



F24-S25
Advanced
Synthesis
Option
Studios

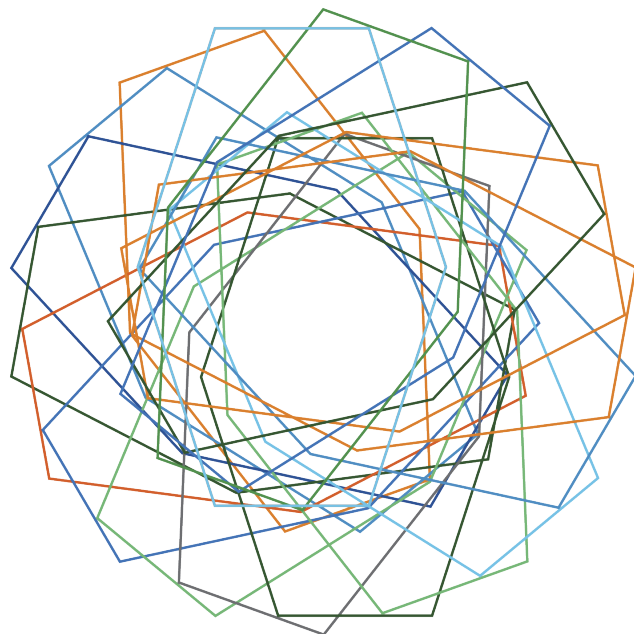
CARNEGIE
MELLON
—ARCHITECTURE

■ The descriptions for F24-S25 Advanced Synthesis Option Studios, (ASOS) are listed in this catalogue. The ASOS selection process includes students' three preference ranking, and happens before each semester (in July for Fall and in November for Spring). At these points an expanded and updated catalogue is published. We send an invitation email to students from B.Arch, M.Arch and MAAD programs who complete a preference form.

■ ASOS studios will be engaged in and respond to the theme of the Public Programs workshops/lectures; Artificial (and Othered) Intelligences

■ F24 Studio Rosters will be published on August 15th 2024
 ----S25 Studio Rosters will be published on November 15th 2024

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COVER IMAGE
 North Sea, North Norfolk, UK

MARY-LOU ARSCOTT + NICK LIADIS
From City to Forest

From one body to a million



F24
ASOS

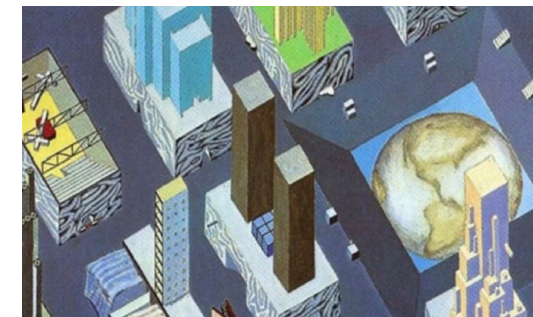
DARAGH BYRNE
Waste Machines

Unmaking Intelligent Spaces



HAL HAYES
Manhatta Interrotta/Manhattan Interrupted

Recontextualizing the grid for sustainable, equitable futures



TOMMY CHEEMOU YANG
Compoundologies

Timber, folklore, and the community irrigation networks of Chiang Mai



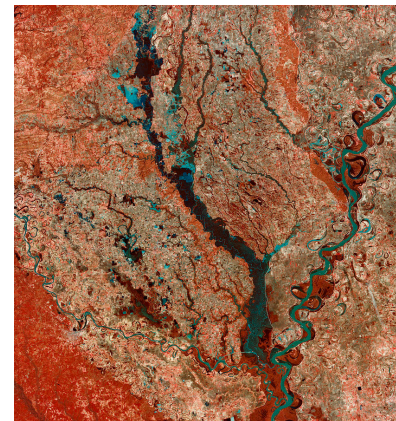
SAROSH ANKLESARIA
Reparative Infrastructures

Reworlding Infrastructure Through the Making of Publics



HEATHER BIZON
**Past Futures:
The Mississippi River Delta**

Aesthetics, Politics, and Multiple Mediums



DANA CUPKOVA
Image Deep:/MycoRepair

Regenerative Reconstructions



GERARD DAMIANI
Barge as par.a.digm

Artificial River Ecological Formations



LAURA GAROFALO
Enchanted Skins

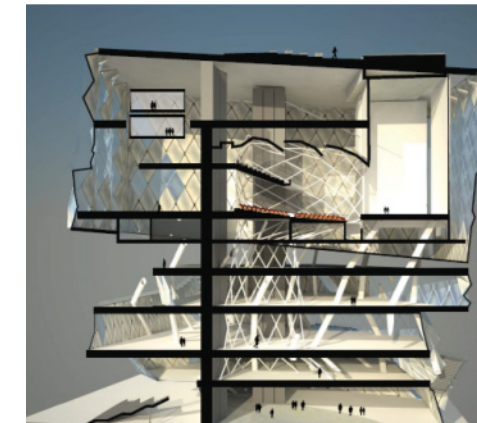
Ornament, Interface and Expression



S25
ASOS

HAL HAYES
**Frozen Music :
Rhythm & Harmony
in Architecture**

San Francisco Symphony
Experimental Theater



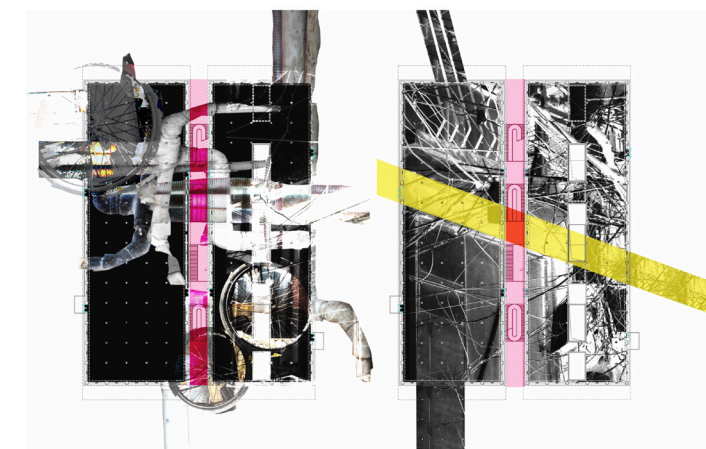
MISRI PATEL
Bridging Craft

Catechizing Performance-Driven
Craft and Paradoxes of High-Tech



TULIZA SINDI +
MARYAM KARIMI
Thesis

Graduate and Undergraduate
Independent Thesis

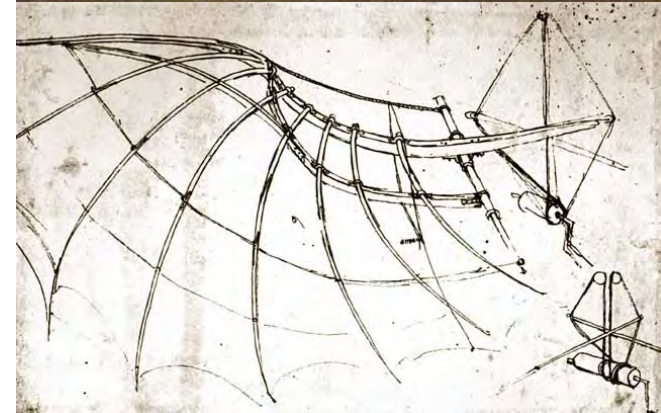


From City to Forest

from one body to a billion

Mary-Lou Arscott + Nick Liadis

“To think new thoughts, by implication, requires stepping out of the epistemic space of Western social theory and into the epistemic configurations associated with the multiple relation ontologies of worlds in struggle.” *Arturo Escobar, Design for the Pluriverse*



Top Skull of Barn swallow,
Middle Drawing by Leonardo Da Vinci, 1490
Bottom Xray of swallow

QUESTIONS

The cycles that drive change in the natural world are ones that architects are often asked to neutralize, suppress, ignore, and very often, destroy. **What rich opportunities for biodiversity and ecological balance are lost when we eliminate these systems within the places we inhabit?** Human-centered time and space remove the possibility for anything else to challenge how we exist in the world. **What does it mean to entwine our sense of self with the subtle or dramatic shifts that define ecosystems from a tiny mountain stream to the enormity of a continent?** Transparency, identity, and reflection. **How can architecture serve as the bridge between our individual and collective identities and the creatures whose lives we disrupt to maintain our comfort and convenience?** Human comfort as a driver of extinction. **By reconciling the tension between our desire for comfort as extinction looms for hundreds of species, in what ways does our human-centered perception of space and time disregard the life cycles and rhythms of non-human creatures, and how can architectural design address this disparity?** **Did you see or hear a bird today?** Probably. We exist everywhere. **How can we limit our impact in a given location and remove our ubiquity, giving up the ability to visit a place that we may have conceived?**

PROMPT

Measuring reality without the usual metrics of familiarity and comfort involves sensitivity to systems we ordinarily ignore. These systems have evolved over millennia, and we have very little understanding of them beyond empirical measurement and simple detection. On any given night in September, millions of songbirds pass over your head, and you have no idea. A large percentage of those feathered bodies get tricked by reflections in glass and die trying to reach a place that doesn't exist. Patterns of seasonal movement can be described in a range of ways, from the empirical to the experiential. How can we detect these patterns and allow our architecture to relate to them in productive ways? How can those patterns be set on a course to evolve and change without our greed and exploitation? You're a bird with the incredible gift of flight. One of billions of feathered bodies embarking on a remarkable journey from your breeding grounds across North America to places as far as South America. Across borders and over oceans and continents, you need to migrate to survive. Evolution has pushed birds to develop extraordinary abilities to overcome distances at the global scale, crossing continents and oceans, connecting their breeding grounds to their wintering grounds. An Ovenbird foraging in Schenley Park during the day might travel hundreds of miles overnight to complete one leg in this immense journey.

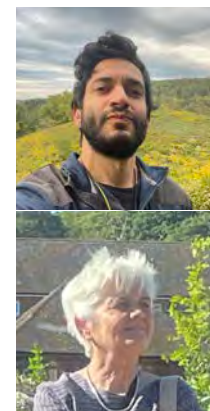
CONTEXT

The proliferation of cities and human-altered landscapes has significantly impeded birds' safe passage during migration—habitat degradation, light pollution, and glass buildings are a few of the spatial alterations that have caused dozens of species to need urgent conservation care. Inside to outside and across a range of scales, the studio will be collecting data—empirically, experientially, and theoretically—to generate propositions for guiding billions of birds safely around cities and buildings. Through an understanding of complex systems, designs will be data-driven, and will explore how humans could adapt to live within the natural world without conflict. Studio work will include regular outdoor data gathering and engaging with Bird Lab's study sites across the Pittsburgh region; there will be a series of discussions with invited guests on radical ecologies as well. We will critically consider ideological frameworks of environmental justice, decolonial geographies, and queering science with reference to the writings of: Ahmed, Escobar, Tsing, Yusoff and Wehiyle, plus bird and habitat-focused texts by Kimmerer, Weidensaul, and Klem. The phenomena of bird migration extends our understanding of relationality across geographies, connects architects to strategies of interrelated ecosystems and challenges the society producing pervasively hostile environments.

Readings will include sections from;

- Ahmed, Sara, *Queer Phenomenology*, Duke UP, 2006
- Escobar, Arturo, *Designs for the Pluriverse*, Duke UP, 2019
- Kimmerer, Robin Wall, *Democracy of Species*, Penguin, 2021
- Klem, Daniel, *Solid Air : Invisible Killer: Saving Billions of Birds from Windows*, Hancock House, 2021
- Tsing, Anna, *Friction: An Ethnography of Global Connection*, Princeton, 2024
- Yusoff, Kathryn, *Geologic Life*, Duke UP, 2024
- Wehiyle, Alexander, *Habeus Viscus*, Duke UP, 2014
- Weidensaul, Scott, *A World on the Wing*, Norton+Co, 2021

Wing of Red-bellied Woodpecker



Nick Liadis, and Mary-Lou Arscott

PROGRAM



The studio will feature a comprehensive, long-term project that will span the entire duration of the course. This project will involve rigorous data collection and the innovative translation of this data into a form that allows it to convey meanings and insights beyond its raw numbers. Students will learn to harness data to tell compelling stories, reveal hidden patterns, and drive actionable insights that can influence architectural and ecological practices. This sustained endeavor will emphasize the integration of scientific rigor with creative interpretation, aiming to produce outcomes that are both informative and transformative. There will also be three shorter, equally rigorous projects, each designed to explore different scales of interaction between architecture and avian ecology. These projects will vary in scope from the micro to the macro, ensuring that complexity and depth are maintained across all levels. Each project will challenge students to think critically about the impact of design decisions on bird populations and to develop innovative solutions that promote coexistence and sustainability. Through these varied exercises, students will refine their ability to navigate and manipulate complex systems, fostering a holistic understanding of the interconnectedness between human habitats and the natural world.

LEARNING OUTCOMES

On successful completion of this studio you should be able to;

- to generate design propositions based on a critical understanding of the relationships between ideology and forms of representation.
- to demonstrate a familiarity with the issues around species hierarchies ecological thinking.
- to use ideas of systems intervention to pose multiple outcomes for change.
- to understand and apply theoretical positions from studio readings as keys to generate discussion and new insight.
- to articulate the ironies, contradictions and counter positions embedded in design propositions.

“Nature is often hidden, sometimes overcome, seldom extinguished.”
-Annie Dillard

Top Northern Saw-whet Owl
Middle Twin Stuppas, Butler County
Right Moss

SPECIAL EVENTS

*In person seminar workshop with Nina-Marie Lister of ECO/LOGICAL DESIGN LAB Toronto, 9/6, 2-4pm

*Site visit to the BirdLab's rural banding location at Twin Stuppas, Butler County, will be made all morning on Saturday 9/7

*In late October, when the evenings draw in, we will join and observe a dark OWL banding session, date TBD





Precious Plastic. Recycling Machines Image Credit: <https://preciousplastic.com/>

WASTE MACHINES

48500, 48650: Unmaking Intelligent Spaces
 18 Units. Fall 2024. T/Th 1-4.50pm. Daragh Byrne



Calculating Empires: A Genealogy of Technology and Power Since 1500. Kate Crawford and Vladan Joler. 2024

ABOUT THIS STUDIO

More and more technology has shorter and shorter lifespans. Discontinued devices, designed obsolescence, junk products, and abandoned IoTs all litter the landscape of technology innovation and production. Companies design products that are deliberately difficult to repair, upgrade or sustain. When they break, become defunct, are abandoned, or upgraded by their owner, this outdated technology is dumped, dismantled, and often disposed of after only a few years of use. This perpetual cycle of consumption and waste has resulted in mountains of discarded electronics. *What alternatives can we imagine?*

This studio examines how we might { break down; undo; rethink; dismantle; discard } the { visions; systems; objects; infrastructures; landscapes; junk; detritus } of { smart; connected; intelligent } technology.

Using a design research approach, we'll examine and unpack the wasteful, material and resource intensive, cycles of innovation found within modern technology. We'll start this process by inventorying and drawing together disparate examples, perspectives, and projects from across disciplinary lines of art, design, architecture, human-computer interaction, and media theory. This will be coupled with design-driven, human-centered inquiries where we will trace and map our cultures of technology abandonment. These explorations will help us understand the systems of obsolescence and collaboratively develop resources from which we can generate possibilities, insights, and opportunities. Finally, we'll imagine and materialize these possibilities as new speculative forms and landscapes for dialog, debate, and discussion with wider audiences.



The Toaster Project. Thomas Thwaites. <https://www.thomasthwaites.com/the-toaster-project/>



Precious Plastic 2020

Precious Plastic Originals
 The Diamond
"Plastic is made from fossil fuel or crude oil that took thousands of years to be created. Yet, we trash plastic in a matter of minutes. Once we burn it, is gone. Forever. Oil is running out and plastic with it. It is time to treat this scarce material as a valuable, scarce and finite resource."



UNMAKING E-WASTE: PROMPT+APPROACH

While often discarded, e-waste is often reusable (either whole devices are still operational but have been discarded; alternatively, electromechanical parts remain operational - motors, screens and other components can be extracted and up-cycled into new devices) or reconfigurable (e.g. the materials — plastics, pcbs, glass from screens, etc. — of the discarded technologies can be creatively recycled to produce new opportunities for use.)

