannah College of Art and Design, Savannah, GA

ABSTRACT: For the winter/spring quarters of 2011 Dr. Andrew Phillip Payne developed a collaborative architecture design studio that focused on materiality, construction detailing, and fabrication. The success of this collaborative practice was untraditional in the sense that participants included product manufacturers, consumer representatives and shop fabricators instead of the typical designer/contractor. This unique experience exposed the students to the full extents of a project from the design phase to fabrication and installation. Professor Payne led a sponsored studio (ARCH406) with CH Briggs, Inc., a product representative for solid surface materials, headquartered in Reading, Pennsylvania. The studio mission was to assist in the development of interior and exterior cladding design concepts using DuPont™ Corian®. Using the information and established design criteria provided by CH Briggs, Inc. the SCAD team worked in three phases – Opportunity Definition, Design Exploration, and Design Refinement.

Phase I – Opportunity Definition
Phase One consisted of 15 undergraduate seniors and included a visit to the DuPont™ Corian® design studio in Philadelphia for consultations with representatives from CH Briggs, Inc. and engineers from DuPont™. Students conducted case study research to familiarize themselves with solid surface materials and general practices for incorporating Corian® into architectural designs. Student development was enhanced through field trips to view samples of material and completed projects at the Dupont™ Corian® design studio in Philadelphia, Pa., ASST Fabricators, Inc. in Harrisburg, Pa., and the Hilton Hotel in downtown Baltimore, Md.

Phase II – Design Exploration
Students gained an understanding of the market, users, manufacturing details and the established design criteria in an effort to inform the product development process. The SCAD team undertook the task of developing design concepts and explored a wide variety of design
proposals including site furniture, façade cladding, signage, and interior details, all of which were pursued in phase III. During the spring quarter architecture students continued their exploration and were joined by an additional group of eight students in the Craft and Tectonics class (ARCH728). The Craft students' approach was more hands-on. The students, working in the SCAD model shop, physically manipulated samples of the material and tested the limits of bending, cutting, drilling, and installation with various fastening systems. These students produced mock-ups of assemblies and small scale design details which demonstrated the application of the cladding designs. The manipulations ranged from simple power tools to parametric designs and CNC fabrication.

Phase III – Design Refinement and Visualization
The students from the studio and Craft classes refined their designs which were then included in the DesignPhiladelphia 2011 exhibition. The gallery opening was well received and rave reviews were offered by design professionals and invited guests

Rural Sustainability

John George Poros
Mississippi State University, MS

ABSTRACT: Ability. For urban areas, sustainability is a working concept, where goals, measurements, and outcomes have undergone research and implementation. In rural areas, almost no research has been done to see how sustainability would be measured or what sustainability goals make sense. In the sustainability literature, rural areas are either ignored or thought to be treated in the same manner as urban areas. We know that rural areas and urban areas have different resources and problems.

In trying to understand this issue, our questions went back to basics: what is rural? What is sustainability? And what would it mean to be sustainable in a rural environment? Our research has led us to think about the cultural dimensions of sustainability as much as the environmental and fiscal issues. In fact, we believe that in understanding the differences between sustainability in a rural area and an urban area, the cultural differences are the most important to understand.

Sustain
In the effort to define rural sustainability, we are attempting to identify indicators for the triple bottom line of economy, community and environment that relate strongly to rural conditions. While aligning the indicators for sustainability with rural conditions is important, rural communities tend to value solutions to problems of community and economy more than the environment. Yet environmental issues are central to sustainability and impact on the community and the economy. We knew that we had to provide a mechanism for rural communities to understand the impact of the environmental decisions that they made on the socio-economic issues that they cared about the most.

Our analysis involves measuring 140 indicators of sustainability in the areas of society, economy and the environment. These indicators are measured against world, national, state and local goals in order to assess how sustainable a town or region is. The assessment is presented as a radar graph to clearly indicate in which categories the town is more or less sustainable. Once the measurement is complete, projects are developed that address the deficiencies measured. The projects are then assessed for their potential to improve the lagging sustainability indicators and a new assessment is made as illustrated in the diagram. The process allows communities to weigh options for development and conservation and make decisions based on all the factors involved.

