During the 1980s, an interest developed in American schools of architecture that was broadly referred to as making. Besides providing an alternative to poststructural inquiry, making introduced a non-formalist current that joined with construction-based indigenous American design traditions (such as organicism, the Shaker tradition, or the work of Ray and Charles Eames). In essence, it advanced a concern for materials and methods of construction, not for their own sake, but as a subject of design.

In architectural education, however, this approach remained marginalized and lacked both pedagogical development and intellectual rigor. By the 1990s, making was pedagogically limited to design/build courses at the periphery of curricula, or manifest as but one of many concerns in standard studio culture. At worst, it had devolved into a vague and romantic faith in materiality and the self-expression of the architect.

Relative to this tradition, I have endeavored to advance the art of design and building, first in my THESIS STUDIOS, then in my professional practice (where components of commissions were designed and built with students), and most recently at the CAC.C. The projects shown here, all from the Charleston program, illustrate the potential for a hybrid academic/program doing service learning work. The earlier projects begin much like the early TOOLS and THESIS studios, and become progressively more concerned with building real architecture. We eventually got there.
portfolio of academic work
FABRICATION PEDAGOGY
As part of the CAC mission to teach students via professional practices, a fabrication studio was developed to include hands-on experience with materials and fabrication. Often grafted into semesters with other service learning projects, the following five-step Transformation Series is a careful set of exercises that introduces students to Charleston, gets them to look at the City as an environment with design content, and shows them how design is utterly related to what and how things are built.

TRANSFORMATION SERIES:
T1: phenomenon acquisition
Students were asked to capture a phenomenon that was characteristic and revelatory of the local context. The series had to manifest a phenomenon of place that could be seen between, but not necessarily in, the photos.

T2: working drawing
Students had to construct a drawing recorded the structure of the phenomenon acquired in Transformation 1.

T3: cardboard
Students were asked to recreate or re-present the phenomenon using only corrugated cardboard and white glue. The work was to be stored in, and displayed upon, a 12 x 12 x 12 inch box.

T4: wood
Students were asked to recreate or re-present the phenomenon using natural wood (no plywood or composites). Glue, screws, and other connectors were prohibited. Case same as T3.

T5: post-industrial materials
Students were asked to recreate or re-present the phenomenon using processed, post-industrial materials: re-constituted wood waste products, plywood, recycled paper products or their derivatives, recycled ferrous and nonferrous metals, plastic, glass, vinyl, and composition construction products. Case same as T3.

T1: PHENOMENON CAPTURE VIA PHOTOGRAPHY
Carson Nolan: working drawing of sun passage through Charleston alley

Steve Lambie: working drawing of plastic garbage bag flapping in shore breeze

Anthony Threatt: working drawing of erosion

Matthew Tindall: working drawing of bicycle moving over cobbleston alley
Matthew Tindall: cardboard/glue impressions of cobbleston street

Natalie Gualy: cardboard/dry ice imploding tower

Robert Price: glue-glazed + baked cardboard oven exploration
Anthony Threatt: wood-wearing series

Steven Keutzer: box-within-a-box-within-a-box

T-4: WOOD TRANSFORMATION
Matthew Tindall: cardboard/glue impressions of cobbleston street
THIRD-FOURTH YEAR STUDIO—SPRING 2003
BOROUGH PROJECT-II

team-taught with Ken Huggins

FABRICATION + SERVICE-LEARNING:
This studio was devoted to learning about design as informed by craft and putting that knowledge in service to a non-profit group. It was a vertical studio involving third- and fourth-year architecture students. In the course of the studio, the students worked with numerous architects, three artists, a curator, and a museum director. This studio is a continuation of the Borough Project I studio, Fall 2002.

PART 1-TIME MACHINE
Part 1 of the studio was a multi-step project that developed the fabrication pedagogy. Students were asked to design and build a time machine. The requirements included:
• Machine must encompass a particular worldview or time-dependent perspective;
• Machine must deal with matter in three states (solid, liquid, and gaseous);
• Machine must be capable of sustaining itself for a “significant period” without human intervention; and
• Machine must leave a physical record of the passage of time.

ITERATIVE DESIGN:
To teach the relationship between materiality and design, students were asked to continually build iterations of their designs (three, minimum). This allowed designs to respond to constructin, function, and material breakdowns and showed how good design anticipates its own physical manifestation.

PROTOTYPING:
The studio developed an language of design particular to prototyping. Rather than design for an ultimate perfect device, each iteration anticipated adjustment and change in its early form.

