THE ETHICAL IMPERATIVE

106TH ANNUAL MEETING

DENVER, COLORADO

CO-CHAIRS

AMIR AMERI

REBECCA O'NEAL DAGG

PROJECT PROCEEDINGS

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Conference Description

In its material, cultural, and economic effects, architecture poses essential and unavoidable ethical quandaries and challenges. In its performative capacity to express ideology, architecture is inexorably entangled in questions of power and legitimation. As part of an interconnected global economic infrastructure that consumes natural resources at an alarming rate, architecture raises new and pressing questions with which educators, practitioners, and students must engage.

Given that there is an infinitely ethical dimension to every aspect of architecture, the 106th ACSA Annual Meeting will seek to solicit wide reflection on the ethical challenges of architecture in a world in flux.

Architecture as practice and as discipline and pedagogy struggles to solve problems and to advance culture. Within this struggle the discipline faces an ambiguity of values and agenda. The relationship between these two purposes, problem solving and cultural advancement, often exists as a rift, a great chasm filled with nuanced dilemmas related to ethics and power.

Join us for the ACSA Annual Meeting in Denver 2018 to engage these and other fundamental questions that face educators across the curriculum.

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ARCHITECTURE IN AN EXPANDED FIELD

Plateau: Reactivating Ground in the Damour Plains

CARLA ARAMOUNY
American University of Beirut

NADA BORGI
American University of Beirut

SANDRA AL RISHANI
American University of Beirut

In 2016, a controversial competition was launched by the Lebanese Order of Engineers and Architects, on a land purchased in the coastal town of Damour south of Beirut. The lot, historically an agricultural field of banana plantations fertile with the nearby Damour River, is a contested agricultural plain, involving a planned but unutilized transit line and a stretch of public sandy beach that is slowly being privatized. The area embodies a seafront and suburb in uncontrolled mutation. The banana fields and public domain are slowly disappearing and instead high-end gated resorts are being developed. A higher allowable built-up area in this zone is also radically changing its fabric.
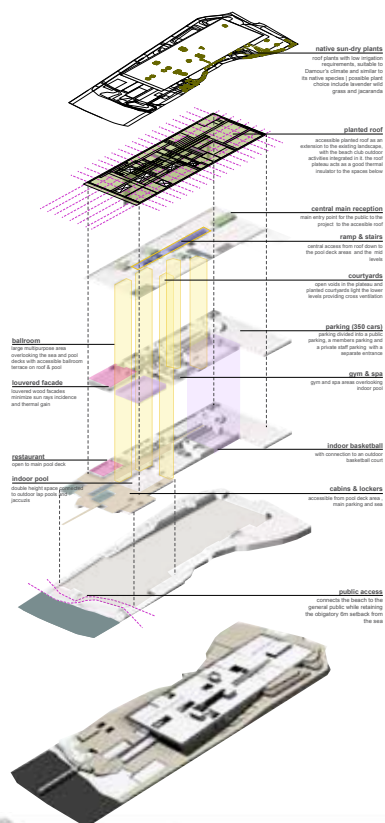
The competition called for the design of a private clubhouse for the Order's members, ignoring the impending controversies surrounding the site. The local code generally ensures the preservation of any existing trees on site, however the land had been intentionally and illegally stripped of its plantations in unknown circumstances. Our approach was clear: we had to make a counter statement against this loss of biodiversity, one that positions the Order of Engineers and Architects as a key advocate for ecological preservation and public space, critiquing their effectively controversial endeavor as implicated by their competition's brief.

We were interested thus in revoking the missing fields by recreating a single terrain that houses all needed functions underneath it, while supplanting the site with its natural cover. Similarly, we sought to regain the public access to the beach, allowing longitudinal and lateral connectivity on the site.

Our winning scheme, Plateau, is designed as a raised planted platform, integrating with the natural sloped terrain at three edges, and incorporating the various outdoor activities of the clubhouse on its roof. This architectural strategy creates a habitable and cultivated mat building, allowing a visual and physical connection from the larger urban context to the sea. A central circulation spine cuts through the building linking the upper level ground entrance to the lower beach levels. A lateral passageway below the main pool decks creates a horizontal link for the public beach, working against the privatization aim of the original brief. The spaces of transition between the multiple levels and the open courtyards linking to the indoor programs, bring forth connectivity and potential encounters. Various circulation spines, slow and fast, horizontal and vertical in between the natural landscape patches, allow the roof to be a vital entity in the life of the building and the ecology of the area.

The design also brings together various strategies that reduce the impact of the project on the environment and its energy consumption by means of passive and active methods. It attempts to be harmonious with the natural features, and to benefit from integrating the construction within the insulating ground. It enforces the use of locally sourced materials and native plant species, and ensures good climatic conditions within the indoor spaces, by maximizing light and cross ventilation through the courtyards and access spines.

native sun-dry plants
roof plants with low irrigation requirements, suitable to Damour's climate and similar to its native species | possible plant choice include lavender wild grass and jacaranda

planted roof
accessible planted roof as an extension to the existing landscape, with the beach club outdoor activities integrated in it. the roof plateau acts as a good thermal insulator to the spaces below

central main reception
main entry point for the public to the project to the accessible roof

ramp & stairs
central access from roof down to the pool deck areas and the mid levels

courtyards
open voids in the plateau and planted courtyards light the lower levels providing cross ventilation

ballroom
large multipurpose area overlooking the sea and pool decks with accessible ballroom terrace on roof & pool

parking (350 cars)
parking divided into a public parking, a members parking and a private staff parking with a separate entrance

louvered facade
louvered wood facades minimize sun rays incidence and thermal gain

gym & spa
gym and spa areas overlooking indoor pool

restaurant
open to main pool deck

indoor basketball
with connection to an outdoor basketball court

indoor pool
double height space open to outdoor lap pool and jacuzzi

cabins & lockers
accessible from pool deck area, main parking and sea

public access
connects the beach to the general public while retaining the obligatory 6m setback from the sea

section AA scale 1/400

section BB scale 1/400

PLATEAU
/pləˈtoʊ/ or /ˈplætoʊ/

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Megalith: A Deterrent

JEAN JAMINET
Kent State University

RICHARD DEMPSEY
Lightroom Studio

ZACH BEALE
Handel Architects

LANDMARKERS FOR A NUCLEAR WASTE ISOLATION SITE

A landmark that circumvents consciousness and compels physiological and instinctive responses evades the communication barriers associated with inevitable loss of meaning.

INTRODUCTION

This project proposes landmarkers for a nuclear waste isolation site east of Carlsbad in the desert of New Mexico. Beneath this site lie millions of barrels of radioactive waste, which are required to remain undisturbed for the duration of a ten-thousand-year decay process. As an alternative approach to the monument-meaning problem in architecture, the proposed landmarkers avoid the tendency to assert meaning through immediately consumable metaphors or simple singular associations, instead retain their mysterious character over time and evade total comprehension.

Megalith is a foreboding field of wind-driven subsonic stelae. The shapes of the stelae have no explicit historic reference, aside from the inclination to stand large stones upright, marking the ground for different reasons. For millennia, these mysterious monuments have provoked the proliferation of innumerable and incredible conception-myths ranging from prehistoric societies to medieval magicians and even alien races. This tendency works in favor of the nuclear waste isolation site, as it has in the past, as a warning beacon or marker of death, where speculation about place and function are continually reproduced.

STELAE & SARCOPHAGUS

The stelae are cast in magnesium phosphate concrete, giving them a dull metallic luster, and helping to prolong their lifespan. Contoured voids within the masses capture and distort prevailing winds, creating harmonic resonance chambers that emit variable resonant and dissonant vibrations at 19 hertz, colloquially known as the "fear frequency." Density of the field and harmonics of the chambers intensify from the perimeter of the site inward. At lower concentrations, the field provokes subtle apprehensiveness and significant reflection at the

periphery. Intensification and incongruence of these stimuli deter interlopers, creating an uninhabitable void at the center of the site for the duration of the decay process.

The buildings at the center of the site, containing access shafts to the waste storage vaults, are covered with a new structural skin. This sarcophagus, adopting a term from the analogous Chernobyl site, is sheathed in a synthetic sapphire mirror to resist scratching from windblown sand. The facade is imagined as an incredibly low-tech Klingon cloaking device that confounds the ideas of literal and phenomenal transparency. Its platonic form removes architectural registration and human scale from the buildings. The filleted edges and reflective qualities of the mirrored panels distort its surroundings, creating a material indeterminacy intended to further conceal its reality.

PETRIFICATION

In this alternate reality, structures are worn by environmental exposure and age, viewed in an abandoned state much further into the future or possibly following a mass-extinction event. The atmospheric amplification of the site along with speculative sensory reception of the structures provoke a curated experience of irrational fear and subjective petrification. This static, yet irritated, state of the subject challenges the hegemony of movement or dislocation that have previously characterized its dubious relation to the architectural object. The physiognomy of this site elicits a tangible cultural resonance, where local folklore and legends of place continually replenish meaning over time.
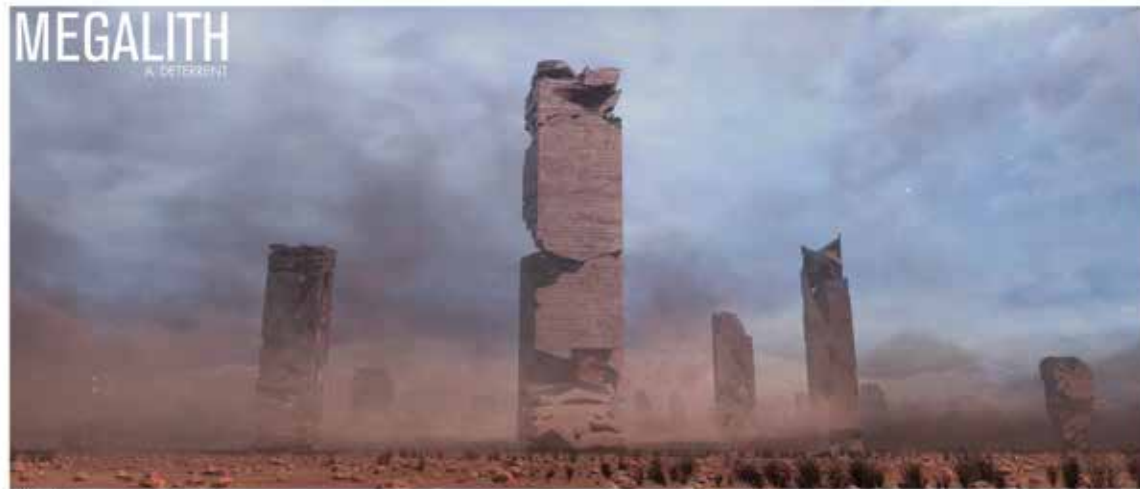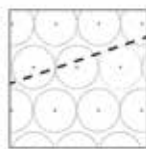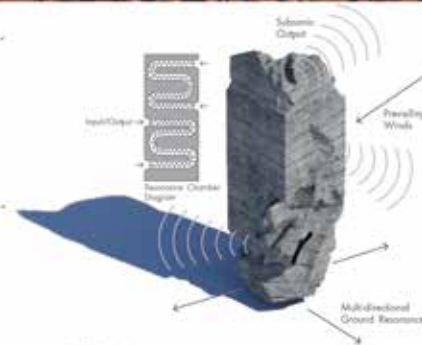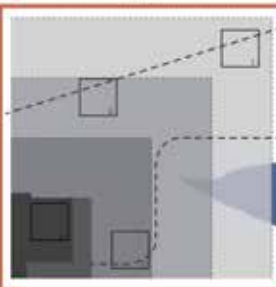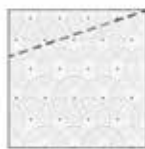
Stelae Field

Stela Detail
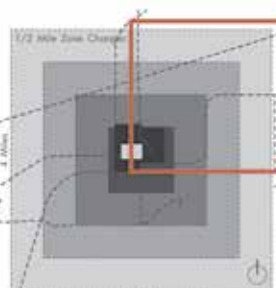
Stela View
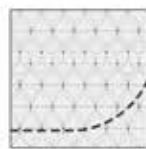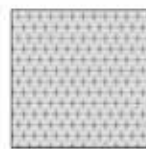
Stelae Field and Sarcophagus
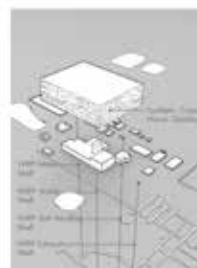
Sarcophagus Exploded Axonometric
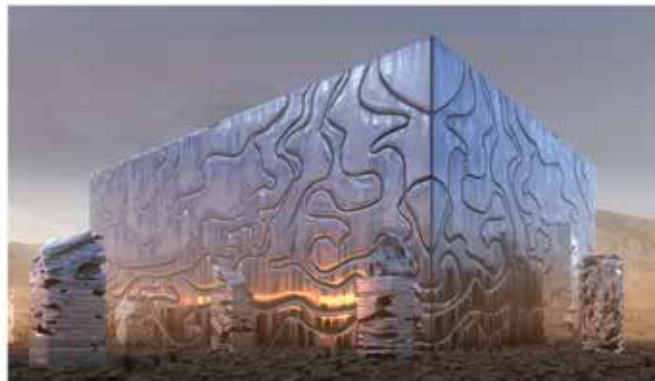
Stela Elevation

The P.I.G. (Philmont Icarian Guild)

JULIA SEDLOCK
Cosmo Design

MARK RONWTREE
Cosmo Design Factory

Like many small towns in post-industrial America, Philmont, NY is a collection of subsidized housing, empty storefronts and residents dependent on welfare benefits, burdened by drug addiction and rapt in nostalgic longing to be great again. And like similar towns, the flipside of Philmont's darkness bares a hidden magic -- underground sluices, secret passages, a labyrinth, ruins, a waterfall, a manmade lake with a vortex, bald eagles, and snapping turtles – in a network of abandoned industrial infrastructure and an ecosystem of creatures that have claimed it as their own.