In 2024, the studio will explore **DIY and experimental e-waste processing**. Drawing inspiration from a rich and emerging canon of work that has aimed to democratize and distribute recycling, fabrication, and materials processing (e.g. Precious Plastic, Solar Sinter, etc.), students will examine the material opportunities of e-waste. We'll then reform e-waste to materialize concerns around AI's wasteful, extractive, but all too often, hidden concerns.

In Weeks 1-7 (Unmaking e-waste: Making Waste Machines): Students will prepare machines made with e-waste to recapture e-waste materials (plastics, electronic components, and PCBs). This will begin with students engaging in *urban mining* — a process that recognizes that the majority of natural resources are no longer below ground — to recover reusable material from relevant e-waste. *Unmaking* these objects, we will recover motors, structures, and other parts to prepare e-waste processing machines adapted from existing open-source designs, for example to chip plastic device enclosures, and explore how materials can be recovered and reused.

In Weeks 8-14 (Unmaking e-waste: Making with Waste Machines): students will use their waste machines to reform and reshape recovered waste materials. They will fabricate tangible representations that embody the operation, issues, and ecological harms of technology and AI.) Using the machines, we will remake recovered materials by engaging in *data physicalization* — creating tangible representations of complex information — and *discursive design* — representing important ideas through artifacts to allow audiences to examine and reflect upon them. Students will experiment with material deposition, decay, wear, and unmaking as ways to make apparent hidden costs and wastes (energy consumption, materially extractive practices, etc.) often veiled in AI and intelligent technologies.

"Unmaking is found in decay, breakdown, obsolescence, disaster, and ruin just as in smashing, dismantling, shattering, deleting, smashing, cancelling, discontinuing, burning down, letting-go, and many others..."

"...The power of unmaking is not in a naive view of reckless destruction but in the poetic way in which a designer creates and layers the unmaking experience within an object."



Plugged In, Thrown Out. Anthony Wu (ASO Data Dump, Fall 2023)

"For my project, I chose to use CD / DVD drives as my discarded device and attempt to repurpose it as a 3D printer. I intend to show people that this process is indeed possible and can be replicated by themselves."

QUESTIONS WE'LL EXPLORE

- How can we think of (electronic) waste? How do we recognize that treating 'electronic discards as waste is a 'worlding'?"¹
- How should designers engage with broken world thinking, as well as the end-of-life and end-of-use of things?
- What are the worlds — situations, contexts, material flows, lifespans — of discard, abandonment and waste that we should critically examine?
- What are the dominant narratives of re-use and repair in technology, in materials, and in the world? What should we question? What should we reframe?
- When are dismantling, decay, ruin, and destruction a resource for design?
 - *How can and why should objects, waste, and technology be unmade:* What does it materially and physically afford for (re)use, (re)composition, (re)work, and (un)making?
 - What aspects — material, conceptual, technical, social, economic, etc. — and issues of e-waste do you want to reckon with? What do you want to draw our collective attention or our collective imagination to notice, understand, and reflect upon? What are our individual and collective material ethics?

LEARNING OBJECTIVES

Within this studio, we'll engage emerging practices and methods in design research and critical speculation — namely **unmaking** — to materialize and explore possibilities for e-waste. We'll work to find new relationships by un-making, un-crafting, un-designing existing e-waste — considering the collateral of technology abandonment to counter, resist, and rethink how design can respond. Our goal will be to engage creatively with these materials, reconfiguring waste into artifacts that build conversation, debate, and dialogue about material ethics..

On successful completion of this studio you should be able to

- Define why and enumerate ways in which e-waste and technology abandonment are relevant to design and architecture, specifically how they relate to material economies, infrastructure, the environment, sustainability, and geographic place..
- Appraise course materials (readings, cases, etc.) and identify supplementary materials of relevance and personal interest to generate discussion and insight.
- Evaluate sources to bring to light matters of concern and recognize the differing voices, disciplines, and perspectives in discourse on waste and technology.
- Understand unmaking and discursive design as a form of design research inquiry.
- Identify and explain the methods and approaches for design and speculation around technology waste and abandonment.
- Identify relevant design factors, issues, and considerations and articulate opportunities for creative response.
- Demonstrate familiarity with how electronic devices work.
- Be able to take apart and rework electronic devices.
- Have used and experimented with using e-waste as materials for unmaking and making.
- Be able to articulate the ecological impact of waste in emerging technologies such as AI..

¹ Lepawsky, J. (2018). Reassembling rubbish: Worlding electronic waste. MIT Press.



EXAMPLES & PRECEDENTS

Refunct Media. Benjamin Gaulon <https://www.recyclism.com/info.html>
 "A series of multimedia sculptures that (re)uses numerous "obsolete" electronic devices (digital and analogue media players and receivers). Those devices are hacked, misused and combined into a complex chain of elements. To use an ecological analogy they "interact" in different symbiotic relationships such as mutualism, parasitism and commensalism.



German designer [Markus Kayser](#) has built a 3D-printing machine that uses sunlight and sand to make glass objects in the desert. Called The Solar Sinter, the device uses a large Fresnel lens to focus a beam of sunlight, creating temperatures between 1400 and 1600 degrees Celsius.



DIY Perks demonstrates building a 4K projector from scrap materials. The core of the projector is a small 4K LCD panel, which is from a recovered, disassembled and modified Sony An old 135 mm large format camera lens acts as a projection lens. The components are sourced from ebay.



The "Common Sands" project by Studio Plastique is an ongoing investigation into sand and sand-based product production, utilization, and disposal. The project "Forite" tiles focuses on repurposing E-waste glass from microwaves, addressing recycling challenges, and uncovering its untapped value to prevent it from entering landfills.



Ilan Mandel and Wendy Ju's *Garbatrage* (2023) is exploring the economies of creative reuse by recovering abandoned devices, hoverboards, and repurposing them towards garbage robots



Marta Torrent Boix uses practice of unmaking with e-waste to develop a pottery studio that "combining old craft techniques with new and wasted technology to create unique ceramic pieces. it began with the disassembly of a washing machine to recover motors, belts and other parts to use in the development of a potters wheel.



Lenovo. kinetic Wabi Sabi ring made of recovered platinum from end-of-life hardware through [Lenovo's Asset Recovery Services \(ARS\)](https://www.csrwire.com/press_releases/763616-lenovo-precious-metals-breathing-new-life-old-technology) https://www.csrwire.com/press_releases/763616-lenovo-precious-metals-breathing-new-life-old-technology



The City of the Captive Globe, *Delirious New York* (Rem Koolhaas)

Manahatta Interrotta | Manhattan Interrupted

48500, 48650: Recontextualizing the grid for sustainable, equitable futures
 Fall 2024. 18 Units. T/R 1-4.50pm, Hal Hayes

ABOUT THIS STUDIO

As growing populations and economies increasingly stress natural resources and ecosystems one thing has become clear; increasing development density within established urban environments is the most sustainable form of growth. Sites formerly considered too burdensome, such as railyards and brownfields, have now become among the most desirable development sites in the planets most vibrant megacities. Such development is needed to address and respond to major environmental and climatic changes which the building environment is affected by and in turn affects.

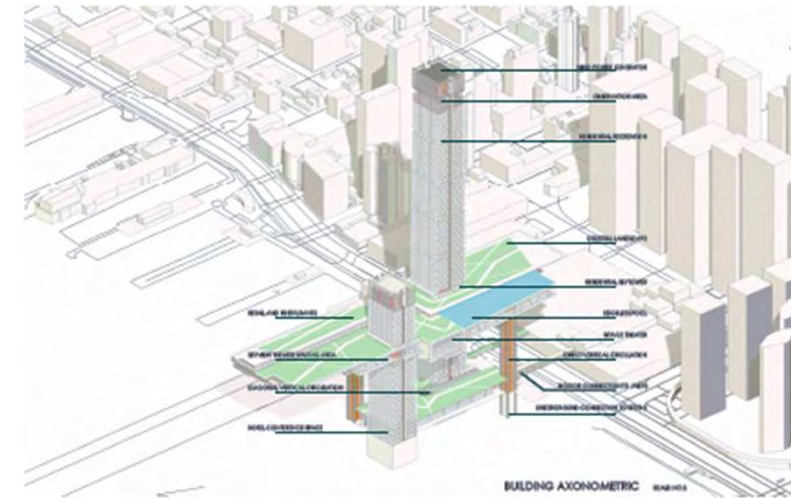


Rebuild By Design: The Big U (BIG)

APPROACH

This studio will challenge the student to address the full range of complex, interrelated urban, architectural and infrastructure design issues of a new major intermodal transportation terminal combined with large, dense mixed-use program. Students will explore structure, systems and building morphology on a grand scale, with major new program integrating with already vast existing buildings and systems. Studio discussion and design will primarily address

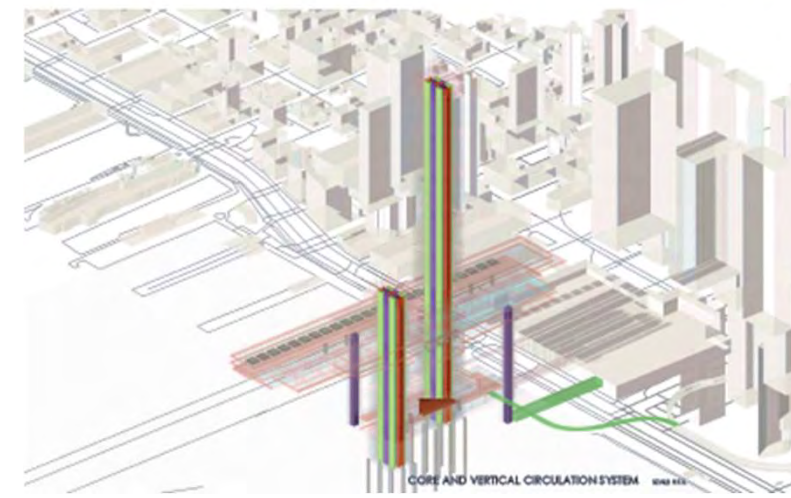
- **Density & Complexity;** design and context of megastructures, supertalls, groundscrapers, symbiotes and parasites etc.
- **Sustainable Systems Integration;** transportation, water conservation, power generation, district thermal, recycling, waste removal, etc.
- **Equitable Development** meeting the needs of underserved communities, reducing disparities while fostering places that are healthy, vibrant, and inclusive.



BUILDING AXONOMETRIC



STRUCTURAL SYSTEM



CORE AND VERTICAL CIRCULATION SYSTEM

D.K.Wang, CMU B.Arch 2019, Sustainable Megastructure, F18



Hal Hayes, Studio Professor

METHODOLOGY

This studio may be considered a guided thesis, with collaborative design research, programming and planning at an urban scale, combined with individual design at the site and building scale.

1. **Perception:** Weeks 1-3. The first three weeks will be devoted to design research, exploration and understanding the context holistically. Four teams of three students each will explore the environment, history, built morphology, and sociology of Manhattan. Parallel individual design sketch problems will study precedents that have been realized, went unbuilt or are proposed locally and globally.
2. **Translation:** Weeks 4-6. Each student team will develop a design manifesto addressing alternative futures, specifying sites and interventions of sustainable systems and equitable development that increases density, diversity and complexity. Program and common conceptual frameworks will be identified from which students will identify individual design challenges.
3. **Provocation:** Week 7. Students will finalize individual or collaborative design proposals including goals, program, and site constraints & opportunities. These will be presented, reviewed and approved or modified in the midterm review.
4. **Exploration:** Week 10. A weekend field trip to New York is tentatively planned for November 1-3, including on-site exploration, field research and a visit to a major architecture firm's office.
5. **Inspiration:** Weeks 8-14. The second half of the semester will be devoted entirely to individual or collaborative student design projects as defined in their manifesto and design proposal. Collaborations and controversies with students designing on adjacent sites are encouraged.

LEARNING OUTCOMES

This studio will challenge the student to address the full range of complex, interrelated design issues of a dense mixed-use urban environment.

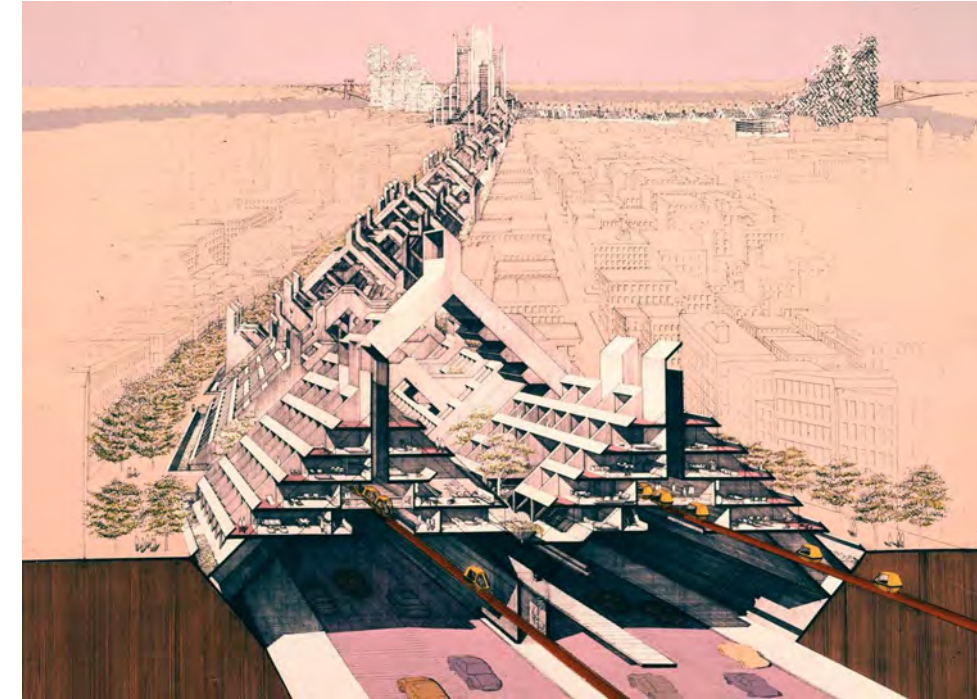
- Explore structure, infrastructure systems and building morphology on a grand scale, with major new program integrating with vast existing buildings and systems
- Design methodologies of contemporary and historic conceptual theory and development strategies, building a foundation of research into design speculations that may be utopian, visionary, practical and/or dystopian.
- Test and expand their conceptual and technical design skills in all key areas, with particular focus on exploring issues arising from architectural, structural, infrastructural and mechanical systems at very large scale and extreme complexity.
- Emphasize the use of hand sketching, physical models and iteration of design, research and analysis at varying scales and degrees of resolution. Students must also expand their mastery of digital and parametric tools for both analysis and conceptual/morphological design development.



R.Ju,Z.Lin,K.Zhang,CMU B.Arch 2018, Sustainable Megastructure

PRECEDENTS

Students will research and study historic precedents, from the optimized block morphologies of Hugh Ferriss, the unbuilt megastructures of Paul Rudolph and contemporary theories of Rem Koolhaas, Bernard Tschumi, BIG, Studio Libeskind, SOM, and others.



