

CRISIS MITIGATION: RESTRUCTURING THE ARCHITECT'S ROLE

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ABSTRACT

The role of the architect is multi-fold and ambiguous - with a desire to have knowledge in everything, we seldom find refined expertise in anything. Contrary to the Vitruvian principle, architecture is no longer an imitation of nature,¹ but rather contributes towards one of the greatest threats to natural systems: the built environment. With the climate crisis increasingly posing a threat to the pursuit of human survival, the building, design and construction industries must take on a critical view of their current operational systems in an attempt to restructure the overall generation and maintenance of the ecological landscape. Through studies conducted in studio and elective courses over a three-semester period, discussions centered around tackling this crisis at a wide variety of scales and media have presented a diverse platform in which the role of the architect can be productively restructured.

A seemingly dramatic conclusion to the impending issues at hand, the end of the world is more discernable than substantive change to our socio-economic and political systems; however, while we can utilize technology to address many issues concerning productivity and production, ultimately change is needed within academic and practical application settings. In challenging what, how and how much we build, we can begin to substantially tackle the core issues that architecture perpetuates in educational discourse and industrial practices. Coupled with a fundamental understanding of factors such as the current energy paradigm, our production and consumption practices, global infrastructural systems, and architecture's ability to operate as a transdisciplinary facilitator, the architect has a responsibility to address the climate crisis head-on.

ACKNOWLEDGMENTS

First and foremost I would like to thank my family for providing me with the support and counsel to complete this journey: my mother, sister, grandparents, partner, Coco & Roxy.

I would also like to thank the faculty and staff at Cornell AAP that have provided invaluable expertise and guidance over the course of this degree program, and have allowed for my intellectual and creative interests to develop freely and organically.

Lastly, to the friendships that have grown stronger over the course of this program – I could not have done it without you.

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THE ROLE OF THE ARCHITECT

The negative ecological impacts we are currently facing in the form of climate change have a deep history in human neglect of environmental landscapes, particularly when it comes to the issue of waste. Throughout time, streets, rivers, and landfills, among many other elements, have all served as vessels to house our waste. These practices have had drastic effects, typically resulting in the declining health of our ecological landscape and individual wellbeing. We frequently turn to governmental institutions and policies as a means to remedy environmental issues, but in most cases the proposals remain at the generic and exclusive level, ultimately limiting the range of solutions that can be implemented. The role of the architect is therefore to promote and support sustainable design measures through all phases of a project's life.

Architects “are faced with arbitrary requests and parameters that they do not establish in countries that they hardly know about issues which they are vaguely aware, and they are expected to solve problems that have been shown to be unsolvable for much better trained brains. By definition, architecture is a chaotic adventure. There is no determined field that generates the architecture, but it is an interrelation of many activities that are merged in a way in which it can't be determined.” (Rem Koolhaas, S, M, L, XL) By this standard, architecture as a practice cannot be decoupled from social, economic, political and ecological factors, but architects primarily operate under a pretense that we are inherently problem solving rather than problematizing. The value of our work is often null unless it achieves a level of permanence; however, the climate crisis requires that we reanalyze this sentiment.

¹ Morris Hicky Morgan and Vitruvius Pollio, Vitruvius, The Ten Books on Architecture (Nabu Press, 2010).

The current understanding of sustainability emphasizes that "...the social, environmental, and economic systems within which sustainable development must occur are constantly changing... therefore, increased resilience and adaptability must be added as a...pillar of sustainability." (Institute for Sustainable Infrastructure, Envision v3, 11) As a practice that is deeply embedded in the causes of the climate crisis, architecture is complicit in ecological negligence and disruptive industry operations. Through a comprehensive understanding of what, how, and how much we build, we can attempt to establish a methodology by which we can begin to mitigate the crisis.



WHAT WE BUILD: ADAPTIVE REUSE

We live and build in an environment that has been made thick with years of construction and demolition to accommodate increasingly unprecedented population growth and desired consumptions. Formulated heavily by the use of fossil fuels, our carbon economy is the backbone of our modern landscape, further enabled by the forms of capitalism that bleed into every aspect of life. Our landscape is built, and therefore defined, yet we continue to search for new lands to manipulate and shape. Ultimately, we need to come to terms with the possibility that the architect's role is no longer to build anew but to work with the old - to provide facelifts, strategic analyses and methods of reuse at every scale. In academia we work towards doing this; in practice, however, many times we fail. "Some argue for the outright 'dematerialization' of construction, a drastic reduction in the amount of physical substance that goes into the built environment - in essence, 'doing more and more with less and less until eventually you can do everything with nothing,' (R. Buckminster Fuller)." (Angelil and Siress, 13-14)

Our architectural inheritance requires greater relevance in practice and discourse. Theory courses present us with ingenious solutions to resolving our ecological landscapes while addressing a trope of other given societal factors, but this resolution is lost when it comes to industry-based applications. In Elisa Iturbe's seminar titled *Overcoming Carbon Form*,² it is posited that architecture's pivotal role in the climate crisis requires a fundamental reframing of our understanding of energy. An active awareness of our current energy paradigm, as defined by the

²Project Documentation: *Overcoming Carbon Form*

abundance of energy in the form of fossil fuels, helps structure a need for a shift away from a carbon economy and asks that we prevent the continual production of carbon forms in our built landscape.

