Teaching Architecture for Our Sustainable Future

ACSA New Faculty Teaching Award Document
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> Architecture is responsible for performing the attitude of the site and makes it visible (Tadao Ando).

As an architectural designer and educator, I believe in the power of architectural design that shapes the relationship between natural and man-made environments. To make this relationship more sustainable and achieve environment-responsive design, understanding science and technology in architecture, which determine environmental behaviors, would be essential. These belief and lessons learned following a decade of practice led me to the area of building science research to further explore the integration of environmental studies into the architectural design process utilizing computational simulation tools.

My goal in teaching architecture is to disseminate this integrative architectural design approach that focuses on environmental issues, as well as to assist students develop holistic design thinking that can turn the constraints from environmental issues into design opportunities. Although my primary research method employs a quantitative approach, I seek to balance quantitative and qualitative studies in the architectural design process since architectural experiences are the interactions and combinations of measurable and immeasurable aspects. These objectives and intentions formed the basis of the courses, independent studies, workshops, and events that are introduced in this portfolio.

Baton Roots (p2), Town and Gown (p5), Green Community for Farmworkers (p7), and Environmental Simulations for Design (p9) show student works with their iterative design study processes utilizing environmental simulations. Low Tech High Impact (p12) takes a step back from high-tech methodologies and reflects on simple low-tech design initiatives for advancing a circular economy. Fun Learning in Building Science (p13) describes my large class teaching strategies to promote student engagement. Climate-Responsive Shading Systems (p15) presents an independent study on kinetic shading systems. Virtual Frictions (p16) and Other Activities (p19) introduce the workshops and exhibitions I organized to learn about sustainability issues and emerging technology in the building industry.

Image from the final project submission by Dylan Rollo Roth

BATON ROOTS Pavilion for Urban Farming

Course: ARCH 5001 and ARCH 7006 Comprehensive Architectural Design

Type: Core studio, B. Arch and M. Arch

Date: Spring 2021

Role of Nominee: Instructor (course evalution average: 4.7/5)

Collaborators: Kris Palagi (coordinator), Tara Street, LSU School of Landscape, Department of Civil Engineering

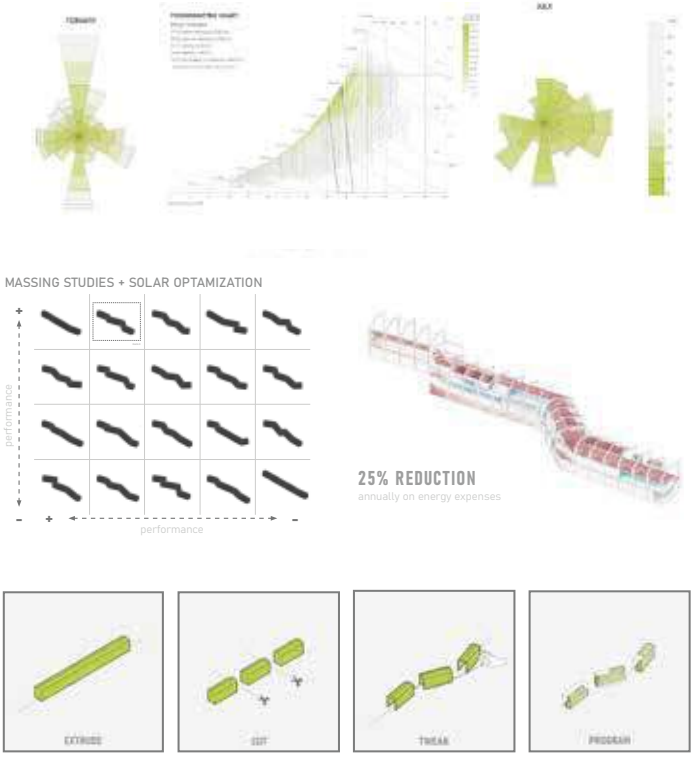
Funding Sources: Our Town grant, the National Endowment for the Arts.

Compensation: 11 students contributed to this project for a 6-credit studio course.

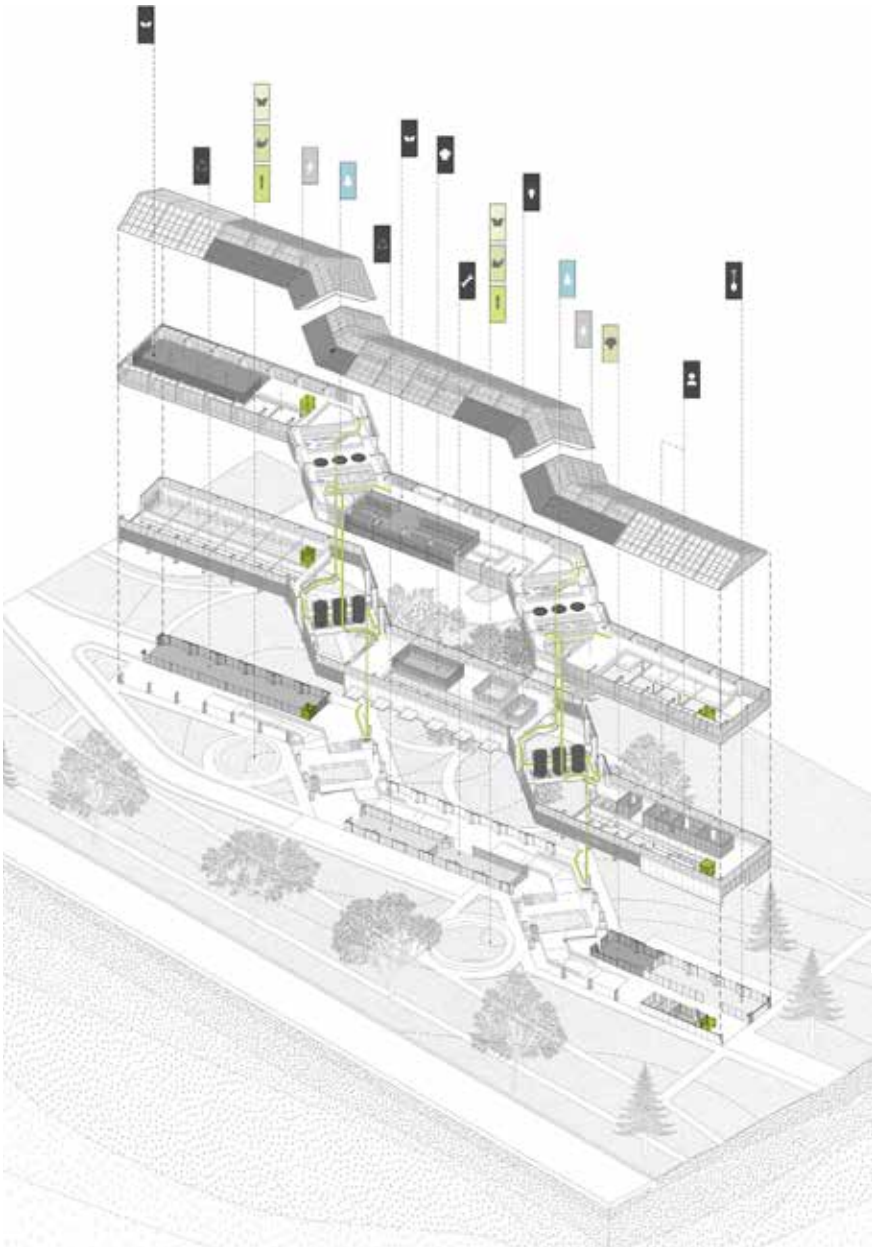
Student Award: 2021 Steel Competition, 2nd Place (Dylan Roth)