Lower Manhattan Expressway Megastructure, P. Rudolph



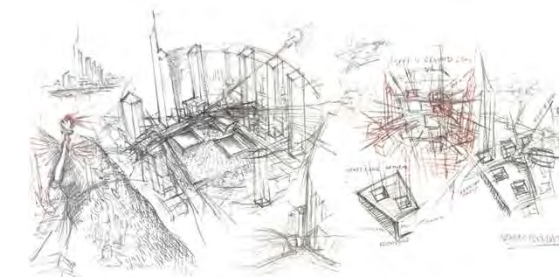
Manhattan Zoning Analysis, H. Ferriss



J.Liang, CMU B.Arch. 2021, Transformation of Waste



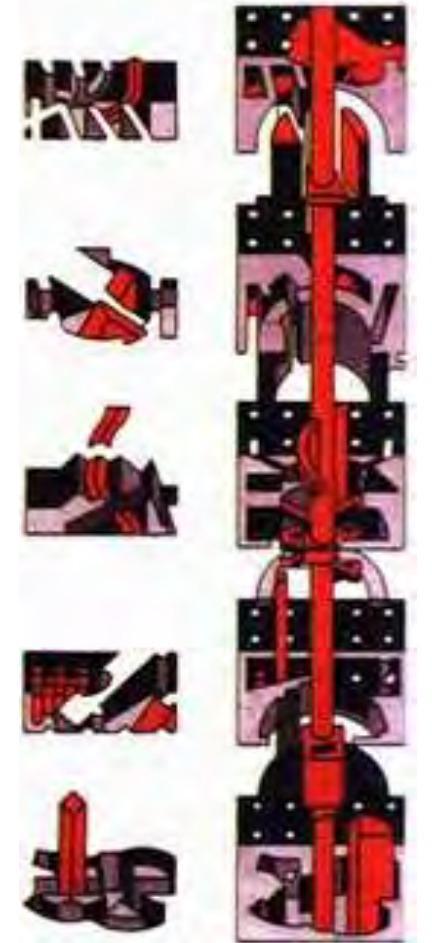
Central Park Flow Hierarchy, H. Hayes



World Trade Center Master Plan, D. Libeskind



Manhatta: A Natural History of New York, E. Sanderson



Manhattan Transcripts, B. Tschumi



Grandmother Boon Reaung photo taken by Graana Khan, 2023.

COMPOUNDOLOGIES

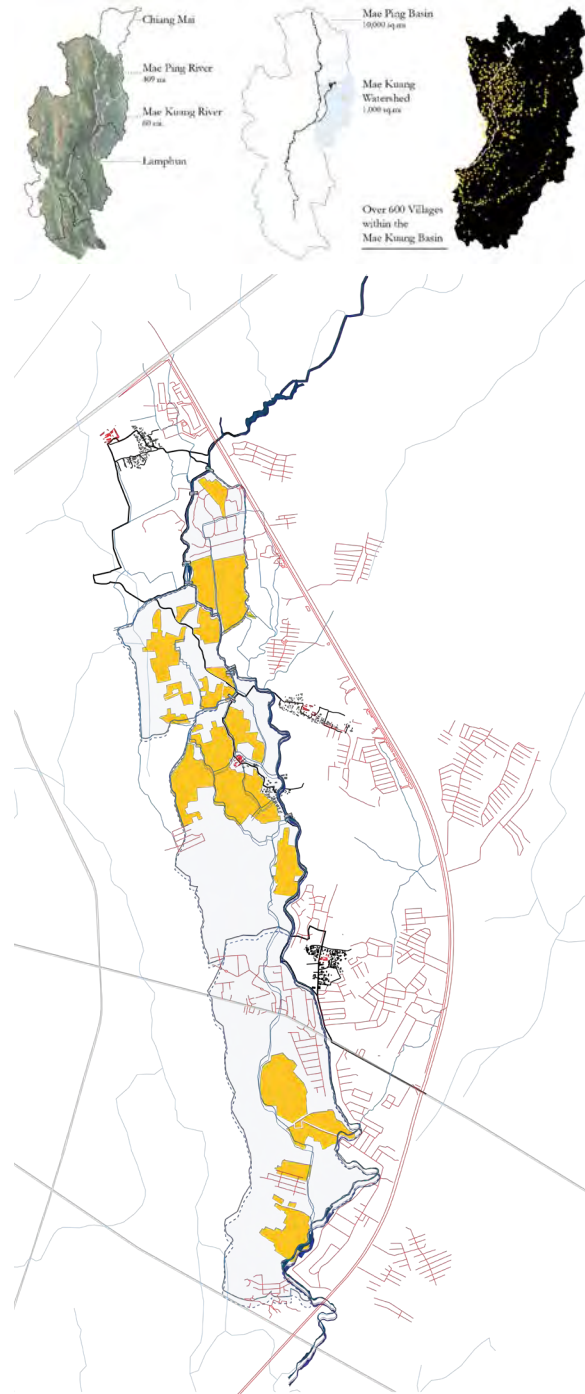
48500, 48650: timber, folklore, and the community irrigation networks of Chiang Mai
 18 Units. Fall 2024. T/Th 1-4.50pm. Tommy CheeMou Yang

THE JOURNEY

In the face of socio-ecological justice, how do learn from other intelligences to build knowledge in material economies, local sourcing, design detailing and the processes of architecture as community empowerment?

This studio fosters knowledge built off of years of relationship building in Chiang Mai, Thailand using fieldwork, toys, comics, film, and visual storytelling to explore citizen empowered design and the regenerative building practices of indigenous timber construction. Chiang Mai is the second-largest province by land area in Thailand (20,107 square kilometers) and the fifth-largest province by population (approximately 1.7 million people). It is located in the northern part of the country, approximately 685 kilometers from Bangkok, on the Mae Ping River basin at the valley between the Mountain Ranges of Lampang and Mae Hong Son. As a design family, we will situate contemporary design discourses around timber, the commons, canals and architecture into systemic socio-ecological processes that includes folklore, forests, land ritual, harvesting, building, repair and the geologic commons. Using field work in a string of villages 8 kilometers east of the center of the expanding city of Chiang Mai, we will explore how the collective wisdom of community stewards uses vernacular timber methods to re-imagine an architecture for and of their common. The studio sharpen techniques in urban-rural forensics, animation, detailed prototyping and typo-morphological research. At four different scales - geology, the city, the building and the construction detail - we will posit emergent narratives from the villages to establish a critical thinking position, a manifesto and redefine the notion of the city and its architecture to engage social, political and economic realities.

With a focus on locality, this studio believes that contemporary building practices can be recalibrated with the embodied knowledge of everyday stewards, ultimately transitioning object-based approaches to address systemic issues that frame contemporary architectural practice. The semester-long journey will nurture a comprehensive project that includes animations, detailed architectural illustrations, and scaled fabrications in the design of a village compound. A pilot exhibit will close the design studio, holding a larger conversation around community empowered architectural design, regenerative practices in architecture, storytelling



Compoundologies Book by Yang + McGrath, ongoing.



Sketches by Tommy cheeMou Yang, 2023.

Phase 01, Weeks 1-3, Socio-Ecological Methods Muang Fai Community Networks: Amplifying Everyday Narratives

Acknowledging the long history between geology, timber, folklore, and the city, we will respond to the problematic histories of urbanization and city planning by understanding the breadth and danger of Chiang Mai's Comprehensive Plan. Using the theories of "operative histories" we will create a series of maps and drawings to unpack lifeworlds of Chiang Mai, TH to provoke dialogue and inspire policy change. This accessible form of analysis and storytelling will interpret and communicate notions of the current lives of the Metropolitan Villagers' locality.

Phase 02, Weeks 4-7, Urban Jigsaws Narrating a Typo-morphological Proposition

Using visual narratives (drawings, maps, and models) we will develop a series of typo-morphological propositions to imagine new futures of how vernacular knowledge can help radicalize current architectural practices. As an extension of Phase 01, we will integrate "othered" ways of prototyping that juxtaposes analogue, digital, and phygital techniques.

Phase 03, Weeks 8-14, Agency and Adjacency Architecture, Toys, Comics, and Animations

Using storytelling and fiction as an affective practice around architecture, we will investigate the political, social, cultural, and environmental tensions through design. We will nurture an architecture imaginary in the development of a compound using methods learnt from toys, comics, and animation. The juxtapositions of imagery, sounds, videos, and sketches will be used to create an argument that would posit an architecture for and of the people into real-world settings of Chiang Mai, TH. By critically engaging through the discourse of community empowered narratives - we consider issues of gender, domestic objects, and everyday life integrating them into the discourse of socio-ecological justice.

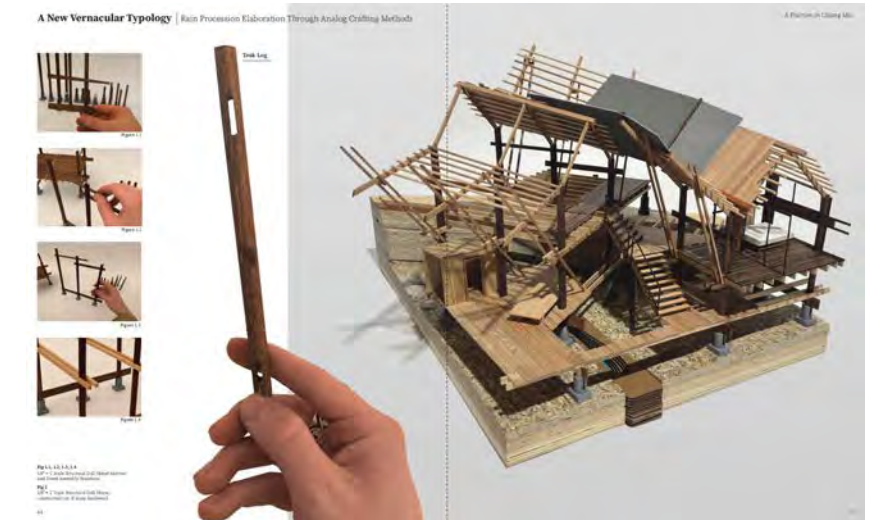
FALL 2024 QUESTS + APPROACH

In 2024, we will learn how everyday life consists of resistances inscribed in spatial terms - against planned, the intended, and the prescribed. Lived histories are spatial confrontations, powers, ideologies, ideas, and everyday existences.

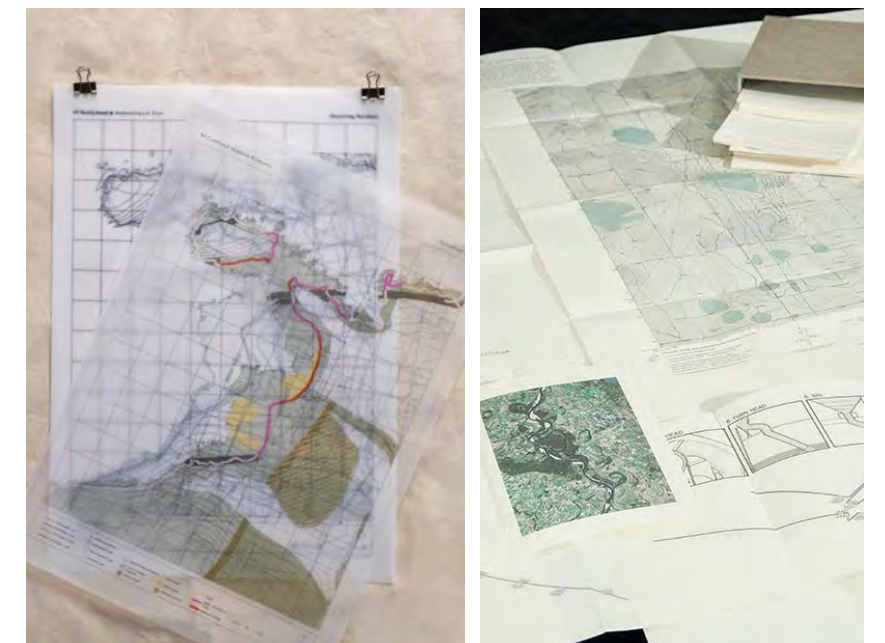
Through distant fact-finding, cinematography, procedural modeling, design, and fiction - we will construct a series of transcultural narratives to amplify the stories of the urban villagers we are working for.

Instead of examining works of individual architects, we will examine the every day and ordinary landscapes of Chiang Mai, TH as a starting point.

In this process, we will imagine and (re)discover forgotten values of resources through the lens of ethno-ecological and use research methods to find barriers and deficits and then challenge them in order to create better accessibilities to imagine new forms of architecture - wider systems of opportunities and spatial interventions of the environment.



A Fracture in Chiang Mai by Brian Hartman (B.Arch '24) 2023

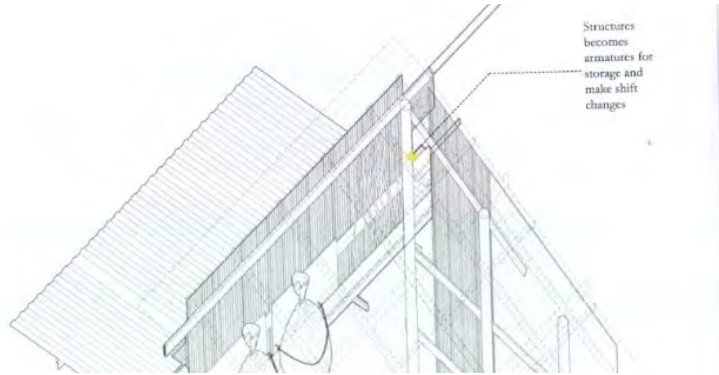


Orkney Mainland Geological Composition by Tom Birch Studio, 2023.

Cultivating the Map by Danny Wills, 2012.

embarking QUESTIONS

- How can histories and presentations of architecture be utilized to think, analyze, and provoke about the city and our societies?
- How do maps, film, buildings, and other artifacts reveal power relationships?
- What are dominant narratives in architecture? How do we verify, resist, countermap, counterdata, and counter visualize from the ground?
- How does the typo-morphological research of the village contest our contemporary notions of regeneration, repair, construction, and design?



Compoundologies Book by Yang + McGrath, ongoing.



LEVELING UP + exhibition

We will foster investigations - exploring and capturing the design process, how narrative and speculation can become a conduit of co-authoring knowledge and design.

On successful completion of this studio you should be able to:

- demonstrate the ability to make design decisions to cultivate a complex socio-ecological design research project
- nurture and sharpen skills in cartography to empower community narratives
- apply advance skills in After Effects and Photoshop to create animations
- use tools in visual storytelling (composition, color, form), and architectural detailing to create an architectural proposition
- appraise comic+toy making to disseminate design research
- analyze, reflect, and respond to readings and distant fact-finding that nurtures architectural and urban knowledge in shifting social and natural landscapes
- challenge advanced digital skills in procedural modeling, big-data mapping, and fabrication curate research, design, and fieldwork into a design monograph that integrates phygital technologies using Adobe Aero

The final of the studio will be a design proposition that will be shared to the mayors and village headmans of San Klang and San Pu Loei in Chiang Mai, TH.



Departure by Tom Haney, 2016.



Butterfly Machine by Keith Newstead, 2016.



A Place to Call Home by Jay&Jin, 2023.

PRECEDENTS + wisdom



Renovation Toolbox by John C Lin, 2017.



Dusit Chumchon (local community) Bastards by Chat, 2023.



Ichihara Usagi Kindergarten by Atelier Bow Wow, 2023.



Pinocchio by David Chauvel comics by Tim McBernie, 2017.



Baan Tita by Yangnar Studio, 2021.



Jomthong Raintree House by Sher Maker, 2023.

Reparative Infrastructures

Reworlding infrastructure through the making of publics

Sarosh Anklesaria

Candilis, Josic, Woods and Schiedhelm, The Free University of Berlin, 1963

QUESTIONS

Questioning the prominence of civil engineering as one of the most influential disciplines of the twentieth century, as well as the unnoticed inertia of urban planning, the field of infrastructure is taking on extreme relevance for public practices and public organizations. The merger of biophysical systems with contemporary infrastructure is now rapidly becoming the dominant order for urban regions. Road networks and freshwater supply can no longer be planned without their watersheds. Sewage treatment and power plants can no longer be engineered without their wastelands. Buildings and facilities can no longer be designed without their energy systems. From this vantage point, ecology is, in and of itself, an economy.

- Pierre Belager, *Redefining Infrastructure*

Our current patterns of infrastructure development reflect an industrialized worldview—one that, in the interests of convenience, efficiency, and bureaucratic control, has largely isolated the various elements of our infrastructural systems. A post-industrial viewpoint, by contrast, focuses on understanding how the parts of such systems relate to each other and to the whole.

- Hilary Brown, *Next Generation Infrastructure*

What is next generation infrastructure in the climate crises? How can architecture participate in conceiving it, and in making it public? How might we design reparative infrastructures through layered socio-ecological framings that consider the politics and aesthetics of infrastructure? In addition to ecological, decarbonized or circular logics, what forms of public culture might be enabled by considering energy, waste, sanitation, or aging transit infrastructure as architecture?