Located two hours north of New York City, Philmont is at the heart of a rapidly gentrifying agricultural community that benefits from city dwellers who retreat here to enjoy a simpler life of farmer's markets and butcher's shops. Despite proximity to resources and investors, the visibility of its poverty has prolonged Philmont's economic recovery, preventing the kind of gentrification that alienates and displaces the most vulnerable of residents. In the meantime, a local grassroots organization, has worked to establish Philmont as a Brownfield Opportunity Area (B.O.A.), funding a comprehensive economic redevelopment plan that will open up future opportunities for projects within the village, including the restoration of its 50 acre reservoir that once powered 15 knitting mills within the village.

Our proposal for the Philmont Icarian Guild (The P.I.G.) is a radically inclusive ideas incubator that will serve as one of several major nodes in the B.O.A. redevelopment plan. In the context of the village plan, the P.I.G. will exist as a dispersed campus of various sized buildings that plugs into the existing framework of historic industrial infrastructure. The largest is a 4000 square foot structure that will house workshops, gallery, retail units and affordable housing units. A neighboring building will provide additional office space and housing. Smaller kiosks will be located on a nearby lake-front property for programming such as a fish and chips shack, a golf cart and boat rental, and a laundry station. The purpose of these smaller kiosks in the context of the P.I.G.'s larger mission is to provide recreational amenities at a scale that can be supported by the existing village economy, as well as flexible job opportunities for local residents in the process of re-entry following rehabilitation and incarceration.

The P.I.G. experiments with a new model of business development and job training, where the group absorbs risks and shares rewards typically associated with individual innovation and entrepreneurship. Linked to existing initiatives within the village and around the country, the P.I.G. is a new form of community institution, operating with a zero-barrier entry policy, open to anybody with an idea and the ambition to make it real. By providing judgment-free workspace, technical support, mentorship and skills training, the P.I.G. offers its members agency and opportunity in a rural community where both are scarce. To behave like Icarus might appear rash or foolhardy, but the willingness to fly too close to the sun without fear of failure is priceless.

The P.I.G.
(Philmont Icarian Guild)

The P.I.G.
(Philmont Icarian Guild)

Ⓐ **Main Building**, 4 Ellsworth Street	Ⓓ **Berkshire Bike Rack**, 9 Ark Street
Ⓑ **Annex Building**, 8 Ellsworth Street	Ⓔ **Klaverack Kayaks**, 9 Ark Street
Ⓒ **Edith & Viv's Fish & Chips**, 9 Ark Street	Ⓕ **Community Clothesline Laundrette**, 9 Ark Street

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F22 Foto Space

JASON F. CARLOW
American University of Sharjah

Located within adjoining floors of an office tower above the bustling streets of the Causeway Bay district in Hong Kong, the F22 Foto Space is a gallery and cultural hub for the exhibition and incubation of photography and design. The gallery is a less formal extension of the F11 Photography Museum, located a few minutes away in the Happy Valley neighborhood of Hong Kong. By comparison to the global scope of the F11 Museum, F22 is meant to promote young, local photographers and artists from the Hong Kong and East Asian region. The brief for the space included a flexible event and gallery space, a small bookshop, office space for curators, a climate controlled photo archive room, a social space for staff and a conference room and lounge for meetings and events. The project is an interior design for the adaptive reuse of a former night club and commercial office space.

The focal points of the design include a circular stair that connects the two floors of gallery space and a rotating entry door in the form of a camera lens. The design team worked closely with engineers to remove a large section of the existing concrete floor plate and translate camera components into structural elements. The stair features a structural balustrade that hangs from a reinforced plate in the ceiling above. The twisting bars of the balustrade create transparency through the staircase and elegantly curve inward to blend into each of the stair treads. The base of stair is inscribed with a pattern that references a camera shutter mechanism and the details and mechanical connections of the stair are also modeled on the parts of a Leica camera body. Inspired by camera aperture, the circular staircase plays with light, shadow and speed. The overall structure creates a play between transparency and opaqueness that evokes the medium of photography and creates a unique backdrop for events.

To create a cinematic entrance, the design team studied camera development and used design elements from various generations of camera lenses to design the door. The aperture in the ceiling above the door is a lighting feature that controls the amount of light at the entrance space. Like early camera bodies and lenses, the spiral stair and entry door are fabricated from brass and then painted with black. Like vintage cameras, over time the black paint will wear off, revealing the brass underneath.

Other notable features of the space include a sleek bookshop that disappears behind a display wall, display screens and lighting integrated into the ceiling coffers. An espresso bar named Café 22 offers a gathering place for informal visits and a meeting point for cultural activities. The two galleries on upper and lower levels are designed in black and white, forming a dialogue between the two floors.

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Desert House

HANS PETER TURSACK
University of Michigan

The formal argument of the Desert House project begins with a cube conceptualized as a flat, unfolded box, composed of six, two-dimensional surfaces. Each surface is structured with a grid, and understood as a graphic problem. Taking a cue from Swiss Modernist graphic design manuals, the surfaces of the box are cast as improvisatory games where particulate elements are distributed within the bounds of a sixteen or nine-square grid. Four drawings, nine elevation studies, two furniture elements and a short pamphlet construct a visual narrative around the design at different scales and levels of resolution.

The aesthetic program of the house is situated within a historical, formalist discourse exploring the relationship between painting or graphic problems, architectural surfaces, and tectonics. The narrative begins with the collapse of hard-edged, geometric painting and Modernist architecture through the De Stijl discovery of the "screen" as a primary or base compositional element in the conception of three-dimensional form. The Postwar neo-avant garde took this problem as the foundation of their gestaltist investigations of complex elevation logics and striated spaces in plan. The ambition of the formal language embedded in the Desert House is to offer an elaboration or extension of these theories catered to the speed, surface-centric material sensibilities and graphic, hyper-flatness that characterize a more contemporary elevation sensibility.

The site is an experiment with a loose, but finite grammar of objects, architectural elements, and graphic fragments distributed in a (primarily) plan-based matrix. Ambiguous in scale and program, different iterations recall game-board layouts, athletic fields, and vacant stage sets. The site also embraces the semantically charged obstacle course-gardens or "complexes" developed by Post-Minimal sculptors like Alice Aycock, Nancy Holt, Mary Miss and Robert Morris as a formal type. Like the complexes of that era, the compositions that make up Graphic Fields are open-ended aggregations of overlapping visual systems; movements between structure and informality suggests growth and change.

DESERT HOUSE

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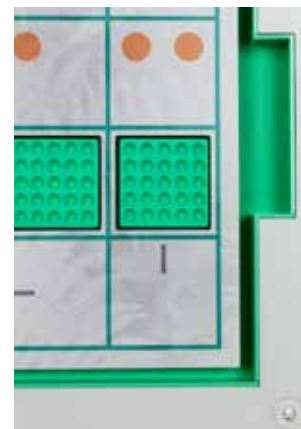PARALLEL PROJECTION RENDERING IN CUSTOM LIGHTBOX

ELEVATION AND PARALLEL PROJECTION RENDERINGS

NINE SQUARE ELEVATION / PANEL STUDIES

PANEL DETAILS

The site is an experiment with a loose, but finite grammar of objects, architectural elements, and graphic fragments distributed in a (primarily) plan-based matrix. Ambiguous in scale and program, different iterations recall game-board layouts, athletic fields, and vacant stage sets. The site also embraces the semantically charged obstacle course-gardens or "complexes" developed by Post-Minimal sculptors like Alice Aycock, Nancy Holt, Mary Miss and Robert Morris as a formal type. Like the complexes of that era, the compositions that make up Graphic Fields are open-ended aggregations of overlapping visual systems; movements between structure and informality suggests growth and change.

Mass-Customized Longboard: Mass Customization and Identity in Skate Culture

BRIAN KELLY

University of Nebraska-Lincoln

"Unlike mechanical making, digital making is rarely matrix-based, hence using file to factory digital technologies is theoretically possible to mass produce variations, within limits, at no extra cost. As we know, digital file to factory technologies offer no economies of scale; the unit cost of the first item in a series is the same as the unit cost of all subsequent ones, whether they be identical or all different."[1]

–Mario Carpo, The Second Digital Turn; Design Beyond Intelligence

Prior to the development of the architect proper in the late 1500's and early 1600's, authorship was a shared condition. The Medieval construction of Gothic cathedrals, for example, was executed over several years and saw many people making decisions with regards its construction. The rise in a desire for ownership, recognition, and compensation paralleled in other disciplines seeking copyright ownership (ie. literature) translated to architecture as part of the development of the profession. In the case of architecture, the architect became a single author credited for all compositional decisions much like a painter to a master work. Fast forward to the end of the 20th century, the open design movement celebrated shared authorship most notably in software development. The Linux operating system, initially authored by Linus Torvalds, was later refined by a much larger group through open-source design approaches as source codes were shared and suggested changes were reviewed and accepted by the community at large. The open design movement has arrived in architecture and is challenging the trajectory of future professional practice.
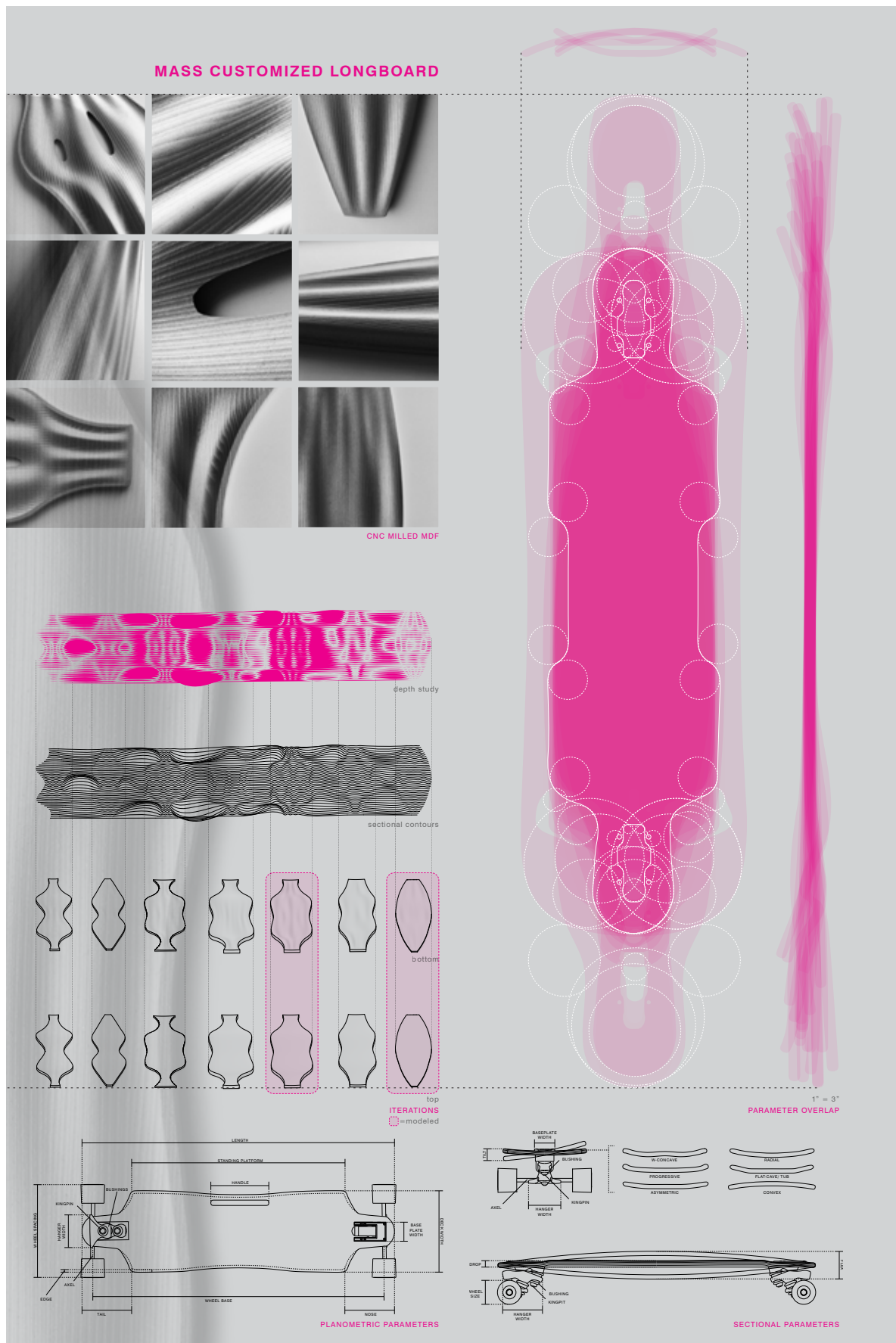
In the culture of skateboarding, identity is critical. Moves are mimicked, and subsequently owned through slight variations in the technique or style. The ability to offer a new spin on existing tricks is ingrained into the DNA of the skater. Identity is communicated by several means (clothes, music, tattoos, etc.) but can also be seen through the bottom surface of the skate deck which is often filled with stickers communicating preferences and opinions. As well, this surface acts as bragging rights exhibiting battle scars of countless attempted tricks which leave imperfections in the surface leading to structural failure. The desire for identity and the varied surface conditions of the bottom surface became a point of departure for an investigation into shared authorship in the design of a longboard.

Ongoing design investigations are working through the ability for a mass-customized parametric definition which can be altered through a simple online interface. This interaction, controlled in its degree of variation to not offer solutions which might sacrifice structural integrity, creates a unique shape and surface which is CNC milled from of vertical laminated recycled hardwood. This research proposes user engagement with smart parameters offering shared authorship between the designer and user. With the longboard seen as a microcosm of architecture due to its compositional and performative requirements, this research is moving into the design of mass-customized architectural proposals offering shared authorship opportunities in the design process.