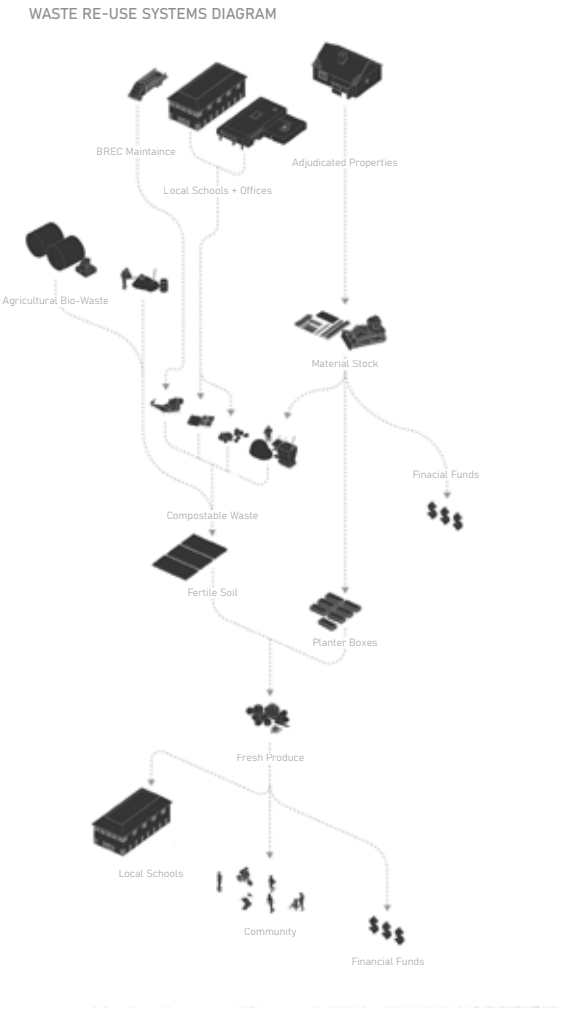
Dissemination: the 2021 AIA/ACSA Intersection Research Conference,
the 2022 PLEA (Passive and Low Energy Architecture) International Conference

The Baton Roots pavilion project was the second comprehensive design studio in collaboration with two colleagues, addressing the food desert issues in the North Baton Rouge area by exploring the potential of vertical farms utilizing various types of building envelopes. BatonRoots is a non-profit organization, located at Howell Park, which aims to provide local access to healthy foods and agriculture education through community farming. Recently, the Recreation and Parks Commission for the East Baton Rouge Parish is redeveloping the Howell Park Golf Course to improve the environment and revitalize the adjacent Windbourne community corridor. To complement this master plan, students in this studio proposed the BatonRoots Pavilion design for indoor farming while also considering opportunities outside the park boundary and more active connections with the community. In addition to community engagement and well-being, minimizing the environmental impact of the building was another important goal of the project. To help students achieve this environmental goal, computational simulation tools, and design optimization methods were introduced during the studio.



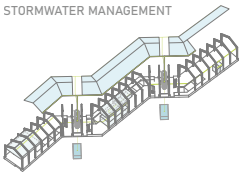
Simulations from the final project submission by Dylan Rollo Roth





Images from the final project submission by Dylan Rollo Roth

STORMWATER MANAGEMENT

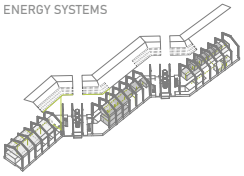


2,200,000 GALLONS of rainwater collected annual

125,000 GALLONS of available cistern storage

Roof Srf Area | Stormwater Storage | Water Requirements

ENERGY SYSTEMS



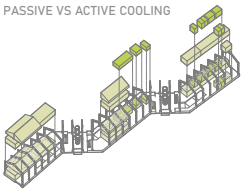
200,000 kWh of energy harvested annually