Furthering studies on a critical level of what we built, an opportunity with Cornell University's Design Connect team during the Fall 2020 semester gathered a group of students, including myself, to repurpose the Village of Waterloo's historic Moore's Furniture Store into an art center after 125 years. Currently standing as a timber-framed three story structure, the proposal includes spaces that take advantage of moments for natural daylighting and the integration of an artist-in-residence program. Initially prompted by budget constraints, the Village's interests in an adaptive reuse project were enhanced following conversations of the historical value of the existing structure, contextual relevance and aesthetic and environmental concerns.³

When focusing on the building at a smaller scale, the opportunities for material reuse and redevelopment can be easily discerned. In Caroline O'Donnell and Dillon Pranger's studio workshop, through a project titled *Chiptonite*,⁴ myself and a team (Nusaiba Khan and Felix Samo) studied the embodied potential of the potato chip bag. Prompted by the inability for the waste generated to be effectively recycled, the project proposed that this item be transformed into a valuable building material - formed into a blanket and stacked into semi-reflective columns. Along a different spectrum, under the direction of Marta Wisniewska, I challenged the potential use of a common food waste item - the eggshell - to become a biodegradable building material. Utilizing chemical properties found within the eggshell in cooperation with those of potato starch, a solid puck could be formed under the appropriate conditions (primarily concerned with accurate heating and cooling temperatures).⁵

Reuse provides a plethora of opportunities for material development and substantial waste reduction from streams other than construction. The possibilities that remain undetermined are infinite, ranging from the material to building scales. A strategic reframing of our material pool provides opportunities for an organic richness to be unearthed as well as a reduction in the energy exerted for pristine⁶ materials to be utilized.

³ Project Documentation: Design Connect – Village of Waterloo

⁴ Project Documentation: CHIPTONITE, p 20

⁵ Project Documentation: Biodegradable Eggshell Resin, p 24

⁶ "Pristine" is never truly pristine due to the inherent scarring that material extraction processes cause and the ensuing energy exertion that is needed for processing.



HOW WE BUILD: ASSEMBLE & DISASSEMBLE

The failures of sustainability are prevalent in everyday architecture at varying scales: the demolition of the Pruitt-Igoe apartment complex in Milwaukee, Wisconsin which let out a cloud of debris so large it demanded attention from architects throughout the U.S.; the gradual unpiecing of the Collegetown Bagels corner near the Cornell University campus; the mindless discarding of used aluminum-plastic chip bags once the contents have been consumed,⁷ and everything in between. The disassembly of these projects are pathetic unwindings of the latent values that each component embodies, ultimately deeming it all as waste.⁸

Perhaps the closest attempt to achieving a sense of time while addressing the core components of assembly, use and disassembly is David Benjamin's MoMA PSI Warm Up submission, Hi-Fi, which turns to the transdisciplinary application of biology and architecture by applying the material practices of growth and decay,⁹ ultimately accepting the notion of impermanence. The acceptance of change and the creation of a path away from the physical scarring of the earth, by means of material extraction, foundational excavation, and waste generation, bring us significantly closer to grounding our future climate state. We need to shift our focus to a more holistic approach as we design, asking questions such as: what will happen to this project over time?; and, what are the ecological costs of building?

Developed simultaneously with a proposal for Overcoming Carbon Form in the format of "carbon accounting",¹⁰ I developed a project proposal under the

⁷ Reference to CHIPTONITE, a project completed by Karisma Dev, Felix Samo & Nusaiba Khan for the Architecture + Ecology studio of the Cornell AAP M.S.AAD semester one program. Visit <https://blogs.cornell.edu/msaad21/2020/11/11/chiptonite/> for more information, p 20

⁸ Waste is defined as: "Objects or materials for which no use or reuse is intended." as outlined by the State of California Cal Recycle program. Visit www.calrecycle.ca.gov for more information.

⁹ David Benjamin, YAP 2014 Winner: Hi-Fi by The Living, MoMA, 2014, <https://www.moma.org/slideshows/74/0>.

¹⁰ Project Documentation: Overcoming Carbon Form – Carbon accounting refers to a breakdown of the energy expended in the generation of building materials, p 26

direction of Florian Idenburg and Karilyn Johannesen for Soho Rep (a New York City based Repertory Theatre Company) that challenges actors, visitors and community members to interact with their accumulated waste.¹¹ By displaying waste at the scale of props and sets in the form of a spatial catalog, individuals are required to produce new content and materials based exclusively off of what is existing; however, it is widely acknowledged that this cannot take place unless a certain ease of assembly and disassembly is integrated into the foundational design concepts of each item. As the architect's role is to support and promote sustainable design principles throughout a project's life, it is paramount that methods of assembly and disassembly are treated as core components of a project's conception.

¹¹ Project Documentation: SOHO Rep:
The Acts of Living, Performing and
Reusing, p 28

HOW MUCH WE BUILD: CAPITALISM



In their docuseries, *The Next Thing You Eat: Burgers - Balanced Diet*, David Chang and Morgan Neville use the American Hamburger as a means of exploring the drastic scale by which the widespread consumption of a singular product has significantly impacted the physical landscape as driven by a singular factor: capitalism.¹² Production shaped by profit without consideration for the life cycle of the product results in wide-scale, irreversible destruction. Similarly, we see patterns of profit-driven production in architectural and urban discourse.

Using food production as a vehicle to understand spatial developments, under the direction of Jesse LeCavalier in a project titled *URBANANAS*,¹³ myself and a team (Ien-Jung Chen, Aleksander Dmitrashchuk, Young June Lee and Felix Samo) used the banana as an icon to explore the global food chain of a raw produce commodity through a projective life cycle analysis and spatial urban prototype. This study revealed that, at the urban, building and consumer scales the consumption of an individual product can effectively shape the environmental landscape if proven to be profitable.

As Willbanks & Kates frame in their text *Global Change in Local Places: How Scale Matters*, "it is clear that some of the driving forces for global [climate] change operate at a global scale...but it seems just as clear that many of the individual phenomena that underlie microenvironmental processes, economic activities, resource use, and population dynamics arise at a local scale." (Willbanks & Kates, 602) The scale and density at which we produce and consume within

¹² David Chang & Morgan Neville, *The Next Thing You Eat: Burgers - Balanced Diet* (Hulu, 2021), 5:00.