ENDNOTE

1. Mario Carpo. The Second Digital Turn: Design Beyond Intelligence. Cambridge: The MIT Press, 2017.

MASS CUSTOMIZED LONGBOARD

CNC MILLED MDF

depth study

sectional contours

bottom

top

ITERATIONS

=modeled

1" = 3"

PARAMETER OVERLAP

PLANOMETRIC PARAMETERS

LENGTH

STANDING PLATFORM

HANDLE

BUSHINGS

KINGPIN

WHEEL BASE

HANGER WIDTH

BASE PLATE WIDTH

BASE WIDTH

EDGE

AXEL

TAIL

WHEEL BASE

NOSE

SECTIONAL PARAMETERS

BASEPLATE WIDTH

BUSHING

AXEL

HANGER WIDTH

KINGPIN

W-CONCAVE

PROGRESSIVE

ASYMMETRIC

RADIAL

FLAT-CAVE/ TUB

CONVEX

DROP

WHEEL SIZE

BUSHING

KINGFIT

HANGER WIDTH

Architecture as Performing Art: Puddin' and the Grumble

PETER OLSHAVSKY
University of Nebraska-Lincoln

Architecture as a performing art was the focus of a second-year architecture studio project that enabled students to design, construct 1:1 prototypes, and fabricate inflatable elements for a play: Puddin' and the Grumble. The project was an interdisciplinary collaboration that situated beginning design students in a creatively risky setting at the junction of introductory architectural knowledge, knowledge creation (research), and multiple communities beyond the traditional design studio.

Puddin' and the Grumble is a play that examines issues surrounding childhood hunger and food insecurity (approximately 19% of children in our university's county experience these issues and 15.8 million nationally). The play tells the story of a 10-year-old girl whose mother works a day and night job. Needing to live with her grandma, Puddin' misses her mother, struggles with 5th grade math, and feels as empty as her stomach. Added to this she's being followed by the Grumble, an obnoxious creature symbolizing her hunger. Written by Becky Boesen and David Von Kampen. Inspired by the kids of the Clinton Elementary Creative Club. Commissioned and produced by the Lied Center for Performing Arts, it was created by Becky Boesen and Petra Wahlqvist as part of the GROW A SHOW program in collaboration with ASCAP in Los Angeles, the Lincoln Food Bank, the College of Fine and Performing Arts, and the second-year architecture students in the College of Architecture.

The project was truly collaborative. The script, music, and actions informed the conception, development, and realization of the architectural elements and vice-versa. For the studio's deliverables, the students were required to generate a research pamphlet (summarizing their findings), drawings (from process to scalar documents), models, 1:1 prototypes for proof of concept, and the final working elements at 1:1 scale that were used on stage. Not only did the students have to consider all of the structural, material and logistical issues of their work but also they had to responsibly engage with larger communities (kids, audience, etc.) that demanded ethical and social consideration.

ARCHITECTURE AS PERFORMING ART
PUDDIN' AND THE GRUMBLE

Transforming a 'Non-Place' Through 'Architecture as Landscape'

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STHANIK Consultants

SUVRO SOVON CHOWDHURY
STHANIK Consultants

Dhaka, because of its alarming population density, limited land area and unplanned developments, faces challenge to posit an alternative approach towards designing urban space, which may eventually manifest into a resilient city. Through the design of 'Architecture as Landscape' an effort was made to transform a leftover open space situated within a zone of historic, cultural and political significance into a 'place' for the 'people' where the 'Genius Loci' itself directed the design elements. The approach that integrates nature and the urbanites will be discussed focusing on the architectural interventions to offer interactive public space. The project dealt with design ideas, considerations and strategies intertwined with challenges due to constrained budget. The 'site' itself being located at the heart of Dhaka city, witnessed the major movements in course of the history of Bangladesh. The project unified not only the surrounding disintegrated built forms but also the tangible and intangible aspects of the people. The approach as mentioned is based on two basic principles; Recollecting the Spirit of the Place and Revisiting the Spirit of the People. Focus has been given on enhancing the latent possibilities of the 'non-place' itself by a deliberate design strategy of evolving the ultimate landscape formation from on-site design decisions responding to its immediate surrounding structures of cultural, historic and programmatic significance as well as existing trees.

Before commissioning the architects, the initial intention of client was to 'beautify' the unused site by conventional means of adding flower bearing plants, lights and paved pedestrian pathway(s). Later a more holistic idea was thought out to convert the site through an approach of place-making with the intention of creating a public place to promote healthy environment to the users. Infusion of utilitarian features and functions were new introduction to the place which demanded speculations and analysis on user profile, activity pattern and scale of usage. A combination of Semiotics and Technical approach ensures a sustainable scenario both in aesthetic and usability. The site was devoid of definition, lacking in pattern of usability and apparently absent as an urban space inspite of its accessibility and permeability. The constraints had manifolds which were to be dealt with two definitions Semiological and Technical. Semiological definition described about the 'idea' of that space to be transformed and the conception behind the phenomenological experiences of that space will contain. Technical aspects were about the material selection, sustainability of the aesthetic, providing service facilities, all those criteria for an urban space.

Addressing Culture, Climate and Ecology, the approach emerges from the efforts of establishing positive feedbacks to the city fabric rather than just to fit into the existing unplanned growth. Ever since the project has been opened for public the once unattended and insignificant open space started catering as a meeting place for the students, faculties and other users of the University Campus. By transforming a 'non-place' into a 'place' for contemplation, this project offers the citizen of Dhaka City the much needed existential experience.

Keywords: Landscape, Place, Non-Place, Existential Experience

Transforming a 'Non-Place' through Architecture as Landscape

Spirit of the 'Place' > Spirit of the 'People' > Spirit of the 'Time'
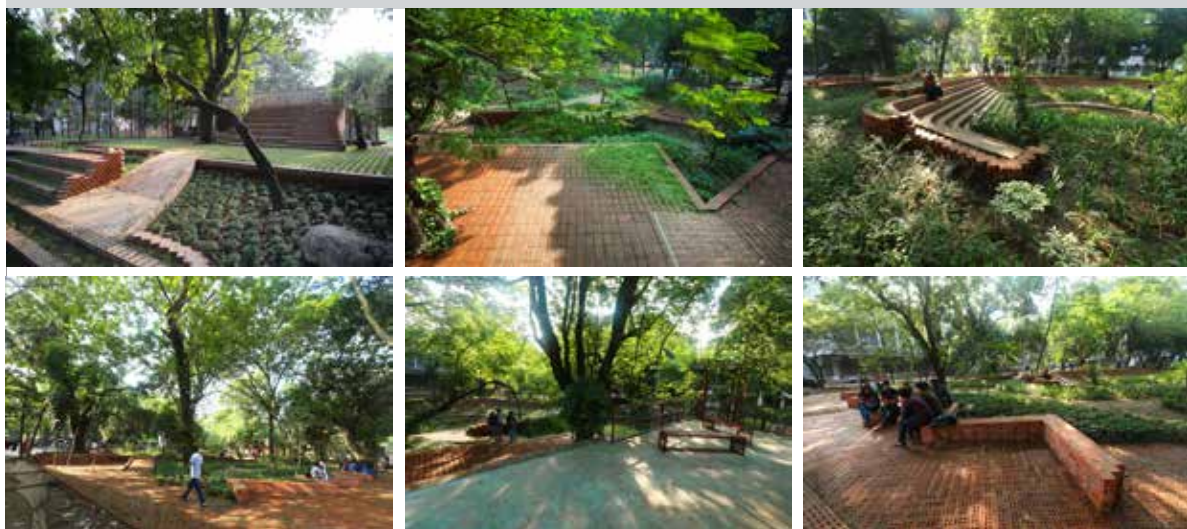
Slow Waste: Wood Pallets in the Expanded Field

LEONARD D. YUI
Roger Williams University

"Materials are reintroduced after use into the process of assimilation, filtration, storage, and production to continue their roles in nature's cycles."

–John T. Lyle

This project expands pallet use by slowing its waste process to serve non-human entities and functions. The work draws inspiration from the discipline of forest science to allow wood to perform more diverse ecological functions, such as water storage, soil retention, sheltering and perching to name a few. Other wood materials include wood floors from a recently renovated mill (estimated at 150 yrs old), large paper tubes, scrap wood and paper. The wildflowers serve both human and non-human entities, but with a particular aim to challenge and share with the public a more ecological configuration between familiar urban wood elements and more nuanced ecological processes.

Pallets are part of a fast-paced urban society, and its production, use and waste aims to sustain reductive tasks to benefit the human condition. Yet, as this project considers, the systems of resource and waste are fundamentally tied to the ecological world that profit from slower temporal transitions and processes. Movements toward "slow food" and "slowing stormwater" are part of a growing agenda to restore a dialog between people and ecology, but still remains largely undervalued. This design project considers how waste too could take advantage of these perspectives by extending decay for the benefit of an ecological habitat as well as human delight.

Waste materials like pallets are often expedited from place to place and more significantly from form to form. It is estimated that 4 billion pallets are in circulation every day in the U.S. and there is increasing effort to recycle or to repurpose these materials.[1] However, the process and method are limited, with 75% of the repurposed materials either being turned into mulch or fuel.[2] Statistics like these show how pallets are simplified and hastened in its return to the environment.

The etymological root of "waste" embodies the concept of "abandonment" or "to leave," which implies a boundary between the human loci and where waste ends up. Even when we try to circumvent this in-between world by reusing or repurposing materials to more ecological systems, they are often narrowly interpreted as carbon storage, energy, and/or nutrients. Privileging certain ecological processes that suit large-scale industrial processes are reducing whole materials into their parts prematurely. In opposition, this project demonstrates a more direct ecologically driven response by including more diverse, open-ended reuse of pallet materials by all species - it celebrates maturation.

ENDNOTES

1. Buehlmann, U., Araman, P., & Bush, R. (2010). Pallet re-use and recycling saves high value material from landfills. Engagement Matters 2(1):8,10, US. Forest Service, Southern Research Station.

2. Araman, P. (2012). "Wood Pallets – An Important U.S. Industrial Product." Presented at 2nd Biennial International Conference on Processing Technologies for the Biobased Products Industries, November 7th, 2012, St Simons Island, Georgia, 69.

PALLETS IN THE EXPANDED FIELD

ASSOCIATION OF COLLEGIATE SCHOOLS OF ARCHITECTURE 2018, DENVER, COLORADO · PROJECT "ARCHITECTURE IN THE EXPANDED FIELD, FROM INTERIORS TO LANDSCAPES"

40"x 48" typical pallet

PALLETS LUBRICATE URBAN INDUSTRY AND COMMERCE. GROCERIES, BUILDING MATERIALS, AND MECHANDISE OF ALL SORTS ARE SHIPPED AND TRANSPORTED ON THIS ESSENTIAL, BUT LARGELY INVISIBLE TOOL. BOTH ITS END OF LIFE AND ITS DIVERSION FROM "WASTE" TO REUSE HAVE LARGELY BEEN SHAPED BY AND EXPEDITED FOR INDUSTRY. AND THERE LIES A QUESTION OF WHETHER MORE COULD BE DONE IF MATERIAL FUNCTIONS COULD BE EXPANDED BEYOND THE TYPICAL SUSTAINABLE ISSUES OF CARBON STORAGE, ENERGY PRODUCTION, AND NUTRIENT MAKEUP, LIKE MULCH - ONE THAT IS DETERMINED BY THE ECOLOGICAL WORLD.

THIS PROJECT EXPANDS PALLET USE BY SLOWING ITS WASTE PROCESS TO SERVE NON-HUMAN ENTITIES AND FUNCTIONS. THE WORK DRAWS INSPIRATION FROM THE DISCIPLINE OF FOREST SCIENCE TO ALLOW WOOD TO PERFORM MORE DIVERSE ECOLOGICAL FUNCTIONS, SUCH AS WATER STORAGE, SOIL RETENTION, SHELTERING AND PERCHING TO NAME A FEW. OTHER WOOD MATERIALS INCLUDE WOOD FLOORS FROM AN RECENTLY RENOVATED MILL (ESTIMATED AT 150 YRS OLD), LARGE PAPER TUBES, SCRAP WOOD AND PAPER. THE WILDFLOWERS SERVES BOTH HUMAN AND NON-HUMAN ENTITIES, BUT WITH A PARTICULAR AIM TO CHALLENGE AND SHARE WITH THE PUBLIC A MORE ECOLOGICAL CONFIGURATION BETWEEN FAMILIAR URBAN WOOD ELEMENTS AND MORE NUANCED ECOLOGICAL PROCESSES.

Foundation

Dragonfly

Solitary Bee

Wildflower

CNC/Rhino/Grasshopper

Inner Garden

Outer Garden

Summer

Fall

Fall Inner Garden

Pollinator Garden

Original Conceptual Diagram

Braided Outer Garden

150yr Old Mill Flooring
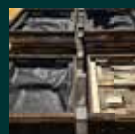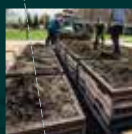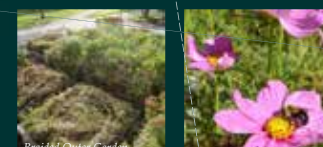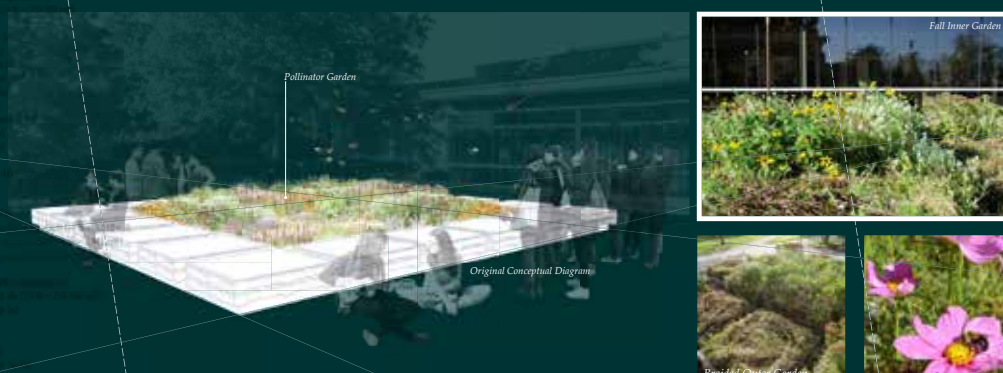
No Man's Land

EMILY GUO
University of Waterloo

Military landscapes are often seen as ecologically desolate territories with harsh and barren conditions. Yet, there is growing evidence that these volatile lands are finding a second life as animal refuges, born out of necessity under the growing effects of the Anthropocene and sixth wave of mass extinction. It is the very nature of the military landscape - weaponized, contaminated, protected - that deters regular human activity and allows this new, damaged Nature to appear. These new cyborg landscapes, where technology meets ecology, tell a story of a post-human future where new ecological relationships are formed between the military pollutants and the animals that inhabit the land. NO MAN'S LAND presents an analysis at 2 scales: the global and the local. At the global scale, an atlas provides a catalogue of sites and site conditions to offer evidence of this phenomenon. Focus then turns to the United States in recognition of their $598.5 billion military-industrial complex and their landscapes that places them at the forefront of the local investigation. At this scale, 3 case studies are presented to further illustrate these new complex relationships more intimately: Johnston Atoll, unincorporated territory (closed/abandoned); Rocky Mountain Arsenal National Wildlife Refuge, Denver (closed/reused); and Guantanamo Bay Naval Station, Cuba (active conflict). Investigative mapping and speculation puts into sharper focus the tension between human, animal, and technology. The thesis argues to re-introduce these territories back into the American vernacular as the "involuntary park" - a kind of post-humanist National Park™. Through a set of design guidelines, an overall approach to re-engage these landscapes is recommended that focuses on public engagement under the guise of "voluntourism." By leveraging human actions, a series of interventions can be implemented that further facilitate animal occupation. The thesis aims to interrogate the conflicting nature of these landscapes and question their future in an increasingly anthropocentric world.