+$16,000 SAVED annually on energy expenses

Energy Consumption

High | Medium | Low

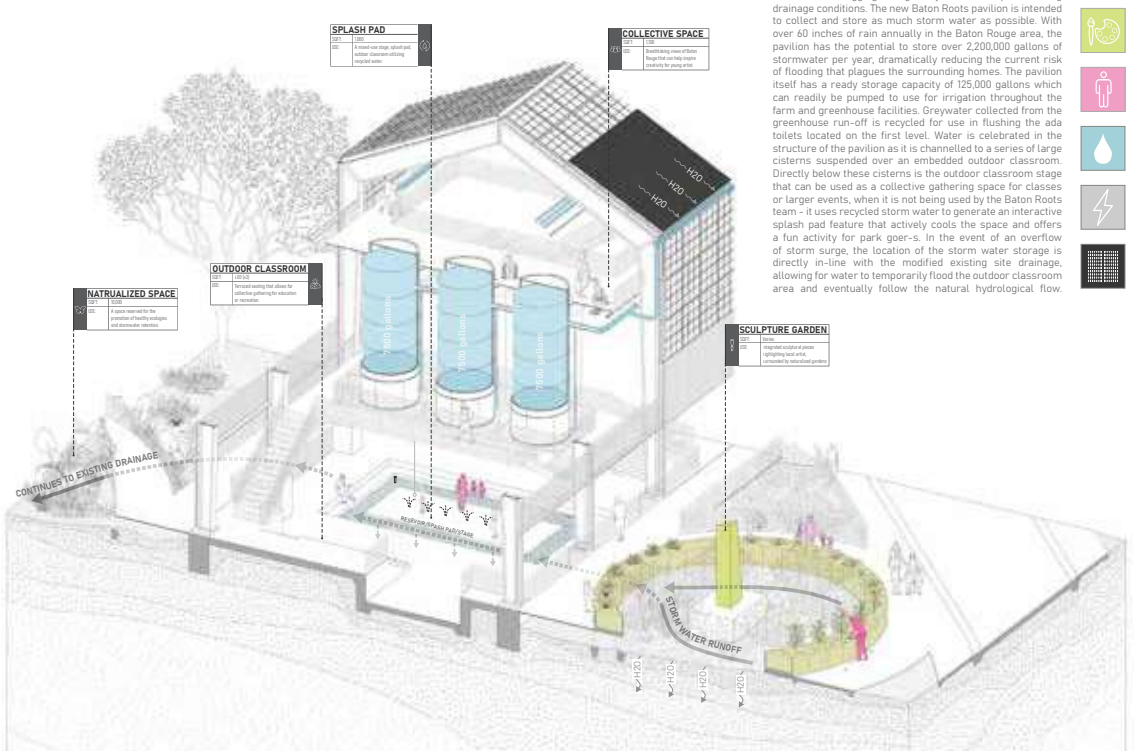
PASSIVE VS ACTIVE COOLING



47,200 SQFT passively ventilated space

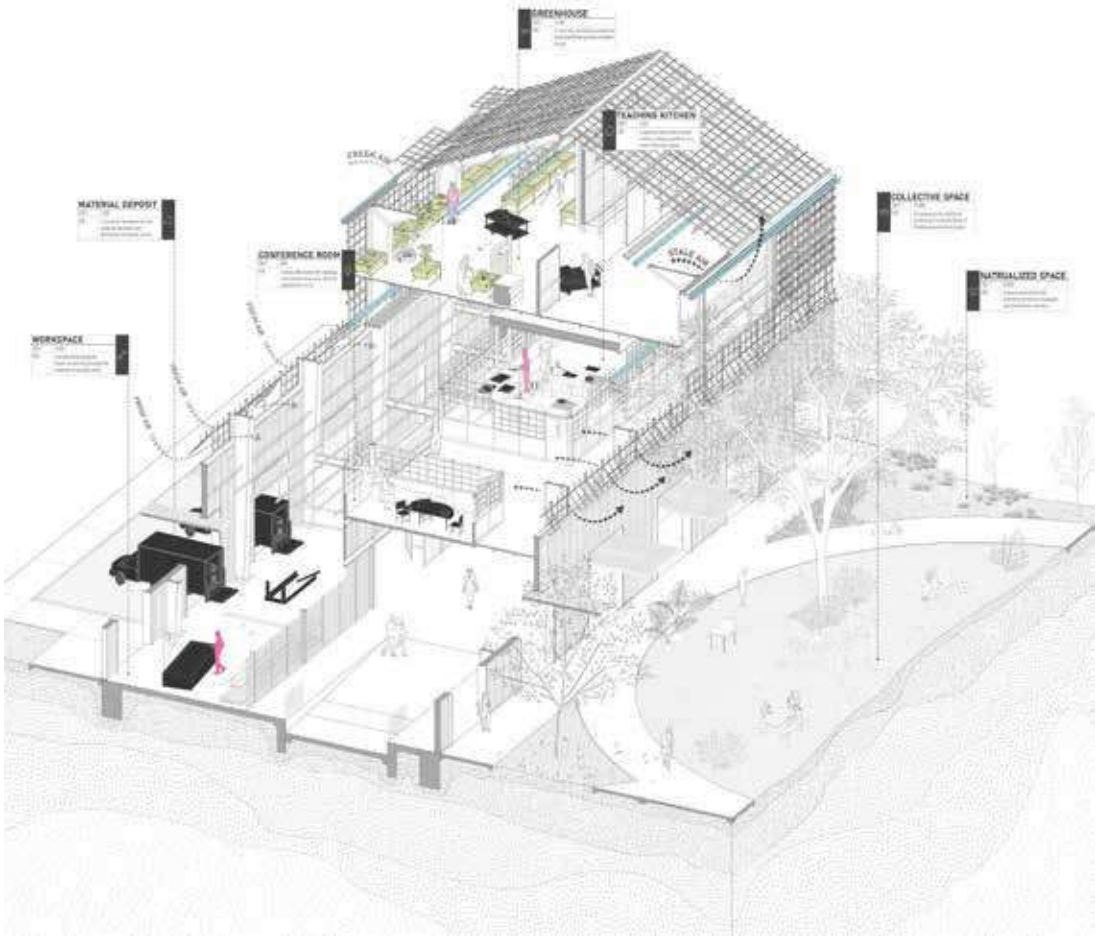
12,500 SQFT conditioned space

passively ventilated | actively conditioned space



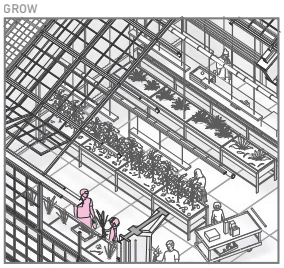
STORM WATER MANAGEMENT

Currently the existing Baton Roots site consistently struggles with issues of bogging during heavy rains due to poor existing drainage conditions. The new Baton Roots pavilion is intended to collect and store as much storm water as possible. With over 60 inches of rain annually in the Baton Rouge area, the pavilion has the potential to store over 2,200,000 gallons of stormwater per year, dramatically reducing the current risk of flooding that plagues the surrounding homes. The pavilion itself has a ready storage capacity of 125,000 gallons which can readily be pumped to use for irrigation throughout the farm and greenhouse facilities. Greywater collected from the greenhouse run-off is recycled for use in flushing the ada toilets located on the first level. Water is celebrated in the structure of the pavilion as it is channelled to a series of large cisterns suspended over an embedded outdoor classroom. Directly below these cisterns is the outdoor classroom stage that can be used as a collective gathering space for classes or larger events, when it is not being used by the Baton Roots team - it uses recycled storm water to generate an interactive splash pad feature that actively cools the space and offers a fun activity for park goer-s. In the event of an overflow of storm surge, the location of the storm water storage is directly in-line with the modified existing site drainage, allowing for water to temporarily flood the outdoor classroom area and eventually follow the natural hydrological flow.



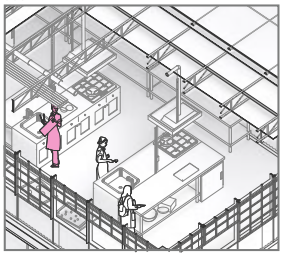
EXPERIENCES

GROW



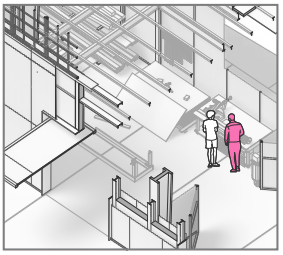
Tony and Diane are brother and sister who come to volunteer with Baton Roots after Diane is let out of school. She loves the view from the 3rd story greenhouse. She always points out their house while she helps weed planter beds.

COOK



Jada is an aspiring chef who utilizes the reservable commercial kitchen space to prepare her grandmothers famous fig preserves with her sisters.

BUILD



Andre is a full-time worker for Baton Roots who works to mentor local teenagers through their construct 101 program where they build and distrubute planter boxes and other small community interventions.

Images from the final project submission by Dylan Rollo Roth

Town & Gown - Engaging Community

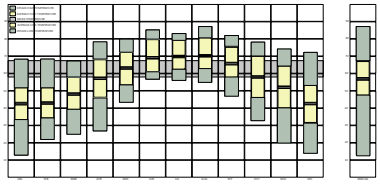
Course: ARCH 7003 Graduate Design Studio III

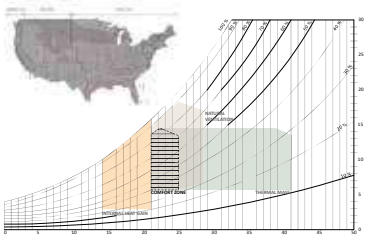
Type: Core studio, M. Arch

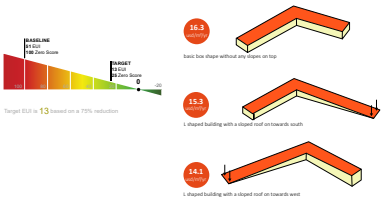
Date: Fall 2020 and Fall 2022

Role of Nominee: Instructor (course evalution average: 4.5/5)

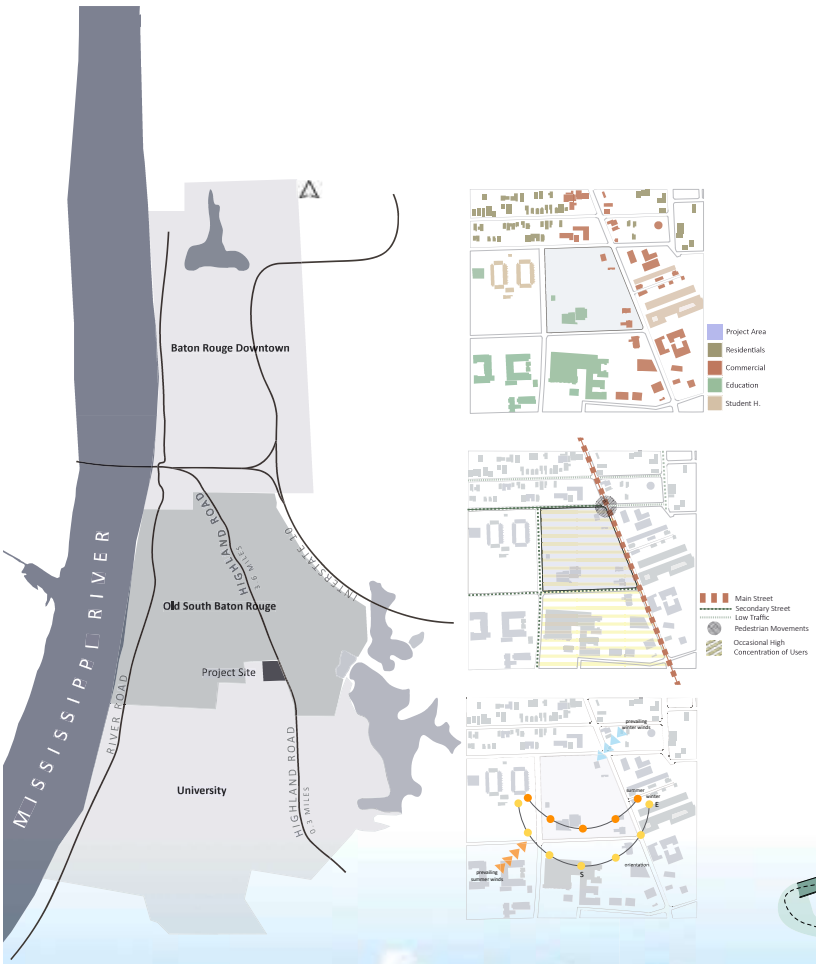
Compensation: 17 students contributed to this project for a 6-credit studio course.



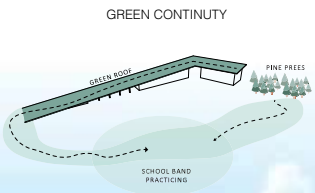




Although the Old South Baton Rouge (OSBR) neighborhood was historically prominent, many of its businesses began to decline in the 1950s. It is now a dilapidated, highly impoverished neighborhood with many abandoned structures. The project site, which sits on the boundary between the campus and the community, was included in both the LSU campus master plan and the OSBR community revitalization master plan. Both plans envisioned the site as a cultural hub. Taking this history and the site location into consideration, this studio investigated how the boundary between campus and the adjacent community can be defined to ensure more harmonious and engaging coexistence. Based on this question, students proposed a student housing complex with a community outreach center on the ground floor.

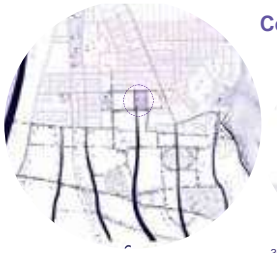


For the Community Outreach Center project, the major criteria is to create a sustainable urban environment. The objective of this idea is finding the way to design architectures harmonized with the environmental contexts and represented local identity. Enhance Old South Baton Rouge' quality of life and community image through agreed upon architectural design objectives; and promote its long-term economic vitality through architectural design objectives which encourage high quality development. In addition to the Community Outreach Center, a Children Learning Center will be also designed aiming to create a facility that explicitly educates and stimulates children through its design by providing an intriguing environment. Considering the proximity of the University, supporting the staff's care of children is one of the main intentions of this project by creating environments that allow the parents to focus their efforts on the care and nurture of children. In this way, facilitating family involvement in the center will foster overall community of Baton Rouge. Establishing a distinctly child-oriented environment within a facility will create the impression of "home" will be the antithesis of a typical institutional setting. The entire facility will be designed to promote transparency and ensure total "sight and sound" of the children. It will be possible to see straight through the building in the center that promotes an expansive imagination and interest in other students, classes and activities.