¹³ Project Documentation: *URBANANAS*, p18

the construction and design industry is catastrophic. For architects, many times sustainable design is manifested in forms of affordable housing, mass housing and small spatial footprints, but what they fail to realize is the operational ecological cost that building at this capacity requires. During a core studio led by Katharina Kral, titled *Minimax*,¹³ I was tasked with designing a multi-phase affordable mass-timber housing complex in Brooklyn, New York. While the structural components addressed a sustainable, renewable material (timber), the spatial and occupational parameters of the studio and resulting projects did not produce particularly compelling proposals for sustainable design solutions. It was revealed through this studio that the unsustainable practices that have been implemented into practice remain at the forefront of green-design discourse.

In his publication *The Uninhabitable Earth*, David Wallace Wells states that “humans don’t cause climate collapse, and nor does carbon. The problem is a particular arrangement of these elements... [the greatest being] capitalism, the whole point of which is to find resources and exploit them.” (Wallace Wells, 142) As a direct result of capitalism, we are rendered incapable of effectively implementing sustainable practices into every stream of our networked society. We are in a heavy surplus phase - the practice of architecture is no longer for shelter, but a method of commodifying a necessity. In Alexandra Quantrill’s seminar, *Configurations of the Technical*, relations between technical, ecological and societal factors are challenged within the context of the built environment to test how the transforming presence of technology can be manifested in architecture. With an increase of the digital and knowledge of the latent infrastructures embedded within our landscapes, we have the power to drastically alter the ways in which we occupy space. We do not need more - we simply need to make it better. The role that building systems play in inhabitants’ comfort is greatly underestimated, but therein lies the power to achieve great spatial successes. As Koolhaas referenced in his outline of the architect’s role, it is our duty to understand all of the components of a working project, not just the building itself.¹⁴

¹³ Project Documentation: *Minimax – The Domestic Playground*, p 22

¹⁴ Rem Koolhaas and Bruce Mau, *S, M, L, XL* (New York: Monacelli Press, 1998).

FINAL NOTES



When it comes to questions of scale, perspective, global markets and survival, as Fredric Jameson tastefully claims, “it’s easier to imagine the end of the world than it is to imagine the end of capitalism.” (Wallace Wells, 144) Along this trajectory, as architects we have designed ourselves into a corner. We can transcend space, feeling, materiality, etc.; however, there is an urgency in which we need to implement change in architectural discourse that can subsequently be executed in practice. Each of the primary points addressed - what, how, and how much we build - can be addressed separately in the climate change conversation; however, architects cannot effectively tackle the climate crisis without a holistic consideration of all three. the construction and design industry is catastrophic.

COLLECTED WORKS (STUDIO + ELECTIVES)