S25 Advanced Synthesis Option Studios



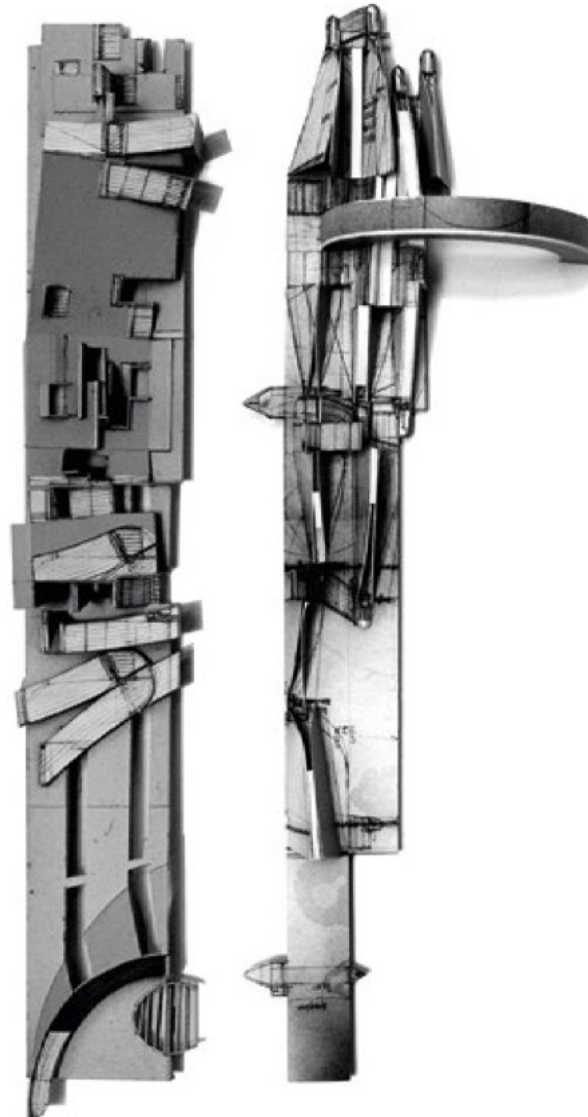
Catskills Aqueduct Headworks, Built 1907-1915



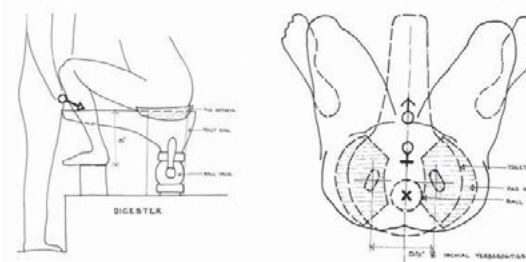
The Roskilde Waste to Energy Plant, Erick van Egeraat, Roskilde, Denmark



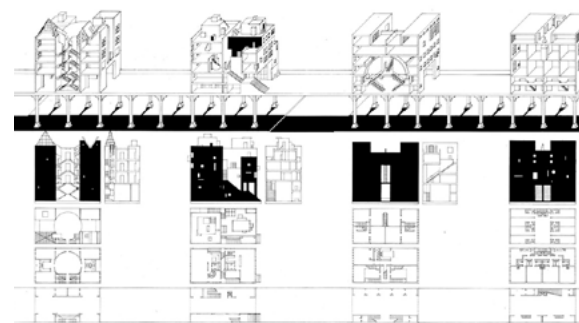
Alcosan Waste Treatment Facility, Pittsburgh



Mark Smout and Laura Allen, *Augmented Landscapes and Delicate Machinery*



Graham Caine, Toilet Bowl drawings, Eco-House, 1972-75



Steven Holl, House of Bridges, 1980, New York

PROMPT

Infrastructure is the literal and figurative armature of modern civilization—the material foundation upon which the contemporary city thrives or fails. The immense systems of buildings and networks—energy-grids, transit systems, sanitation, recycling, refuse and waste processing plants—support not only the fundamental functions of everyday life but also sustain the very fabric of modern existence, often unnoticed and unappreciated. Although these networks are ubiquitously intertwined into the city’s framework, infrastructure paradoxically remains invisible within urban public space. Frequently hidden underground, relegated to the city’s periphery, or confined to under-served neighborhoods, these systems only enter public consciousness when they malfunction. Equally invisible are the material processes that entail the management and maintenance of pipes and buildings, especially the human labor of essential workers that are required for constant upkeep, repair, and up-gradation. Today many key infrastructural systems in the United States are rapidly aging and in need of repair and replacement. The climate crisis further exposes the profound vulnerability of these systems with renewed calls for reimagining infrastructures from hard, mono-functional, compartmentalized works of civil engineering, toward softer, ecologically informed infrastructures that promote circular flows of energy and waste.

Critical to this work is the need to bring into view, make public and demystify the sites of infrastructure—toward greater proximities with people and communities. This produces a far more complex understanding of infrastructure-as-architecture, an inherently layered project of synthesis and reworlding. This Advanced Synthesis Design Studio adopts the term “Reparative Infrastructures” to call for a reimagination of infrastructural systems that are decarbonized, decentralized networks that promote other/new proximities.

CONTEXT

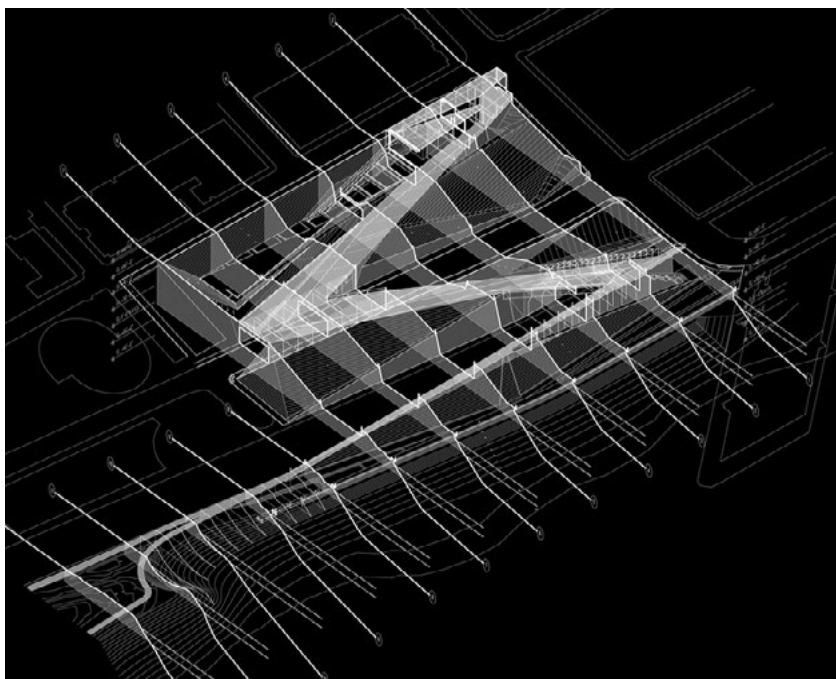
The term “public works” in the United States has a long history, but gained prominence during the New Deal era of the 1930s, and the postwar era of the 1940s and 50s, when significant investments in infrastructures were made through large scale federally funded programs. Starting with the New Deal that called into question the predominant history of laissez-faire economics, the state favored significant investment in infrastructure as a form of economic and social development. Over recent decades, the term “infrastructure” has come to replace “public works,” obscuring the social and political significance of these systems to the public life of the city. The recently passed “The Bipartisan Infrastructure Law” proposes “a once-in-a-generation investment to help communities across the country tackle the climate crisis while creating good-paying jobs, addressing environmental justice, and boosting local economies.” This studio will use the concept of Reparative Infrastructures to address this re-centering of infrastructure as an essential site/tool of architectural investigation.



Grace Farms, SANAA, New Canaan



Newton Creek Wastewater Treatment Plant, Brooklyn



Seattle Olympic Park, Weiss Manfredi, Seattle

PROGRAM & OUTLINE

The very definition of infrastructure demands that it translate as a system across multiple scales, and be understood as a network beyond the local or discreet architectural object. Yet architecture as a discipline has a long and rich history of considering building-as-infrastructure (From matt buildings to ecological urbanism, systems thinking is central to the architectural imagination). The studio will explore the productive friction between these opposing tendencies and call for multi-scalar explorations of architecture-as-infrastructure that enable both systemic and place-based investigations.

The studio will focus on aging and yet-to-be-designed infrastructures of **sanitation, waste-to-energy, and transit**, exploring how they might foster new publics and social practices through layered, hybrid and temporal programs. We will consider “reparative” ways of understanding infrastructures; to address and rectify historical injustices often caused by infrastructures, to imagine how communities might reclaim agency over their built environments or support workers that maintain these infrastructures. As new forms of public space they must engage, inspire and educate the diverse publics that visit or traverse these sites.

LEARNING OUTCOMES

This studio will engage design-research as a primary vehicle for understanding the relationships between architecture and infrastructure through emerging discourse in the discipline. Through design-research students will develop speculative agendas for considering new forms of public/reparative infrastructure-architectures.

Learning Outcomes for the studio will include:

1. To situate architecture as a socially, ecologically and politically engaged discipline and cultural praxis. Beyond normative best practices, students will demonstrate speculative and liberatory capacities for their design interventions.
2. To critically examine infrastructure/architecture as a manifestation of social, ecological and planetary consequences, across multiple scales and temporalities.
3. To consider the material, structural, scalar, and tectonic implications of architectural design interventions. This includes an understanding of circular, decarbonized means through which infrastructures might be reconsidered.
4. To consider the capacity of architecture to entangle new programs and imagine new publics as these relate to transitioning infrastructures.
5. To develop critical forms of architectural representation, including verbal and written skills, through which these agendas might be communicated.



Detroit Rock City: a vertical botanic garden, Stan Allen, Detroit



Mierle Laderman Ukeles' *Maintenance Art*. Ukeles reveals the invisible nature of labor involved in cleaning, childcare or sanitation work, drawing connections between the infrastructural and the bodily.



Pittsburgh, Main and distributed sewage network

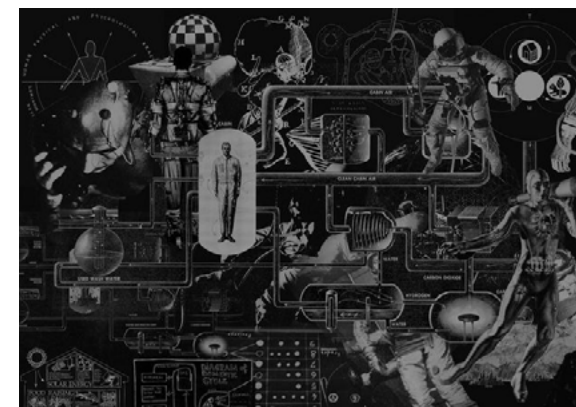
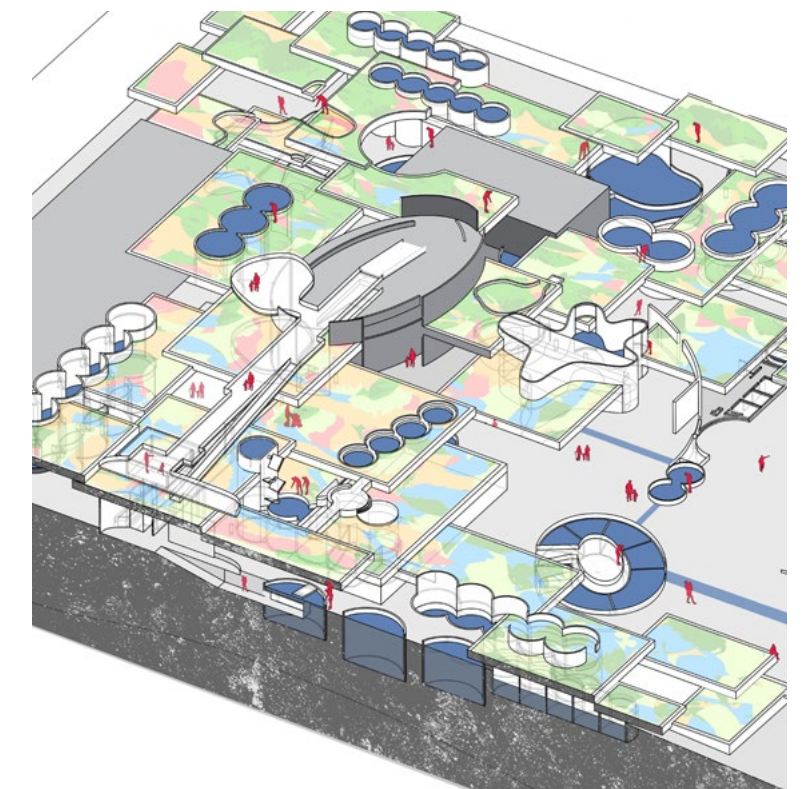


Image from Lydia Kallipoliti, *Architecture of Closed Worlds, Or What is the Power of Shit?*



Nicholas Thies, Lora Marks, Sharvi Shah, and Tai Le, Design for Transitions Studio Work in Progress, Fall 2024, Carnegie Mellon University.

Past Futures: The Mississippi River Delta

Aesthetics, Politics, and Multiple Mediums



QUESTIONS

What are our histories? How does politics influence the built environment? How does the way we represent the past project upon our present and future conditions? What is the relationship between representation and projection?

We will investigate the Past Futures of the Great American Mississippi River. How can we redesign common things, consensus, priorities and hierarchies, the invisible connections between universal, national, and local rights? What is revolution and resolution in relation to the potential histories and futures of the Mississippi River: the people and culture, its ecology and the future conditions of the environment?

In principle, we're going to think critically about how we construct the identity of a place through its cultural, social, political, and ecological systems and develop procedures for doing so. What are the effects and consequences upon our operational design thinking? Who are the constituencies and social traditions; how do these challenge new typologies; what are the tectonic, ecological and social details as a result? Who are the constituencies and social traditions; how do these challenge new typologies; what are the tectonic, ecological and social details as a result?



"To assess and manipulate the medium, you may have to cultivate a capacity to perceive in a split screen—to straddle mental partitions that separate the nominative from the active and dispositional. You must develop something like a canine mind; you see things with names and hear humans speaking words but those things cannot be comprehended in the absence of a thousand other affective cues and relative positions between things in context."
-Keller Eastling, Medium Design

"The old idea of infrastructure as "grey buildings behind a chain-link fence" gives way to a different social and political imaginary for how planetary metabolism of energy, food, information and so on are produced, refined, and distributed. In the future of architectural history, I think there's going to be a re-appreciation of what we've generally dismissed as "industrial architecture."
- Benjamin Bratton, The Terraforming is Not Optional

AESTHETICS

Projections into the future can often become mere fantasy escape. But an aesthetics of a speculative realism can produce scenarios that directly comment on our own moment in time through advancing a particular crisis into the near future. These scenarios are often great lenses for a critical engagement with contemporary problems.

We will consider the contemporary issues of climate change, resources, labor and social-political relations in the Colorado River Basin. What is the role of architecture?

It is necessary for a cultural practice such as architecture to deeply investigate questions of aesthetics. Architecture is a cultural project that contributes to a developing understanding of how tradition, environment, and identity affect our built reality: past, present and future. We will explore, and investigate through multiple mediums; both 2D and 3D.

To fully appreciate a representation, the viewer or listener must understand this 'worlding' aspect: an image does not simply present an object or a moment, but represents a world. Exchange is inherently essential when considering the mashup and interrogating the culture machine. The building designs will be fully represented through sets of architectural representations, based out of the initial representational exercises from the start of the semester. All forms of media are available for these speculations. The two key questions pertain to: plausibility as established through representation, and the aesthetics of realism.

PROCESS

We will take up the tactic of the Mashup and expand upon the American "melting pot". What does combining cultural and spatial traditions and typologies do to affect and transform our built reality?

The mashup methodology has seamlessly assumed a defining position with global cultural production. The complexity and variety of technique embedded in the mashup presents the architectural operation mixing, blending and reconfiguration of existing inputs (political, cultural, typological, social) to produce new outcomes - past, present & future. Students will work in collaboration, as well as individual project studies to develop a semester long design project, in high resolution.

We will consider the aesthetic qualities and disposition of objects, information, drawings, photographs, moving image. We will confront the aesthetics of reality and how to transpose informational systems into visual language while developing a design research methodology.



OPERATIONS

This studio is focused, in part, on the problem of how we construct facts and our understanding about the built environment. What is our understanding of history, and whose history have we been given through the “facts”? We will explore operational speculations through the lens of plausibility. Where do the scopes of future imaginaries and innovation lie in the stories of the past?