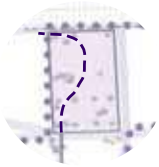


Images from the final project submission by Arzu Sevinc

Concepts Diagram



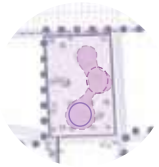
1-Existing Green Spines



2-Continue the existing green spine throughout the site.

3-Three different life experience, Public,Semi Public, Private

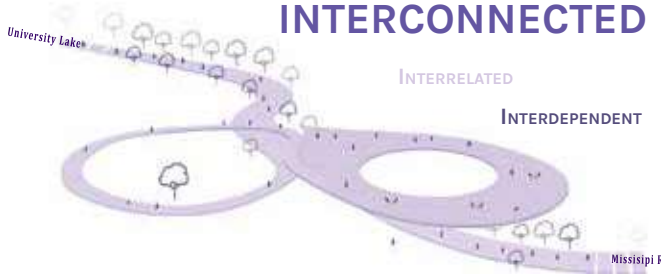
4-Integrate the path way with building components.



5- A Platform to connect the three functions

6- Each courtyard became an Environmental strategy component,

Every Thing IS INTERCONNECTED



Design for Ecosystem

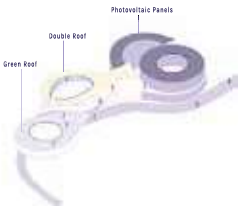
1-Using Native flora and funa
2-roof garden, bioswale
3-lifting up the building to base flood elevation
4-dimmable led lights

Design for economy

1- overhangs for sunshading are places to meet (minimize square footage)
2-using local resources and materials
3-creating jobs for small buisnesses

Design for discovery

1-discovering the strategy, using round shape for hurricane prone regions in order to be more aerodynamic, bearing more wind load and being more stable, this can be examined and studied.



Images from the final project submission by Shana Naderi

Green Community for Farmworkers

Course: ARCH 7003 Graduate Design Studio III

Type: Core studio, M. Arch

Date: Fall 2021

Role of Nominee: Instructor (course evalution average: 4.5/5)

Compensation: 14 students contributed to this project for a 6-credit studio course.

Based on the Architecture at Zero competition framework, this project explored the lifestyle of farmworkers in Visalia, the Central Valley of California, and sought a design solution to provide a stronger community that can give a sense of belonging to the members. Farmworkers are traditionally defined as persons whose primary incomes are earned through permanent or seasonal agricultural labor, an essential component of the agriculture industry. However, many farmworker households tend to have difficulties in securing safe, decent, and affordable housing and are often forced to occupy substandard homes or live in overcrowded situations. This project focused on solving this problem by developing a healthier living environment for farmworkers with an inspiring, but affordable design.

Images from the final project submission by Maryam Sinejani

1Bed Room Plan

2Bed Room Plan

3Bed Room Plan

This project concept reflects the distinctive climatic and social conditions of Visalia and Latino farmers, contributing to an architectural design that emphasizes sustainable design practices that achieve zero net energy while reflecting the distinctive geography and culture of the target society. During the design process of the affordable and sustainable residential complex, our main goal was to reduce the energy amount by using the least amount of money. Passive ventilation, seasonal shading, and effective daylighting reduce cooling, heating, and lighting loads, allowing a roof-top photovoltaic system to provide power equivalent to most of the energy used by the building. To reach our goal, we tried to use natural ventilation by placing the windows in a position that helps with the airflow in the units.

Passive Design

Geothermal Heating - Ground source heat pump for radiant floors and thermal comfort.

Cross Ventilation - Operable windows in each unit allow for selective air flow, minimizing HVAC loads.

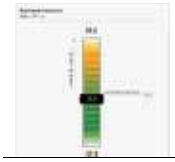
Solar Power - Solar arrays on rooftops provide renewable energy and the opportunity for tax subsidies

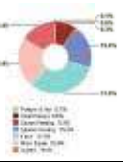
Rainwater Collection - Illustrated in the section, rainwater is being collected in this project.As a result, this system maximizes water collection while simultaneously enriching the users' audible & haptic relationship with water.

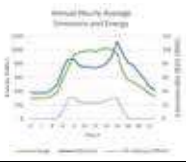
Drought Resistant trees - All trees and vegetation of the site are local and drought resistant.

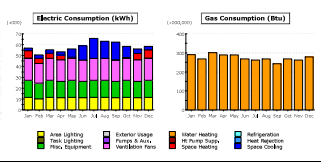
Daylighting - Building orientation as well as window strategies maximize daylighting in all units and each corridor

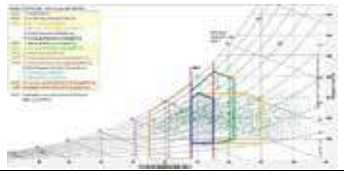
Electric cars - 5 Spots of parking on the site are reserved for electric cars and charger station.











Images from the final project submission by Maryam Sinejani

Environmental Simulations for Design

Course: ARCH 4041 Issues in Sustainability

Type: Elective, B. Arch and M. Arch

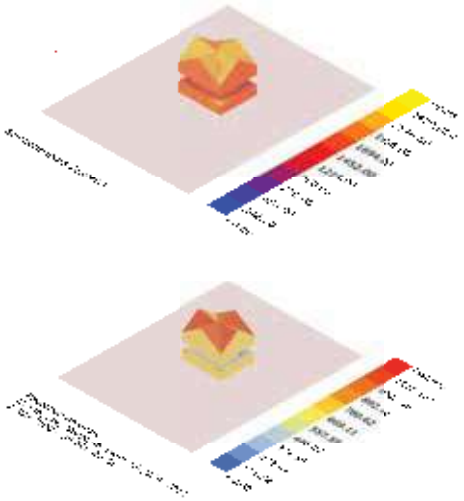
Date: Fall 2022

Role of Nominee: Instructor (course evalution average: 4.8/5)

Collaborator: Traci Birch

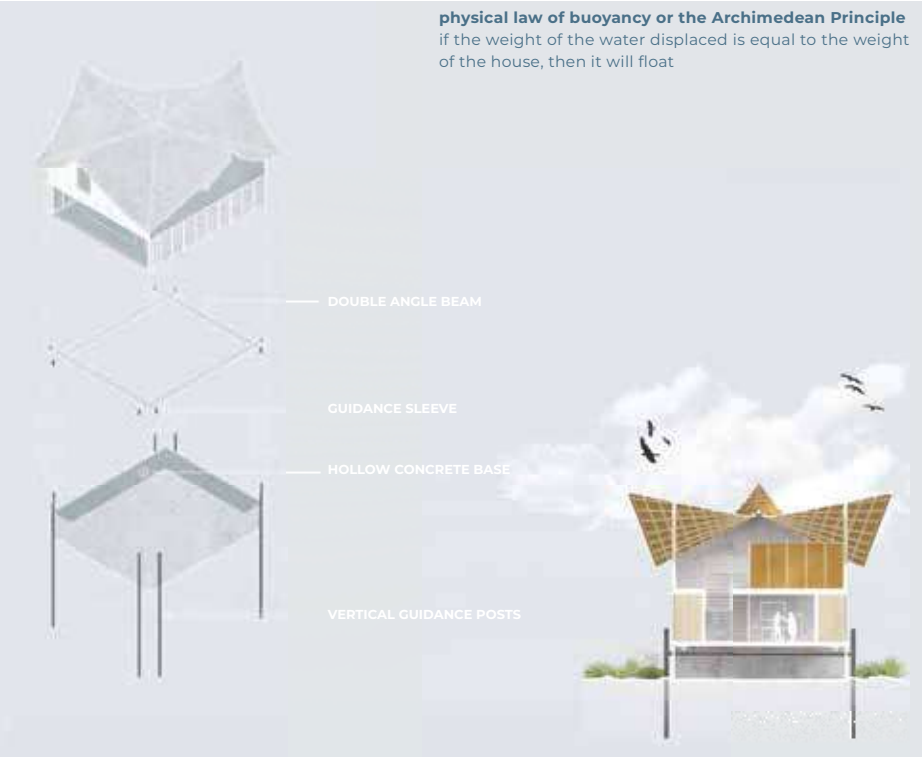
Compensation: 22 students contributed to this project for a 3-credit course.