Adam Shoolbred: WATER CLOCK
Water is released from the tanks, via hose, into the clear cup; when the cup fills, it tips forward depositing the water into the bucket and releasing a steel ball from a cache at the upper back; the ball travels down multiple tracks, eventually spinning a wheel at the base and releasing a ticket.
William Gray: COUSCOUS CLOCK

The clock is initiated by pulling a string to release the couscous, through a funnel, into a water-filled test tube. Over a period of approximately 10 minutes, the couscous swells, forcing upward a wooden plunger. This dowel takes with it a measuring tape (the required tangible record). As it rises, the dowel creates an inclined plane on top of the device, which eventually dumps a fishing weight into a plastic tube, the weight simultaneously pulling a string that triggers the adjacent device. The weight falls atop a can of spray paint, blasting a stencil which notes that this part of the device has “completed” its assignment.
Matthew Post: CRICKET CLOCK
The basic mechanism in this time machine is a pendulum
that is powered by the movement of crickets.
The critters are released into one chamber at the top of
the device, which causes it to tilt to one side, completing
an electric circuit at the base of the pendulum and illumin-
ating a light below the lower cage. As the bottom of the
cage is made of screen and given the cricket’s natural aver-
sion to light, the colony makes its way through the black
tube toward the dark cage opposite, but, as a critical mass
passes over, the weight shifts. As the pendulum swings
across, it momentarily completes a midpoint circuit, which
prints a ticket at the machine’s base, before completing the
other light circuit—and the process begins again.

Below, the first two iterations show how this student
was able to advance such a sophisticated device by virtue
of small steps. The first version is nothing more than a
seesaw in which a cricket population could be tested and
the necessary mechanical sensitivity be determined. The
second iteration added electrical lighting and the size/pro-
portion of the swing arm developed. Not until the final
version were more developed aesthetics developed and
the electronic ticket-spitting function. The prototyping
approach allowed many changes to be made on the fly to
the final time machine.
PART 2-BOROUGH PROJECT-II
The Borough Project-I (Fall 2002) was so well received that Spoleto Festival USA asked the CAC to collaborate in the production of its visual arts program for the 2003 festival.

PARTNERS:
Mary Jane Jacob, Independent Curator (Chicago) for Spoleto with artists Rick Lowe (Houston) and Suzanne Lacy (LA) again collaborated. The CAC was responsible for the physical setting; the artists for the community participation.

RESOURCES:
The CAC raised the resources for this installation by securing donations from material suppliers and contractors.

THEME:
For the art festival, we recalled the lost Borough while contributing to the contemporary city by hosting a series of civic conversations on urban livability. In order to make tangible the twice demolished neighborhood, we proposed a reconstruction of its historic urban pattern. The final scheme, based on the archetypal Single House, recreated the street/layout of c. 1900—the old Borough—but used a color and material pallet from a low-income housing project from the latter half of the twentieth century. A series of porches became the setting for a grand civic debate.

PORCH:
Each porch represented a Single House that stood around 1900; the yellow concrete masonry units recalled the materials of Ansonborough Homes, which occupied the site from 1939-1995. The installation’s design derived from the typology of the Single House, with its side-facing porch. A flag field around each porch demarcated the footprint of the missing house.
PROCESS:
The design team developed the installation concept. Students built preliminary mock-ups at a local concrete masonry plant; then a complete preliminary mockup at the actual site. From these early experiments, the final project emerged. All wood components were prefabricated at the CAC shop.

INSTALLATION:
As the festival was held after the semester ended, a team of twenty-five young local architects was recruited to assist with the installation. Like a movie, the installation was story-boarded, with individual teams assigned coordinated construction tasks.

Foundation:
A template was used to spray the foundation's footprint, which was then dug, leveled, and filled with plywood.

Blocks:
Concrete masonry units were painted, then dry-stacked on the foundation. A platform of steel lintels was laid across the steps and rear block-platform, then covered with blocks.

Structural system:
The blocks were tied together with threaded rod and a friction-fit wood spacer-and-wedge system. The static end of the cinch had a simple cross-wedge to hold it in place; opposite, a wedge was driven between the masonry and a dowel that was slipped through a hole in the cinch.

Timing:
The entire assembly of sixteen porches, plus flags, was installed in just 36 hours—right before the performance.
FLAGS:
Around the porches, 15,000 survey flags were laid-out on a 12” grid. Not only did these flags fill-in the scale of the early twentieth-century houses, but, in the evening when the wind blew in from the water, they animated the empty porches, much like the ghosts of former residents.
Lay-out boards were prepared in advance and flagging started on the side opposite the porches, so that all crews could work simultaneously.
GRAPHICS (opposite):
The CAC produced the graphics for the festival, including invitations and programs.
The Borough Project, Clemson Architecture Center in Charleston, and Spoleto Festival USA invite you to the performance of **latitude 32°—NAVIGATING HOME**
saturday, June 7
7:30 p.m.

performance begins at
the Borough Houses:
35 + 35-1/2, Calhoun
(near East Bay Street)
performance lasts approximately
2 hours, 30 minutes

admission FREE
PERFORMANCE:
For the arts festival, eighty prominent citizens (from the Mayor to teenage leaders) debated issues of urban livability. Starting at the sisters’ houses, former Borough residents delivered an oral history of the lost neighborhood. Then, the audience filed past the empty porches (in the rain). Under an outdoor shelter, citizens then convened around tables, each with a discussion leader, and discussed density, traffic, schools, public space, streets, parks, and other issues of civic life and urban design.
SERVICE-LEARNING:
When the CAC.C expanded onto the second floor of the historic Marine Hospital, we used an undergraduate studio to develop our plan. Given a room punctured with six large doors and windows, the library was a particularly difficult problem: how to acquire sufficient stack space?