We will think ethically about the modes of communication and translation we develop and use in our projects. How does AI understand and interpret our environments; what is our agency and relationship to machine learning in our design processes and cultural speculations?

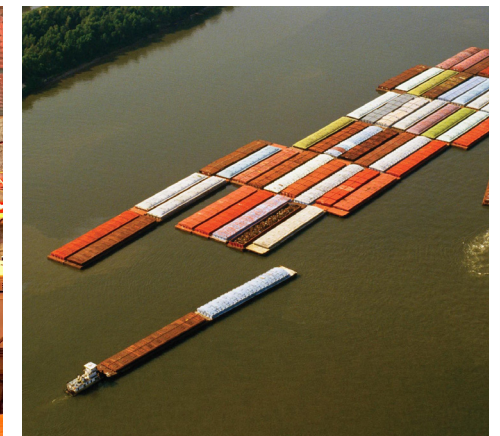
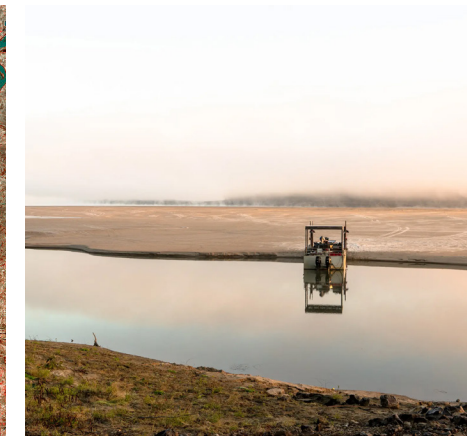
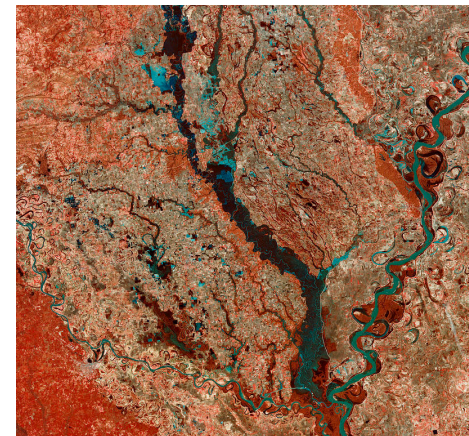
In this studio, students are expected to engage and develop a wide range of inter-related capacities, including critical thinking, analytical writing and reflective design production; ranging from building conservation, design research, emerging technologies and materiality, social issues, landscape, urbanism, spatial perception and methods of conceptual thinking.

LEARNING OUTCOMES

On successful completion of this studio you should be able:

The course is designed for students to produce a semester long, studio based project. The course will hinge around the articulation of the architectural argument into a design proposition culminating in the exhibition of work.

- Leverage verbal, written, and visual forms of communication to describe complex ideas.
- Transition research based design to projective design processes.
- Understand how the choice of design media, method and representations affects the understanding of the built environment.
- Development and execution of design methodology.
- Production of final materials for exhibition and publication of work



SELECT REFERENCES:
 Groys, Boris, In the Flow;
 Ranciere, Jacques, The Politics of Aesthetics;
 Easterling, Keller, Extrastatecraft;
 Lambert-Beatty, Carrie, "Make-Believe: Parafiction and Plausibility*";
 Young, Michael. "Reality Modeled After Images: Architecture & Aesthetics after the Digital Image.";
 Steyerl, Hito, "In Defense of the Poor Image";
 Latour, Bruno, "Visualisation & Cognition: Drawing Things Together"

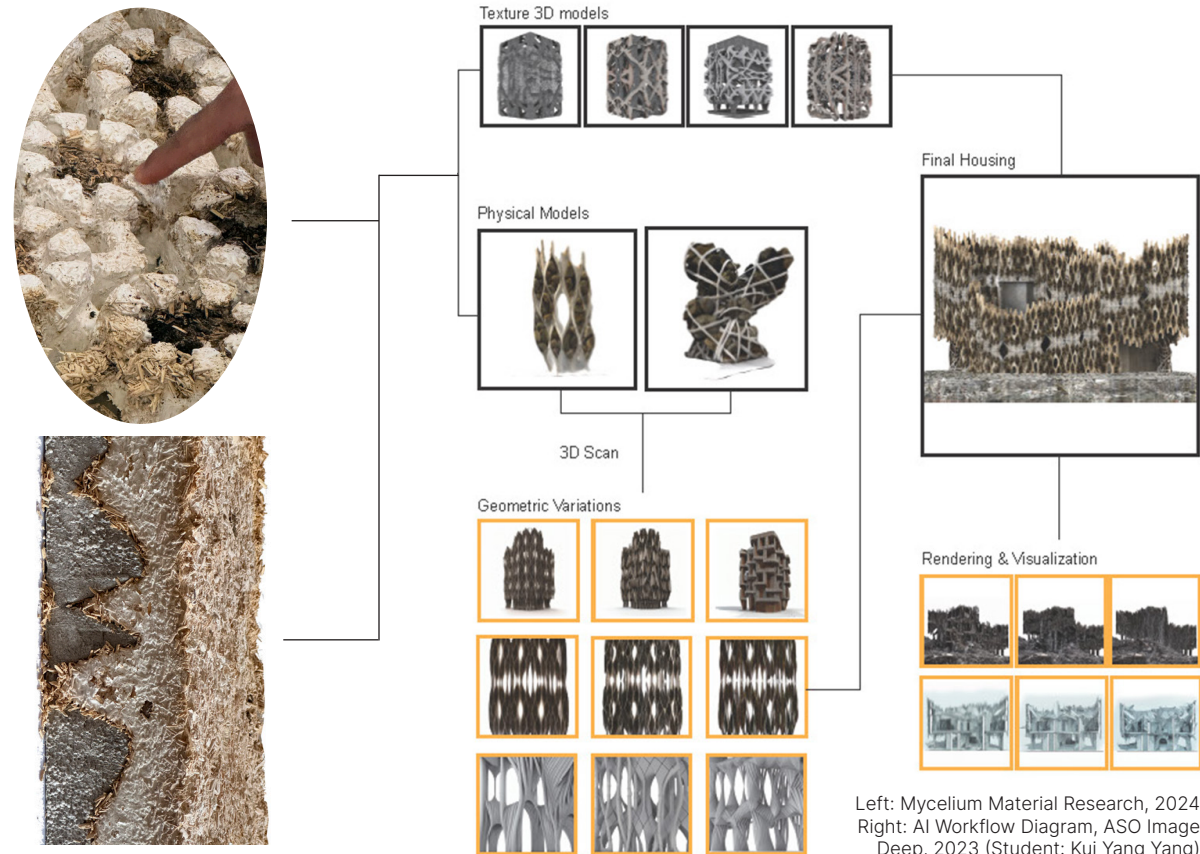
Image Deep:/MycoRepair

Regenerative Reconstructions

Dana Cupkova

QUESTIONS

Can AI help cultivate regenerative architecture? Can architecture become endemic by reconnecting with landscapes dominated by invasive species? How can decay and decomposition become integral components of growth? How do we frame architectural reconstruction process as an attunement with natural processes? Advances in Artificial Intelligence (AI) and Deep Learning (DL) are reshaping the future of design disciplines, challenging traditional notions of authorship and architectural precedent. These technologies allow for the near-instantaneous generation of architectural proposals, where images and sketches are produced through natural language prompts and referenced against vast digital archives—without following conventional design processes. This studio will engage with computational frameworks and generative AI techniques beyond visual inspiration, integrating material research in mycelium and bio-materials. By growing material systems within the context of reconstructive life-cycles, we will explore how these biological models can inform AI workflows. This approach aims to unlock alternative design pathways, distinct from the predetermined aesthetics often associated with text-to-image models.



Left: Mycelium Material Research, 2024
 Right: AI Workflow Diagram, ASO Image Deep, 2023 (Student: Kui Yang Yang)

PROCESS

This studio will focus on design processes that engage material computation within the context of circular design. We will aim to merge parallel lines of investigation: (a) Prototyping mycelium-based structures; (b) Digitizing analog models to simulate and compute performance; (c) Using AI platforms to visualize the design implications of these systems; (c) Designing infill structures for specific site to create circular processes of growth that support architectural intent and the integration of ecosystems. Through these investigations, the studio will explore how material systems, computational tools, and site-specific design can converge to foster regenerative architectural practices. We will work with image-based spatial models, focusing on unlocking embedded information within images for direct translation into 3D models through depth map modeling. Alongside this, we will leverage material research and develop custom physical material prototypes to inform AI workflows. This approach will explore how new architectural systems can be constructed using locally sourced materials, engaging invasive species as part of the process. By reconsidering the ecological imperatives of building within specific social, ecological, and geopolitical contexts, we aim to explore the aesthetics of bio-material circularity within the framework of participatory labor systems.

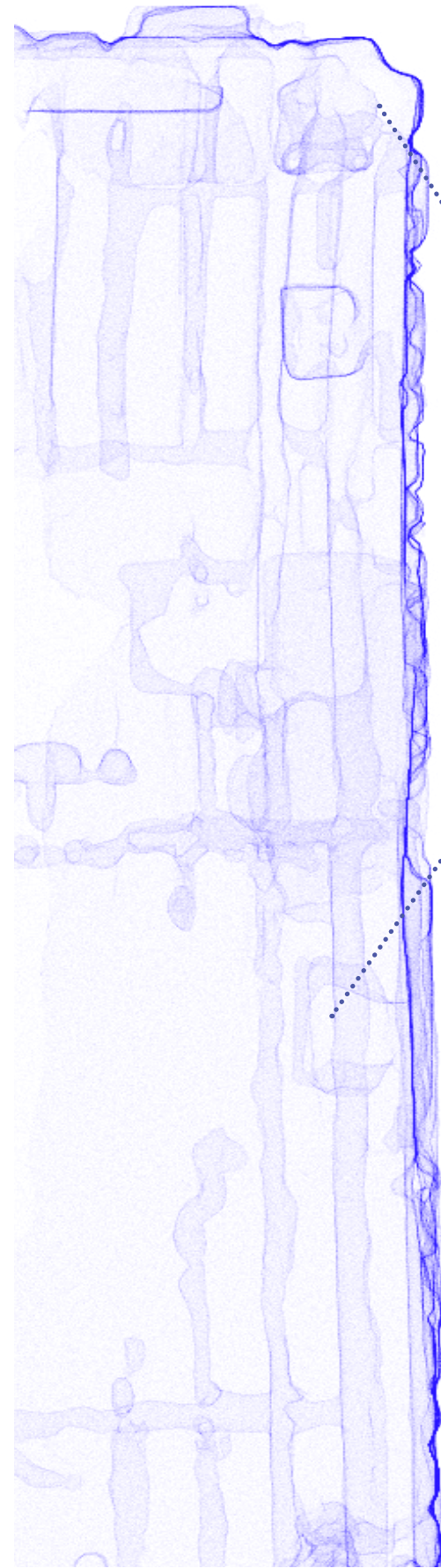
CONTEXT

Collaborative Materiality: “Fungus is a system, an ecosystem, a rhizomatic network that sometimes, but not always, bears the ‘fruits’ we commonly call mushrooms. Mycelium can be considered a messenger in the forest ecosystem, like a chatty and curious neighbor who teases out the latest gossip from everyone in town and loves to pass on that information. Biologist Suzanne Simard compared the mycelium network to the Internet and social media—a way for trees to communicate with each other.” (Let’s Become Fungal, 2023)
 In the context of the studio, the growth cycle and ecosystemic symbiosis of the mycelium will inform the material experiments.

Language and AI: The language of architecture traditionally revolves around the spatial development of architectural forms, rooted in architectural types, elements, programs, and ideologies, while drawing from the historical knowledge of architectural precedents. However, in the context of AI, the use of architectural precedent, particularly concerning its ethical implications and potential biases, might become obscured.

MycoCRuMBLE, 2024: Waste and Mycelium Material Research, 2024. (Dana Cupkova)





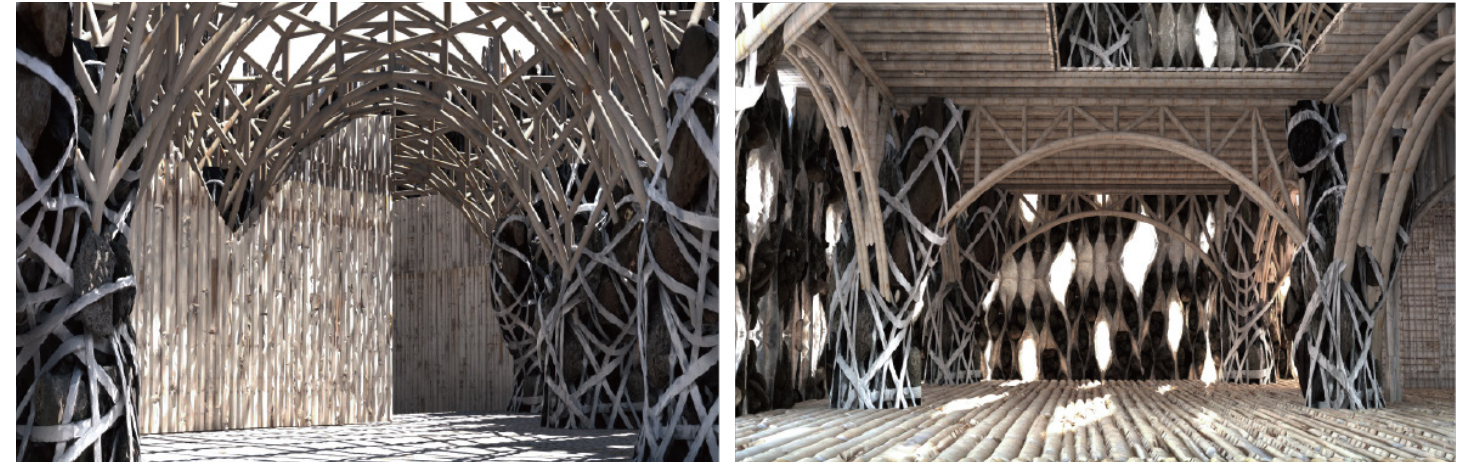
Left and Above: Draft 3D scan of the General Sisters' facility
Below: Mycelium Material Study 2024 (Students: Adrienne Hin To Lu and Taehyun Lim)

PROGRAM

The ambition of this studio is to examine the architecture of adaptive reuse, focusing on bio-remediation through the use of invasive species and mycelium, along with material circularity, embodied energy, and labor frameworks as primary inspirations for the formation of matter.

The project will be situated within the incomplete facility of General Sisters, an art collective based in North Braddock. The studio will function as a pilot project, demonstrating that mushroom-based reconstruction is both replicable and accessible. In addition to the already mentioned frameworks, the design process will include: (a) 3D scanning of spaces; (b) Engagement with community members; (c) Facilitating a workshop to teach participants how to cast with mycelium (optional); (d) Documenting the process and envisioning broader spatial implications.

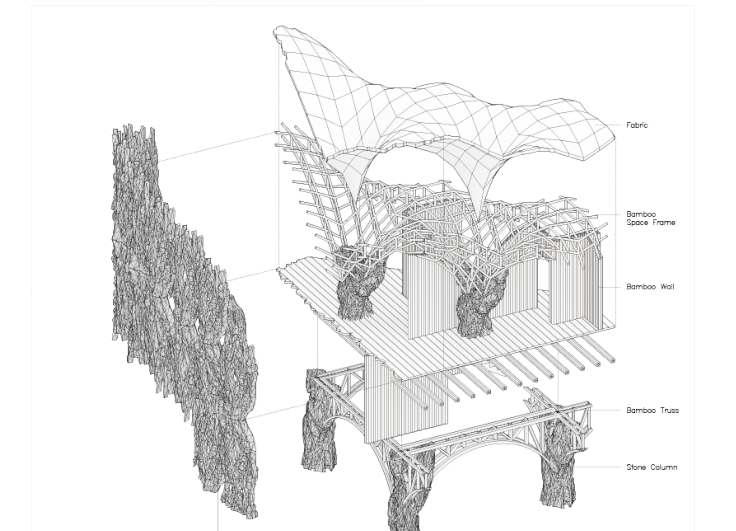
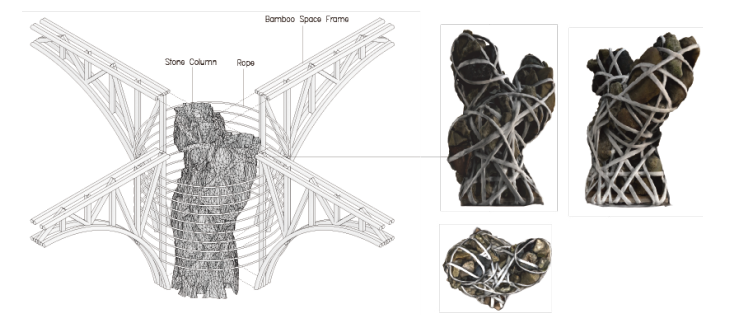
The goal is to re-situate design within a hyper-local framework of material resources and life-cycles, positioning architecture as a vehicle for ecological and communal restoration. By promoting a shift away from purely data-driven rationales, this studio aims to engage in design guided by environmental ethics and sensory subjectivities, integrating these elements into our collective aesthetic and ecological experience.