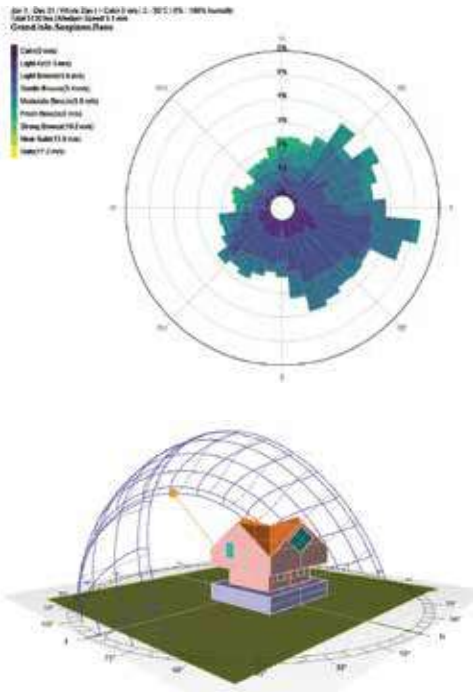
In this project, students had an opportunity to utilize various building performance simulation tools and methods they learned to develop the design of their projects. Recently, there has been an increasing number of building performance simulation users due to the development of various user-friendly simulation tools. However, the number of blind users, who can run the simulations without understanding the result, has also been increasing. This may be a barrier to achieving the goal of conducting environmental simulations in the early stages of architectural design to inform and assist the design decision-making processes. Therefore, the objective of this project was to support students to correctly interpret the simulation results, in addition to running the tools, to maximize the interaction between the environmental simulations and their design thinking.



Solar radiation analyses from the final project submission by Angel Asa

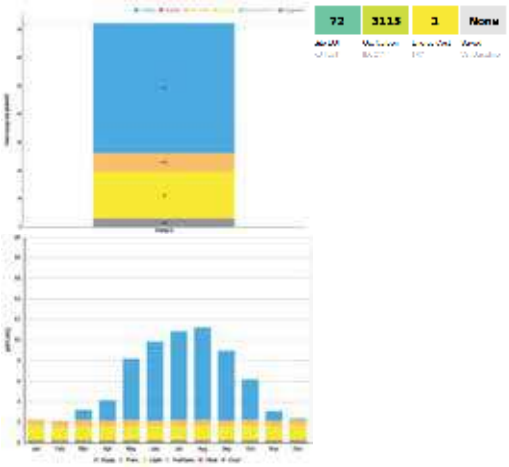
Site map from the final project submission by Angel Asa



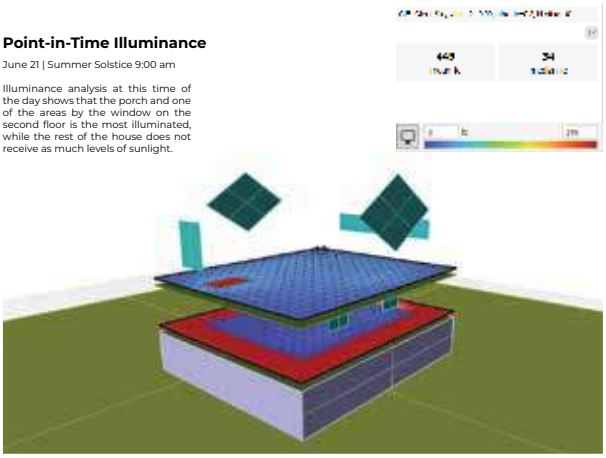


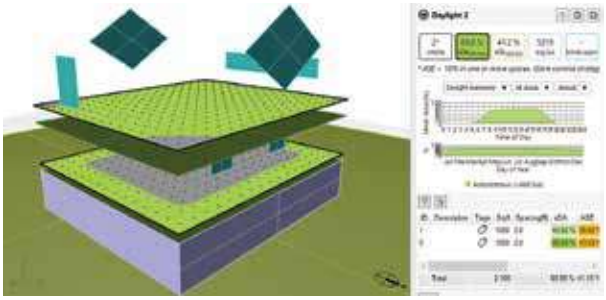
Sun and wind analyses from the final project submission by Angel Asa

Images from the final project submission by Angel Asa



Energy simulations from the final project submission by Angel Asa





Images from the final project submission by Angel Asa

Lighting simulations from the final project submission by Angel Asa

Low Tech High Impact: Rethinking Materials

Course: ARCH 4041 Issues in Sustainability

Type: Elective, B. Arch and M. Arch

Date: Fall 2023

Role of Nominee: Instructor (course evalution average: 4.7/5)

Compensation: 23 students contributed to this project for a 3-credit course.

Dissemination: presented and published at 2024 PLEA (Passive and Low Energy Architecture) International Conference.

Increasing plastic waste and pollution have become a major concern recently, threatening human health and ecosystems. According to UNESCO, about 80% of marine pollution is plastic waste, which affects around 17% of marine species. Although the production of plastic in the last ten years outweighs the production in the previous century, which may triple the amount of plastic waste in oceans by 2040, only 10% of the current plastic waste is being recycled according to the EPA (Environmental Protection Agency). The negative impacts of plastic waste have been widely known, such as the contamination of the environment, air pollution from uncontrolled incineration, and food contamination for wildlife and human beings. To solve this problem, zero-waste efforts would be the key, and one of the effective ways for this would be increasing recycled materials for construction.

This project particularly focused on plastic bottles, one of the most used items in the world, exploring their potential as construction materials. While plastic bottles are the most common type of plastic waste, the structural integrity of the assembly may be a challenge for the construction. Through the design-build process of a chair, this project aims to find an effective and sustainable method for achieving the structural integrity of the assembly in addition to a comfortable and aesthetically pleasing design. Although students could choose the materials for stacking and connecting the bottles, only recycled or biodegradable material options were allowed. The required bearing capacity was 200 lb.