This project was conceived and executed by one student who had never built anything prior to attending the CAC.C. The concept was simple: let the stacks, themselves, serve as the library door. The result was more than pragmatic: to close oneself into the library was to shut-away the outside world.
ENTRY:
Approaching the library with stacks closed, one is given a glimpse into the room and an invitation to push the off-center red vertical support.

LANGUAGE:
The aesthetic language of the library wall is drawn from the system of fabrication and assembly.

ORDER 1: the red structural grid;
ORDER 2: the module of the stack;
ORDER 3: the logic of fitting together plywood sheets via slots and oversize dovetails;
ORDER 4: the hardware pattern.

The poetics of the pivoting center stack is revealed through the yellow pivot, the arc-pattern left on the floor by the wheel, and the semicircular pivot clearance in the stack (above).
SCOPE + CLIENT:
This series of undergraduate and vertical studios, interspersed over three years, was devoted to a service-learning design/build project for the Gibbes Museum of Art.

All work was conducted in teams; each studio undertook a discrete category of the project:

2003 (PRE-STUDENT): programming; schematics
FALL 2004: analysis, schematic design and development
SPRING 2005: design development, structural design
SUMMER 2005-SPRING 2006: fabrication

MANDATE:
The original building, a sophisticated Beaux-Arts composition, was completed in 1903 to the design of Frank Milburn. In the century since its construction, the Museum had been cloaked in “nature,” cut-off from the street by reflective solar films and display panels blocking the windows, and barricaded by parking.

The Museum commissioned the CAC.C to design and build a temporary installation that would call attention to the building and re-present the Institution in keeping with the progressive agenda of its new Director.

CONCEPTUAL DESIGN
Of twelve designs prepared by the faculty, the Museum selected one that veiled the iconic center of the building, forming a large canvas, or projection screen of the original temple-front. By covering the most iconic part of the Beaux-Arts facade, the scheme would call attention to the plight of the building and provide a canvas for which the museum could commission new works.
An extensive analysis of the original building by the CAC.C revealed a sophisticated design that used ordering, proportion, virtual space, and perspective to draw pedestrians into the building and to make the shallow forecourt feel deeper.

This analysis and the proposed design (through design development) were exhibited at the Museum.
model: layered scheme

November 2004

This step in the project’s development took the design concept (the idea of covering the temple form with a mask) and added three new distinctions:

1. By its size and placement, along with those of the door, the mask could frame components of the Beaux-Arts architecture;
2. The mask could be built up out of layers that would have a structure and rhythm as the Gibbes; and
3. Qualities of transparency and reflection could be used to enhance the concealing/revealing opposition.

This model was preceded by about fifty mask studies, like the one below. After building this model, it became apparent that, being flat against the building, the scheme was essentially a sign and offered limited three-dimensional opportunities.

model: spatial scheme

November 2004

This model explored the potential for pulling the installation away from the Gibbes, looking at the space between. Two discoveries resulted:

1. An outdoor lobby could be created, a supplement to the existing entry into the Museum (which effectively has no lobby); and
2. The space between installation and building would allow sun to light the back of the mask at mid-day. The resulting light/shadow play might be used to animate the project.

Each final model was preceded by quicker study models, like the one below (of which there could be as many as ten). The studies worked through the issues at hand and provide a quick way to learn by trial and error. The struts back to the classical columns, below, were originally intended to structure the installation; the model revealed their space-making potential.
SCHEMATIC DESIGN:
SCHEME 1 (above + left): A straightforward development of the Conceptual Design, this proposal veiled the original building with layers.

SCHEME 2 (below): Exploring the potential for space between the original building and the installation, Scheme 2 pulled the veil away but braced it to the original structure.
SCHEMATIC DESIGN:

SCHEME 3: Combining the best attributes of Schemes 1 and 2, this proposal built upon the perspectival manipulations of the original building. From the axis where the Beaux-Arts composition became dynamic, the highly energetic installation would appear static. Thus, the Installation used the building's design principles, but deployed them in reverse.
FABRICATION PHILOSOPHY 1.0:
ABOVE + LEFT: In order to insure correct perspectival alignment, the initial design proposed a field adjustable construction system.