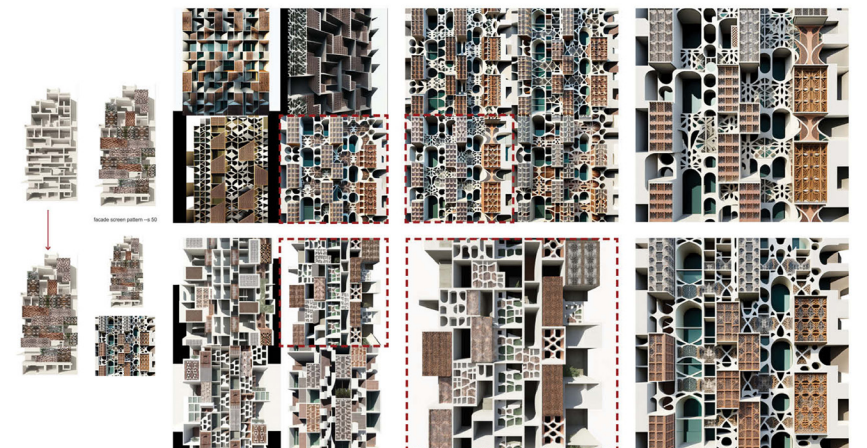
LEARNING OBJECTIVES

Upon successful completion of this studio, you should be able to:

- Better understand ethical frameworks, data ownership, and data bias in relation to current generative AI models and formulate AI-based instructions for design and representation.
- Conduct material research experiments
- Grow physical prototypes using mycelium and translate them into digital models through 3D scanning.
- Learn how computers perceive and design sketches with words.
- Transform images into 3D spatial models using depth-map modeling workflows.
- Engage with material simulation workflows.
- Develop situated ecological imperatives based on aesthetic associations within ideological and ethical contexts.
- Think independently and work collaboratively.



Hybrid Systems



Images from ASO Image Deep, 2023 (Students: Kui Yang Yang and Neha Hegde)

Barge as par·a·digm

Artificial River Ecological Formations
Gerard Damiani

QUESTIONS

In each era of art and architecture, creatives have looked towards the present condition of context in search of new uses for the ordinary items that exist in plain sight.

This spring's ASOS offering will look at the commonplace western Pennsylvania waterways and river barges as a way to resolve the present cultural and ecological challenges as well as the making of objects that engage the water's edge.

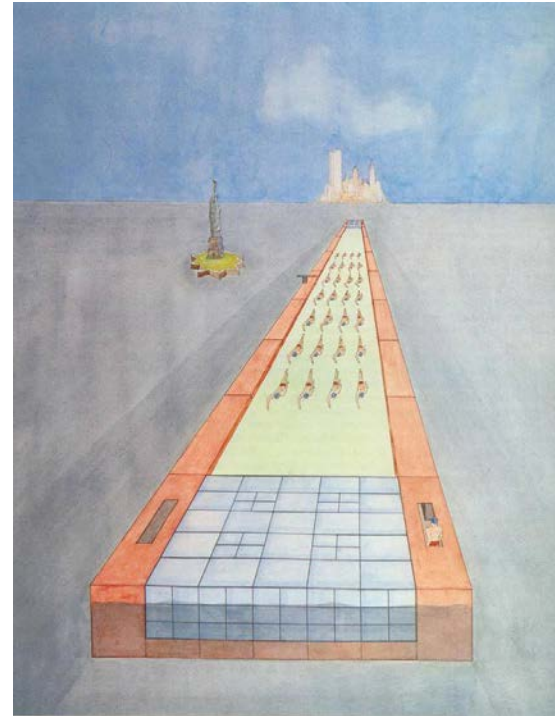
Architect's fascination with the barge has been mythological, societal, cultural and utilitarian.

MOSCOW, 1923

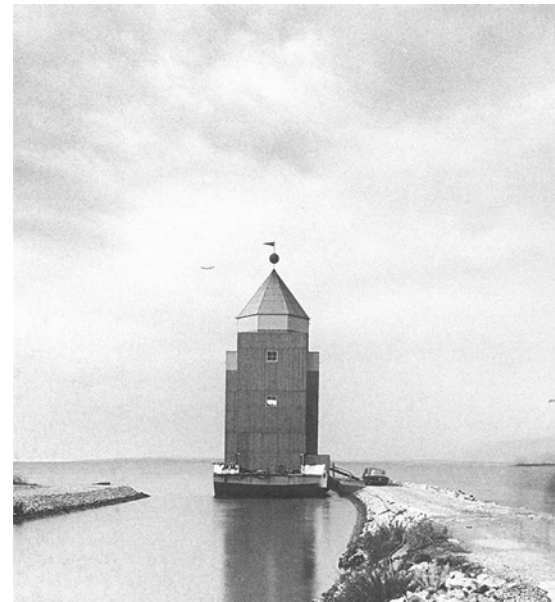
At school one day, a student designed a floating swimming pool. Nobody remembered who it was. The idea had been in the air. Others were designing flying cities, spherical theaters, whole artificial planets. Someone had to invent the floating swimming pool. The floating pool – an enclave of purity in contaminated surroundings – seemed a first step, modest yet radical, in a gradual program of improving the world through architecture. To prove the strength of the idea, the architecture students decided to build a prototype in their spare time.....

In the early thirties, the political situation, which had once stimulated projects such as the pool, became rigid, even ominous. A few years later still (the pool was quite rusty now, but popular as ever), the ideology it represented became suspect. An idea such as the pool, its shiftiness, its almost invisible presence, the iceberg-like quality of its submerged social activity, all these became suddenly subversive.....

Excerpt 1: The Story of the Pool (1978), DELIRIOUS NEW YORK, Rem Koolhaas



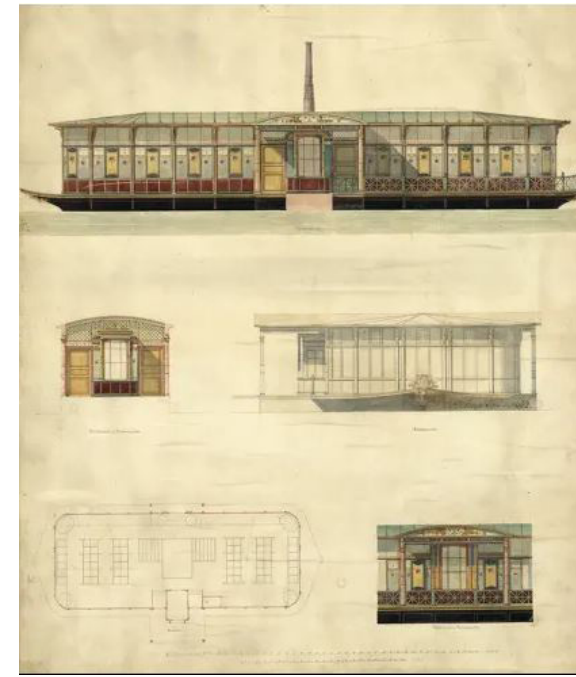
The Arrival of the Floating Pool, Madelon Vruessendorp and Rem Koolhaas 1975



Teatro del Mondo, Aldo Rossi 1980



Point Counterpoint, Louis Kahn, 1976



Treichler Laundry Boat, Gottfried Semper, 1861

PROMPT

It is expected this reuse project will look at the project at various scales and programs based on topics such as the societal, the ecological, the individual, the collective and the technical.

NEW YORK, 1976

A rotating schedule gave each lifeguard/architect a turn at the command of the 'ship' (an opportunity rejected by some hard-core anarchists, who preferred the anonymous integrity of continuous swimming to such responsibilities).....

They cooked on a primitive stove, living on supplies of preserved cabbage and tomatoes, and on the fish they found each daybreak washed into the pool by the Atlantic's waves. (Although captive, these fish were hard to catch due to the pool's immensity.).....

Excerpt 2: The Story of the Pool (1978), DELIRIOUS NEW YORK, Rem Koolhaas

CONTEXT

Located on the western Pennsylvania waterways, the studio will operate within a number of towns located along the Monongahela and Ohio Rivers. The project(s) will operate within the edge conditions of these places. Since the enactment of the Clean Water Act, river fish and related species have dramatically increased. How these interventions help to continue this ecological recovery is a critical part of this studio's working process.

3 MONTHS LATER

The architects of New York were uneasy about the sudden influx of Constructivists (some quite famous, others long thought to have been exiled to Siberia – if not executed – after Frank Lloyd Wright visited the USSR in 1937 and betrayed his Modern colleagues in the name of Architecture).....

Excerpt 2: The Story of the Pool (1978), DELIRIOUS NEW YORK, Rem Koolhaas



Floating Refuge (Louise Catherine Canal- Boat) Le Corbusier 1929

PROGRAM

The projects will vary per student and site location selected. However, the programmatic response is to be directly linked to the challenges facing western Pennsylvania communities. It is expected each student will evaluate the social, ecological and technological.

5 MINUTES LATER

In front of Welfare Palace Hotel, the raft of the Constructivists collides with the raft of the Medusa: optimism vs. pessimism.

The steel of the pool slices through the plastic of the sculpture like a knife through butter.

Excerpt 4: The Story of the Pool (1978), DELIRIOUS NEW YORK, Rem Koolhaas



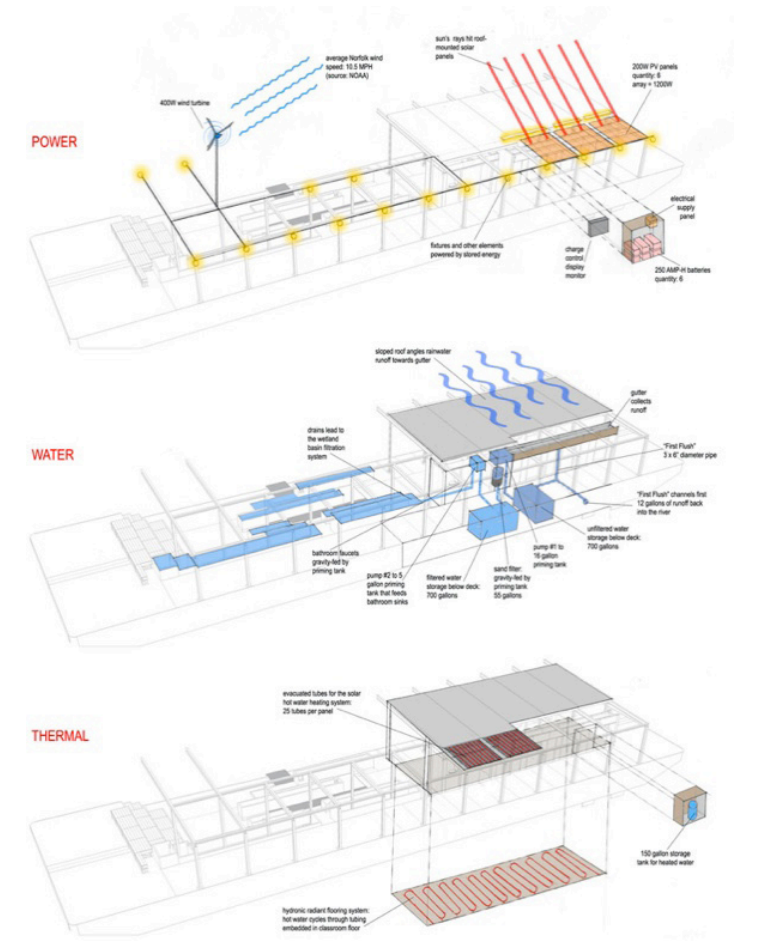
Heartlan Fabrication, Brownsville, Pennsylvania

LEARNING OUTCOMES

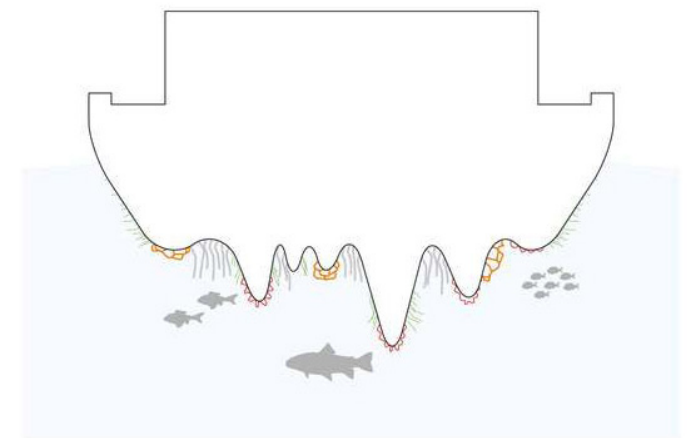
The goal of this project is to make you more self-aware of the commonplace and how as architects we can make responsible changes to the places we are apart.

This studio will travel to look at such items that lie in plain sight and now have new uses and new connections to individuals, communities and the environments in which they are apart.

The studio will visit a barge manufacturing plant, the Louis Kahn Architectural Archives at the Weitzman School of Design in Philadelphia and visit other barge/ river/ lake related structures.



Learning Barge, Crisman + Petrus Architects 2006



Buoyant Ecologies, Future Architecture 2020

Enchanted Skins

Ornament, Interface, and Expression

Laura Garófalo

QUESTIONS

This Advanced Synthesis Studio will explore the intersection of ceramic materiality, building envelope expression, and the communicative potential of ornament. In the process we will question the relevance of ornament, craft, and materiality, in architectural design.

What is the relevance of ornament today? How can ornament shape user experiences, influence movement, and enrich the sensory environment? Is ornament relevant for socio-cultural communication, ecological responsiveness, biophilic agency? Is pure joy in craft and haptic engagement enough to sustain it? How can ornament, historically tied to social hierarchies, be reinterpreted in contemporary contexts to promote social equity and inclusivity? to create a sense of place?

Can we critically assess the role of ornament in contemporary architecture while immersing ourselves in its craft? Can historical and contemporary craft processes help designers communicate cultural values, enhance social interaction, foster belonging, and support local ecology?