Image from the project submission by Omid Elhami and Maryam Sinejani

Image from the project submission by Omid Elhami and Maryam Sinejani

Exhibition by Gabe DeLiberty and Leah LeBlanc

Fun Learning in Building Science

Course: ARCH 3008 Environmental Control Systems

Type: Core course, B. Arch and M. Arch

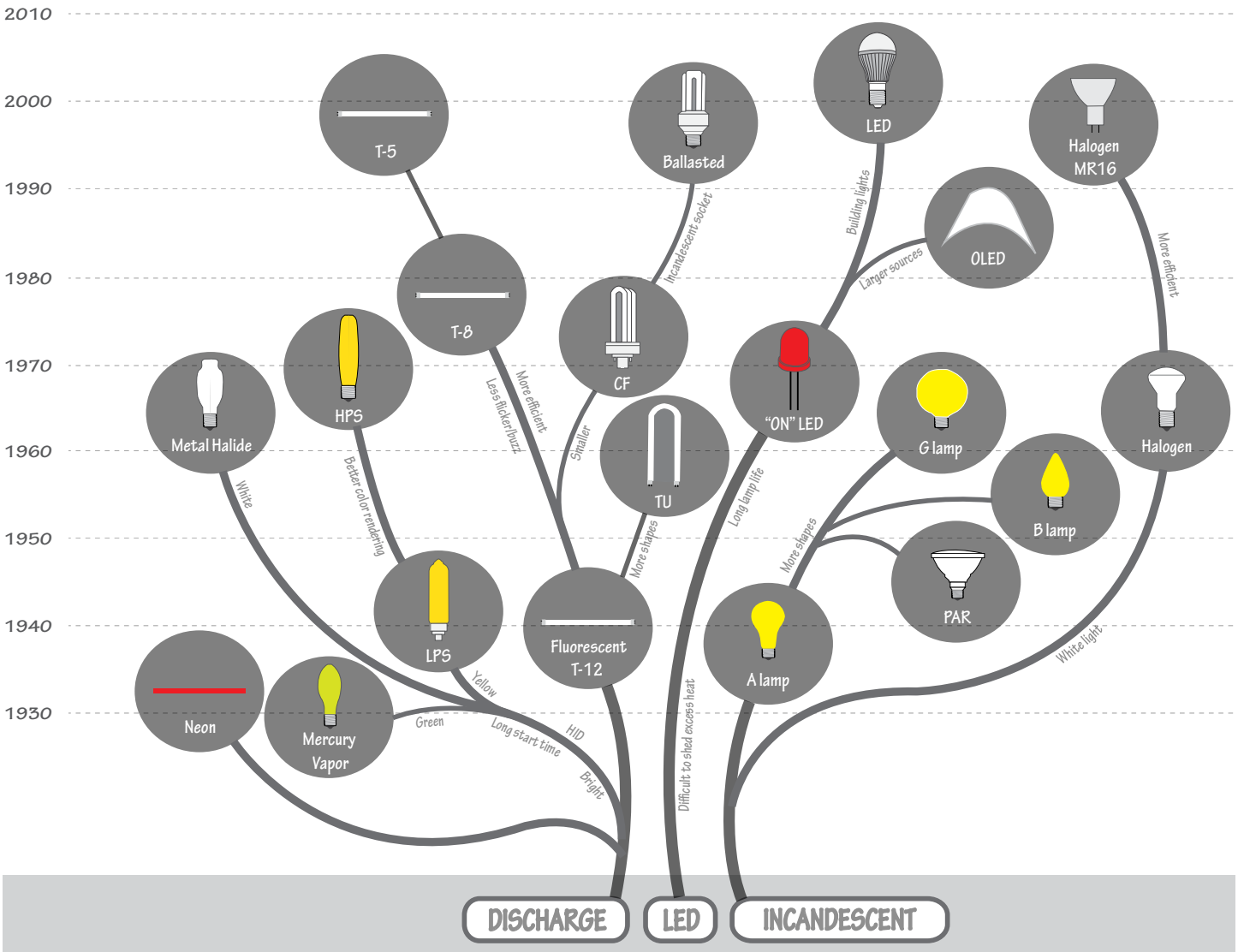
Date: Spring 2020 - Spring 2024

Role of Nominee: Instructor (course evalution average: 4.4/5)

Funding Sources: LSU STF (Student Tech Fee) program

Compensation: total 493 students worked on these activities for a 3-credit course.

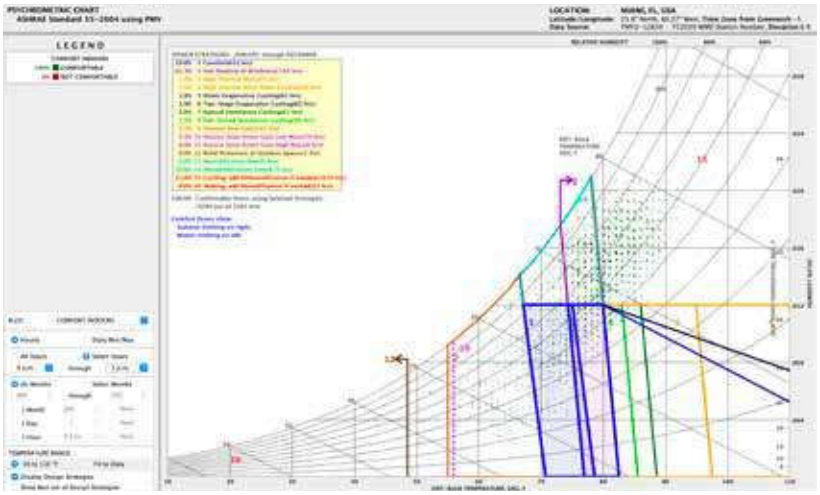
Based on my experience of teaching and assisting building systems courses and my own experience as an architecture student taking building science courses, I found that not many students in the architectural design program enjoy this course due to the numbers and calculations involved in the addressed topics. Large class sizes have also been a barrier to addressing the topics in depth and attracting students' attention. However, environmental systems issues are critical to achieving sustainable building design and developing rough ideas further into real building design. Therefore, I tried to maximize student engagement in the class to support students in understanding the topics and maintain their interests by providing fun learning environments and real-life examples. The student engagement strategies included in-class game apps, bingo games, stage performances with students, Flipped Classroom, and user-friendly analysis tools.



Electric Lighting Tree (ARCH 3008 course material), by Soo Jeong Jo in collaboration with Michael Ermann

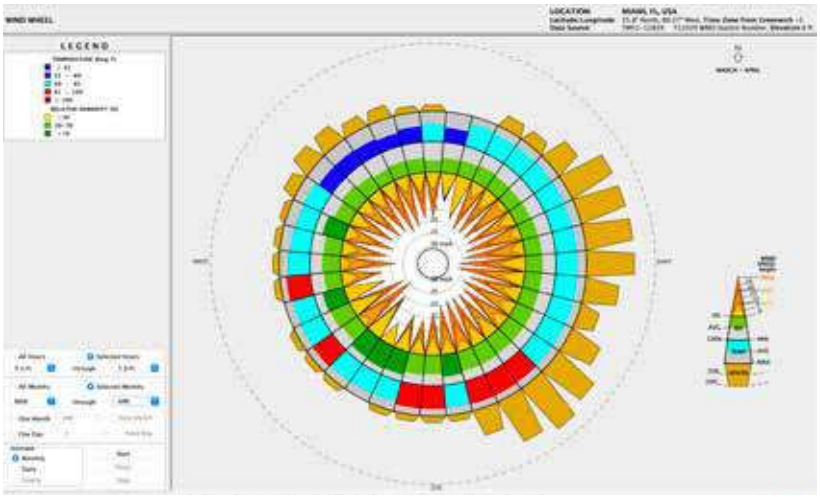
Fluorescent Lamp	Luminaire	High Intensity Discharge (HID)
Discharge Lamp	Incandescent Lamp	Coefficient of Utilization (CU)
FREE	Halogen Lamp	Metal Halide

In-class game: Artificial Lighting Bingo

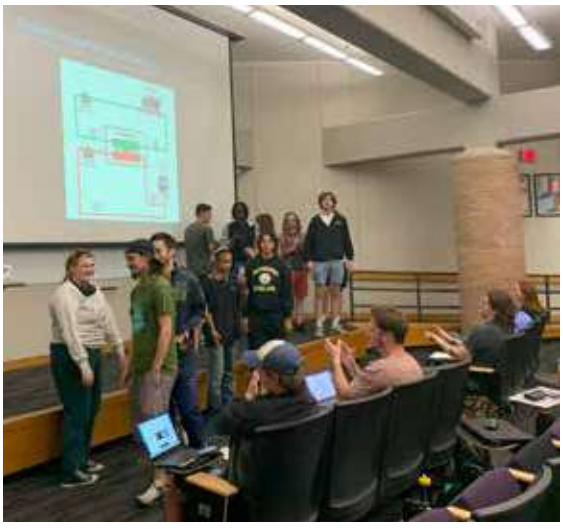


Thermal comfort study by Kaitlyn Parker (software: Climate Consultant).

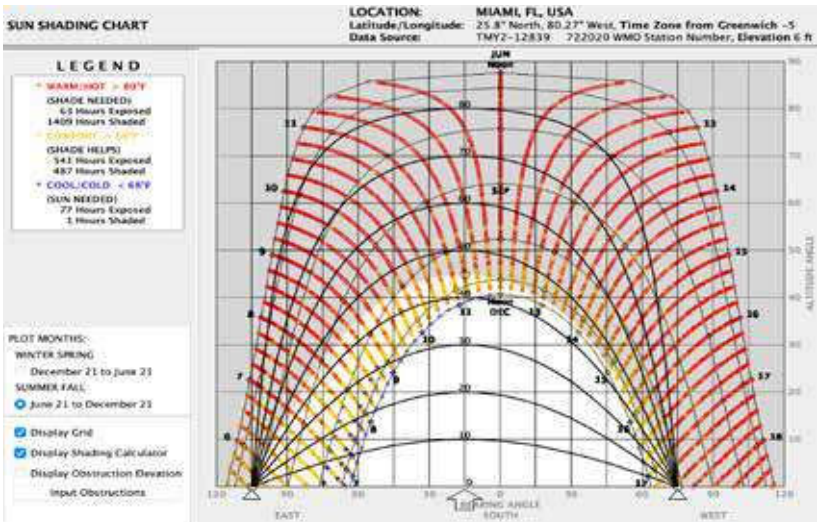
In-class game: quiz contest using Kahoot gaming app



Windflow study by Kaitlyn Parker (software: Climate Consultant).



In-class game: playing the cooling cycle for large buildings



Sunshading study by Kaitlyn Parker (software: Climate Consultant).

Climate-Responsive Shading Systems

Course: LSU Discover Undergraduate Research program

Type: Independent Study, B. Arch

Date: Fall 2022 - Spring 2024

Role of Nominee: Advisor

Compensation: 3 students contributed to this project for the research program credit and conference travel funds.

Student Award: 2024 ARCC (Architectural Research Centers Consortium) King Medal

Dissemination: presented at the 2024 NCUR (National Conference on Undergraduate Research).