BELOW: A limited budget required us to use pine rather than weather-resistant woods. Here a boat-building epoxy system is tested.
FABRICATION PHILOSOPHY 2.0:
When it proved too costly to make the Installation field-adjustable, a high-tech laser survey of the facade and grounds was made. This data was put in a digital model and the Installation was re-designed around it with a non-adjustable system. Accurate to 1/8", this technology allowed the project to be designed and fabricated “in perspective” with a high degree of confidence in the resulting alignments.
DESIGN DEVELOPMENT:

LEFT: To make the Installation structurally autonomous under hurricane winds, steel bridging was added between the Standards. These study models show two of several options that were developed with the structural engineer.

Full-scale mock-ups were developed along with the models to insure that the architectural language emerged from the construction system.

PLAZA TOUCH-DOWN

The steel bracing came to a VEE and attached to a battered pile right beside the Museum’s front door. The pile and bracing had to align in a continuous angle, which presented a difficult design challenge. The Touch-Down was developed into a multivalent component that included a bench/podium, and was based on the enlarged profile of a string course on the original building.

The Touch-Down illustrates a method of moving from concept to fabrication, through developing iterations of models and full-scale mock-ups.
CONSTRUCTION DOCUMENTS:
A complete set of construction documents, including shop drawings, was prepared by the CAC. A small sample is shown. The set was used to obtain a building permit and for fabrication.
DESIGN DEVELOPMENT + FABRICATION: Standards

Four standards were fabricated, each a different size but of identical proportions. They reveal the draftsman’s method of delineating entasis.

The Standards were made from glu-laminated beams, re-assembled into large slabs, then hand-cut to computer-generated templates.
FABRICATION: Standards
Each Standard had two laminated exterior slabs with an intermediate layer of 3/4” steel plate and plywood.

Each steel plate was a different size and placed in a unique location in order to attach to the sloped steel pipe-Bracing. These plates were epoxied and bolted in position.

The finished components were encased in boat-building epoxy.
The Grid was made up of 11 layers of 1/2” plywood, epoxied and nailed. A deck, template, and formwork on which to layout and construct the Grid had to first be built. The assembly system was developed because of the design: no angle in any axis was square in order to achieve the perspective alignment.
DESIGN DEVELOPMENT + FABRICATION: Lexan

To resist hurricane winds, we were forced to use lexan (held by hurricane anchors) rather than acrylic sheet. Each plate was a unique size and shape; each anchor pattern was different. A spacer jig was designed and built to insure that the gaps between the plates was precise.
DESIGN DEVELOPMENT + FABRICATION: Splines
The cost of the Lexan was such that we could not afford material thick enough span the Grid. To counteract deflections, a system of Splines was designed in response to empirical field measurements. The Splines were then fabricated out of Lexan and installed in the space left by the Hurricane clips.

DESIGN DEVELOPMENT + FABRICATION: Skewed Frame
Located where people could touch it, the Skewed Frame was to be an exceptional piece of craft and was a vestige of our original fabrication philosophy of field-adjustable construction. When seen from the perspective hot-spot, the Skewed Frame would perfectly align with an existing window in the Museum (where a monitor would show video art). Each side of this Brazilian cherry frame could be adjusted in length and angle.
The Purlins provided an interface between the Standards and the Grid. From early model studies, it was clear that these should be as transparent as possible—hence the unusual tripartite section, which also related to the historic rhythms. Because there were no mathematical models for this shape, we had to build a test section and empirically load test it; then, design and fabricate the components.
FABRICATION—Limestone Base:
Four limestone bases were designed on profiles in the original building. Carved by students, the four unique bases revealed the stone-carving process used in constructing the original building. The hole cored through the block allowed structural steel to reach the micro-pile.
While the CAC.C was fabricating this project, Clemson University held a design competition, commissioned an architect, and was making plans for a new building for the Charleston center. The proposed contemporary design proved very controversial and was widely opposed by neighborhood groups and some preservation associations.

At the same time, the commissioning Director of the Gibbes, Elizabeth Fleming, left the Museum to become the President of Converse College.

Just before erection of the installation was scheduled to begin, this letter was received from the Museum’s new Director.

When a school sets out to execute actual projects, it must realize that, sometimes, they come with real risks and problems.
FORCE OF NATURE

PROJECT:
This project brought ten Japanese artists to the Carolinas to put installations in multiple venues exploring the relationship between humans and nature.

The CAC.C designed and built two settings for artists Motoi Yamamoto and Junko Ishiro, in different buildings at the College of Charleston. Each project responded to the conditions of its context and was tailored to properties of the respective artist—which were radically different.

PARTNERS:
Halsey Institute of Contemporary Art; College of Architecture, UNC-Charlotte; Winthrop University Galleries; McColl Center for Visual Art; Sumter Gallery of Art; Van Every/Smith Galleries at Davidson College

ARTISTS' CONCEPTION:
Each artist brought a body of work, a sensibility, and a concept for their installations. We worked with each at a design development level to support and enhance the work in situ.