NO MAN'S LAND
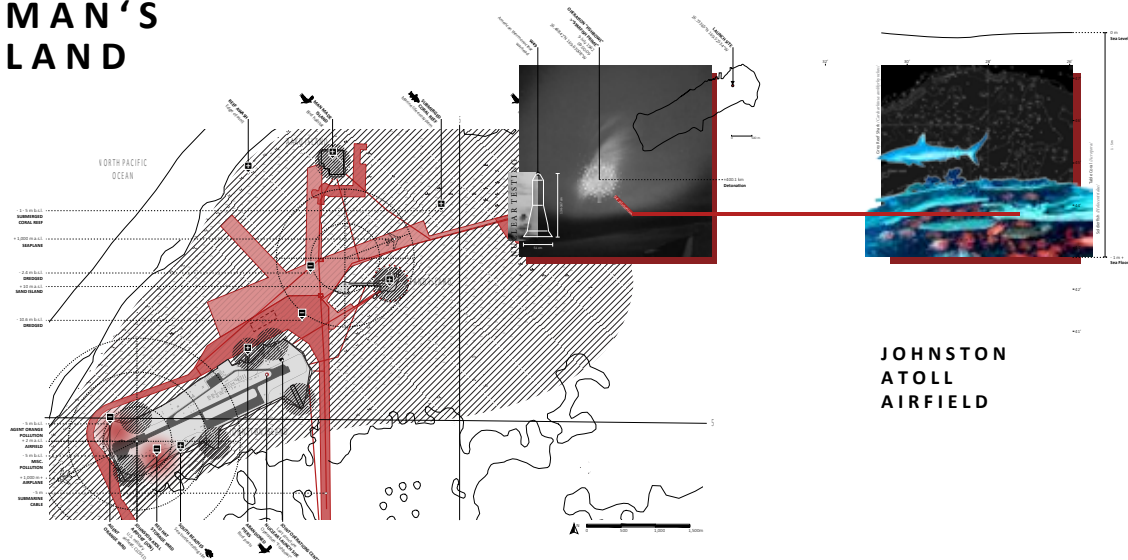
JOHNSTON ATOLL AIRFIELD
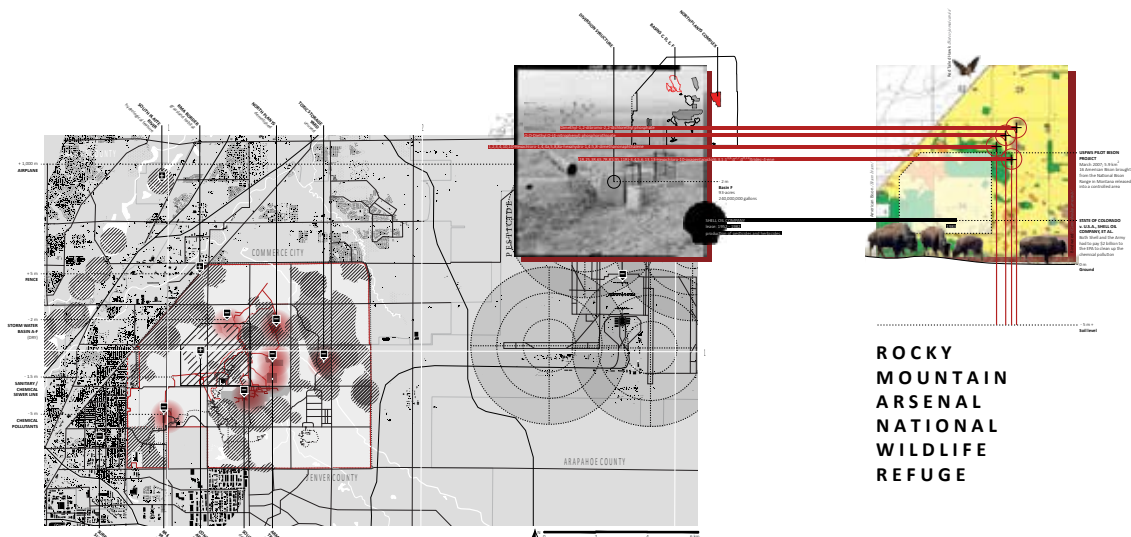
ROCKY MOUNTAIN ARSENAL NATIONAL WILDLIFE REFUGE
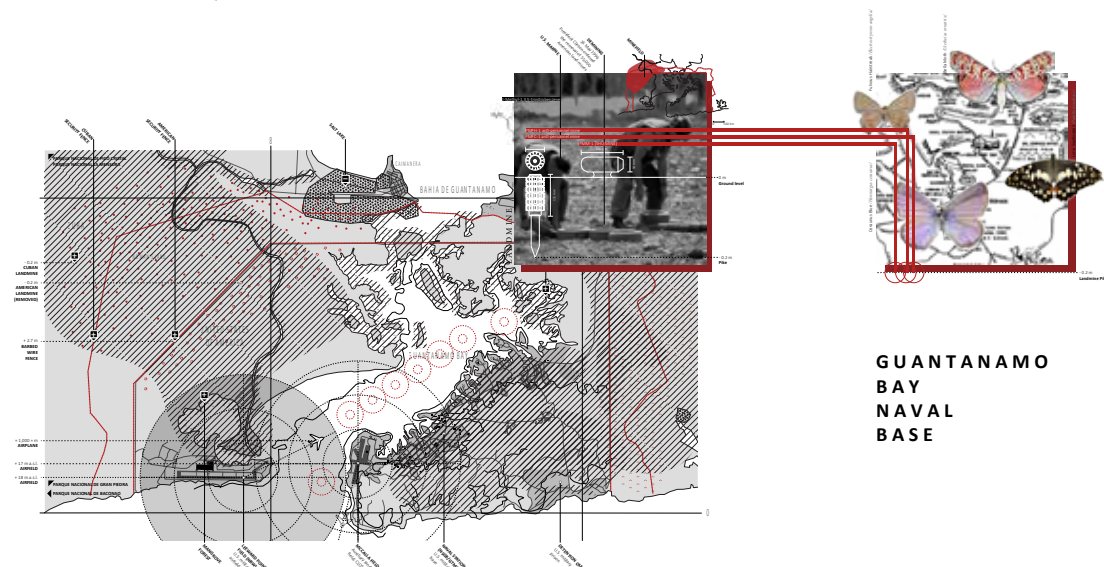
GUANTANAMO BAY NAVAL BASE

Rhizolith Island: Floating Concrete Breakwater for Mangrove Restoration

JULIE LARSEN
Syracuse University

ROGER HUBELI
Syracuse University

The project was developed in collaboration between Syracuse University Assistant Professors Roger Hubeli and Julie Larsen, and CEMEX GLOBAL R&D. Rhizolith Island is a floating, resilient coastal infrastructure that revitalizes depleting mangrove forests along vulnerable shorelines with ongoing flooding. The modular form of the elements uses advanced concrete technology to strengthen ecological performance of the island as a breakwater and reinforces appreciation of ecologies that surround and protect communities. The project is a collaboration between architects, material scientists, coastal engineers, the local government, and NGOs. Rhizolith Island aims to create a protective barrier for new mangroves to grow and thrive in deep water shorelines. As a breakwater, a collection of islands would attenuate waves through the aggregation of dozens of two-meter concrete elements. Rhizolith Island is designed for failure. The concrete elements are designed to intentionally fail and break apart over time to revert the site back to a more 'natural' state where mangroves become the prominent flood protection once again.

DESIGNING FOR FAILURE

The concrete elements last long enough to protect new mangroves as they grow but are designed to intentionally fail once the mangroves reach maturity. The island is comprised of high strength and lightweight concrete. This ensures that the elements are strong enough to be a breakwater while simultaneously working as a flotation device to keep mangrove seedlings above water until the mangrove roots moor themselves securely into the seabed. The elements are constructed of two pieces; a head and a fin. The fin is comprised of high strength; while the head is made to be light, porous, and buoyant. Together, these elements work to create a strong, buoyant structure that creates stability for mangroves to survive harsh water conditions. To ensure longevity of the mangroves, the inevitable failure of the concrete is designed to break apart naturally once mangrove roots become robust and naturally moor into the newly formed sediment below the modules. As the concrete breaks apart over time, it is trapped in the roots of the mangrove with the natural leaf litter accumulating around the fin.

MORE THAN JUST INFRASTRUCTURE

A key component to making the project viable for the City of Cartagena was to not only engineer a solution but design the forms to ensure high quality public space that people can engage with along the shoreline, above and below the water. While the faceted surfaces derive from the fabrication process, the faceted voids are introduced to encourage fish to swim and create new ecosystems below water. The holes also act as 'rakes' to catch debris and leaf litter that helps to build up sediment for the mangrove roots to moor into.

AGGREGATION INTO ISLAND AND BREAKWATER SYSTEMS

The individual elements can be singular or aggregated into clusters of two to twenty elements. They are connected together with a rope system while the heads are protected with rubber rings around the perimeter to avoid pre-mature cracking. When aggregated into clusters, the floating islands work together as a buoyant field that acts as a soft but very strong breakwater. The islands can reconfigure into varying patterns, depending on the environmental forces, site constraints, and needs of the users.

RHIZOLITH ISLAND

FLOATING CONCRETE BREAKWATER FOR MANGROVE REFORESTATION

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DRAWING SHOWING AN UNDERWATER VIEW OF ELEMENTS BEING CONNECTED BY DIVERS

SECTION 'BEFORE' - INITIAL GROWTH OF PLANTED MANGROVES

SECTION 'AFTER' - MANGROVES FULLY GROWN, ROOTS ENTANGLE BROKEN BREAKWATER

CROSS SECTION OF ISLAND ELEMENTS SHOWING POROUS CONCRETE AS GROWING MEDIUM

PLAN - AGGREGATION OF ELEMENTS INTO ONE ISLAND SEEN ABOVE WATER

AGGREGATION OF MULTIPLE ISLANDS INTO FLOATING BREAKWATER

CONCEPTUAL RENDERING OF ISLAND

BEFORE / AFTER RENDERINGS OF ISLANDS IMPLEMENTED AS BREAKWATERS ALONG COAST

PHOTOGRAPH OF FULL SCALE PROTOTYPE (APPROX. 7'X 5' X 3')

PHOTOGRAPH OF SMALL SCALE PROTOTYPE (APPROX. 1.5'X 1' X .5')

PHOTOGRAPH OF FULL SCALE ISLAND PROTOTYPE IN THE HARBOR OF CARTAGENA, COLOMBIA

Reorienting the Rural: The Great Plains Shelterbelt in an Expanded Subjective Field

ROY C. CLOUTIER
University of British Columbia

NICOLE SYLVIA
University of British Columbia

'Reorienting the Rural' is a research project that uses the climatic and economic disruptions sweeping the Great Plains as both site and pretext to re-examine how architecture conceives of order, form, and the agency of more-than-human subjects. The project appropriates and redeploys the spatial, territorial, and microclimatic logics of the original Great Plains Shelterbelt of the 1930s—reinvigorating it just as its current form reaches the limits of its ability to mediate soil moisture by lifting the wind off their fields. It centers on a speculative narrative of farmers "tightening their belts"—their Shelterbelts, that is—in response to the looming threat of a second Dust Bowl. Aggregating along an emerging Aridity Line beyond which crops lack the soil moisture to consistently grow, the new belts thicken the line into a newly-sheltered territory—while at the same time thickening the idea of what the Shelterbelt can be and do.

First, while the original Shelterbelt was aligned to the abstract order of the Jefferson Grid, the new belt is instead cued directly to the bioclimatic operations that it performs—tightening the 'Belts to better harness the wind shadow of the trees, buildings, devices, and objects that make it up. No longer confined to the edges of the grid, the belts realign to negotiate prevailing wind direction, slope, height of objects, and desired length of shadow—allowing for much more pronounced microclimatic mediation.

Second, where the original Shelterbelt was more or less entirely trees, the new belts host a variety of different uses within their open-ended spatial, legal, and microclimatic platform. These are grafted into the current monofunctional monoculture of the region—helping the farmers hedge their economic bets while also hedging their fields. Much like the wind-turbine land-leasing model that precedes them, the belts operate as a source of alternative income and sustenance—a new way to engage economies and ecologies often written out of the landscape of the Plains.

Third, where the original Shelterbelt was a singular intervention, the new belts take form as a self-sustaining process of planting, harvesting, and reorientation. Replanting is cued to measurement and realignment, allowing the belts to tighten and adjust in an ongoing way—a reflexive form of order.

