

The Practice of Practice: Foundation Studio to Rural Studio

In today's future, knowledge is indeed valuable. But know-how is invaluable and the architecture students at Auburn University have the know-how to get things done. As a direct reflection of the stated mission and values of the Architecture Program, we believe in the importance of action. Therefore, we also believe that the best way to learn how to do something is by actually doing it. As a Land Grant institution, our architecture program is deeply rooted in the ethos of outreach and service learning. In close collaboration with architectural and industry professionals, consultants, and community leaders, our students work on meaningful, public interest design projects that have real life impacts. Through this context-intensive work, our students come to understand that design is a material act that bears profound social consequences. As such, the issues of making, craft, manufacture and assembly all have meaning that resonates much deeper than a simple understanding of form and aesthetics. Thus the development of "know-how" (the embodiment of knowledge through the act of making and building) becomes the unique characteristic that enables our students to emerge as socially engaged, active and truly impactful design professionals. These are our core values.

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Ours is a public interest Design-Build program and from their first year to their last, our students are immersed in an education in which they are instructed in the value of impact. Learning through their respective collaborative, community-based Design-Build projects, they quickly come to understand that they don't need to wait until they are professionals to make a resonating impact upon the place in which they find themselves. The Architecture Program as a whole embeds in each year level some aspect of community-based collaboration and Design-Build strategies as a pedagogical framework in an effort push the educational ethos of learning by making out of the representational mode of the architectural model and into the material discourse of actual-sized architectural fabrications and assemblies.

Our principles of community-based Design-Build education are rooted in the Vitruvian virtues of architecture, *firmitas, utilitas, et venustas*. Traditionally these virtues translate directly to "firmness, commodity and delight." ¹ Within the scaffolding of our pedagogical framework, we think of these architectural virtues as part of our core principles and translate them as follows: Building Performance (*firmitas*), Environmental Stewardship (*utilitas*) and Social Relevance (*venustas*).

This paper seeks to discuss four frameworks countering the Foundation Unit Studio (First Year) community-based, Design-Build project, South's BEST, with the resulting Rural Studio projects designed by these student cohorts as Fifth Year Rural Studio students through the lens of the three principles, *firmitas, utilitas et venustas*. The frameworks are: 1) mediating through scale, texture and pattern, 2) component-based architectural assemblies, 3) material repurposing and 4) the dynamic nature of architectural systems.

THE FOUNDATION UNIT STUDIO AND SOUTH'S BEST

The First Year Architecture Program at Auburn University focuses on the act of synthesizing thinking, doing and making or more simply put the "practice of practice." The objectives of the studio course concentrate on habits of mind and habits of work—how one thinks and how one acts. It is the very nature of studio culture to embrace such objectives and to understand and convey studio as a class, studio as a place and studio as an activity. The transference of this understanding of studio culture to the beginning design student lies squarely in practice as in "practice makes perfect"—do it over and over and over again—as well as in the practice of design, synthesizing thinking, doing and making, the very nature of the act of the profession.

For over a decade, the Foundation Unit Studio in Architecture has engaged in a professional service project in collaboration with the College of Engineering and the College of Sciences and Mathematics. In this collaboration, the first year architecture studio designs the physical atmosphere—the look and feel—for a two and a half day national robotics competition, "South's BEST."

The BEST (Boosting Engineering Science and Technology) organization has at its core the following goals as they relate to a pedagogical framework:

- Maximize the "pipeline" of future engineers, scientists, and technical professionals by promoting the growth of local competition sites across the United States.
- Promote the involvement of under-served inner city schools.
- Increase the participation of women and minority students. 2

The annual impact of this collaborative project is significant. It reaches 3,000 middle and high school students—from over 60 schools east of the Mississippi—exposing them to STEM (Science, Technology, Engineering and Mathematics) educational principles and making technology education accessible on a broad scale. Each year the project also reaches over 300 students in the local academic community who act as assistants and volunteers. Year in and year out, the event draws 3,500 people totaling 35,000 people in the past decade alone.