Rural
Sturgis, Mississippi is a town of 254 people in the eastern portion of Mississippi. The town has little industry besides an underused saw mill, but has a cafe, hardware store, tire shop, and gas station in its small downtown. The elementary school in town is part of the county system and there are six different religious denominations in Sturgis. The town has a park and an association dirt go-kart track. One of the best assets in Sturgis is a vintage BMW motorcycle shop that is known nationwide for its stock of vintage BMW's and the

ability to repair them. The owner of the shop instituted a motorcycle rally in Sturgis 14 years ago and several thousand bikers attend.

Sturgis has become the test bed for the project because typical rural problems can be seen in microcosm. Despite the typical rural problems of health, education and employment, Sturgis shows some remarkable positives in faith based institutions, number of college degrees, home ownership and average income. By mapping areas with the greatest impact on society, economy and the environment, we will take the indicator measurements and find sites where projects can affect the more negative factors and thus increase sustainability overall.

Implementation
Our planned use of these indicators will be to allow towns like Sturgis to assess new projects or economic development opportunities more holistically. We see this process of measuring sustainability becoming part of the required comprehensive planning process to establish a baseline and goals for a town in regard to sustainability. Sustainability through the base line assessment and requiring the assessment for new projects would give rural communities the tools to stay on the path to a sustainable future.

The Idealized Temple Morphology: Surveying the Public Perception of Sacred Architecture

Brandon Ro
The Catholic University of America, Washington, DC

ABSTRACT: Throughout the global history of architecture, many cultures and religions have built sacred buildings and symbolic monuments under the rubric of 'temples.' In many instances, temple spaces have influenced the world's cultural identity in the spheres of politics, sociology, and religion. The power of architecture lies in its ability to shape human understanding. In other words, human perceptions are often transformed to some degree when people interact with architectural configurations. Yet understanding the impact of the phenomenology of architecture on perception in such encounters is rather difficult to quantify because of the subjectivity of human experience.

In the following study, however, survey research is proving to be a viable method for: 1) testing the relevance and public reaction to conceptual models and theories of sacred architecture, 2) providing empirical and quantitative data documenting sacred architecture's effect on human understanding and perception, and 3) producing an idealized morphology or set of design strategies that can guide architects and religious specialists in the planning phases of new projects. Overall, the study reports data gathered from over a hundred survey respondents from a convenience sampling (n=112) and serves as a preliminary attempt at bringing research into 'sharper focus' by surveying the public perception of sacred architecture.

The survey was designed to first test the relevance of the theoretical framework of comparative historian of religion, Lindsay Jones, in his second volume of The Hermeneutics of Sacred Architecture (Cambridge: Harvard University Press, 2000). Jones' theory is derived from empirical case study observation, thus following the inductive approach to research by identifying patterns from the world's sacred architecture. On the other hand, since the survey tests Jones' theory, it can be viewed as a more deductive method. The survey deals with a different type of empirical observation, namely the quantification of people's subjective perceptions of sacred architecture.

One limitation to the study is that there is a potential bias in the data, since a large number of respondents (96%) agreed that a 'space or building can be sacred and have meaning.' While this may be the case, the fact that there was such a high average acceptance rate (70%) for Jones' thirty-three 'ritual-architectural priorities,' despite the differences in gender, age, education, religion, and occupation, helps validate the significance and value of the results for both designers and religious specialists.

Another limitation to the survey is that respondents do not comprise a scientific sample of a particular population demographic. Notwithstanding this limitation, however, the descriptive statistics of the survey data not only provide us with a preliminary attempt at surveying the public perception of sacred architecture but also provide us with the top ten most important design strategies for temple projects. One potential for the future use of the survey is how it can better gauge a client's (i.e., clergy, congregation, etc.) perceptions

and idealizations of sacred architecture during the initial planning stages of design and then compare that data with post-occupancy evaluations to determine the transformative quality of the new ritual space on human perception.

Activating the Indeterminate: Engaging Sites of Industrial Atrophy

Jennifer Shields, Bryan Shields
University of North Carolina Charlotte, Charlotte, NC

ABSTRACT: Remnants of the technological landscape contain a rich palimpsest of cultural and material history ripe for reactivation, transforming artifacts of industrial obsolescence into cultural catalysts through minimal intervention.

The contemporary city is littered with derelict sites: once active commercial or industrial zones, now void of human occupation, containing architectural remains left to atrophy. These ruins often exhibit a rich palimpsest of cultural and material history, ripe with latent potentialities to be revealed. How can these wastelands, remnants of the technological landscape, be reactivated, transforming artifacts of industrial obsolescence into cultural catalysts through minimal intervention?