URBANANAS

CHIPTONITE

DESIGN CONNECT: VILLAGE OF WATERLOO

MINIMAX: DOMESTIC PLAYGROUND

FANTASTIC MATERIALS & WHERE TO FIND THEM: BIODEGRADABLE
EGGSHELL RESINS

OVERCOMING CARBON FORM: SYRACUSE CENTER OF EXCELLENCE

SOHO REP: THE ACTS OF LIVING, PERFORMING & REUSING

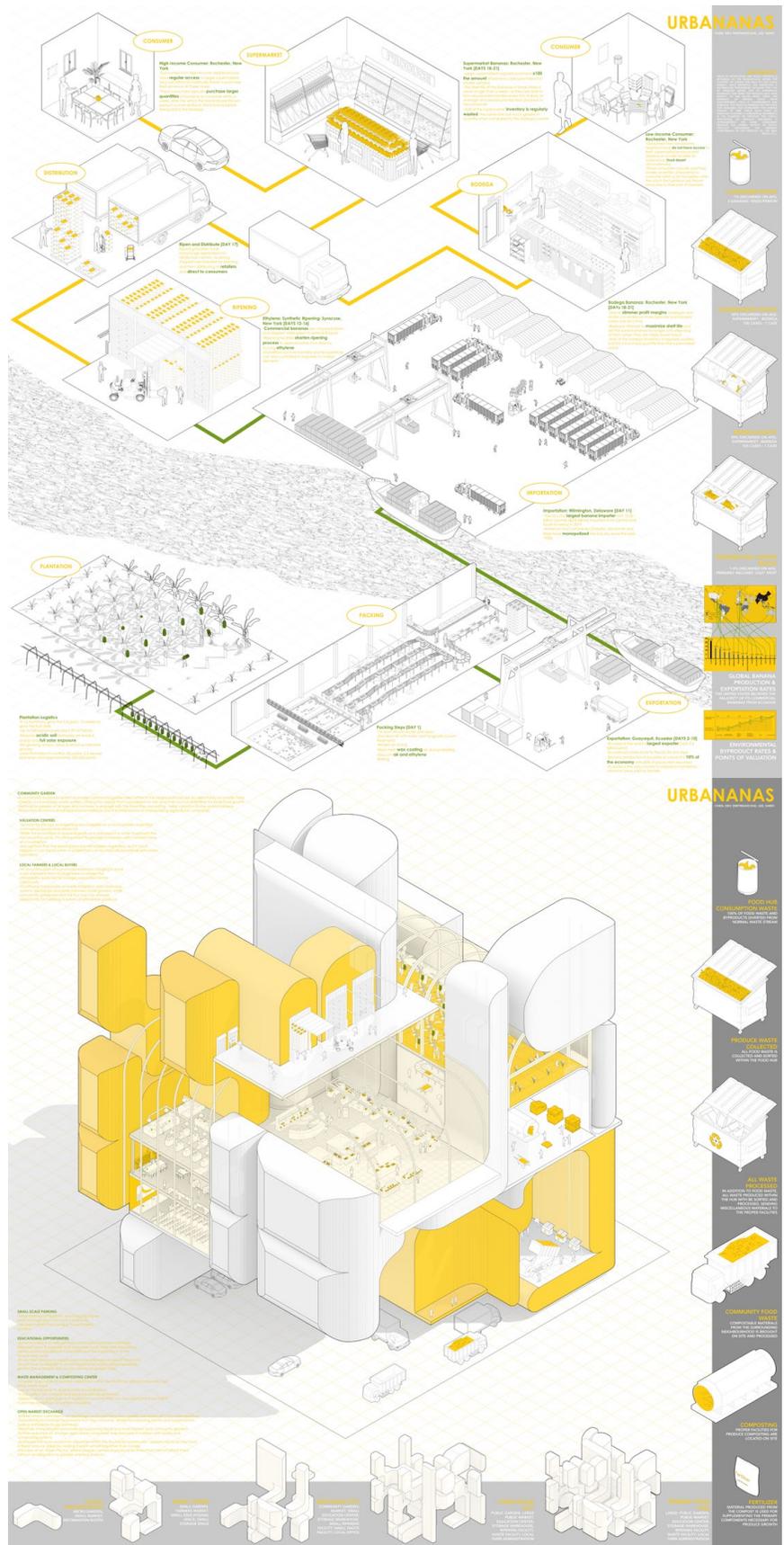
URBANANAS

Instructor: Jesse LeCavalier

Team: Ien-Jung Chen, Karisma Dev, Aleksander Dmitrashchuk, Young June Lee and Felix Samo

Date: Fall 2020

Through an urban systems study, the typology of the food hub is used to explore the ways in which socio-political and economic factors further problematize the spatial inequalities generated as a result of the demand and consumption of commodity food items (such as raw produce that is not seasonal and/or native to areas where it is consumed).

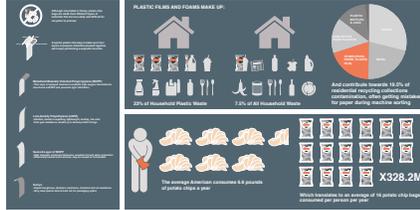




How can new approaches to infrastructure support new food distribution typologies, better integration with local transport systems, and more flexible distribution responses? How can challenging latent values of the food supply chain support more equitable, convivial, and experientially rich environments?

Jesse LeCavalier

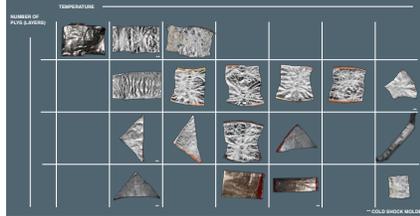
AMERICA'S #1 SNACK FOOD



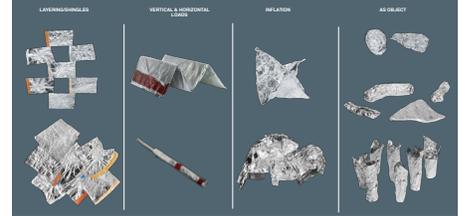
MODULE PRACTICAL IMPLEMENTATION



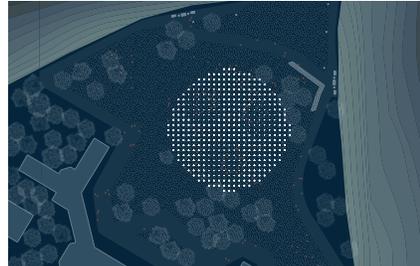
MATERIAL TESTING



ASSEMBLAGE



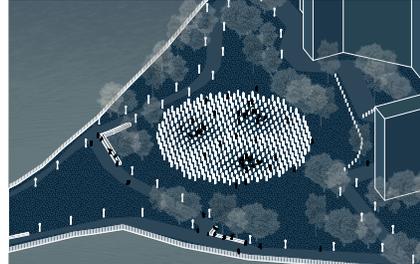
SITE PLAN



PERSPECTIVE 01



ISOMETRIC



PERSPECTIVE 02



CHIPTONITE

Instructors: Caroline O'Donnell & Dillon Pranger

Team: Karisma Dev, Nusaiba KhaN, and Felix Samo

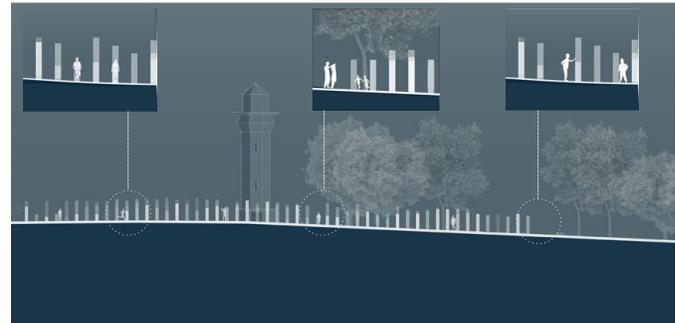
Date: Fall 2020

Using a material reuse study that employed the chip bag as a valuable building material, this project explored the ways in which understanding the embodied energy and chemical properties of certain items that have been deemed as waste can be transformed into a novel building medium.