South's BEST is the initial project in each architecture cohort's education. It forms the foundation for their subsequent five years of collaborative, community-based, Design-Build education within our accredited professional degree program. The project is facilitated as if in an architectural practice; the students have a spatial program they develop, a budget they manage, a client they collaborate with (representatives from Colleges of Engineering and Sciences and Mathematics), professional sound, lighting and production consultants, a design and fabrication deadline, an installation schedule and a maintenance role. The primary collaborators with the students are professionals within their respective fields. Collaboration in this sense recognizes the fact that students can't learn the discipline of architecture if they are collaborating with students in other fields who are in the process of learning their own discipline.

Over the past 10 years, a wide variety of material and assembly choices have been employed, each year attempting to solve issues discovered by previous years, attack new problems to move the entire project forward as well as responding to the specifics of each years' competition—narrative theme, site, installation schedules and budgets. The material selections and installations have varied widely from plywood decking installations, to inflatable visqueen installations, to pipe and post installations, to large kinetic walking machines, to projected installations, as well as installations using over 95% recycled materials.

In such a large-scale and ambitious project, the students naturally must learn the essential skills of design studio: orthographic and freehand drawing, model building, research methods and resources, studio materials and methods, and design fluency. In addition to these fundamental design skills, we seek to invest in the students a higher order of ideals that often cannot be delivered directly, but must be approached in an indirect yet persistent manner. These collateral ideals include both the habits of mind—curiosity, fluid and critical thinking, the habitual nature of experience, a belief in the importance of action—and the habits of work—reliance on colleagues for an emergent ecology of production, initiative and self reliance, organized persistence, and work done daily. In other words, explicit, direct instruction about a subject is not the same as the application of ideas during real, problematic situations. This intersection between knowledge and know-how implies an embodiment of knowledge and demands a hands-on approach to learning.

THE RURAL STUDIO

The Rural Studio philosophy suggests that everyone, both rich or poor, deserves the benefit of good design. To fulfill this ethic, the Studio has evolved toward community-oriented projects as opposed to early projects that addressed one client at a time. Projects have become multi-year, multi-phase efforts traveling across three counties. The students work within the community to define solutions, fundraise, design and, ultimately, build remarkable projects. The Studio continually questions what should be built, rather than what can be built, both for the performance and operation of the projects. In the past 20 years of its existence, Rural Studio has built more than 150 projects and educated more than 600 "Citizen Architects." 3

Often the faculty at Rural Studio are asked how they achieve such good design, collaboration and noble intentions from undergraduate students. This question is rooted in the mis-belief that there is something truly "indefinable" that happens only at Rural Studio. While Rural Studio is undeniably a special place with remarkable outcomes, it is not by magic but rather through intentional curricular design. It is in fact the first four years of education in regards to community-centered Design-Build pedagogy that makes it possible for the students to do extraordinary things while at Rural Studio.

FRAMEWORK: MEDIATING SCALE THROUGH TEXTURE AND PATTERN SOUTH'S BEST, INFLATABLES

Every year that the Foundation Unit has participated in designing the stage set for South's BEST there is a significant design challenge that is quite simply focused on the short time frame and small budget counter posed against the large scale required of the work to make a visual impact in the 9.7 million cubic foot Auburn Arena. The size of the designed objects located on the arena floor must be significantly amplified relative to scale for them to be visually legible from the elevated seating area around the arena. It became apparent in the early years of this project that there could be profound material costs with minimal impact if traditional methods of stage and theater set design were employed for this project.



The students began by investigating materials that were manageable to work with for a group of 30 students but that would have a significant visual impact when installed in the arena. After exploring and rejecting many possibilities, the students began to work with visqueen as a material selection. Interestingly enough, the solution came from the constraint that it had to be small, transportable, fast to set up and inexpensive. As the students made proposal after proposal that were rejected because they were too costly, too difficult to transport, and took too long to construct: exasperated, one of the students quipped, “I wish we could just build it out of air.” Eureka!