In stepping into an expanded field—in the case of the Great Plains, not only figuratively but also quite literally—architecture confronts both an opportunity and the necessity to reconsider its notions of agency and subjectivity. Could architecture come to be seen less as an authorial act of will and more as a co-production between a host of forces—human and non-human, animate and inanimate alike? How might such an expanded perspective bring us closer to the everyday practices of a broader, often under-addressed set of subjects—in turn, opening new potentials and better addressing their needs? Ultimately, how might such an expanded understanding of agency in architecture allow us to operate within a broader ethical field—re-conceiving and re-deploying the tools of architecture to engage a wider array of subjects?

REORIENTING THE RURAL
THE GREAT PLAINS SHELTERBELT IN AN EXPANDED SUBJECTIVE FIELD

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The Great Plains, Ungrounded
declining Shelterbelt, advancing Aridity Line

existing 1930s Shelterbelt remnants

tightened 'Belts
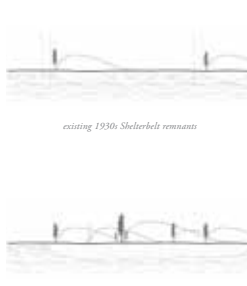
Tightening the 'Belts
from the Jefferson Grid to an evolving bioclimatic grid

Reflexive Territories
incremental transition; ongoing transformation

An Ecology of Typologies
the bioclimatic grid of the new 'Belts hosts an open, polyvalent ecology of interchangeable uses, which can be swapped in or out and reoriented over time

Constellations of the In-between: Architectural Speculations in Contested Urban Interstices

LORINC VASS
University of British Columbia

The city, far from being a physical object with a coherent view, is a complex assemblage of material and immaterial events and unfolding in space and time. Against this complexity and formlessness, the capacity of architecture is commonly located in the imposition of limits. Yet amidst an increasingly trans-disciplinary field, and in an environment of uncertainty and change, the nature of architectural intervention and its sources of agency increasingly come into question. In this questioning of spatial design practice today, the concerns of aesthetics, politics and ethics are inseparable. This is unmistakably manifest in urban conditions of interstitiality: the many overlooked, and often contested, in-between territories at large across the city. 'Constellations of the In-between' explores such marginal spaces, with an interest in the latent forms of agency found in the complex spatio-temporal topologies of material elements, social frameworks, and cultural practices.

The project comprises four architectural speculations in territories selected from across Metropolitan Vancouver: each a unique interstitial constellation, but together commonly characterized by ambiguous and contested relations between spatial jurisdiction and temporal occupation. Drawing on spatial indeterminacy and temporal flux as repositories of agency, a series of propositions respond to possible trajectories facing each site. (1) In 'Displaced Reserve: Acoustic Crossing,' a constellation of communication devices are deployed at the Kitsilano Indian Reserve no. 6, a historically contested aboriginal village site in Vancouver. By collecting, focusing and transmitting sound, the acoustic mirrors engender provisional connections across the multiple jurisdictions currently occupying the territory. (2) In 'Assemblage Agriculture: Interfaith Silo,' a series of shared parking towers are constructed in Richmond's 'Highway to Heaven,' located on the edge of protected agricultural land specially zoned for religious buildings. Responding to the uneasy coexistence of assembly and agriculture, the new infrastructure allows both activities to expand beyond their conventional zoning boundaries. (3) In 'Mutable Habitat: Commuter Cover,' a series of canopies are installed in Burnaby's (in)

famous winter roosting site of northwestern crows. Deployed above street-front parking, the tensile constructions provide a series of civic amenities for both humans and crows, working around their respective daily and seasonal cycles of occupation. (4) In 'Succession Infrastructure: Collective Clearing,' publicness and privacy become intertwined on the right-of-way of a natural gas pipeline in Surrey. Populated by a series of devices that facilitate spatial demarcation and communal gathering, the linear greenway becomes a mediating framework between personal and shared jurisdiction.

Positioned between realism and provocation, each speculation builds on the existing topological relationship found within its particular interstitial context, drawing forth its latent potential for new, productive spatial and temporal configurations. As such, each intervention encompasses both a localized catalyst and its system-wide effects on the landscape. Beyond transforming the territories onto which they are projected, these effects also become sources of agency for the very process of drawing. In this undertaking, 'constellation' constitutes both the subject and the method. It offers multiple, seemingly unconnected viewpoints, and allows for an open-ended yet constructive mapping of relations. It involves both looking at multiple points, and looking from those points. By offering alternative vantage points on the city, and proposing spatial arrangements conductive to communication, cohabitation, succession and negotiation, 'Constellations of the In-between' operates across the realms aesthetics, politics, and ethics.

Constellations of the In-between

Architectural Speculations in Contested Urban Interstices

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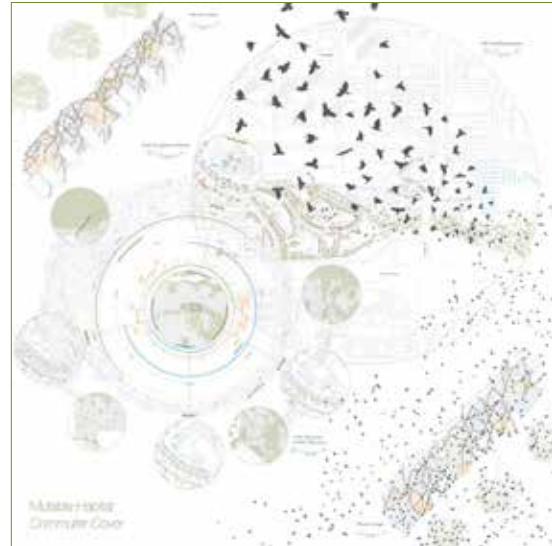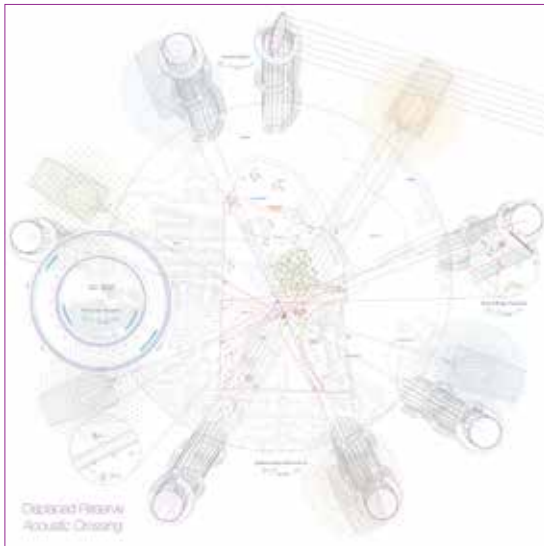
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Periphractic Space: Mapping Racial Construction in North American Urban Landscapes

JAMES C. FORREN
Dalhousie University

In Razing Africville Jennifer Nelson (2008) describes actions taken by the City of Halifax, Nova Scotia to isolate the community of Africville – African-Nova Scotians forcibly relocated in the late 1960s. The city encircled Africville with land purchases used for an infectious disease hospital and city dump among other noxious services, creating a targeted space of neglect. This common activity in North American cities constructs ideas of race by penning-in communities. It geographically restricts their movement and access to services and isolates them in the civic imagination: a condition identified by Theo Goldberg in Racist Culture (1993) as periphractic space. Rather than separating populations, however, this circumference of isolation actually facilitates activities of transgression, defilement, and return by dominant groups: a pattern of asymmetric exchange. As communities and their borders evolve over time the response of insurgent groups for greater social and political incorporation challenges and weakens the conscriptions of the periphractic boundary.

Through a method of mapping which incorporates social and technical instruments like timelines, oral histories, city reports, archived surveys, and GPS data this paper traces the penning-in of African-Nova Scotian owned properties and the ensuing tug of war for land ownership between the dominant and insurgent populations of Halifax. This process synthesizes fragmented sources, visualizing the progression of this particular urban geography and enabling us to empirically test Goldberg's thesis of periphractic exclusion and uncover patterns of activity which resist it. The outcomes of the research support the design of an interpretive landscape program , the Africville Walk, undertaken in partnership with the Africville Museum.

Periphractic Space:
Mapping Racial Construction in
North American Urban Landscapes

Peripheral
Exclusion

Periphractic
Exclusion

Skinner's Well

Lincolnville Environmental Racism Protest

Sheila Pelly, councillor for Lincolnville, Sunnyville and Upper Big Tracadie, said the dump has been a controversial issue in the area. But she laconically sums up the situation: "It has to be put somewhere."

Joe Skinner

Infectious Disease Hospital

Piezometric Level

Artesian Well   10 meters

Confined Aquifer

The illustration opposite shows an artesian well drilled into a confined aquifer beneath the granite bedrock of the Halifax peninsula. Decades of contamination from sewage and outflow from an up-hill infectious disease hospital made the water table wells which the community relied upon undrinkable. Despite numerous community and municipal petitions the city council repeatedly denied requests to provide the tax-paying community with municipal water.

Contaminated Water Table Wells

$1,000

"The city failed to act on a School Board suggestion in the summer of 1944 that the school at Africville, a community otherwise dependent upon wells, be supplied with mains water. A 6-inch main from the Quarantine Hospital on the hill above would have cost $8,000 to $13,000 and a summer-only surface pipe $1,000. After much equivocating, the City Works Committee, uncertain about the post-war future of Africville, balked at the "large expenditure for the purpose of extending sewer and water mains ... if the area is to be used for a different purpose in the future. (Naftel p. 222)."

Schoolhouse

Skinner's Well traces a gruesome act of environmental racism and the incorporative resistance to this act by a resident of the community. Contaminating the ground water with runoff from an infectious disease hospital, the City of Halifax refused municipal water service to the community, even at the low price of $1,000. Joe Skinner dug an artesian well which became the community's only means of fresh water supply.

Periphractic Timeline

1878   1964

Exclusion

1978   2012

Integration   Incorporation

- Private (Africville Community)
- Private (Other)
- Industrial
- City of Halifax/Halifax Regional Municipality
- Province of Nova Scotia
- Crown Land

■ Structure (Africville Community)
□ Structure (Other)

Periphractic Timeline conducts an empirical study of land ownership patterns in and around Africville to illustrate the geographic operation of periphractic exclusion in North American cities. The patterns demonstrate Goldberg's thesis of Exclusion (the isolation of communities), Integration (their forced dispersal by a dominant class), and Incorporation (the shift in values, culture, and ownership as communities demand civic rpresentation).

Carvery Map

Finally the relocation itself ended on a sour note when expropriation threats and intimidation were used get the last resident, "Pa" Carvery, to come to terms (Clairmont 2010).

Reception at Community Hall to celebrate the return of Africville's WW II veterans (Clairmont 2010).

Eddie Carvery returned to Africville after being displaced as a child. To this day he maintains his residence there, an act of ongoing defiance against the state-sponsored powers which dismantled his community. Son of 'Pa', brother to Irvine.

Pa Carvery
Reginald Carvery
Hattie Carvery
Herb Carvery
Fred Carvery
Jack Carvery
Pucy Carvery
John Carvery
Rifbed Carvery
M. Viola Carvery

Eddie Carvery

Irvine Carvery

Son of 'Pa' Carvery, brother of Eddie. Resident displaced at 15. President of Africville Genealogy Society.

Eddie Carvery

1878   1916   1950   2012

Kinship ties have been a crucial identifier for the Africville community, and people still introduce themselves by their family connections. *Carvery Map* traces the ties of the Carvery family, a central house whose members include the last relocated resident, Pa Carvery; a former resident squatting in protest for the last twenty five years, Eddie; and the president of the Africville Genealogical Society, Irvine, Eddie's younger brother. The map is a prototype for other significant families such as the Howe's and the Brown's, showing the significance of these ties through space and time and the damage wrought by their rupture through "Integration." Blank spaces mark homes yet to be identified through conversations with former community members, whereby the map operates as an ongoing instrument of community engagement.
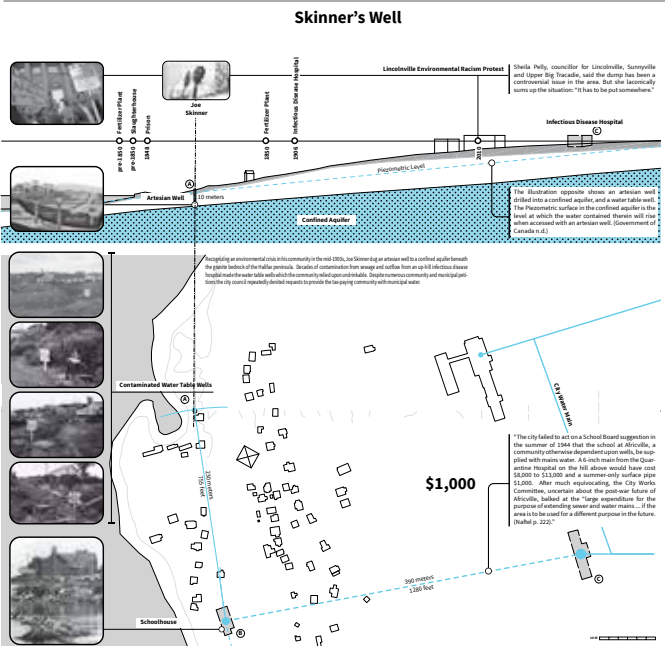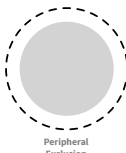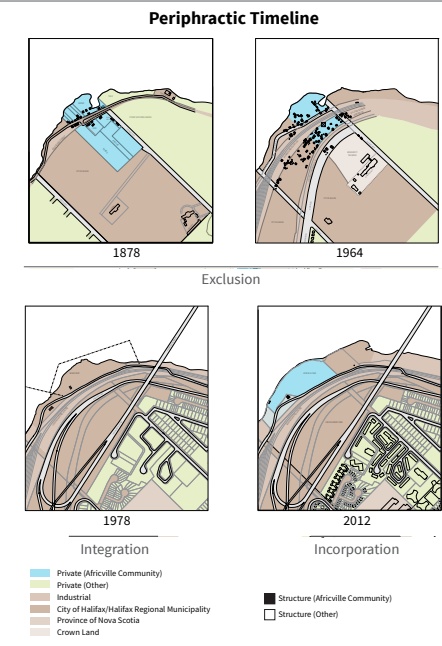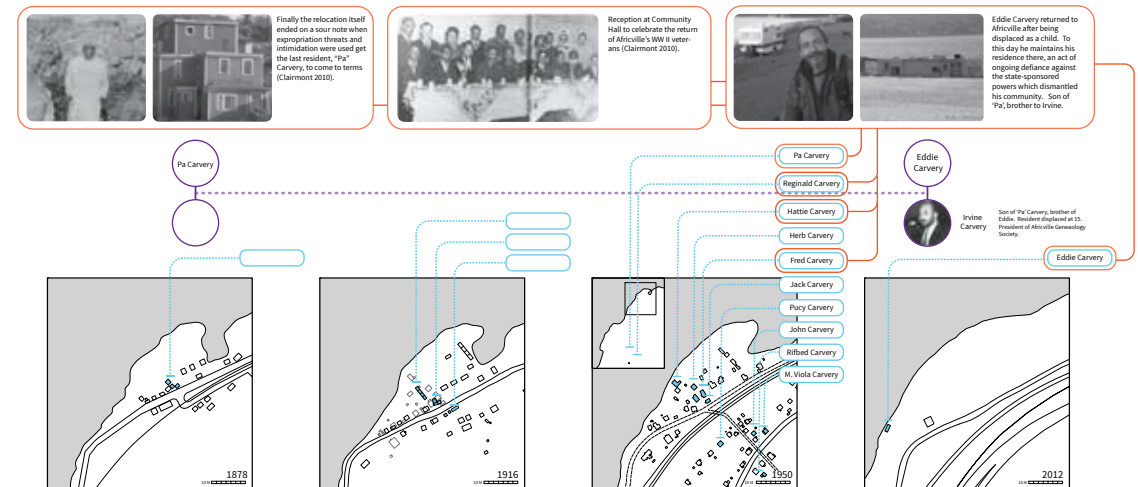
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Clairmont, D. H., & Magill, D. W. (1971). *Africville relocation report* Dalhousie University. Institute of Public Affairs.