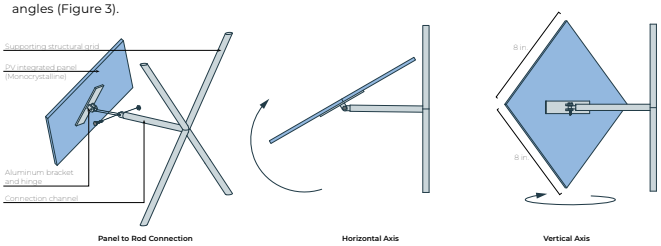
This project was based on the question about effective cooling strategies using passive systems in a hot and humid climate. The risk of extreme heat has been growing recently in Louisiana due to global warming, thus increasing the energy use for cooling. Implementing a shading device is an effective strategy to reduce the impact of solar heating and the building's energy demand for cooling. Specifically, kinetic shading systems are considered one of the solutions for future building retrofit due to their ability to respond to changing weather conditions. Moreover, kinetic façade systems added to an exterior façade of a building have great potential to be combined with photovoltaic (PV) systems in Louisiana, which receives intensive solar energy throughout the year.

This project, therefore, focused on a solar-responsive facade with mechanical movement in response to the sun in the Louisiana climate context for mitigating extreme heat conditions and generating energy to enhance existing buildings' energy performance. The proposed study aimed to investigate the performance of a kinetic façade system and identify how the direction of the rotating axis impacts the energy performance of the shading device by utilizing computational building performance simulations.

METHODOLOGY (Continued)

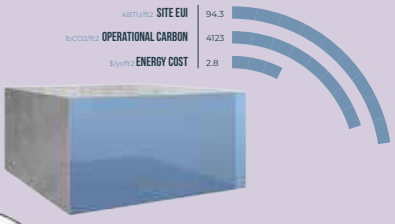
To determine an effective shading axis, we decided to set the following parameters:

- **Structure & Composition:** The photo-voltaic panels are 8" x 8" and binded by aluminum brackets on 2 edges which are then attached to a 6" connecting channel through a hinge. The connecting channel is fastened on a tension rod structural system, following the diagrid. The connecting channel allows the panels to offset from the supporting structural grid; the panels, therefore, could rotate in necessary angles (Figure 3).

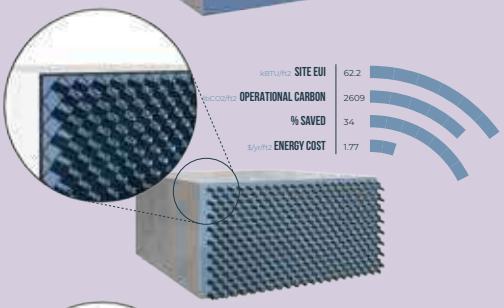


RESULTS

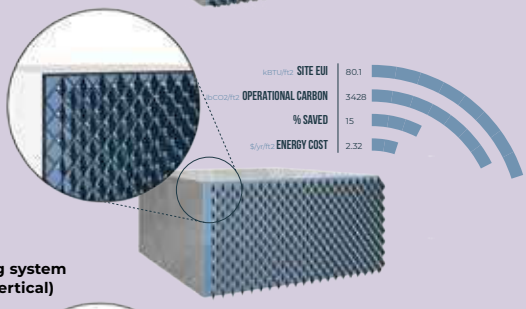
Case 1: Baseline (Without shading system)



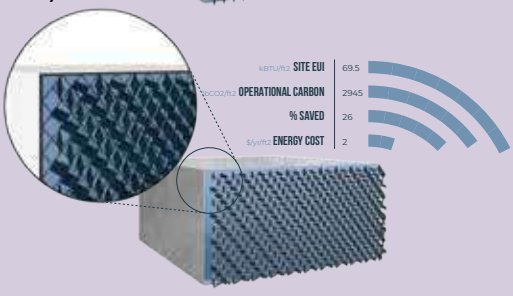
Case 2: With horizontal shading system



Case 3: With vertical shading system



Case 4: With mix shading system (horizontal and vertical)



PHYSICAL MODEL

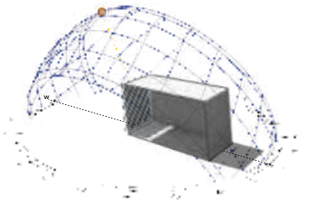


Figure 4: Sun Angle and Shadow Projection of Shading System
generated with ClimateStudio

Images from the NCUR poster by Angel Asa, Victoria Lopez, and Yilin Zheng.

Virtual Frictions: Digital to Physical, Physical to Digital

Course: All-School Workshop - Digital Fabrication

Type: LSU School of Architecture workshop, B. Arch and M. Arch

Date: Spring 2020

Role of Nominee: Organizor

Collaborators: Niloufar Emami, Zachary Angles

Funding Sources: LSBAE Mary “Teeny” Simmons Architectural Education and Research Fund,
LSU Center for Collaborative Knowledge, LSU College of Art & Design

Compensation: 200 students contributed to this project for their architecture course credits for 3 days.

This three-day workshop and symposium investigated how physical craft and digital technologies might inform one another. In this workshop for the whole School of Architecture, students participated in one of the seven fabrication groups, guided by invited leaders, who use a variety of materials and techniques to create physical or digital products. The groups explored traditional and emerging fabrication methodologies, such as welding, weaving, and inflating, using drones, virtual reality (VR), and robotic arms. The exhibition of the workshop outcomes and the roundtable discussion with the workshop leaders and additional speakers from various colleges concluded the event.

REFLATE group led by Jonathan Desi-Olive

ZIP FORM group led by Emily Baker

INTER-DIMENSIONAL NARRATIVES group led by Olga Mesa

CROP CIRCLES group led by Brandon Clifford

Virtual Frictions

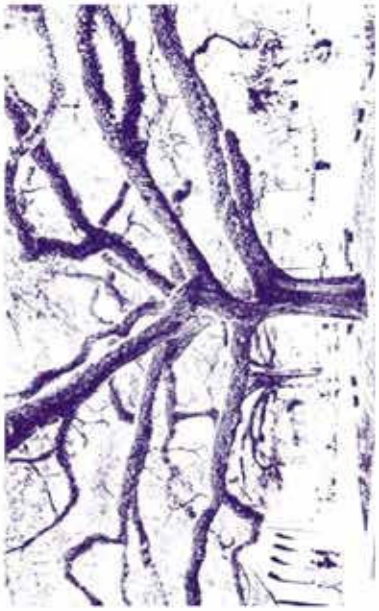
Louisiana State University School of Architecture

FEB 13 FEB 14 FEB 15

OPEN TO PUBLIC
KICK-OFF LECTURE
BRANDON CLIFFORD

7 WORKSHOPS

OPEN TO PUBLIC
ROUND TABLE &
RECEPTION



"Virtual craft still seems like an oxymoron; any fool can tell you that a craftsperson needs to touch [their] work. This touch can be indirect —indeed no glassblower lays a hand on molten material—but it must be physical and continual, and it must provide control of whole processes ... more abstract endeavors such as conducting an orchestra or composing elegant software have often been referred to as craft, this has always been in a more distant sense of the word ... Our digital practices seem more akin to traditional handicrafts, where a master continuously coaxes a material."[1]

Digital technologies have provided watershed moments for innovation and progress (promised and realized). Innovations in computation have offered exciting new possibilities for the construction, consideration, and design of the built world. Architects tackling this new area of expertise have long grappled with the challenge of reconciling the new languages of scripting, software, and virtual environments with the established traditions of material craft, physical drafting and measure, and tactile response.

At the same time that the discipline has seen digital fabrication shift from niche specialization towards a new status quo, some architects and designers have shifted their investigations from exploring the potentials new computational and fabrication technologies present towards possible reciprocities between computational processes and traditional crafts or insights.

How can digital technologies learn from physical craft? This is the sincere and challenging question which Virtual Frictions proposes as a launching point for a series of investigations exploring the reciprocities between digital craft and physical materials and tools. Seven invited workshop instructors will lead investigations into timely questions in digital fabrication. Through their work, students will learn new skills, explore new aspects of technologies, and be introduced to making in new and exciting ways. The three-day event will be kicked-off with a lecture by Brandon Clifford, of MIT and Matter Design, and will culminate in a round-table and reception to share the results of the workshops.

1 McCullough, Malcolm. Abstracting Craft: the Practiced Digital Hand. Cambridge (Massachusetts): MIT Press, 1996.

Organized by:
Niloufar Emami, Zachary Angles, and Soo Jeong Jo
sarch@lsu.edu

[CROP CIRCLES]
analog algorithms
Brandon Clifford
Massachusetts Institute of Technology

Mystery and speculation surround the nocturnal creations of geometries in the landscape: Crop Circles. As cryptic as their creation stories are, the geometries that describe them are universally rule-based. Students will begin by establishing their rule-based geometries at the desk, then translate them into a computation method that constructs a code to deploy a drawing at a geological scale.