This sent the students down the inflatables path that in the end was extremely successful. As is easy to imagine, with the early studies the initial inflatables tended toward blobby shapes with absolutely no structure. However, they were able to successfully disassemble many known objects—such as a beach ball—to understand the pattern for each particular assembly. This led to a study and mastery of platonic solids, shapes with internal structure and large-scale fabrications of inflated pattern. There was a significant learning curve regarding the fabrication technique for the inflations. The students initially worked with taped seams but quickly devised a system of folded and ironed seams to create edges and corners in the geometric constructions. The more complex the form, the more internally fabricated structural components were necessary in order to maintain the form in the inflated state.

**FRAMEWORK: MEDIATING SCALE THROUGH TEXTURE AND PATTERN
RURAL STUDIO, NEWBERN FIRE STATION AND GREENSBORO BOYS AND
GIRLS CLUB**

These projects are big.

The Newbern Volunteer Fire Department and Town Hall is the first new public building in Newbern, Alabama in 110 years. It houses three fire trucks and satisfies the town’s needs for a place to house elections, council meetings, volunteer firefighter classes, fund-raising and community gatherings. The building is supported by a wood and metal truss structure, which is enclosed by translucent polycarbonate panels, protected from the sun by cedar slats and topped-off with a galvanized aluminum roof.

Inside there is a mezzanine level for fire fighting classes and at the ground floor a bathroom and kitchen. Not only was the project conceived and built in just two

Figure 1: left: Foundation Studio South’s BEST inflatable screen wall, right: Rural Studio Newbern Fire Station

years, but at the same time the team raised \$100,000 in materials donations. 4 With this—the first of many—community-scale Design-Build projects, the students thought big: a big scale jump from other buildings in the immediate surrounds, big equipment—40 foot boom crane—and big impact for the community at large.

Since 2011, the Studio has been working with the City of Greensboro, the newly formed Boys and Girls Club of Greensboro, and the West Alabama Boys and Girls Club to find an appropriate location for the newly chartered Boys and Girls Club in Greensboro. Rural Studio has designed an 8-phase, 5-year plan for the conversion of the under utilized City Armory into both a Boys and Girls Club and a Recreation Center. The plan has been embraced by the local city and county administrations with the commitment of financial support.

The first phase started in September 2011, when the Boys and Girls Club officially moved into the Armory. Over the next two years, a 5th year team designed and built an extension to the existing Armory compound, providing a new, but separate Boys and Girls Club facility. 5 This project is the largest of any Design-Build project the Studio has tackled. The project is 5,000 square feet and was built by a four-person design team: a monumental undertaking.

FRAMEWORK: ARCHITECTURAL ASSEMBLY THROUGH COMPONENTS

SOUTH'S BEST, FLAT PACK

Another challenge that became apparent in the early years of participation in the BEST project was the issue of transportability of the project from the design site to the assembly and presentation site, the Auburn University Arena. The installation schedule for South's BEST begins at 8:00 pm and must be completed 12 hours later when the games begin in the Arena at 8:00 am. The entire construct has to be able to be quickly, efficiently and without undo wear on the assembly, broken-down, transported and re-assembled on site in the Arena, ready for the robotics competition to begin the next morning.

The ability to design, study, assemble, disassemble, transport and re-assemble requires a certain attitude toward transportation. The students decided that they would take cues from the efficiencies of flat pack manufacturing models and strive to design an impactful design that was an efficient system of storage and transport as much as it was an efficient and beautiful system of assembly.

FRAMEWORK: ARCHITECTURAL ASSEMBLY THROUGH COMPONENTS

RURAL STUDIO, THE \$20K HOUSE

The \$20K House project aims to establish a market-rate model house to be built by a contractor under a USDA rural housing loan program. A loan of \$20,000 is considered to be the lowest amount someone living on Social Security could afford to repay, which translates to approximately \$10,000 in materials and \$10,000 for labor and contractor profit. 6 The project is in its tenth year with 16 \$20K houses built or currently under construction. Each version of the house takes on a specific challenge from slab-on-grade to accessibility to tornado saferooms, all in an effort to create a version of the \$20K house that is available to suit any particular need. One of the primary ways that the project maintains its cost at \$20,000 is the efficiency of material use through tested and proven assemblies. It is specifically through the multi-year development of the project that these efficiencies can be realized.