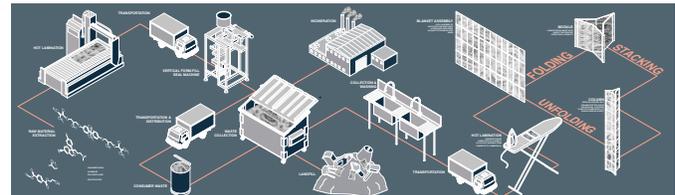
STAGES OF USE

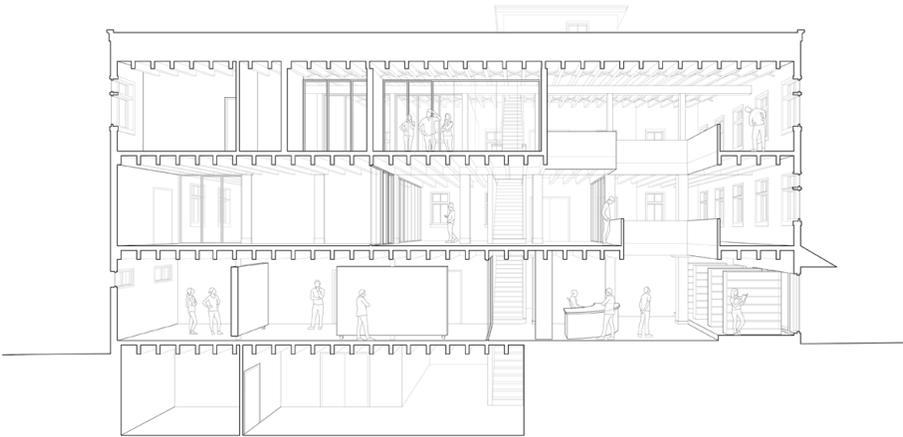


SECTION + SITUATIONAL VIGNETTES



HOW IT'S MADE





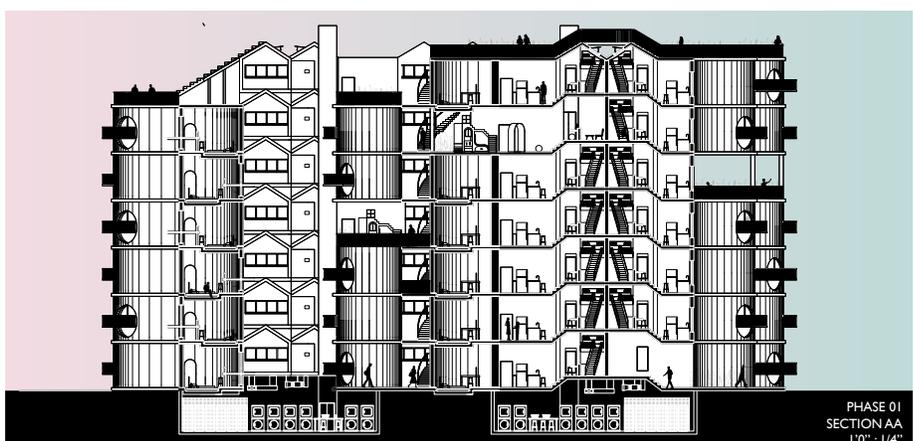
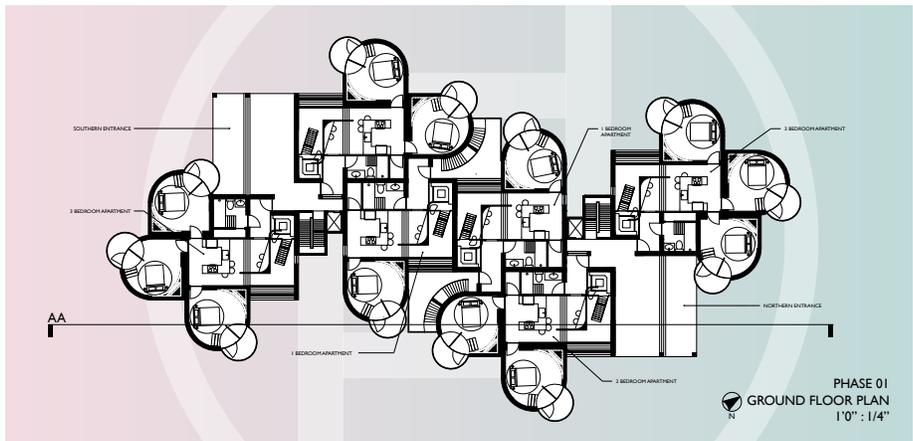
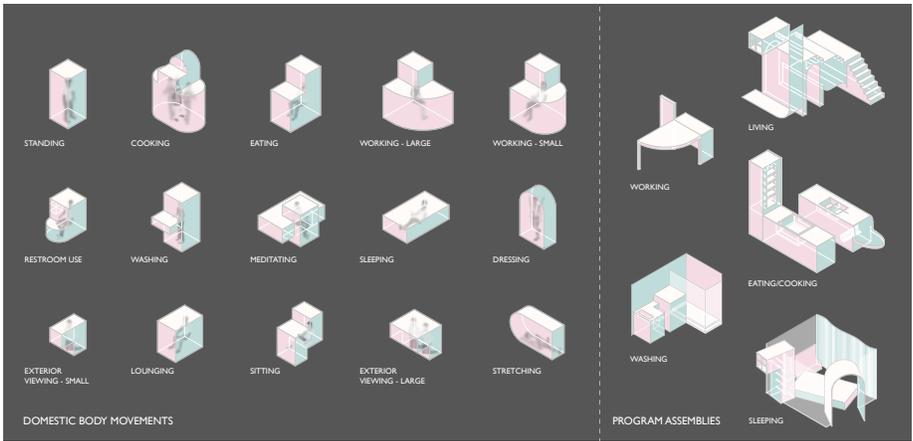
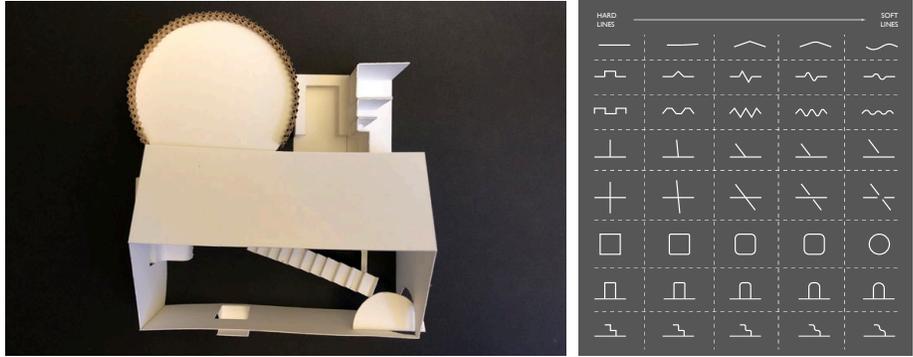
DESIGN CONNECT: VILLAGE OF WATERLOO

Instructor: Michael Tomlan

Team: Adam Baily, Grace Cheng, Nattane Deruytter, Karisma Dev, Nasha Gitau, Katie Latchford, Felix Samo, Dhyan Sharma, Xinyue Shen

Date: Fall 2020

Addressing an RFP for the Village of Waterloo, this adaptive reuse project was located at the former site of Moore's Furniture Store and required that it be transformed into a community art center that would attract artists and patrons from a variety of art forms. Given the buildings 125-year history, our project team identified the importance of retaining as many of the existing elements as possible.