Goldberg, D. (1993). *Racist culture : Philosophy and the politics of meaning.* Cambridge, Mass.: Blackwell.

Government of Canada (n.d.). Environment and Climate Change Canada. *Groundwater.* Retrieved from https://www.ec.gc.ca/eau-water/default.asp?lang=En&n=300688DC-1

Naftel, W. (2008). *Halifax at war : Searchlights, squadrons and submarines, 1939-1945.* Halifax, N.S.: Formac Pub.

Nelson, J. J. (. J. (2008). *Razing africville a geography of racism.* Toronto ; Buffalo : University of Toronto Press.

The Africville Walk, schematic design.
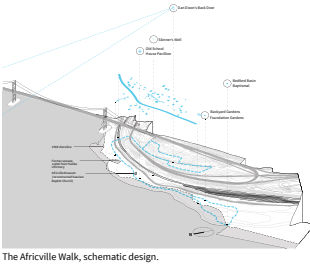
Another Stack

ERIK HERRMANN
University of Michigan

ASHLEY BIGHAM
University of Michigan

Another Stack is an experimental environment composed of flexible platforms for hosting events, lectures, workshops and everyday gathering in a large commons space. The environment design also includes plants, a large circular drum for image projection and integrated lighting on the platforms. The environment is re-arranged on an almost daily basis by users sitting, working, talking, eating, meeting and even sleeping in the space.

The individual platform elements seat 6-8 people and can be easily stacked and aggregated into larger arrangements to increase capacity. Measuring nearly 8' wide, the circular and square-shaped platforms are too large to be understood as typical furniture, inviting users to improvise novel postures, uses and formal compositions. Although simple in form and playful in shape, the platforms are calibrated in height and proportion and cantilevered on all sides to accommodate use as seating, work surface and tables. The voids cut in each platform lighten the individual units and suggest gathering around "primitive" communal forms. The environment is further enhanced through the integration of large graphic patterns, which suggest relationships between the terraced elements and offer a landscape of occupiable graphics to visitors.

As a rapidly prototyped, inexpensive furnishing solution, the platforms are fabricated from SIPs panels, resulting in a solid, yet relatively lightweight system of solid construction that could be rapidly produced offsite. The platforms were transported on site for painting, varnishing and sealing. The resulting foam-core platforms are extremely strong and stable, yet can be easily re-arranged by small groups of 3 to 4 users. The surfaces are finished to expose the OSB texture as a finish, celebrating a modest but ubiquitous material typically relegated to interior wall construction in high-performance residential construction.

Conference Furniture Arrangement

Platform Stack

Graphics Pattern Axonometric

SIPs Profiles During Fabrication

Spectators Enjoying Lunch
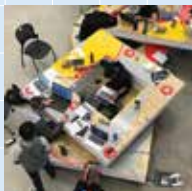
Workshop Table Format

ANOTHER STACK

ASHLEY BIGHAM & ERIK HERRMANN (OUTPOST OFFICE)

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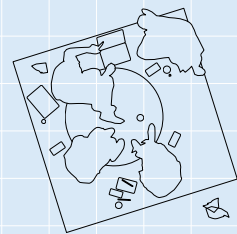
Platform Layout Plan
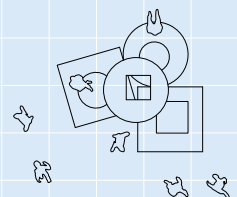
Platform Arrangement Layout Plan

Unconventional_Structures: Torodial Plume

JORGE ADAN ITUARTE-ARREOLA   **RYAN LEE THOMAS**

The ever-shifting surface of the earth creates a plethora of effects on territories, climate, and territorial ecosystems. Of these effects, no hemispheric region appears as catastrophically consistent in terms of natural disasters, than that of the Asia-Pacific.

Geographically speaking, the country of Indonesia happens to receive the blunt of Earth's natural forces, given that it resides in the belt of shifting tectonic plates known as the Ring of Fire, whose proximal circumstances make it highly susceptible to seismic and volcanic activity.

To fully understand the risk of these circumstances, and their scope in terms of the ecologies they affect, analysis was enacted through critical cartography.

Part of this effort involved instructing local people on how to map their region using Open Source Data, as a means of progressive local agency. This locally-revised data served as a mechanism to understand how people react to natural disasters; how they travel, urbanize, operate, and evacuate.

The area of study consisted of Mount Sinabung, a recently active stratovolcano, and its neighboring territories in North Sumatra, Indonesia. Through exploration and analysis based on the volcano's risk and effects, we sought to resolve the most ailing issue this region is succumb to. Ash.

Airborne ash proved to be the largest concern in regards to the volcano, causing respiratory damages, infections, and death to the people living there. Volcanic ash has proven beneficial for the surrounding agriculture, in the soil, and can also be utilized as a binding agent in concrete production.

This project investigated an intervention in the landscape as a pre-emptive measure, an unconventional structure integrated as an ephemeral buffer for pyroclastic flow. The collecting ability of the structure allows for maximum extraction of a latent resource. This project speculates the mediums of resource sequestration and protection from a natural catastrophic threat as a possible infrastructural industry.

ARCHITECTURE IN AN EXPANDED FIELD, FROM INTERIORS TO LANDSCAPES
UNCONVENTIONAL STRUCTURES: **TORDIAL PLUME**

VOLCANO
SOUTHEAST ASIA

EARTH'S TECTONIC BOUNDARIES
'RING OF FIRE' / SOUTHEAST ASIA _DYMAXION PROJECTION

MOUNT SINABUNG ERUPTING

SURROUNDING CONTEXT

TO MT. SINABUNG
TO BERASTAGI

KABANJAHE

TOPOGRAPHY
RESIDENTIAL
PROVINCES

TO LAKE DUNUA TOBA

MAJOR ROUTES
FIGURE GROUND _ROAD INFRASTRUCTURE
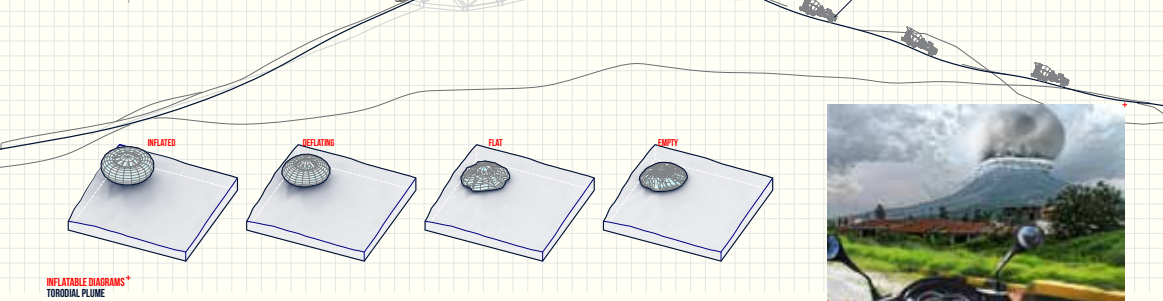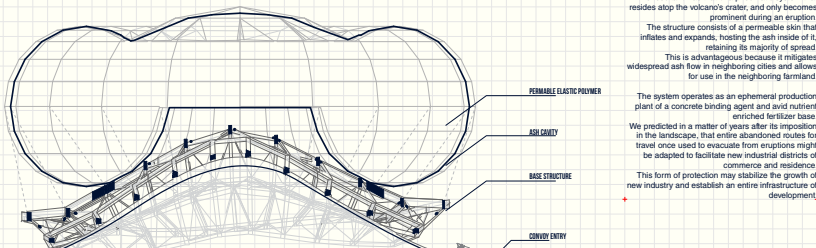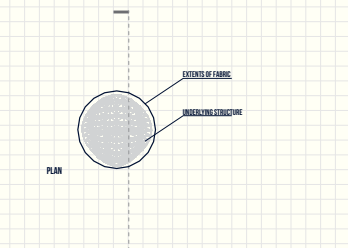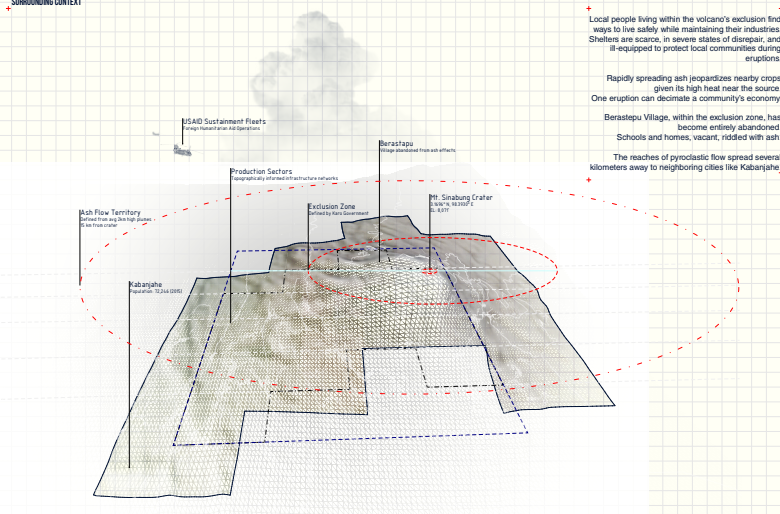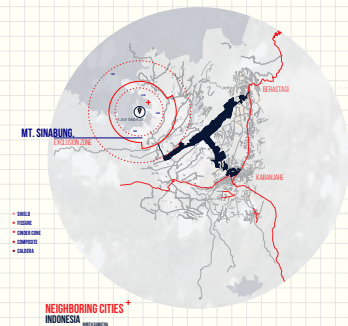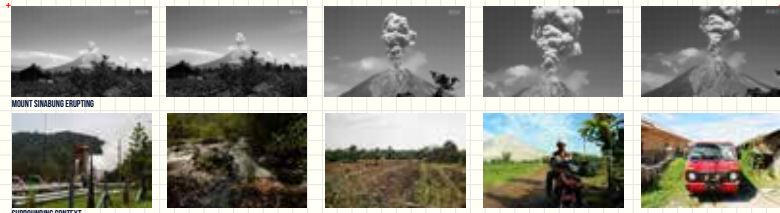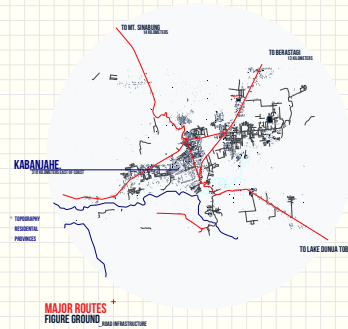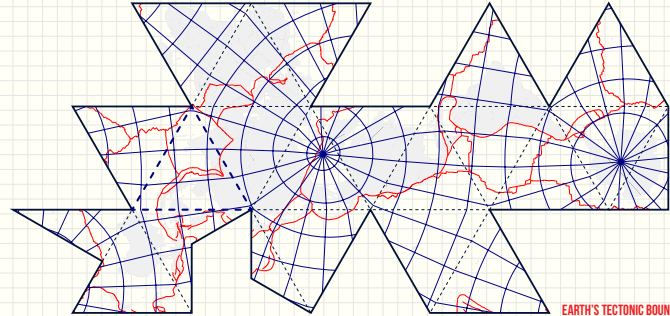
Local people living within the volcano's exclusion find ways to live safely while maintaining their industries. Shelters are scarce, in severe states of disrepair, and ill-equipped to protect local communities during eruptions.

Rapidly spreading ash jeopardizes nearby crops given its high heat near the source. One eruption can decimate a community's economy.

Berastepu Village, within the exclusion zone, has become entirely abandoned. Schools and homes, vacant, riddled with ash.

The reaches of pyroclastic flow spread several kilometers away to neighboring cities like Kabanjahe.