FRAMEWORK: MATERIAL REPURPOSING

SOUTH'S BEST, BOTTLE WALL

This particular cohort of students responded of their own accord to the issues of



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cost and material waste of previous years as well as working with conceptual ideas related to six sigma manufacturing (the theme of the games in that particular year). Instead of continuing to work with wood constructs, they focused on researching the six sigma manufacturing process and they discovered that plastic bottles and aluminum cans were actually designed for efficient methods of packing and shipping and not only to solve ergonomic issues.

They devised a system of stacking the bottles and cans capitalizing on the packing qualities inherent in the design of the cans and bottles to create a large-scale screen. The screen was designed with a thin frame system of 2 x 10's, plywood and chicken wire that capitalized on the differences in the transparency and opacity of the bottles and cans. The student-designed details simultaneous allowed for the precision packing of bottles and cans on the one hand and the loose coupling of hand-made assemblies on the other. The end result was a remarkable screen wall that created an impressive presence in the competition space.

The work of the project involved seeking out sources for used bottles and cans that had already entered the recycling stream. The students worked with university and community recyclers to gather bottles and cans that could be used in the fabrication of the screen. Coming face to face with the hidden realities of energy resource consumption demanded by the recycling process itself, the students collected, washed, sanitized and sorted 23,000 bottles and 13,000 cans—the countless detritus of empty beverage containers. At the conclusion of the installation, all recyclable materials were returned to the recycling center and reentered the recycling stream.

**FRAMEWORK: MATERIAL REPURPOSING
RURAL STUDIO, LION'S PARK PLAYSCAPE**

Lions Park Playscape stretches the traditional definition of a playground by focusing on the idea of a bigger environment, rather than the pieces in it. While traditional play equipment is designed to evoke physical activity, this bigger environment incorporates mental stimulation and development by promoting imagination and creativity, challenge and competition, and bringing in basic skills related to color, shapes and sounds that children learn at early ages.

The Playscape team designed and built a maze of over 6,000 55-gallon galvanized barrels with 48,000 welds that attach the barrels together. Within that environment, a variety of running, hiding, jumping, climbing, and other exploratory experiences exist to create opportunities for physical activity; however undulating ground surfaces, sound tubes, and sensory rooms are hidden throughout the maze to heighten discovery and create opportunities for mental stimulation and imagination. 7

Figure 2: left: Foundation Studio South's BEST flat pack assembly, right: Rural Studio flat pack assembly, image copyright Timothy Hursley



The primary material, the 55-gallon galvanized drums cost too much for the manufacturing environment to recycle so they actually go directly into the landfill. The barrels are designed with a coating on the inside to protect from contamination the mint-oil that they house. The full barrels are valued at \$30,000 each, but once empty they have no value at all and are in fact rubbish. The design team for the Playscape was able to essentially create a recycling stream for this particular material. The barrels are also currently being utilized as a thermal wall in the Solar Greenhouse project at Rural Studio.

FRAMEWORK: DYNAMIC NATURE OF ARCHITECTURAL SYSTEMS

SOUTH'S BEST, BUGS!

The theme of the 2011 BEST competition was “BUGS!” The faculty decided early in the semester to use the object of the bug to begin to study issues related to scale, representation and movement. The faculty wondered if there was a way to engage a student group in a more kinetic construct for the competition design. With this in mind, there was a series of three pre-projects that influenced the students’ resolution of the BEST project. The first pre-project was a 22” x 30” prisma-color rendering of a bug. These highly detailed analysis drawings engaged the students in the mechanical understanding of the joints of their respective bug. The second pre-project was a prototyping assignment to fabricate, in teams, an exact forgery of an Arthur Ganson machine. These machines are highly detailed with an elegant quality to them and required the students to learn a wide range of new skills including welding, soldering and precision motor work. The third pre-project was an additional prototyping assignment of the creation of a full-scale working adaption of a Theo Jansen “Strandbeest.”