SITES:
Yamamoto was located in the three-story rotunda of the College of Charleston library; Ishiro in the upper level of the Halsey Gallery.

STUDENTS:
This studio was conducted with three students: two graduate and one undergraduate. Each project was based on a simple concept made possible by a well developed detail; both were designed and built in the first half of one semester.
YAMAMOTO:
In keeping with the Zen-like nature of this artist’s work, a levitating platform was designed to an exacting and poetic order—even where it was invisible.
ISHIRO:
This video booth, where visitors could watch the artist burn her paintings, was also a reliquary for the ashes.
Vertical Studio—CAC.C

Spring 2008

The MiNimuseum of Richard McMahan

ACSA Creative Achievement Award 2008-2009

Project:
The MiNimuseum of Richard McMahan exhibited 1100+ works of miniature art. The exhibit was designed and built with ten students in one semester as a Piccolo Spoleto Invitational Exhibition 16 May-30 June 2008.

Site:
The 30’ diameter 3-storey rotunda, Addlestone Library, College of Charleston

Curator:
Halsey Institute of Contemporary Art

Consultants:
Orbital Engineering and Consulting, LLC; 4SE; Meadors Construction Corp

Pro Bono Partners:
Low Country Case & Millwork, JMO Woodworks

Sponsors:
Halsey Institute of Contemporary Art, CAC.C, Friends of the Library at CoC, Addlestone Library

Artist:
Since 1990 Richard McMahan has been recreating the masterworks of Western art in miniature. His work is driven by an obsession to create a vast collection of cultural artifacts more than systematic reproduction. Endowed with a photographic memory, the artist often studies a work in a book, then creates his reproduction from memory—including the brush strokes. He gets most of his materials at Walmart.

We received the collection uncataloged.

Collection Connections: Portraits
ABOVE: 2-D works, mapped across time in standard art historical taxonomy.

MIDDLE: 2-D works above; 3-D works below. We regrouped the collection into seven primary McManesian periods: Tombgpytian, Byzothic, Renroque, Acamatic, Grobetan, Praetellaneous, and Modressionist.

BELOW: Artists who were reproduced five or more times in the collection. Frida Kahlo is the most-favored artist (25 works), followed by Goya (22 works) and Picasso (19 works).
RESEARCH

The collection was analyzed; its priorities and emphases mapped. Conventional art-historical taxonomy was rebuilt into seven McMahanian periods in which the work was presented: Tombgynptian, Byzothic, Renroque, Acamanic, Grobetan, Prafhelaneous, and Modressionist.

The entire 2-D collection was scanned and printed at actual scale to work out the size, scale, and organization of the collection.

RIGHT: Da Vinci’s Portrait of Lisa Gherardini is 13% the size of McMahan’s entire 2-D collection, which is almost the same size (103%) as Frida Kahlo’s The Two Fridas. Kahlo is the most reproduced artist in McMahan’s collection.

BELOW: The MINImuseum presented the work so as to downplay the negative associations with reproduction, both its commercial and banal overtones.
SCHEDULE (left)
SCHEMATIC DESIGN was orchestrated in four bursts of production, which allowed a range of options to be considered and systematically reduced to a single scheme.

DESIGN DEVELOPMENT was planned to get basic components into production so more complicated parts of the project could be developed.

PRODUCTION DOCS were reduced to an absolute minimum, due to the laser-CNC technology transfer. Circles indicate fast-track release of “cut-packs” to our CNC partner.

FABRICATION was handled largely by commercial out-sourcing.

INSTALLATION was efficient, due to planning for staging and erection during Design Development.

ADVANCED

SCHEMATIC DESIGN
Three approaches were tested: walls, cabinets, and combination wall + cabinet. We abandoned the single wall schemes and advanced the ZIGZAG, CABINET, and COLLECTION schemes to the next round. Ultimately, the client chose the ZIGZAG scheme.
PROGRAM AS 3-D DIAGRAM

With Pre-Modern works on one side, and Modressionist works on the other, the spaces made by the ZIGZAG were oriented to the museological traits of the period being presented (above-right). The length of each ZIGZAG-wall was sized to the part of the collection it contained (below-right): Tombgyptian (yellow), Byzothic (red), Renoque (green), Grobetan (dark blue), Acamantic (light blue), and Modressionist (orange—the entire length of the west side).

GAPS (left): In order for a viewer to following the chronological display of the art, Gaps were required at intersections in the ZIGZAG. Massing models were used to study the options. The goal was to insert a sliver of space in the continuous wall without undermining the ZIGZAG’s continuity.

LIGHTING (above): This scheme tested the use of outriggers to hold conventional flood lights. This approach was abandoned as the outriggers were unsympathetic to the acute angles of the ZIGZAG; lighting would have to be contained within the wall.