In service of attempting to answer this question, the Roofless Gallery for [Con]temporary Art is a design/build project undertaken to reinhabit a specific abandoned artifact. A dry-cleaning facility lies in a state of ruin along a heavily traveled spine in Charlotte, the seam between two underserved urban neighborhoods. The roofless character of the building, a space defined only by walls as a result of neglect and weathering, creates an unintended but fortuitous Terrellian skyspace. The inherent boundaries of its urban context offer solace solely in the vertical dimension, providing the opportunity to transcend physical and societal limitations and reconnect with the boundless firmament. This artifact has the potential to reactivate the urban corridor: interventions into the structure will provide a means of reinhabiting the site and engaging in a dialogue with the community.

This roofless structure has been envisioned as a temporary arts space that would encourage interaction between local artists and residents, provide partially protected but unconditioned space for episodic arts and music events. Recognizing the rich spatial and haptic experience of the space as a result of the ambiguity between exterior and interior, we have explored ways to construct an integument of found materials that preserves the roofless nature of the building. The project culminates in post-installation testing through an arts and music event, bringing together students, artists, and neighbors – the reactivation of a vestigal urban site through minimal architectural intervention.

Daylighting Through a Collaborative Vision

Robert Sproull, Magdalena Garmaz
Auburn University, Auburn, AL

ABSTRACT: Architectural spaces are defined by light – especially natural light, and as Le Corbusier pointed out, one need only trace the history of windows to comprehend the history of architecture. But, as contemporary architecture has been at times partially defined by the dissolving of its heavy load bearing exterior, the process of designing it has been characterized by a struggle to control the temperature of the modern interior. Thermal and luminous comfort may only be achieved through a fine balance between admitting enough light without losing, or admitting, too much heat. This is a significant design challenge, and traditionally the architect assumed responsibility for solving this problem. However, as buildings have grown more complex, creating extraordinary luminous experiences without increasing energy usage has often required design experimentation and careful testing of day-lighting components. This methodology simply cannot be supported by most budgets and is often too time consuming to meet most schedules.

Because of this, the process of making buildings has changed. Over the last five decades, as projects have become considerably more complex, the architectural industry has shifted from the single, visionary designer to multifaceted teams made up of discipline specific experts. The collaborative has replaced the individual. In spite of the fluid nature of design delivery in practice, academia's educational model has remained relatively unchanged; the student, (often working alone), single-handedly develops his/her own concepts. This model succeeds in teaching individuals to harness their own creativity, but falls short in conveying the importance of teamwork in today's design and construction process. However, this methodological inconsistency can be overcome. By connecting students with actual specialists from the field and directing them to work together towards specific design outcomes, the value of collaboration begins to be understood, and the importance of recognizing and working toward the collective vision of a design team as a whole is comprehended.

This poster documents the testing of this notion in a fifth year design studio that focused its investigations on day-lighting in the architectural design process. The investigations combined testing of aesthetical and thermal properties of light in order to produce design solutions that are not only visually appropriate, but also highly inventive and energy-efficient. Students produced physical and digital models, while continuously testing and recording results, hence creating a final presentation that was more about a thoughtful, structured process rather than a finished building. What made this studio unique was a carefully built-in and continuous dialogue with "real world" practitioners. Students consulted world renowned lighting experts throughout their entire design process, met with principal architects from major day-lighting projects in the region, and discussed thermal issues related to day-lighting with the facilities manager of a nationally recognized museum. This framework provided students with a unique experience. It allowed them to explore and develop design possibilities specific to their particular projects through a collaborative process much more similar to that which they will experience upon entering the profession.

Designing a Sunshade Installation for the UT Zero Energy House: An Exploration in Generative Modeling Tools

Edgar Stach
Philadelphia University, Philadelphia, PA

ABSTRACT: The subjective quality of architectural design requires all designers to consider an infinite set of possibilities to a project design. Logically, the faster a designer can visualize and communicate possible ideas within a given time frame, the better their opportunity to discover the best design solution. Ultimately, perfection in architectural design can never be achieved, but its pursuit does lead to a more refined solution.

Computer-aided drafting and modeling has provided designers more efficient visualization of project designs, heightened productivity, and increased workflow; however, with the increasing complexity of contemporary designs, new generative modeling technology must be employed to sustain efficient productivity in the design process. Generative modeling is a computer software technology which allows the designer to provide a set of parameters in which a programming script can be written to generate elements within a given domain. This technology allows the designer to model highly customizable and complex elements which can be generated at the speed of a computer calculation.