Though the pre-projects for this cohort were much more directed than in previous years, the design process for the students once the BEST project began was the same as in previous years. The students devised their scheme for the competition and determined that they wanted to design and fabricate all kinetic apparatuses for the competition. The kinetic apparatuses all required highly iterative prototyping (much like what they had done with the Ganson machines) in order to prove their efficacy as working machines. At this junction, the students had to prove the design worked through studying assembly methods with real materials and at a real scale. The evaluation process was laid bare: the final proposal wasn’t successful until it worked.

FRAMEWORK: DYNAMIC NATURE OF ARCHITECTURAL SYSTEMS

RURAL STUDIO, NEWBERN TOWN HALL AND LIONS PARK SCOUT HUT

Seven years after building a volunteer fire station in downtown Newbern, Rural Studio designed and built a Town Hall for the community. Located just north of the Fire Station, the Town Hall creates a civic square in which the Fire Station and Town Hall form the north and south walls of a public courtyard space.

Figure 3: left: Foundation Studio South’s BEST detail of bottle and can wall, right: Rural Studio detail of barrels at Lions Park Playscape



The Town Hall is constructed of 8” square heavy timber cypress that serves as the building’s exterior finish, insulation and interior finish. The 43 steel trusses that make up the roof structure provide deep overhangs to protect the walls, while the roof’s open gable ends help to vent the building. Fabricated from a series of steel angle frames, the building’s windows and doors articulate openings in the timbers by being placed fully inside or outside of the timber walls. The structure is designed as a true timber building. The material palette was designed to give both physical and psychological weight to the civic building. 8 Since the heavy timber cypress serves as interior surface, exterior surface and structure however, it had to be designed to contract and swell relative to weather conditions and moves as much as 8”. The windows, exterior walls and interior walls are all designed as separate systems; all details allow the structure to slip and slide vertically to accommodate the natural movement of the materials.

The Scout Hut student team created a home in Lions Park for the Cub Scouts and Boy Scouts of Greensboro, Alabama by constructing the Scout Hut using a series of wooden frames, or “bents,” assembled on the ground and raised into place on top of a concrete slab. In an effort to further Rural Studio material research, the team harvested small diameter timbers—forest thinnings—as an exterior cladding and structural ballast by stacking the treated timbers into the wooden frames. 9 The Scout Hut responds to the truthfulness of log cabin construction emulated in many area scout huts—though produced with false timber facades—while exposing the kinetic nature of the structure. The Scout Hut picks itself up on little feet, exposing floor-story windows at the ground’s edge—a light connection with saddlebags full of the weight of the thinnings to hold the building back down to the ground.

CONCLUSION

Our students are making *real architecture for real people with real consequences*. Through the act of this work, knowledge is transferred to know-how and ideas are transferred to ideals. We invest in our students the understanding that architecture truly matters. Our principles of building performance, environmental stewardship and social relevance emerge as the very thing we strive to embed. At the end of the day, we want our students to be idealistic. To borrow words from Michael Murphy 10, “Architecture is not neutral. It either helps or it hurts.” We aim for our students to embody the principles and ideals that enable a practice of architecture that makes the world a little better place.

ENDNOTES

1. *Vitruvius: the ten books on architecture*, Vitruvius Pollio.; M H Morgan, 1960.
2. South’s BEST literature, 2014.
- 3–9. Rural Studio literature, 2014.
10. Michael Murphy is a principal of the firm, MASS Design Group and lectured at Auburn University during the fall of 2013.

Figure 4: left: Foundation Studio South’s BEST kinetic apparatus, right: Rural Studio Lions Park Scout Hut, image copyright Timothy Hursley