USAID Sustainment Fleets
Foreign Humanitarian Aid Operations

Production Sectors
Topographically informed infrastructure networks

Berastapu
Village abandoned from ash effluents

Ash Flow Territory
Defined from avg 3km high plumes -
15 km from crater

Exclusion Zone
Defined by Karo Government

Mt. Sinabung Crater
3.16'N°N, 98.392°E
EL. 8,071'

Kabanjahe
Population: 72,244 (2015)

MT. SINABUNG
EXCLUSION ZONE

BERASTAGI

KABANJAHE

SHIELD
FISSURE
CINDER CONE
COMPOSITE
CALDERA

NEIGHBORING CITIES
INDONESIA _NORTH SUMATRA

The resultant was that of a pneumatic system that resides atop the volcano's crater, and only becomes prominent during an eruption.
The structure consists of a permeable skin that inflates and expands, hosting the ash inside of it, retaining its majority of spread.
This is advantageous because it mitigates widespread ash flow in neighboring cities and allows for use in the neighboring farmland.

The system operates as an ephemeral production plant of a concrete binding agent and avid nutrient enriched fertilizer base.
We predicted in a matter of years after its imposition in the landscape, that entire abandoned routes for travel once used to evacuate from eruptions might be adapted to facilitate new industrial districts of commerce and residence.
This form of protection may stabilize the growth of new industry and establish an entire infrastructure of development.

EXTENTS OF FABRIC

UNDERLYING STRUCTURE

PERMABLE ELASTIC POLYMER

ASH CAVITY

BASE STRUCTURE

PLAN

CONVOY ENTRY

INFLATED   DEFLATING   FLAT   EMPTY

INFLATABLE DIAGRAMS
TORODIAL PLUME

Iterative Garden

JULIA JAMROZIK
University at Buffalo, SUNY

'Line garden' is a playful exploration of the possibility of using simple materials to achieve a changing temporary space. The garden questions aspects of historical of garden design and explores the potential of re-imagining and de-contextualizing contemporary mass-produced materials. The iterative nature of the project has allowed for reactive changes and explorations to be undertaken, testing material effects, spatial configurations, color combinations, and the relationships between the installation and its visitors.

The installation's main material, barricade tape, is typically used to delineate a perimeter and keep people out of a particular area. Here however it is deployed precisely to bring visitors into the space and entice them to inhabit it. The utilitarian material was applied in combination with simple wooden substructures, that were re-used and adapted over the years.

The spaces created encourage interaction without being prescriptive about use. While adults enjoy the comfort of the loungers and take pleasure in the moment of repose that the installation provides, youngsters use the web of tape as a maze to crawl through, frolic in and explore. As the movement of the lines of barrier tape varies greatly with the changing of the weather, a multi-sensory experience is created, from a quiet, gentle stir to the sound of a vigorous rustle accompanied by dynamic movement.

The project was a winner of an open international competition in 2014. The competition entry and the first iteration of the garden focused on an exploration of a permeable, horizontal and maze-like field created by parallel lines of barrier tape. Due in part to its popularity with the visitors, the designers were invited back the following years to re-install and adapt the garden.

In 2015 the colors of the field were altered and, reacting to a lack of shade, three new canopy elements added. As they each hang to a different datum, the canopies also gave a different experience of the barricade tape.

In the 2016 version black and white barrier tape was used inspired by razzle dazzle, a form of warship camouflage from WWI. The contrasting colors enhance the appearance of movement of the tape.

The 2017 version of the garden is entirely vertical and was the most spatial and the most engulfing of the installations. A net stretched over a rectangular frame was used to suspend the various lengths of barrier tape creating a cavernous void on the interior of the cuboid. The colors were a mix of those used in previous iterations, literally re-using the scrap material from previous years.

The opportunity to re-install the project, has allowed for an exploration of the space of the garden from a hovering horizontal field to a mixture of horizontal and vertical elements and finally to a fully vertical and enclosing volume. Consistently working with barrier tape, the changing configurations have lead to an awareness of the properties of the material and the ways that it can be deployed to heighten a multi-sensorial experience for the visitors. The four iterations have also been a way of testing color-combinations and their interaction with light, layering and spatial pattern-making. Speaking not only to these parameters as aspects of the historical art of garden design but also to the potential of re-imagining and de-contextualizing contemporary mass produced materials, the iterative project explores effects that can be accomplished with simple means.

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Plan in 2014, 2015 and 2016
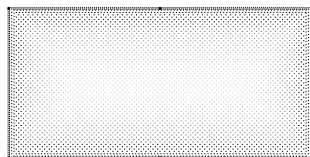
Plan in 2017

The Line Gardens were installed by Julia Jamrozik and Coryn Kempster as part of the annual International Garden Festival at Jardins de Métis / Reford Gardens in Grand-Métis, Québec. Photos by Louise Tanguay, Martin Bond and Coryn Kempster

2014
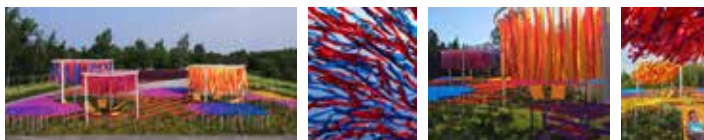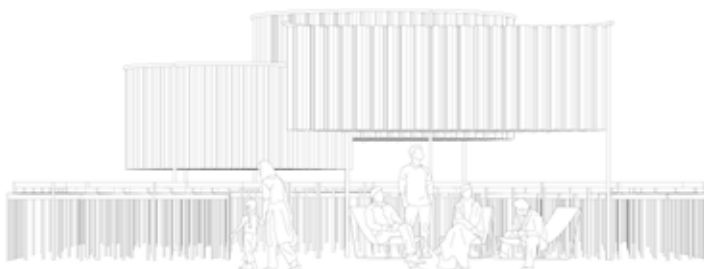
2015
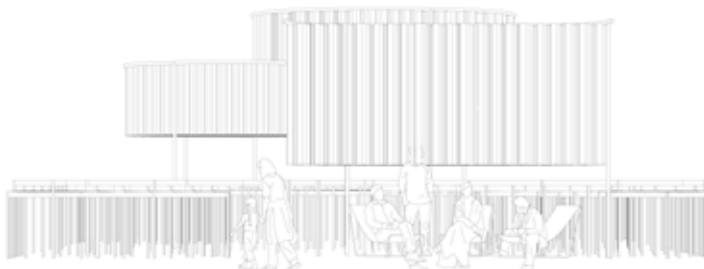
2016
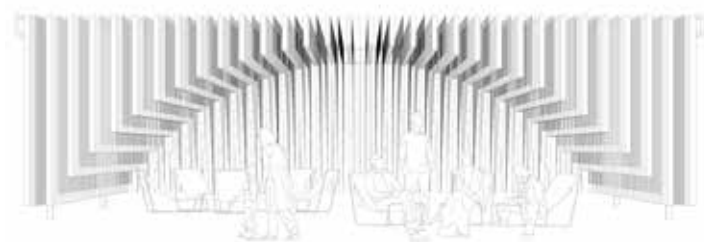
2017

Small Scale Big Impact: Connecting Communities to the Urban Landscape through Neighborhood Parks

WILLIAM JOSEPH DORAN
Louisiana State University

Public spaces like neighborhood parks help communities thrive and often anchor the daily lives of residents – especially kids. Most mid-size American cities house hundreds of these parks in their urban cores, yet their design, programming, and potential to impact underserved communities is often overlooked. Municipal park systems tend to focus on large parks and broad-reaching amenities like zoos and sports facilities, while ignoring the inherent value in neighborhood parks as venues for community engagement and a locus for connecting people. Small parks are an incredibly valuable asset to thriving cities.

The project shown is based in the Mid City area of Baton Rouge, Louisiana – and explores to role of the park in bringing people together around their common geography, history, and culture. The project, called IAMMIDCITY, began with a 3rd-grade curriculum at two local public elementary schools that focused on the history, geography, and culture of the Mid City area. The students made maps, laid out timelines, and took photos to document how they see Mid City. They were also given small wood cutouts that read "#IAMMIDCITY," as part of a corresponding social media and branding campaign for the area. At the end of the school year, the photos found themselves in the heart of a local park situated between the two schools as part of an installation also dubbed IAMMIDCITY.

For the installation, the photos were printed and laminated on composite metal panels and installed in a grid in the basketball court at the park. In the process, the design team met local kids, parents, and neighbors who use the park every day. Some helped with the installation and recognized friends, family, or even themselves in the photos. This revealed just how vital the park was to the neighborhood. The design team began to walk the streets to meet more residents and talk to businesses-owners. Spending a lot of time in the area allowed the team to genuinely get to know the neighborhood and opened up a dialogue about what residents would like to see in the park. The team began relaying those needs to a representative from the local parks system, which inspired them to approach administrators about funding some much-needed park improvements. Little

did we know that it would create a lasting collaboration with the parks system and the neighborhood to improve the park.

As a result, the parks system assembled some possible improvement options to discuss with residents such as new play equipment, community planter boxes, benches, and maybe even some mural walls. The project team facilitated meetings with the parks system and residents to design some hands-on opportunities for participation in the improvements. To create a truly community-designed park, it's critical to build sincere relationships and empower residents to shape their communities as they grow and change. Construction began this fall and is expected to be complete early next year.

SMALL SCALE
BIG IMPACT

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Corner park at Spain and 22nd Streets

Neighborhood kids playing basketball and assisting with the installation.

(32) 2'-0" X 2'-0"
COMPOSITE PANELS
W/ MOUNTED IMAGES
HUNG FROM CHAIN LINK

EXIST.
BASKETBALL
COURT FENCING

REPAINT COURT
SURFACE & ADD
"#IAMMIDCITY"

PAINTED
PLANTERS W/
POTTED PLANTS

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1 SITE PLAN
NTS

SPAIN STREET
R.O.W. 50'-0"

For the installation, the photos were printed and laminated on composite metal panels and installed in a grid in the basketball court at the park. In the process, the design team met local kids, parents, and neighbors who use the park every day. Some helped with the installation and recognized friends, family, or even themselves in the photos. This 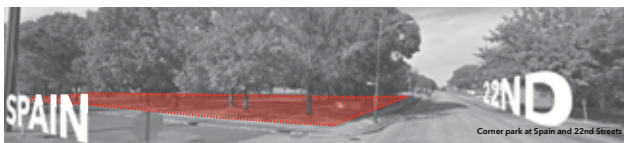revealed just how vital the park was to the neighborhood. The design team began to walk the streets to meet more residents and talk to businesses-owners. Spending a lot of time in the area allowed the team to genuinely get to know the neighborhood and opened up a dialogue about what residents would like to see in the park. The team began relaying those needs to a representative from the local parks system, which inspired them to approach administrators about funding some much-needed park improvements. Little did we know that it would create a lasting collaboration with the parks system and the neighborhood to improve the park.

As a result, the parks system assembled some possible improvement options to discuss with residents such as new play equipment, community planter boxes, benches, and maybe even some mural walls. The project team facilitated meetings with the parks system and residents to design some hands-on opportunities for participation in the improvements. To create a truly community-designed park, it's critical to build sincere relationships and empower residents to shape their communities as they grow and change. Construction began this fall and is expected to be complete early next year.

Residents, visitors, and park representatives discuss ideas and enjoy coffee in the park.

BUILDING BEHAVIORS

Emboss Tower

JIN YOUNG SONG
University At Buffalo, SUNY

Emboss tower explores the function of a structural skin with an embossed surface applicable to use for tall building structures. The major diagrid system with a secondary embossed surface structure provides an enhanced perimeter structural system by increasing tube section areas and reduces wind loads by disorienting major organizing wind forces.

A parametric study used to investigate an optimized configuration of the embossed structure revealed that the embossed structure has a structural advantage in stiffening the structure, reducing lateral drift to 90% compared to a non-embossed diagrid baseline model, and results of wind load analysis using computational fluid dynamic software, demonstrated the proposed embossed system reduced lateral surface loads.

The resulting undulating embossed skin geometry presents both opportunities for incorporating versatile interior environments as well as unique challenges for daylighting and thermal control of the envelope. Solar and thermal control requires multiple daylighting solutions to address each local façade surface condition in order to reduce energy loads and meet occupant comfort standards.

These findings illustrate that although more complex in geometry, architects and engineers can produce tall buildings that have less impact on our environment by utilizing structural forms that reduce structural steel needed for stiffening, thus reducing embodied CO_2, while positively affecting indoor quality and energy performance, all possible while creating a unique urban iconography derived from the performance of building skin.

EMBOSS TOWER
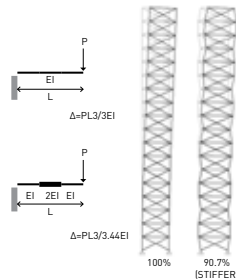
The Emboss tower explores the function of structural skin, by shaping the surface of embossing to enhance the stiffness of tower. The skin also disorients major organizing wind reducing significant surface wind pressure to reduce steel tonnage for the structure. The self-shading effect allows for interior shading systems to be specified for each sub-surfaces inclination and azimuth angles, permitting more location specific solar control. The planning behind the embossed skin also allows versatile office environments and presents a unique urban iconography to the street derived from performance of the building skin.

$\Delta = PL3/3EI$

$\Delta = PL3/3.44EI$

100%   90.7%
        (STIFFER)

BUILDING DRIFT IMPROVEMENT BASED ON THE PRINCIPLE OF DEFLECTION OF BEAMS

1 module
(1:1.5 aspect ratio)

6 module
(1:9 aspect ratio)

Building Displacement
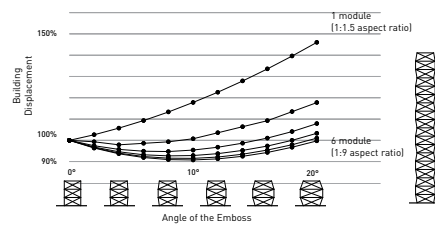
Angle of the Emboss

OPTIMIZED DEGREE OF THE EMBOSS MODULE

100% 98.9% 92.6% 97.4%   100% 98% 95.9% 92.6%   61% 59% 59%
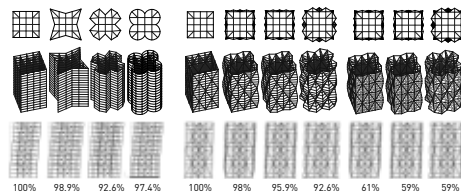
SURFACE SHAPE AND STRUCTURAL STIFFNESS

BASELINE   100%   EMBOSS   91%

STORY DRIFT

INTER-STORY DRIFT
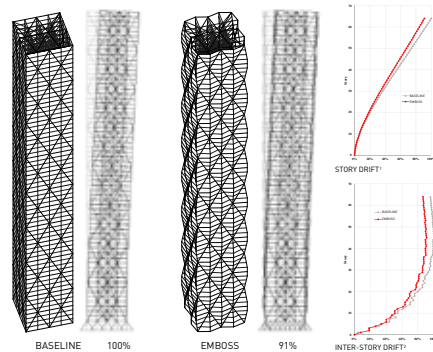
INCREASED EFFICIENCY OF STACKED EMBOSSED MODULE
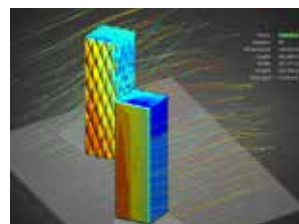
CFD computational analysis shows that the embossed skin could significantly reduce the base shear force of the structure. For example, the base shear forces of the embossed skin type under 90° and 120° angles of attack are, respectively, 18.06% and 21.20% less than those of baseline model.