What are some the benefits of generative modeling, and does it support practicing sustainable design? This poster will discuss the implementation of Grasshopper, a generative modeling plug-in for Rhinoceros 4.0, and its role in creating a sunshade installation by a research design team for the "zero-energy" house project at the University of Tennessee in Knoxville. More importantly, the instructive description of the design and fabrication process will show that the same steps can be adapted to other architectural projects.

Step-by-Step: Democratizing Architectural Making

James Stevens
Lawrence Technological University, Southfield, MI

ABSTRACT: “Design, like war, is an uncertain trade, and we have to make the things we have designed before we can find out whether our assumptions are right or wrong… ’Research’ is very often a euphemism for trying the wrong ways first, as we all must do.” 1

The Industrial Age, and most recently the Information Age, has shifted the role of the architect away from that of the “master craftsman” to the professional “knowledge worker.”2 As a result, there is a growing divide between “knowledge” and “making” in the practice of architecture. This poster will be a critical examination of the divide between knowledge and making and how the profession and academia have moved, or not, towards a new understanding. The availability of new digital tools and materials, made possible through the democratization of manufacturing and community knowledge, allows for a new opportunity for craft, design, and research.

Presently, architecture publications either focus on theoretical aspects of digital fabrication or vocational techniques. Collegiate level architecture in particular suffers from the absence of how-to research and process-based instruction. If the typical architecture student or faculty member wants to profile cut or slip cast, there is no definitive source for how to start such an endeavor. They must conduct extensive research and use trial and error methods to become acquainted with the digital fabrication equipment and processes.

In order to make digital fabrication processes more visible to students as well as the entire architecture community, a university’s digital fabrication lab (name omitted for blind review) is currently working to expand the lab’s blog to include an instructional section on such processes. This poster will describe the blog’s anticipated how-to section demonstrating easily replicable digital fabrication processes in such a way that balances design theory and vocational information. The poster will describe the blog’s method of selecting appropriate processes for inclusion, its use of media to convey architectural making, and its approach to combining theoretical and technical knowledge. The planned expansion of the blog is significant because it democratizes the “how-to” of architectural making. The blog is the ideal forum for disseminating this collegiate knowledge as it has hundreds of followers and the interactive nature of the web allows for clear instruction of design and fabrication processes. Most importantly, it has the potential to not only help the university student, but to mend the divide between knowledge and making in the greater design community.

1 David Pye, The Nature & Aesthetics of Design (New York: Van Norstrand Reinhold Company, 1978) 27.

2 Matthew B. Crawford, Shop Class as Soulcraft: An Inquiry Into the Value of Work (New York: The Penguin Press, 2009) 47, 138.

Café Design Build

Chris Welty
Southern Polytechnic State University, Marietta, GA

ABSTRACT: To paraphrase from John Connell’s lecture at “High Octane, what’s next?” symposium, the act of making is inherently human. It’s what separates man from animal. The act of making is the central most feature to our species. Other species on the planet have specialized exploiting variations in form, habits or physiology, to adapt to specific environments and conditions. Birds have hollow bones so their structure is light, allowing them to fly. Fish have developed gills to breath under water. Man on the other hand has not adapted to any specific condition. He can be found throughout the world and beyond, now even occupying outer space.

The act of making should not be confused with assembling. The act of making is comprised of conceiving and then constructing. Making is telling a story, revealing who we are at that time. Whether low tech or high

tech, you will learn more with the first thing you build bound by constraints such as weather, codes and budget than almost anything else you learned in school.

This focused studio builds on a long history of design-build within the Architecture Department at Southern Poly. Recalling a time of the master builder the studio will focus on the main aspects of design-build; design, construction, and management. Learning by doing the students will explore and experiment with the art and craft of architecture. Simulating an actual design-build practice the studio will present an educational model that reflects a comprehensive design-build environment. The project will follow the entire design and construction covering topics from design, systems selection, detailing, budgeting and procurement, scheduling and construction.

The design-build program proposes a small-scale project sponsored by our chapter of Freedom By Design. Entitled, Café: Design Build the project is envisioned as the moveable kiosk and permanent home for their weekly bake sale fundraiser. The purpose of the kiosk is two-fold, one as social mediator and two as philanthropic revenue stream.

The poster describes the methodology and framework for the design build pedagogy. It outlines the process from start to finish elaborating on studio exercises and student research. In addition the poster presents observations and challenges that were encountered during this process and provides strategies for future successes.