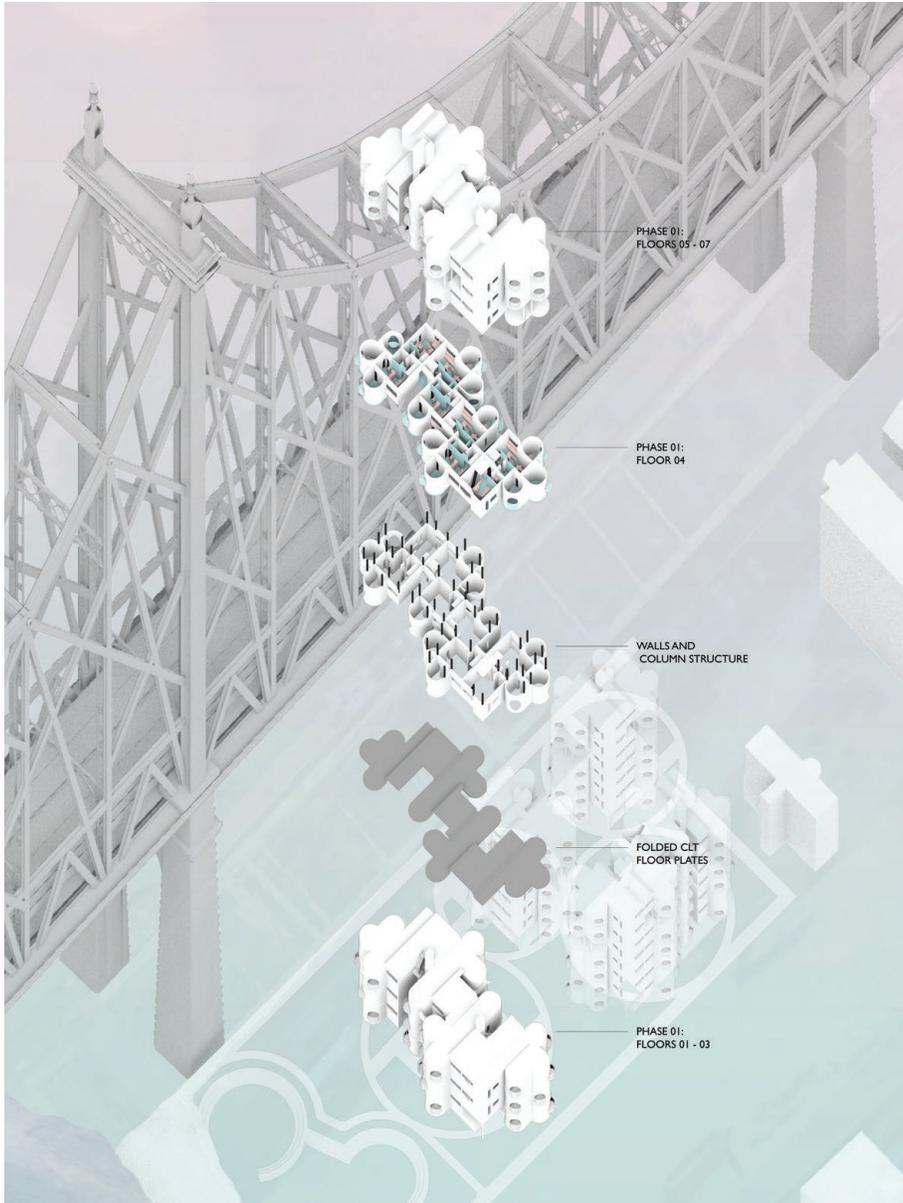
MINIMAX: DOMESTIC PLAYGROUND

Instructor: Katharina Kral

Team: Karisma Dev

Date: Spring 2021

This design studio prompted students to design under the pretense of a phased-development site for affordable housing in Brooklyn, New York. Sustainability was driven predominantly through the core structural material – mass timber; however, the overall ecological footprint of the building was still left unrefined, as the building systems and operations were generally given little consideration in most project proposals.



How can we quantify and qualify actions of the human body to create spatial interventions that promote domestic occupiable efficiency?

"Projects should: Have a strong relation to the neighborhood (urban design and building planning). Meet the needs of households and individuals (apartment planning and accessible design). Promote greater equitability and health outcomes. Encourage active design. Utilize sustainable or renewable products and promote energy efficiency. Select sustainable features that can potentially reduce operating costs."

NYC HDP



**FANTASTIC MATERIALS AND
WHERE TO FIND THEM:
BIODEGRADABLE EGGHELL
RESINS**

Instructor: Marta Wisniewska

Team: Karisma Dev

Date: Spring 2021

Driven by a challenge to rethink unconventional sources for building materials, this course resulted in the production of a bio-degradable eggshell resin, consisting of dehydrated eggshells and potato starch. Similar to Chiptonite, the opportunities for reuse prompted thought processes that factored into the consideration of energy expended, production methods and subsidiary waste produced (i.e. here, that was predominantly water, as everything else was a food product that could be consumed).