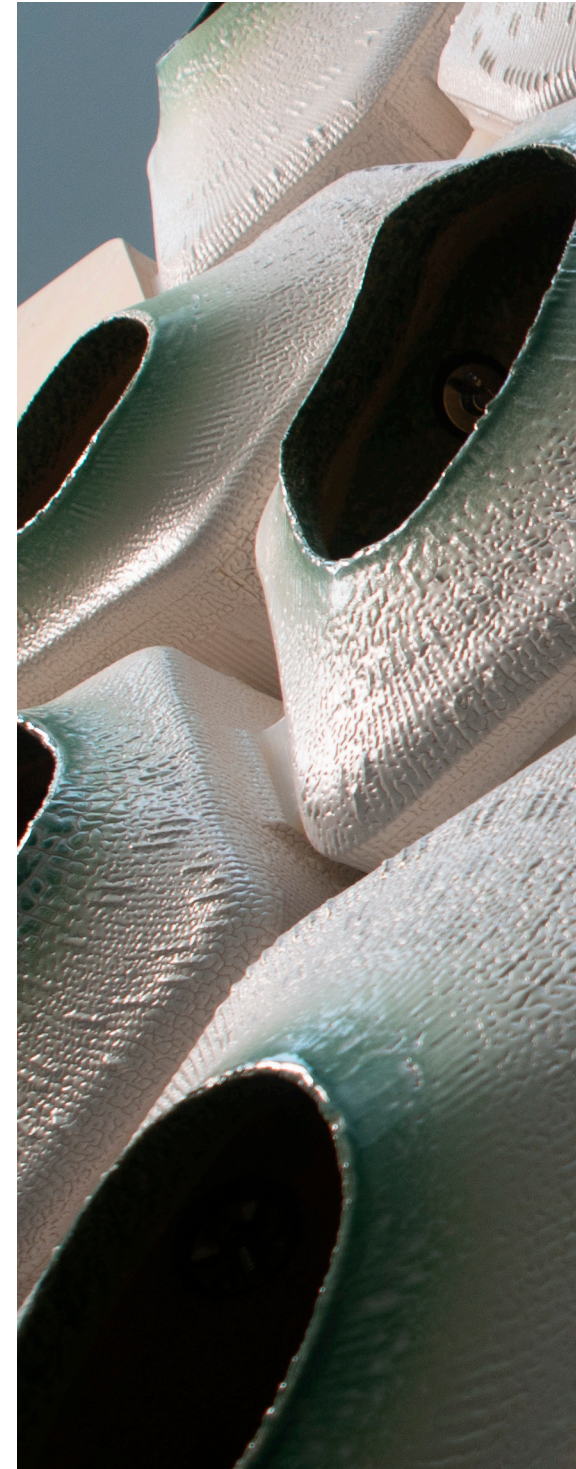
How do material logics challenge computational design constraints which may impose control over materials? What insights does the making process offer? Can material logics inform the development of the form and use of the building?

How do the material properties particularly of ceramics—such as hardness, durability, and finish—influence building envelope design? How do the visual and tactile qualities of ceramic materials, coupled with ornamentation, contribute to the sensory experience of the built environment?

Can we advocate for a new ontology of the building envelope that integrates historical analysis with contemporary technological developments, considering the interplay of material properties, environmental performance, and cultural values to inform the form and function of the whole?



Ceramis Moss Screen Prototype,
by Henning Larsen ACAW 2023



LMN Architects Facade Prototype, ACAW
2020, slip cast ceramic module informed
both by mathematical patterns for hexago-
nal tiling as well as elements found in nature

PROMPT

ORNAMENT: The studio will examine the roles of ornament and the building envelope as dynamic interfaces that mediate between interior and exterior environments, shaping architectural form, user experiences, and environmental performance, while considering historical influences and material properties. It will emphasize the building envelope as a medium of sociocultural communication, exploring how ornament can be used to express cultural identity, enhance social interaction, and promote inclusivity. The Enchanted Skins ASO will encourage the exploration of tactile, visual, and multi-sensory experiences creating spaces and building skins that evoke a sense of wonder and delight.

'The ornamental dimension lies on the very border that separates enchantment and disillusion, magic and rationality. It makes architecture vibrate ...' Antoine Picon

ENVELOPE: Students will be encouraged to literally push the architectural envelope, creating building skins that are not only technically innovative but also aesthetically captivating and emotionally engaging. Such building skins will not be barriers but will call for a world where co-existence and stewardship of our air, land, and water matter because they impact our somatic boundary. This approach transcends traditional sustainable design, recognizing humans as integral to ecosystems, striving for mutually beneficial relationships with other beings.

MATERIALITY: Material research will organize the semester starting with form finding explorations and finishing with ceramic assembly prototypes. By grounding these speculations in the tangible reality of ceramic materials, students will consider how the envelope's ornament can be used to blur boundaries, create visual and spatial connections, and enhance the interplay between internal and external spaces. This will inform how the visual and tactile qualities of ceramic materials, coupled with ornamentation, contribute to the sensory experience of the built environment. The design will not only utilize terra cotta, but also encourage a critical reflection on its materiality and the labor involved in its production, transportation, installation, and upkeep.

CRAFT: The semester will center on craft as a process rather than a product to emphasize the collaborative relationship between the maker and the material. We will reflect on the impact of immersion in the process of making on the holistic design of buildings and ornamentation. By merging current technology with an appreciation for the sensual we will delve into the opportunities that arise from deep dedication to an assembly, material, or craft.



'Civilizations series' by Robert Strati,
Vintage china plate and ink painting, 2024

CONTEXT

Since the late 19th century, modern architecture has prompted a crisis in understanding the building envelope as the facade became detached from structural performance. But a paradigm shift has occurred, moving away from the Modernist emphasis on structure and space towards a focus on the building envelope. This shift is attributed to technological advancements, climate and energy consciousness, and changing programmatic needs. Sustainability requirements have placed greater emphasis on the building's periphery, where energy exchange takes place, leading to a focus on the performance of the envelope. The need for flexible interior spaces, adaptable to changing needs, has also led to a separation between interior and exterior, with the envelope taking on a more autonomous role. With this shift, the envelope becomes the primary canvas for architectural expression, not merely a technical element but a complex interplay of material, environmental, and cultural factors much like ornament. Ornament is now often treated as an integral part of the building envelope, closely tied to materiality and fabrication techniques. This is partly due to technology which allows for the creation of complex textures, patterns, and topologies, and supported by the integration of computer-aided industrial fabrication and a new specialization in envelope design. While traditional ornament explicitly reflected the identities of the architect, client, and broader societal values, contemporary ornament shapes architectural subjectivity through a more subtle and immersive approach, prioritizing the affective experience of the viewer. It has a capacity to create a sense of personality through texture, pattern, and topology. These elements can be used to articulate the building envelope and define its relationship to context giving it a role in both socio-cultural and environmental "performance".

A time tested material for architectural ornament, ceramic is also experiencing a renaissance. Its versatility as a material allows for the creation of the complex surfaces while

its performative properties, low embodied carbon, high resilience and low maintenance make it environmentally desirable. The studio provides an in depth look at this material which is embedded in an ancient artistic tradition and engages cutting-edge fabrication. The instructor's involvement with a community of architects and industry partners facilitates this exploration. Industry partner Boston Valley Terra Cotta, as well as members of design and facade engineering firms, and ceramic artists participating in the yearly Architectural Ceramic Assemblies Workshop (<https://archceramicworkshop.com/>) will inform the development of each project. Optional participation in ACAW in the summer of 2025 will round out the semester's experience.

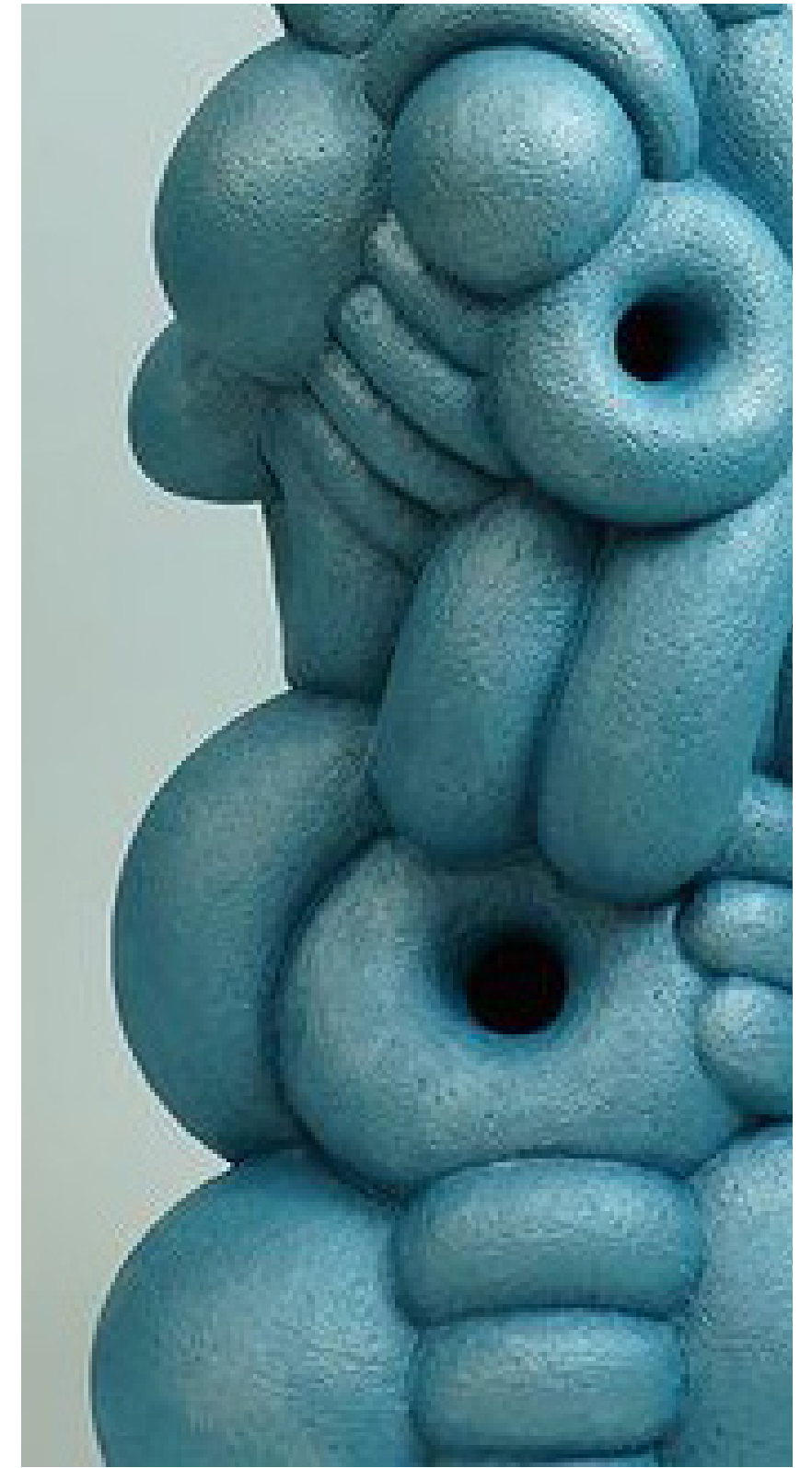
PROGRAM

This studio will explore the design of an architectural ceramic-clad building with an ornamental envelope, culminating in a proposal for Center for Craft. Preparation will include visits to workshops and art/craft centers in the region. Students will define the institution's site, community, production display and education requirements. The proposal will showcase the building's form, spatial organization, and ceramic envelope design, including fabrication methods and ornament integration.

LEARNING OUTCOMES

Students will develop the following skills and knowledge:

- Develop morphological transformations for performative ornamental surfaces while using speculative design to envision alternative architectural futures.
- Understand the historical trajectory and evolving significance of ornament in architecture
- Address environmental regeneration, resilience, and adaptability.
- Learn the technical aspects of ceramic material systems, including properties, production processes, and installation methods, and how ceramic properties like hardness and durability influence building envelope design.
- Design ornamental ceramic envelopes.
- Explore digital and analog tools for designing, fabricating, and prototyping.
- Understand the impact of digital technologies and computational design tools on ornament design and production.



Yuki Ando Ceramics

Frozen Music: Rhythm & Harmony in Architecture

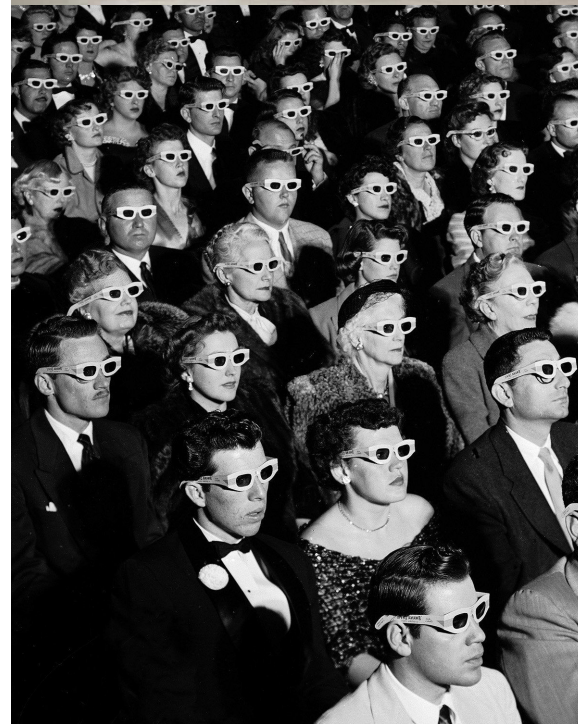
San Francisco Symphony Experimental Theater

Hal Hayes

QUESTIONS

Design research focusing on a specific building typology can elucidate basic principles of architecture theory, technology, and practice. Theaters and performing arts buildings of all types are among the most complex typologies, consequently they provide an excellent and challenging subject for the study of advanced and comprehensive architectural design. Design questions students will explore involve key design issues, parameters and processes;

- **OCCUPANCY:** human behavior, and movement through space, including the study of sequence, hierarchy and spatial narrative. Explore and understand the impact of the built environment on human health, safety, and welfare.
- **STRUCTURE & SYSTEMS:** study and understand the established and emerging systems, technologies, and assemblies of building construction with particular focus on theater-specific systems such as lighting, acoustics, projection, and complex long-span structures.
- **URBANISM & HISTORY:** the challenges, opportunities and rewards of design in a richly layered, dense, historically significant site. Study and understand both the historic and emerging social and cultural significance of this site,
- **SUSTAINABILITY:** study and understand the dynamic between built and natural environments to mitigate climate change. Explore ecological, advanced building performance, adaptation, and resilience principles.
- **INCLUSIVITY:** study and understand the diverse cultural and social contexts of this specific site and translate that understanding into built environments that equitably support and include people of different backgrounds, resources, and abilities.
- **COLLABORATION:** introduce work in multidisciplinary student-faculty teams with diverse stakeholder expertise, goals and objectives to solve complex problems.



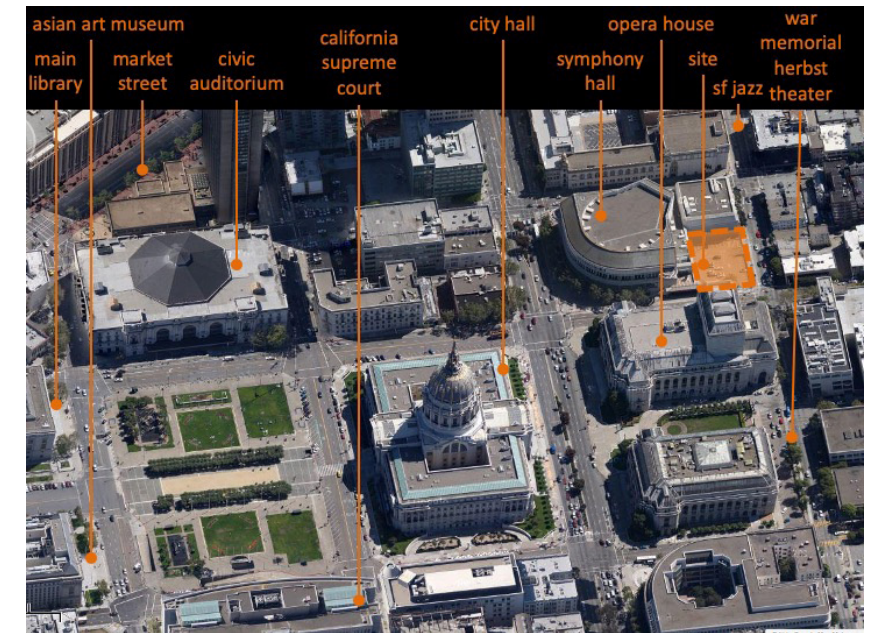
PROMPT

“Music is liquid architecture; Architecture is frozen music.”

Johann Wolfgang von Goethe

Goethe’s famous quote succinctly captures the idea that all creative disciplines, specifically architecture and music, similarly express humanity’s artistry in different media. The architectural typology of performance, in which music is ubiquitous, is perhaps where this dialog and synergy can be most effectively and poignantly addressed. Issues of rhythm, structure, harmony, hierarchy, sequence and balance are seminal to both regardless of function.

Most global cultures developed musical and theatrical performance independently, with their own unique forms and traditions. Contemporary theater building design typology has continually evolved with changes in culture, social mores, cross-pollination with other cultures, and the development of new technologies. Occupants experience space through their sequence of movement and the changes occurring in the spaces they inhabit.