[ZIP FORM]
digital curved forms
Emily Baker
University of Arkansas

The mathematical concept of parallel transport will be physicalized as students design and create curving steel forms that "zip" together from flat parts. Students will digitally model unique forms using a provided parametric strategy. Simple analog jigs will enable the fabrication of these complex forms at large scale. This workshop aims to reveal how analog fabrication techniques paired with computational design strategies can make fabrication of complex geometries easy, efficient, and fun.

[REFLATE]
digitally designing inflatables
Jonathan Desi-Olive
Kansas State University

In teams, workshop participants will design and build their own inflatable environments under a very simple premise: the structures must be made of HDPE plastic sheeting and must fit within a volume of 5m x 5m x 5m with the whole team inside. Upon completion, the "village" of inflatable pavilion-like structures will be exhibited across the LSU campus.

[CONSTRUCTING TEXTILES]
parametric knit forms
Shelby Doyle
Iowa State University

In groups of five to six people, students will design and construct textile installations that explore the friction between digital simulations of textiles and their physical construction. This will include modeling proposals in Kangaroo Physics for Grasshopper then fabricating large peg looms, knitting panels, and installing the knits to reflect the initial design proposal.

[INTER-DIMENSIONAL NARRATIVES]
VR designed 3D forms
Olga Mesa
Roger Williams University

In pairs, students will respond to prompts to construct a spatial inter-dimensional narrative within a virtual environment. They will examine the frictions and reciprocities inherent in traveling between physical and digital space, and the spatial perception and physical sensations triggered by visual stimuli. Participants are encouraged to test the connection between the body and its movements to measure, model, and control phenomena. A portion of their scenes will be translated into 3D printed objects that embody their spatial constructs and appeal to our imagination.

[ROBOTIC "AUGMENTED" VISION]
robotically captured AR videos
Ebrahim Poustinchi
Kent State University

RAV investigates a possible medium to establish a workflow between a custom-made AR application and a curated robotic motion. Enhanced through the lens of the existing contemporary discourse about representation, students use RAV workflow to develop a hybrid actual/virtual video, that is half digital and half physical. As an outcome of the workshop, students will develop a robotic videography path for the UR5 robot arm to capture a curated video of the AR scene.

[GRAVITY-ASSISTED CASTING]
variable parametric casting molds
Lavender Tessmer
Massachusetts Institute of Technology

The workshop will focus on casting as a scalable form of production, examining the trade-offs between geometric complexity, variation, and timing. Projects will investigate a "gravity-assisted" casting technique, using multiple possible orientations of a partially filled casting mold to generate different geometric permutations. Each team will produce a mold that is capable of producing more than one geometry using gravity-assisted variation—a casting "machine" for producing an array of unique geometries. Using digital modeling to maximize the potential of geometric relationships in the mold design, students will explore the interior and exterior mold geometries along with different volumes of casting material and number of separate material deposits.

LSU | Louisiana State University

Funding provided by:
The LSBAE Mary "Teeny" Simmons Architectural Education and Research Fund
The LSU Center for Collaborative Knowledge
The LSU College of Art & Design

Poster Design: Zachary Angles

"I just wanted to take the time to congratulate Niloufar, Zach, and Soo Jo's efforts and success in our workshop. I normally don't write reviews for things but I cant believe how productive and beneficial this has been. In this workshop the students were constantly engaged and enjoyed being there. You all truly did a Fantastic job."

"I enjoyed the change of perspective with working in a modeling software that allowed for human movement through space. It gave me a different and improved understanding of design."

"The first thing was being able to interact with students from the different years of architecture school. It was also beneficial having outside professors and assistants lead the workshops. I appreciate the other perspectives that people outside of LSU can bring. Using and exploring a medium I have never used before was also very beneficial."

"To see different ways in which we can go about creating spaces."

"The opportunity to see a project through its process of digital design to its actual habitable construction was important because it is an experience that students do not get too often. It also allowed me to work through problems as they appeared in the fabrication process."

"I really enjoy these workshops, because it breaks down the studio walls in a way. We become one big studio of Atkinson instead of our studios separated by year."

"This workshop was really fun and I enjoyed learning new techniques with different peers. I also appreciate the opportunity to interact with various students since it's not easy to see everyone when most are in studio at the same time or schedules don't match up outside of scheduled studio hours."

ROBOTIC "AUGMENTED" VISION group led by Ebrahim Poustinchi

CONSTRUCTING TEXTILES group led by Shelby Doyle (top and bottom)

Other Activities

Along with the projects mentioned above, I have been attempting to provide additional avenues for students to broaden their perspectives through workshops and events. Examples of these include the international workshop with Pai Chai University (Korea) at the LSU campus, the exhibition and public reception of the ARCH 3002 studio project with the local community at Hilltop Arboretum, and the tour of the SOM New York office that takes part as part of the ARCH 7003 field trip. The BIPV (building-integrated photovoltaics) systems session I offered during the 2024 Architecture Summer Camp for high school students was an additional example of my efforts to reach K12 students and involve future generations in the design and research endeavors for a more sustainable future.

Renewable Energy workshop, 2024 Architecture Summer Camp
(Collaborator: Arup Bhattacharya, College of Engineering)

SOM New York office visit, 2019F ARCH 7003 Field Trip

2023S ARCH 3002/3102 project exhibition at Hilltop Arboretum (Collaborators: Gary Gilbert, Sergio Padilla, ARCH 3102 students)

International workshop at LSU, 2024S LSU Honors program
(Collaborator: Taeckgu Lee, Pai Chai University,
Funded by: Korean Ministry of Land,Infrastructure and Transport, LSU Provost's Fund)

Student Comments

Anonymous comments from the 2019 Fall - 2024 Spring course evaluations

- Soo is an excellent professor. She offered excellent suggestions and design criticisms throughout the semester. I could really see how my design evolved over the course of a few months.

- One of the studios that I highly recommend students to take. Soo is very passionate about sustainable design and through this studio I was able to gain new skills and knowledge on sustainable design. She made the learning of this course very fun and engaging throughout.

- The Instructor was one the best I've had in my time at LSU.

- Mrs. Jo is extremely enthusiastic about architecture and it showed in her lectures and zoom classes. I enjoyed learning under her as well as utilizing programs like climate consultant that show how technology works alongside architecture and design. She was very open to criticism and created many polls on zoom for students to give their input on how the class was going throughout the semester. Overall, I think she is a great professor for the class and will continue to be for as long as she teaches it.

- Our instructor was great at leading a group of architecture student successfully throughout the semester. I personally feel so lucky to take this studio class because I learned a lot about architecture.

- Soo did a wonderful job at sequentially placing assignments throughout the semester so that different design considerations could be thoroughly considered. She did a wonderful job at sharing her expertise by creating videos, leading workshops, and making herself available for questions regarding new material.

- Soo is such a great professor in teaching sustainable architecture courses and this class is highly recommended for those interested in learning more about sustainability. She really knows the topic in–depth and teaches really well.

- Soo is the best at teaching this class! I really enjoyed her class and she knows all about environmental control systems, the way she taught the class was very clear and made it very helpful to understand. Thank you Soo, I really enjoyed your class!

- This class was a pleasure to take. The instructor was impeccable and she made the class very accessible throughout the semester! Would recommend to future students!

- Mrs. Jo was an extremely good instructor for the course – and hand–made many assignments with excel spreadsheets and design calculations involved that helped myself and other students to really grasp the concept of the mathematics behind the designs we created.

- Professor Soo was an amazing teacher. She explained everything in detail and guided us for our further design development. She made available a lot of resources which we can refer to easily. She explained even the basics of each assignment through examples which were quite helpful. Her support was admiring throughout the semester.

- I really enjoyed the plastic bottle chair project. It was easy to get excited about working on it because most classes don't have projects like that, and I had never made something like it before.

- Professor Soo is an excellent professor! This was my favorite class of the semester and I enjoyed the challenges presented in the quizzes and projects she assigned.

- Professor Soo is very passionate about the topic and her way of teaching reflects this. Her class feels more like conversations rather than lectures themselves. She does her best to implement engaging exercises that I really appreciate.

- The instructor made this class very engaging with the activities we did in class. It was a great class.

- I thought the instructor was very enthusiastic about the topics being taught and as a result I started to become more interested in the class over time. I think the professor had a well-developed balance between slideshows, videos, and participation which made me excited to attend the class.

- Soo is highly knowledgeable within the field of sustainability and did a thorough job of sharing her expertise. She gave resources so that we could always find more information if needed. She had a grasp upon all of our studio project concepts and shared resources when she came across them. I appreciate that she would express interest in all of our career aspirations within the field of architecture and give guidance too.