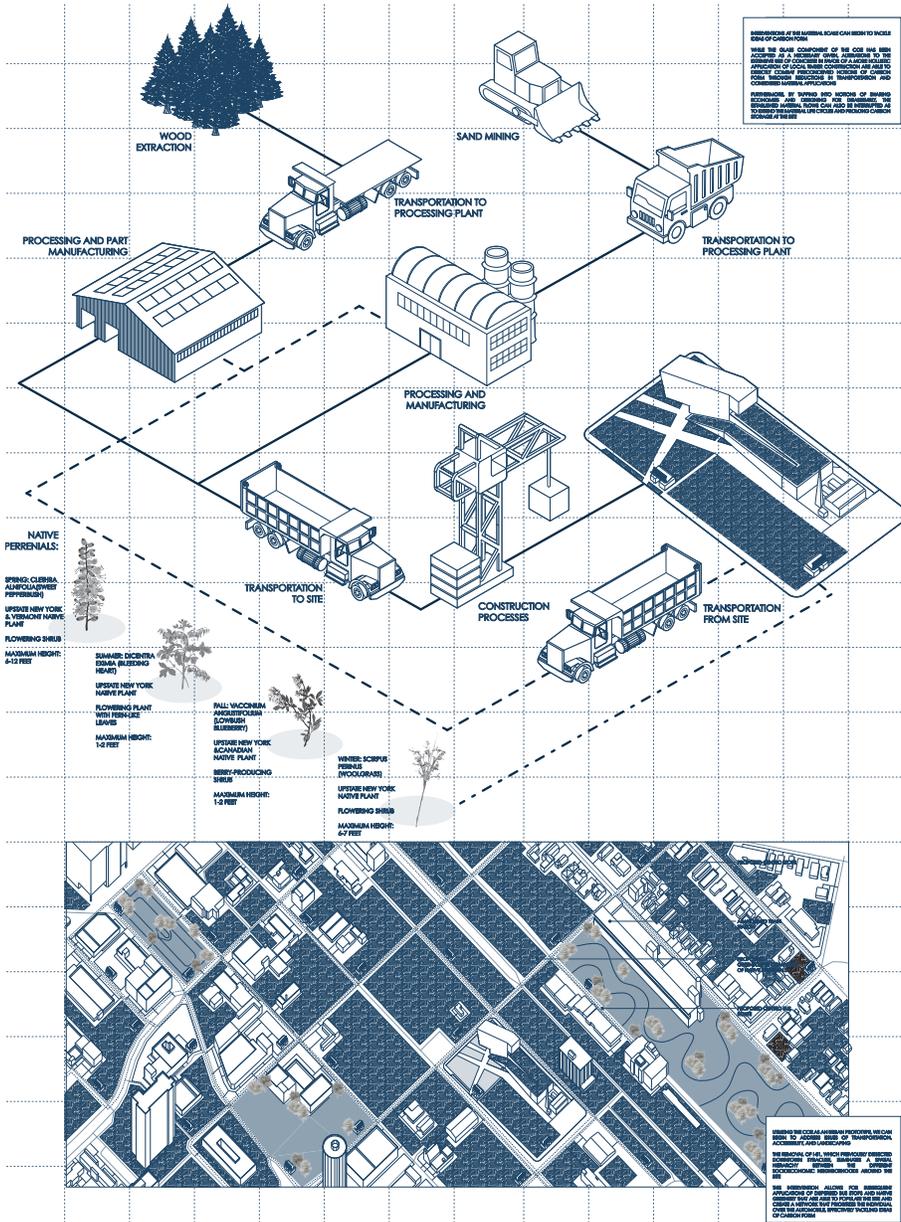


How can we create a biodegradable, food-waste-based material that is environmentally friendly and as durable as resin-based products?

Biocomposite eggshell resins are not a new development - they have been studied since the late 1990s as a sustainable alternative to plastics within the medical industry; however, there has not been an integrated dedication to studying the potentials of the material's use. In their undergraduate thesis titled *Learning from Fine Dining*, Karisma Dev and Felix Samo conducted introductory research into material developments stemming from biocomposite eggshell resins as a building material. Similar in properties to terrazzo, which is commonly used for flooring, countertops, and facade tiles, this bio-based material posed a promising alternative to the traditionally cradle-to-grave material. Testing the composition of the biocomposite eggshells, Dev and Samo found that many fossil-fuel based ingredients could safely and effectively be substituted for food-based materials such as food-safe silicone, olive oil as a release agent and epoxy resin

Recipes for Speculation: Potato Plastics and Eggshell Aggregates

OVERCOMING CARBON FORM



“Carbon form can also refer to specific relational or positional matters. For example, a spinach leaf in itself is not a carbon form. But a spinach leaf grown with petroleum-based pesticides and fertilizers, sown and harvested with gasoline-fueled machinery, packed in a plastic container, delivered on a truck, and sold in an air-conditioned Walmart superstore surrounded by open expanses of asphalt is, if not a carbon form in itself, a commodity that circulates within a complex network of carbon forms and defines specific relationships within that network.”

Elisa Iturbe, Architecture and the Death of Carbon Modernity, Log 47

**SOHO REP: THE ACTS OF
LIVING, PERFORMING AND
REUSING**

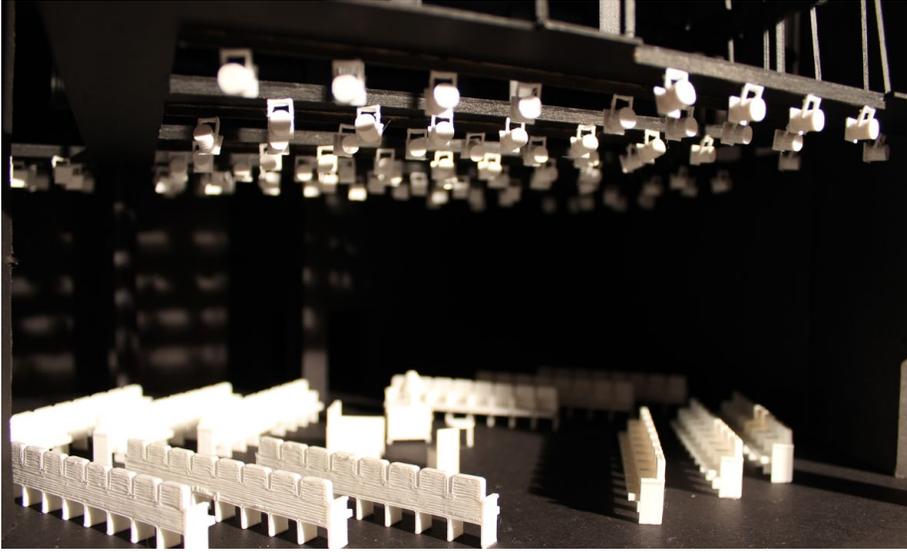
Instructors: Florian Idenburg &
Karilyn Johannesen