ART PRESENTATION (above): Model studying how 2- and 3-D art might be presented in the emerging ZIGZAG wall. This model proposed that the method and module of art-mounting would influence the construction of the wall. This model set up the fork in Design Development between the SLAT and the TRI-WALL Schemes.
DIGITAL TECHNOLOGY

At this juncture we recognized the potential for linking laser with CNC technologies and an assembly system, based primarily on friction-fit components, was developed. Four horizontal components (head, shoulder, knee, and toes) connected evenly-spaced vertical fins.
SLAT VERSION, ZIGZAG SCHEME
This scheme explored a vertical wall covered by horizontal slats. Building a system by which to hang miniature 2-D art into the very fabric of the wall, the SLAT scheme proposed to incorporate the scale of McMahan’s art into the exhibit architecture. The SLAT wall offered a different character on each side: field of windows for the pre-Modern side (ABOVE LEFT); a set of running channels for Modressionist works (LEFT). On the pre-Modern side, regularly spaced U-shaped slits were pre-cut with the laser into each slat. This allowed pockets of space, based on the modular slits, to be made by the curator on site.
Architecturally, the SLAT wall allowed a viewer on one side of the wall to sense the presence of viewers on the other side by seeing their silhouettes. In the detail models and mock-ups, the wall framing was made so that we could adjust the vertical relationship of the slats on each side as well as the wall width. Thus did we control the clarity of silhouette.
The SLAT scheme was abandoned when it became clear that an individual LED would be required for each work of art.
TRI-WALL VERSION, ZIGZAG SCHEME

This scheme emerged from two motives: a Raked Wall study in another scheme and the need for simple, efficient lighting. In principle, the wall section has three components: a middle panel on which to hang art (facing both ways), and an outer skin on each side. The space between is flooded with light.

BELLOW: The full-scale mock-up showed that the wall section was too narrow to allow adequate illumination in the viewing zone.

The scheme to emerge from Schematic Design phase IV was TRI-WALL III, with the friction peg system from TRI-WALL IV.
WALL SYSTEM

The friction-fit system conceived in late Schematic Design was refined in a series of 1-1/2” = 1’-0” models, culminating in a mahogany + chipboard model of the whole MINImuseum. This model was assembled analogously to the actual installation to test staging and erection sequences.
IN-STUDIO MOCK-UP
A three-bay mock-up was produced and assembled in order to test the friction-fit wall system that had been developed in models. As a result of this mock-up, we reduced tolerances and closed-up tab-and-slot fittings.
The Studio Mock-Up was then painted, electrified, and installed on site (over a ZIGZAG template taped to the floor. As a result of this mock-up, we re-tweaked the panel installation system and added diffusers to reduce glare from the light fixtures.
TOE-FIN: Set in parallel tracks on the floor, the Toes were notched on the project’s module of 18”-on-center. The Fins, too, were notched to regulate the Toe-spacing. Thus, the Toes and Fins were self-aligning and self-spacing.

Too long to be cut from a single piece of MDF, Toe sections interlock under the Fins such that the Fin-connection holds Toe sections together.

WALL SYSTEM

As shown during the actual installation, the friction-fit wall system worked exactly as designed and tested in our models and mock-ups.
SHOULDER: When a Fin was raised on the Toes, a Shoulder would lock it into position. The Shoulder had three locking mechanisms:

• A “stop” (circled) regulated the Shoulder’s position relative to the Fins;
• A “tab” interlocked with the companion tab of an adjoining Shoulder; and
• The receiving slots for pins connected the joined Shoulders to the Fin.
KNEE: Every five bays, a Knee was inserted to provide linear alignment and continuity. Shaped like a Shoulder without the “stop,” the Knee needed to be pegged only at its ends.

MODRESSIONIST DISPLAY PANEL: Also spanning multiple bays, the 1/2” MDF panel facing the vertical (Modressionist) side was slid into its receiving slot in the Fins. Screw blocks, attached first to the fins, were then back-screwed into the panel. This panel not only was a place to hang art, but provided stability against racking.
OUTRIGGERS: Suspended from the Shoulders and Knees, Outriggers were placed at every bay on the Modressionist side and at niches on the pre-Modern side. Each Outrigger carried a bulb-holder.

HEAD (above): Similar to the Toes in form, the Head merely supported the wall-top.