CONTEXT

San Francisco’s Civic Center is considered to be the largest planned example of City Beautiful urban design. Pittsburgh’s Oakland, by contrast, is larger but not the result of a coherent master plan.

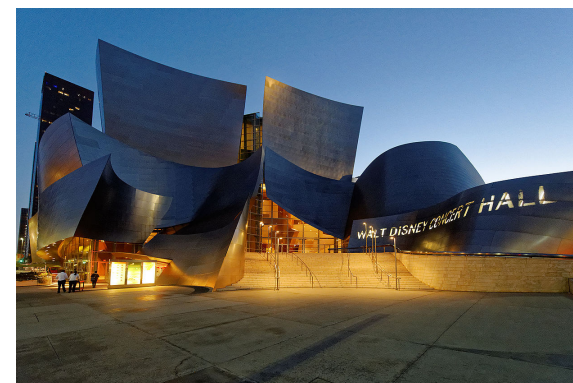
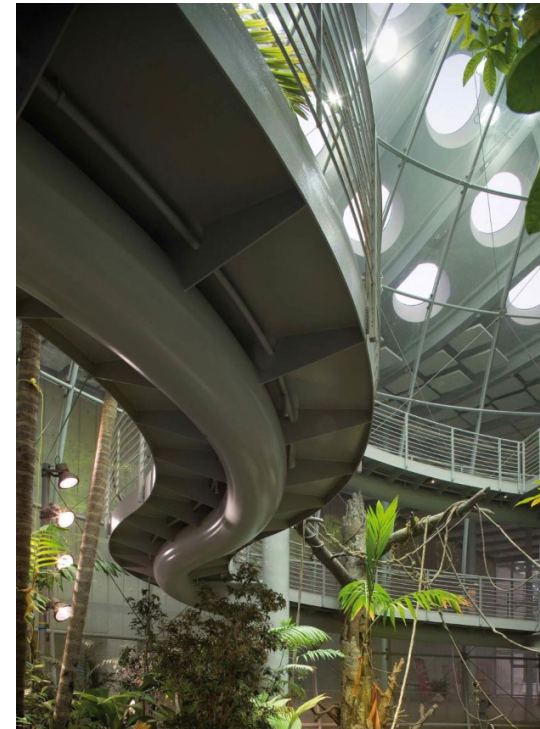
The site for the studio design project is a parking lot adjacent to the existing Louise Davies Symphony Hall, a 1980 addition to the Civic Center by SOM. A new theater for experimental technologies and new musical performance styles will be both a free-standing venue and an expansion of the existing performing arts complex, connecting to the emerging Franklin Street cultural corridor.

OPTIONAL FIELD TRIP & FUNDING

A site visit and meeting with the “client” executive leadership of the symphony and the professionals working on the actual project is planned for Spring Break. We will study San Francisco’s Civic Center, the Davies Symphony Hall, SF Jazz, the deYoung Museum (Herzog & deMeuron, far left top) and California Academy of Sciences (Renzo Piano Building Workshop, left top).

An optional extension to Los Angeles will include tours of Disney Concert Hall (Gehry Partners, far left bottom), the Getty Museum (Richard Meier), Cal Arts “Wild Beast” Recital Hall (Hodgetts & Fung, left bottom) and LACMA Pavilion for Japanese Art (Bruce Goff).

Funding for this trip will be available for a minimum of \$500/student, with some additional funding for those with additional need.



PROGRAM

A new flexible venue to host a variety of different musical and multi-media performances with a seating capacity of 450-500. The stage and seating configurations must be flexible to have different forms. Design goals and considerations will include

- Natural ventilation,
- Exterior projections or light shows,
- Net-Zero performance with electricity generation,
- Advanced theatre technology,
- A campus environment expanding and integrating with the existing main symphony hall, rehearsal hall and adjacent opera house,
- Outdoor performance space(s),
- Performance production facilities, and
- Audience amenities.

LEARNING OUTCOMES

This studio will emphasize the use of hand sketching, physical models and iteration of design at varying scales and degrees of resolution. Students must also expand their mastery of digital and parametric tools for both analysis and conceptual/morphological design development.

This studio is part of the Theater Architecture concentration, and is the result of a direct invitation to participate in this real project from Len Auerbach of Apiero Design, one of the leading theater design consultants.

We will focus on three of the four NAAB Student Criteria.
 SC.1 Health, Safety, and Welfare in the Built Environment— understanding the impact of the built environment on human health, safety, and welfare at multiple scales, from buildings to cities.
 SC.2 Professional Practice—understanding professional ethics, the regulatory requirements, the fundamental business processes relevant to architecture practice in the United States, and the forces influencing change in these subjects.
 SC.4 Technical Knowledge—understanding the established and emerging systems, technologies, and assemblies of building construction, and the methods and criteria architects use to assess those technologies against the design, economics, and performance objectives of projects.

Co-Requisites; (co-taught by Hal Hayes & Dick Block, Drama Assoc. Head & Scenic Design Prof.)

62:408/62:708 - Mini 3, (6 units), Theater Architecture I

62:418/62:718 - Mini 4 (3 units), Theater Architecture II

top right Renzo Piano BW, California Academy of Science, SF
 top left Herzog de Meuron, De Young Museum SF,
 bottom right Frank Gehry, Disney Concert Hall, LA
 bottom left Hodgetts and Fung, Wild Beast, Cal Arts, Valencia

Briding Craft

Catechizing Performance-Driven Craft and Paradoxes of High-Tech

Misri Patel

QUESTIONS

In the realm of architecture as a multi-sensorial experience, technological advancements have empowered designers to delve deeper into the nuances of sensory characteristics, utilizing digital tools to meticulously explore and craft spatial conditions that resonate with touch, sound, and spatial awareness. Just as visual enhancements can make a space visually appealing, aural enhancements enrich the auditory experience of a space (Blesser and Salter, 2007).

The trajectory of architectural evolution has brought about discernible effects on the acoustic characteristics— in the late 19th and early 20th centuries, architectural design departed from elaborate, highly ornate structures to embrace simpler, more minimalist forms (Adams, 2016). The resulting reverberant spaces and acoustic challenges led to the creation of a specialized architectural product: acoustic panels. In contrast, Wallace Sabine, tasked with correcting the problematic acoustics of a lecture hall at Harvard's Fogg Art Museum in 1895, used an unconventional yet remarkably effective solution: horsehair.

In exploring the intersection of craft, technology and acoustics, Briding Craft prompts a fundamental inquiry, fostering a deeper exploration into:

How does the integration of acoustic considerations into the design process influence the efficacy of architectural spaces, ultimately preventing acoustics from being relegated to an after-thought in the design phase?

How can advanced prototyping techniques be used to enhance the acoustic design of spaces using traditional and unconventional materials and methods?

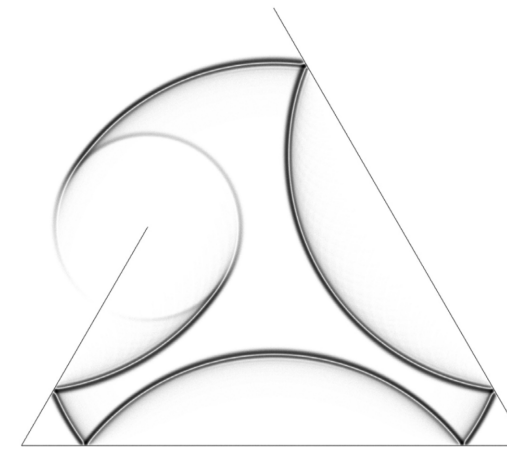
How can we broaden the pedagogical model to incorporate insights from craftspeople, design technologists, and acoustic specialists, positioning the architect as both designer and maker?



Fogg Art Museum, 1895.
Source: Riverbank Acoustical Labs.



The first acoustic lab, 1918.
Source: Riverbank Acoustical Lab.



Sound energy escaping from a partial enclosure.
Source: Acoustic Ornament (Belanger, 2021)

PROMPT

The snowy landscape showcases a diverse range of acoustic behaviors, influenced by the varying states of the snow. The frozen expanse, with its flat and hard surface, functions as a proficient sound reflector. Sound waves encountering this compacted, rigid surface bounce off, creating a reflective acoustic environment. Conversely, the freshly fallen soft snow introduces a contrasting acoustic dynamic.

Characterized by its softness, porous structure, and increased surface area, the soft snow becomes an effective sound absorber. The porosity of the freshly fallen snow allows it to trap and dissipate sound energy, reducing the extent of reflections. This absorption is further enhanced by the greater surface area of the soft, uncompacted snow, providing more opportunities for sound energy to be absorbed (Acoustic Ornament, Belanger 2021).

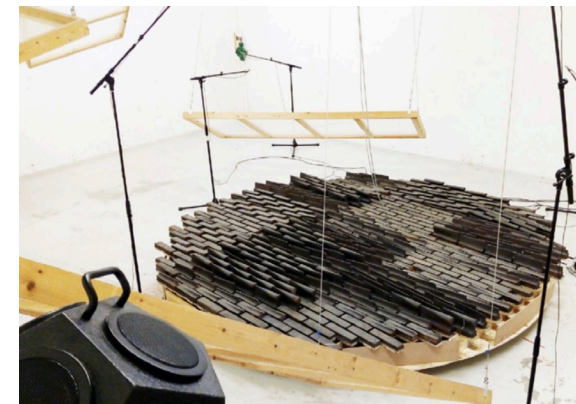
In essence, the snowy landscape manifests a spectrum of acoustic behaviors, transitioning from a reflective to an absorptive state. This interplay between the physical characteristics of the material and the resultant acoustic effects adds a layer of complexity to the sonic experience within snowy environments. Underscoring this natural phenomenon, how can designers today employ versatile materials and methods to create an acoustic continuum?

CONTEXT

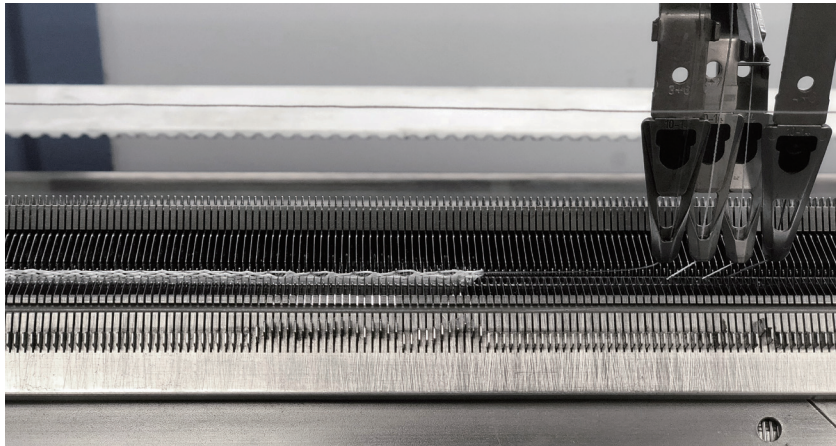
Technological progress in construction and fabrication has yielded a profusion of custom geometries and unparalleled precision in part manufacturing. Recent years have seen a growing emphasis on the importance of performance in architectural design, attracting the attention of both professionals and architects (Hensel and Menges, 2008).

Consequently, with the rise of advanced digital fabrication and manufacturing technologies becoming more accessible, how can we expand on the notion of resilient materials? Can the material capabilities of coir, sugarcane bagasse, fly ash, recycled PETG, glass-fiber, etc be harnessed to be performative?

And, can ancient building blocks-- like clay bricks, typically known for their excellent thermal performance be reimagined to address the largely underexplored acoustic qualities?



Contemporary methods for acoustic testing.
Source: Sound Scattering Acoustic Brick (Rossi et al. 2020)



CNC Knitting Machine.
Source: Kneu-crete: CNC knits for programmable hybrid formworks (Aljomairi, Chun-Wen & Patel, 2019)

PROGRAM

The studio focuses on the histories within three disciplines-- architecture, manufacturing (traditional and digital) and acoustics. The design methodology used in this studio emerges from the design research developed by the instructor and students during the Ann Kalla Professorship. It combines material, tools and methods methods to synthesize a rich palette of technological resources that not only expands the creative possibilities of design but also allows for a more nuanced and intentional integration of sensory elements. It is expected that new methods and tools will emerge as the studio progresses.

By probing the histories of these disciplines and delving into the synergies between them, this research-based studio serves as a conduit for the realization of spatial environments that transcend traditional boundaries and embrace the forefront of material exploration. Through the initial workshops and guest lectures, student will learn from traditional craftspeople, design technologists (CNC knitting and additive manufacturing) and acoustic specialists.

Expanding on initial hands-on workshops and individual material research, students will collaborate in pairs. Consequently, the groups will formulate a design research statement and insights into strategies, design and fabrication of scaled prototypes.

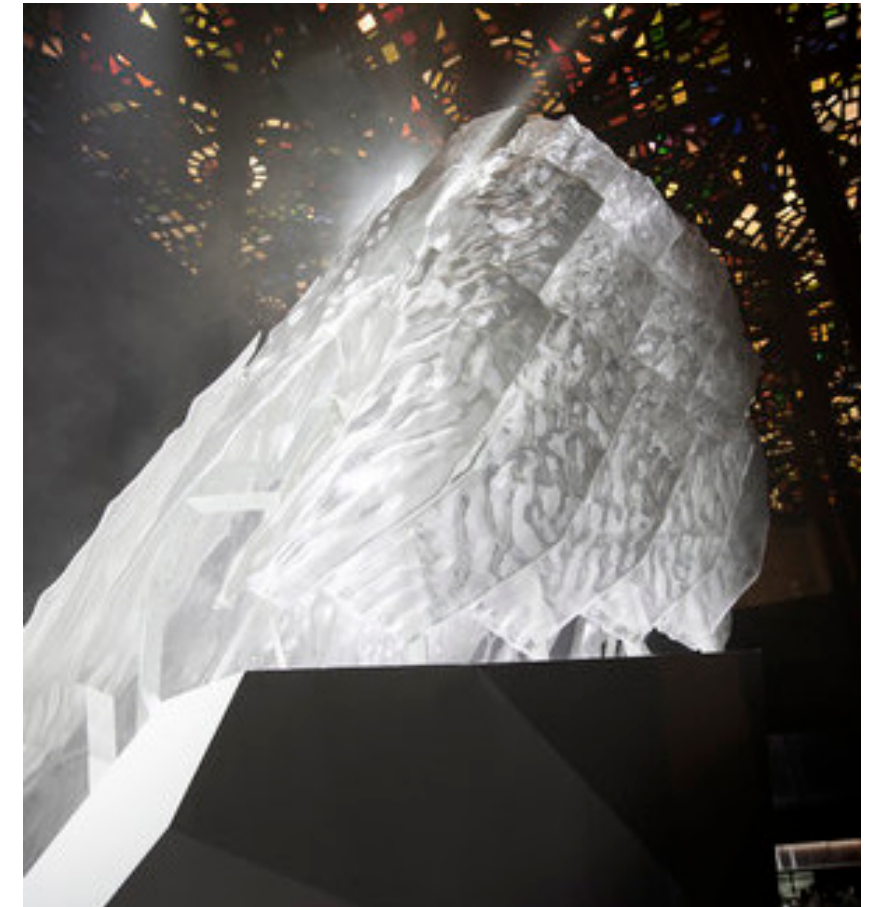


Additively Manufactured Textile.
Source: Collateral Computation (Patel, 2023)

LEARNING OUTCOMES

There is no prior knowledge expected for this studio. Through the studio, following are the course objectives and learning outcomes:

1. Analyze sources to highlight key issues and acknowledge the diverse voices, disciplines, and perspectives involved in the discussion of craft, technology and performance-based design.
2. Understand the fundamentals of acoustics and experimental design research methods.
3. You gain a deeper understanding of the relationships between form, simulation environments, and the role of material systems in shaping aural architecture.
4. Develop and enhance your conceptual and technical design skills across disciplines, with an emphasis on material systems, both traditional and digital fabrication techniques, and acoustic performance-driven design at multiple scales.
5. Think independently and craft a transdimensional framework to formulate a comprehensive design research statement.



Floe (Studio Roland Snooks, 2018).