Team: Karisma Dev

Date: Fall 2021

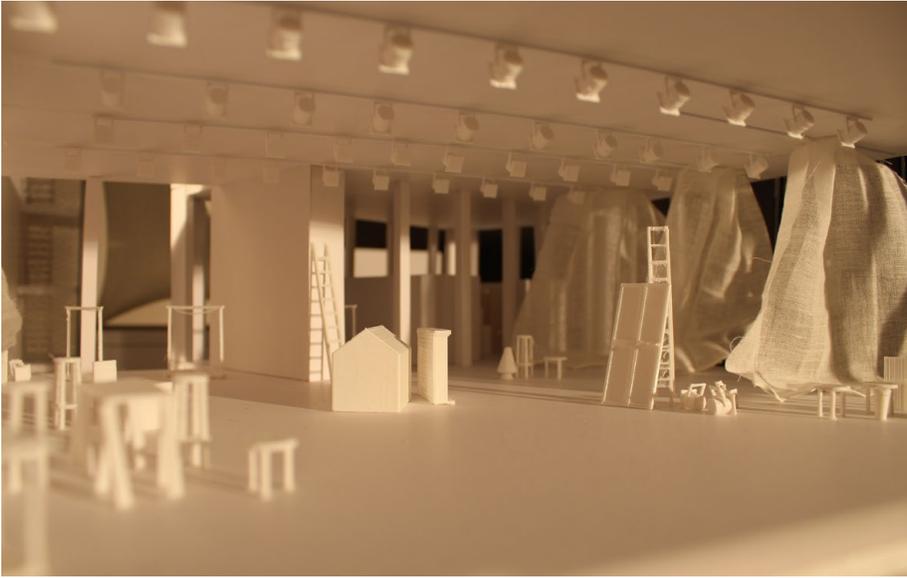
This design studio responds to New York City's Soho Repertory Theatre's need for a new performance and production space, located in the Fort Greene neighborhood of Brooklyn. In addition to the required black-box theatre and artist-in-residence house, this proposal incorporates an integrated network of reuse between theatres in Brooklyn while strategically creating spatial catalog of waste throughout the neighborhood for actors, directors, writers, visitors and community members to engage with.





“Soho Rep. provides radical theater makers with productions of the highest caliber and tailor-made development at key junctures in their artistic practice. We elevate artists as thought leaders and citizens who change the field and society. Artistic autonomy is paramount at Soho Rep.—we encourage an unmediated connection between artists and audiences to create a springboard for transformation and rich civic life beyond the walls of our small theater.”

SOHO Rep, Project Client



BIBLIOGRAPHY

The American Institute of Architects. Design for Adaptability, Deconstruction, and Reuse. The American Institute of Architects. <<https://www.aia.org/resources/6282663-design-for-adaptability-deconstruction-and>>.

Benjamin, David. YAP 2014 Winner: Hy-Fi by The Living. MoMA, 2014. <<https://www.moma.org/slideshows/74/0>>.

California, State of. CalRecycle Internet Home Page. CalRecycle Home Page. <<http://www.calrecycle.ca.gov/>>.

Cornell Atkinson Center for Sustainability. Cornell University, December 18, 1970. <<https://www.atkinson.cornell.edu/>>.

Chang, David, and Morgan Neville. The Next Thing You Eat: Burgers - Balanced Diet. Hulu, 2021.

Closing the Loop through Design and Engineering. Circular Construction Lab at Cornell AAP. Cornell University. <<http://ccl.aap.cornell.edu/>>.

de Krieger, Jos. Architecture That Sees Beauty in Waste | Jos De Krieger | TEDxChristchurch. Architecture That Sees Beauty in Waste. TEDx, 2016. <https://www.youtube.com/watch?v=j3_ILj5I_7I>.

de Krieger, Jos. Architecture That Sees Beauty in Waste | Jos De Krieger | TEDxChristchurch. Architecture That Sees Beauty in Waste. TEDx, 2016. <https://www.youtube.com/watch?v=j3_lj5l_7l>.

Dent, Andrew. To Eliminate Waste, We Need to Rediscover Thrift | Andrew Dent. To Eliminate Waste, We Need to Rediscover Thrift .TED , 2018. <https://www.youtube.com/watch?v=kZP8Kqr_bcw>.

Eisenman, Peter. Project or Practice?. YouTube. Syracuse University, 2013. <<https://www.youtube.com/watch?v=TnyJRYuhHU>>.

Institute for Sustainable Infrastructure. Envision: Sustainable Infrastructure Framework Guidance Manual. Third Editioned. Washington DC: Institute for Sustainable Infrastructure, 2018.

Klein, Naomi. This Changes Everything: Capitalism vs. the Climate. Toronto: CNIB, 2015.

Koolhaas, Rem, and Bruce Mau. S, M, L, XL. New York: Monacelli Press, 1998.

Morgan, Morris Hicky, and Vitruvius Pollio. Vitruvius, The Ten Books on Architecture. Nabu Press, 2010.

Solidpixels., <https://www.solidpixels.net>. Home. reSITE. Shared Cities: Creative Momentum. <<https://www.resite.org/>>.

Wallace-Wells, David. The Uninhabitable Earth: Life After Warming. New York: Tim Duggan Books, 2019.