NICHE (below): For a limited number of 3-D works that did not belong with the major Node collections, wall niches were installed on the back of the Modressionist Display Panels.
Parts developed in AutoCAD for the laser models were adjusted to full-scale tolerances; then laid out for MDF sheets to be cut by the CNC fabricator.
ELECTRICAL

Working with an electrical engineer and contractor, the students laid out an electrical plan (right); then wired and installed all fixtures.
POWER GARGOYLES
The Rotunda had only three receptacles at ground level, all on a single 20 AMP circuit. (Our final layout incorporated 112-23W and 41-13W compact fluorescent bulbs; for lighting alone, we needed more than 26 amps.) We solved this problem by running extension cords from circuits on the second floor. We celebrated these extension cords with Power Gargoyles (right): cantilevered spouts that directed bright red power cords into the wall-top.
LOST + STOLEN

Part of the Collection comprised reproductions whose originals had been lost or stolen. Our exhibit trope for such pieces was to allow visitors to see these only in mirror-image (above). Thus the display schema was analogous to the existential situation of the originating work: where an original could no longer be seen, neither could McMahan’s reproduction.
NODE DESIGN
Where the ZIGZAG wrapped around itself, the resulting Node offered a special programming opportunity. Early studies explored whether these Nodes should be occupiable (as booths) hollow shadow-boxes, or solid masses. Model studies also explored how the application of a raked side or channeled side would impact their characters.

As the studies progressed, it became clear that each Node (Tombgyptian, Grobetan, and Modressionist) would have its own content group, and thus that each should have its own corresponding architectural character.

Ultimately, each Node became a custom sub-design of the wall system that was being developed concurrently.
TOMBGYPTIAN NODE

Containing McMahan’s Tomb of the Fictional Pharaoh plus misc. Egyptian artifacts, the Tombgyptian Node was conceived as offering viewers an archaeological experience of discovery. Approached from the north, the viewer would encounter a relatively solid mass, punctured with view ports, and become progressively more open with movement around the Node.

TOMBGYPTIAN STRUCTURE

This Node was complicated by an intersection with the ZIGZAG wall; the Podgressionist-channel cutting into its perimeter; and a lengthy cantilever. Models shown here were made to develop the structure.
This model was the first to adapt the basic wall system to a Node, in particular figuring out how to hang the skin on the Fins. The system has been adapted to meet the structural needs of the cantilevered corner.

TOMBEGYPTIAN ASSEMBLY + ERECTION
Models were used to figure out how the actual construction would be staged and assembled. In this model, the cantilever over the Tomb was again revised. The challenge with the cantilever was keeping the rhythm of supporting the Fins (to which the skin was attached) while retaining structural continuity in the cantilever beams. Note the increased depth of the top and bottom chords in this version.
The final study model reconciled the Tomb, the structure, and the skin. Viewing ports and pipes were added, as were display cases.

LASER-TO-CNC
The transfer of design files, explored on the laser, to production files, executed with CNC equipment, was not only efficient, but provided a high level of fidelity. The final model was highly accurate in forecasting the form of the final project.
NODE ENCOUNTER

The Tombgyptian Node was designed for viewers to have an archaeological-like experience.

Coming from the primary entry, viewports invite them to peer into the Node—which, though the viewer’s eyes look straight ahead, offers downward glimpses of Tomb rooms. As the viewer moves counterclockwise around the Node, more of the artifacts are revealed. Finally, the full Tomb is revealed, buried in the far acute corner.
The development of the Grobetan Node lagged the Tombgyptian. Because the Grobetan was similar, albeit smaller and less complicated, it used the structure and skin systems previously developed.

The three sides of the Grobetan presented objects from Asia, the Americas, and ancient artifacts from the “cradle of civilization.”
MODRESSIONIST NODE

Housing modern furniture and sculpture, the Node contained a number of sub-genres that were thematically or historically related. The concept was to connect related pieces; this developed from trays to tubes-of-space allowing the viewer to make visual connections.
MODRESSIONIST STRUCTURE

The structural challenge in this Node was to maintain the raked profile and square panel module of the skin while accommodating the complex internal tubes of space.

RIGHT: The first studies adopted the language of the basic wall system. This proved too complicated.

BELOW: Studies in which large corner fins supported the interior tubes of space. The remaining surface fins were reduced in profile to provide support only for the skin. This fundamental structural approach was used in the final installation.
MODRESSONIST NODE: Furniture from one movement is visible and connected to that from a related movement through interior spaces.
ENTRY

Facing the Library’s main entry, the north wall-end introduced viewers to the artist. A film of McMahan painting an exhibited miniature (left) was shown on a — miniature — video screen. Audio was projected through a “sound shower” so as not to disrupt the quiet of the library.
MAGNIFYING GLASSES
So that miniatures could be closely inspected, magnifying glasses were provided to viewers at each end of the ZIGZAG.
THE TWO SIDES

Each side of the ZIGZAG had a character expressive of the work displayed therein: Modressionist (left) and PreModern (right).
WALL-TOP
Using the top of the wall as another facade for presenting 3-D works, the “super hero” category in McMahan’s oeuvre was given a home in the timeline without disrupting the categorical continuities at eye-level. It also addressed viewers looking down from the upper levels of the Rotunda.

A timeline corresponding to the wall displays was imprinted on top; major Node themes were also indicated.
From previous installations, we knew that even works on the wall-top would need protection—due to the propensity of college students to throw things from upper levels. The system of identifying works, plus protecting them with acrylic sheet ("sneeze-guard security"), was adapted from the basic wall system.

Nodes were given an acrylic roof to support the artifice of the ZIGZAG and to let viewers peer into them. On top of each Node, objects covered by a protective disk of acrylic, the circular disk focusing attention while relating to the triangular Node.
MODRESSIONIST TOP
Artifacts from the Titanic were displayed on the Modressionist Node. Acrylic stands to exhibit flat v were designed and fabricated by the studio.
GROBETAN TOP

Masks, statuary, and religious artifacts from primitive Pacific cultures were placed on the Grobetan Node.

RIGHT: All the replicas were approximately 2-4" long, except one very long figure. A hole was cut into the acrylic "pool" and a special suspension stand made for this figure.
THE TATTOO
Figures atop the wall were placed along a timeline, also regulating placement in the wall below. Wall-top graphics, the “tattoo,” were made with vinyl cut in the laser.

FAR LEFT + OPPOSITE PAGE: “Action figures,” such as William Shakespeare and Tsar Nicholas II, were placed in a circle connected to a lifeline showing their births and deaths. Imaginary characters or figures whose data was uncertain, such as African Woman and Miko the Japanese Woman, were placed in hatched eras.
Clearly, the MaMahan work was all about size. Images of McMahan’s miniatures were projected on the ceiling of the Rotunda by an LCD projector buried in the Tombgyptian Node. The projector was mounted in an adjustable acrylic stand, designed and built by the Tombgyptian team.

VIEWING STATIONS
Putting art on top of the ZIGZAG presented a major problem: how would viewers see it? The viewing stations (steel + acrylic), secured to railings at the second- and third-levels, were equipped with binoculars through which viewers could examine the wall-top works (as well as other museum-goers).

MOCK-UP (left): Viewing stations were developed in chip-board mock-ups; then fabricated by welding water-jet steel. Students did all the fabrication.
12. PACIFIC OCEANIC

- A. UNKNOWN
  - DRUM WITH ABSTRACT HANDLE
  - c. 1900-2000

- B. UNKNOWN
  - DRUM WITH LIZARD HANDLE
  - c. 1900-2000

- C. UNKNOWN
  - ABORIGINAL SCULPTURE—MALE
  - 1950

- D. UNKNOWN
  - RED BIRD
  - c. 1900-2000

- E. UNKNOWN
  - AFRICAN MASK
  - c. 1900-2000

- F. UNKNOWN
  - ANCESTRAL TOTEM POLE
  - UNKNOWN

- G. UNKNOWN
  - MASK FROM MALI
  - c. 1900-2000

- H. UNKNOWN
  - UNKNOWN
  - c. 1900-2000

- I. UNKNOWN
  - MASK FORM MALI
  - c. 1900-2000

- J. UNKNOWN
  - WHITE TWIN MASK
  - c. 1900-2000

- K. UNKNOWN
  - BROWN TWIN MASK
  - c. 1900-2000

- L. UNKNOWN
  - UNKNOWN
  - MASK WITH COWRY SHELLS
  - c. 1900-2000
The MINImuseum was designed and fabricated during Spring Semester 2008 by ten students. They remained in Charleston for two weeks after term at their own expense and without course credit to install it.

ROSYLYN COWART
*I believe in the art of simplicity and the power of space.*

ANDREW EDWARDS
*I strive for a style defined by purpose.*

NICK KUNZI
*Good architects work to redefine the limits of their craft, which today includes sustainable practices.*

ALYSON LESLIE
*Even the smallest details transform space and capture the curiosity and imagination of the inhabitant.*

MADISON MEGGS
*I am an architect who meets deadlines.*

TAYLOR NEWMAN
*I am forever amazed by the process of making.*

KELLY POLLARD
*Although I am working in service to others, I am ultimately designing for myself.*

JAMIE PRATT
*A good architect is constantly developing.*

WILLIAM SMITH
*The problem is the opportunity.*

JOEL TRANTHAM
*A good architect is a master of how little he knows.*

KATHERINE BORKOWSKI
Before becoming the Administrative Assistant to the CAC.C, Borkowski was a Project Manager at the Halsey Institute of Contemporary Art. She catalogued and scanned McMahan’s entire collection and was a principal installer of this exhibition.

DAVID PASTRE
A master craftsman with a Master of Architecture degree, Pastre is a designer with JMO Woodworks as well as the CAC.C shop manager and a co-teacher of this studio. Pastre’s skill and commitment to craft are everywhere evident in this project.

ROBERT MILLER
Robert Miller is an architect, Professor, and Director of the CAC.C. He has been developing design/build education for young architects throughout his twenty years of teaching.