EMBOSS FOR WIND LOAD REDUCTION
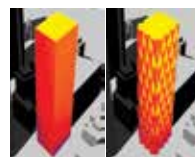
The embossed form would benefit greatly from local solutions for controlling the local indoor environment, external shading, and glare than a uniform approach derived from each elevations general orientation as would be typical of a linear building envelope.

EMBOSS FOR EFFICIENT SOLAR CONTROL

THE SHARE: Net Zero Energy, Cross Laminated Timber Urban Housing Prototype

MICHAEL GAMBLE
Georgia Institute of Technology

Cross Laminated Timber is emerging as a revolutionary material in the development of midrise urban housing. Transformational thinking about energy and project delivery systems is quickly changing the how we approach energy, health, affordability, and construction.

This project is part of a growing body of work under development in our research group that is connected to fully integrated building delivery models, from land acquisition, through project delivery, occupation and life cycle management.

This prototype is situated on a ¼ typical city block, in this case Seattle or Atlanta. Its structure is fabricated using C.L.T, a low impact, prefabricated, lightweight and very strong material that generates almost no waste onsite. Also, this material has proven to be a great alternative to the traditional materials on which construction has been based for years, like precast.

This work informs our architecture and engineering based design studio pedagogy, and is directly connected to our Institute's internationally recognized Ph.D and M.S. programs in High Performance Building. These highly structured advanced studios are tailored to different levels of complexity and focus areas, creating new opportunities for the application of building physics and building technology, always with sustained emphasis on design.

When paired with localized or district scaled renewable energy packages, highly advanced urban housing prototypes emerge which address a variety of key questions technical, environmental and social challenges, including:

1. Consistent use of highly renewable, local, and recyclable products, especially in the southeast U.S., where high quality timber is readily available.

2. Collaborative consumption models allow occupants to share key lifestyle needs like kitchens, workspace, internet, maintenance, resulting in a deliberate approach to affordability. The three main building masses are conceived as a free plan that allow multiple configurations according to the user's needs and can be subdivided into housing 'shares' from 400 – 4000 sf.

3. In many sunbelt cities, parking is still part of the housing equation. Here, CLT is used for medium span autonomous vehicle parking, optimizing circulation and space for users helping to reduce energy needs and material costs. In fact, these concepts have resulted into an ambitious combination which tries to foresee and analyze the change on needs and behaviors of buildings based on its users.

4. Energy chase system partners with vertical circulation to create maximum flexibility in the plan for a variety of scaled living and working units. Outline system as follows (see diagrams)
   • Ground source Heat Pump and Energy Pilings
   • Radiant Floor Heating and Cooling
   • Energy Recovery Ventilators to manage condensate
   • On site energy generation PV panels – the energy veil
   • BIPV integrated into shading devices

Sustained efforts in the area of market rate, carbon neutral, energy positve energy consuming market rate urban housing will lead to:
• advances in interdisciplinary educational models
• community engagement and debate around 21st century housing, energy and affordability
• advances in what constitutes the public realm in urban areas with increasing density
• inquiry into innovative materials and construction methods
• advances in dialogues around design and energy delivery

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Shotgun Chameleon

ZUI NG
Prairie View A&M University

Situated at Historical Fourth ward Houston, Texas, Shotgun Chameleon is inspired by the flexibility of Gulf Coast raised shotgun houses floor plan and the versatility of chameleon skin. The design emphasizes programmatic flexibility and response to climate. The chameleon-like front screen element provides a myriad of facade possibilities to adapt this design to different urban contexts and to a variety of solar/ wind orientations. Possibilities include wood siding painted to blend with the streetscape, billboards where commercial uses are feasible on the ground floor, louvered wood (vertical or horizontal depending on orientation) to allow for breezes while blocking direct sun and providing privacy, solar panel screen to harvest solar energy, or vine covered screens reminiscent of French quarter balconies. As for the alternating wood slats screen on the sides, they provides privacy for both residents and the neighbors while allowing sunlight and wind to move through the house. The double height glass windows frame an ever evolving urban view at the South whereas the floor to ceiling window frame the four seasons views of nature at the north.

This 1,500 square feet house is designed with cross ventilation in mind. Summer breeze is channeled through the south facing balcony and porch to passively ventilate the house. Angle of roof was carefully calculated to allow lower winter sunlight to enter the interior spaces while higher summer sunlight stays outside. The balcony and porch which extend the spaces whenever needed by opening glass sliding doors without adding additional air conditioned space. The choice of renewable wood material, high efficient mechanical equipment (mini split ac units and tank-less water heater), dual flush toilet, led lighting, foam insulation and low-e insulated windows drastically reduces energy consumption.

Flexibility and adaptability of interior space is key to this design. Closing the internal stair, this 3 bedrooms and 2 baths single family home could become an up and down duplex for rental or accommodate multi-generational family arrangement. Tenant on upper floor could use the external stairs. This same setting could also be used as live-work space with the bottom unit as office spaces. The renting out option helps generate income to offset the cost of mortgage. This encourages a more sustainable way of home ownership. The design of the house also aims to revisit and to celebrate the idea of balcony and porch living which rooted heavily in the vernacular of the neighborhood, Freedmen's Town. The balcony not only provides a great social space for the residents but also encourages interaction with neighbors on sidewalk or across the street.
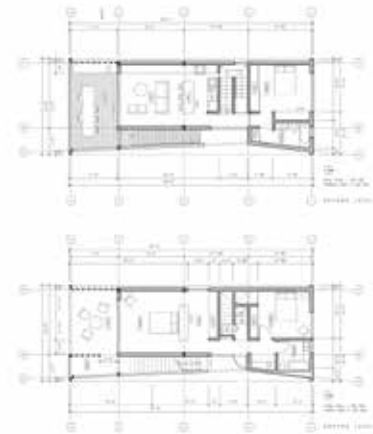
SHOTGUN CHAMELEON
An Adaptive Disaster Replacement Home

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The alternating wood slats screen on the sides provides privacy for both residents and the neighbors while allowing sunlight and wind to move through the house. A double height glass window frames an ever evolving urban view at the south and a floor to ceiling opening in the second floor bedroom frames the four season views of nature at the north. Flexibility and adaptability of interior space is key to this design (see floor plans). Closing the internal stair, this 3 bedrooms and 2 baths single family home could become an up and down duplex for rental or accommodate multi generational family arrangement. Tenant on upper floor could use the external stairs. This same setting could also be used as live-work space with the bottom unit as office spaces. The renting out option helps generate income to offset the cost of mortgage. This encourages a more sustainable way of home ownership. The design of the house also aims to revisit and to celebrate the idea of balcony and porch living which rooted heavily in the vernacular of the neighborhood, Freedmen's Town. The balcony not only provides a great social space for the residents but also encourages interaction with neighbors on sidewalk or across street. This 1,5000 sqf house is designed with cross ventilation in mind. Summer breeze is channeled through the south facing balcony and porch to passively ventilate the house. Angle of roof was carefully calculated to allow lower winter sunlight to enter the interior spaces while higher summer sunlight stays outside. The balcony and porch which extend the spaces whenever needed by opening glass sliding doors without adding additional AC space. The choice of renewable wood material, high efficient mechanical equipment, dual flush toilet, led lighting, foam insulation and low-e insulated windows drastically reduces energy consumption.

SINGLE FAMILY HOUSE   UP & DOWN DUPLEX   COURTYARD HOUSE
GREEN HOUSE   LIVE / WORK DUPLEX   RETAIL STRIP CENTER

	SHOTGUN CHAMELEON	HOUSE NEXT DOOR
One Year Total	kWh/yr	14270 kWh/yr
Texas Average	14263 kWh/yr	

COLUMN TO GROUND DETAIL   WALL TO GROUND DETAIL   SCREEN WALLS DETAIL   CEDAR WALL DETAIL

SENYAI: Big Noodles Acoustics

DANA CUPKOVA
Carnegie Mellon University

GRETCHEN CRAIG
Carnegie Mellon University

The ceiling of Senyai, inspired by the vaulted geometry of ancient Thai architecture, incorporates acoustic and lighting performance into a contemporary spatial experience with soft ambient effects. Visual layering of ceilings fins is suggestive of movement while changing the diffusion of global sound though varied depth of each individual double-curved vaulted zone. The global texture of the surface and color plays with light to create a sense spatial weightlessness and visual expansion, as the eye travels beyond the each articulated edge. At the same time the slats appear as a continuous surface, mimicking an active body of water, or, in homage to the restaurant's name ("senyai" translates to "big noodles" in Thai), a bowl of hot noodles in broth. The ceiling is formed by a series of 275 unique vertical slats that perpendicularly sectionally change in series in the perpendicular direction--no two slats, or vaults, are alike. Using a non-uniform diagrid as a method for standardizing highly varied component-based construction, we created a localized effect of privacy while diffusing sound through the dynamic character of geometry.

Using three dimensional ellipsoidal vaults, the ceiling geometry supports a sense of individual presence within the small collective space. An ellipsoid is a double curved surface that in its idealized version concentrates the direction of the sound to travel back to the foci point at which the table is located. In Senyai's ceiling the computational surface of the pure ellipsoid is materialized through series of diagonally cut slotted fins that mitigate sound reflections in the space related to high frequency sounds. The fins increase the area of the elliptical surface to maximize the number of sound reflections, trapping them sectionally within their depth and thus holistically performing as a spatial diffuser. As each bay within the diagrid has a varied size and depth, each bay produces a different frequency of reverberation, making the global diffusion more pleasant, cutting off high frequencies (high noise levels) in the space. The intention was to create a geometry that would both act as a holistic sound diffuser throughout the small room with the potential to direct the localized sound intensity towards

the elliptical foci, and cut off the fall-off sound towards the neighboring zones. Hence the depth of the fins varies, thinning towards the top vertex of the ellipsoid and thickening towards its edges. The scalar variation along the collective ellipsoidal geometry produces a series of sound effects dispersed along the larger space. Historically, double curved vaults were used to create echoed reverberation effects with a series of successive reflections on hard smooth surfaces. In this case, we are using geometry to simultaneously reflect and diffuse the sound to effectively soften the acoustic spatial quality. Slotting of the geometry eliminates the echo effects that would be otherwise produced, while still allowing for a concentrated privacy of sound within the loose boundaries of three dimensional bubble. The relationship of the global geometry to variation of the surface subdivision allows for both: easy digital fabrication through the use of CNC technology, as well as tighter coordination of performative effects.

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SENYAI: Big Noodles Acoustics

2 x 4 x 4000: Mass, Material, and Microclimate

ALEX TIMMER
University of Wisconsin-Milwaukee

This reading hut was constructed for a family on a small farm. Consisting of four thousand linear feet of two by four, the hut was intended to provide a space for the children play and read. While open to the air, with no sealed enclosure, the space is intended to provide thermal comfort during the summer months. It provides shelter from the sun and a lower mean radiant temperature due to this self-shading and naturally occurring night flushing of the structure. The initial idea came out of a study folding and cutting the edges of a cube to produce aperture. The shift from the paper to wood forced a transition in strategy. With this in mind, the goal of this project is to engage the given construction systems in an oblique manner, in this case stacking wood like masonry to produce aperture. We deployed the 2 x 4 in much the same way one might deploy a brick, stacking each in sequence. Each aperture consists of two shelves and the indentation of the exterior wall. They are articulated to provide a bench, a desk, and several storage spaces. The corner detail is the result of the 2 x 4 boards weaving together. This is expressed on the exterior but hidden on the interior of the hut. By voiding out the boards, the apertures expose a shifting column at each corner.

The walls, stacked untreated pine, absorb moisture and resist heat gains. While the slatted windows prevent direct summer sunlight from penetrating the space they allow air to flow freely through the walls. While warm air can pass through the structure, the mass of the walls produces a cool microclimate within the space by thermal lag. The hut's slatted apertures additionally provide several views to the tree line and adjacent corn fields.

Systems of material, thermal, social, and economic concerns are present in this design. They have agency outside of the designer and as such push back on the design intent in ways that generate unique outcomes. These systems provide an armature and foundation for this methodology of design.

2 x 4 x 4000
Mass, Material, and Microclimate

Hudsonville, MI   Alex Timmer

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moved back and forth depending on the time of year.
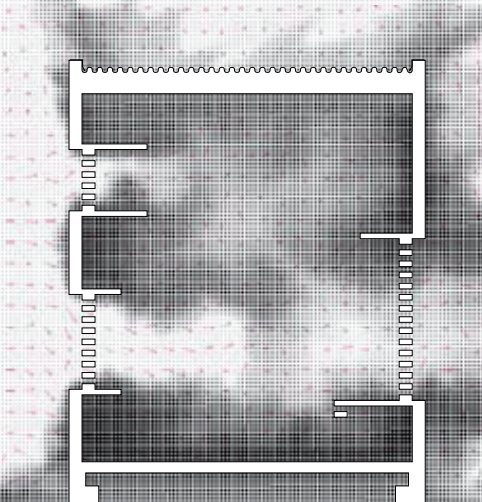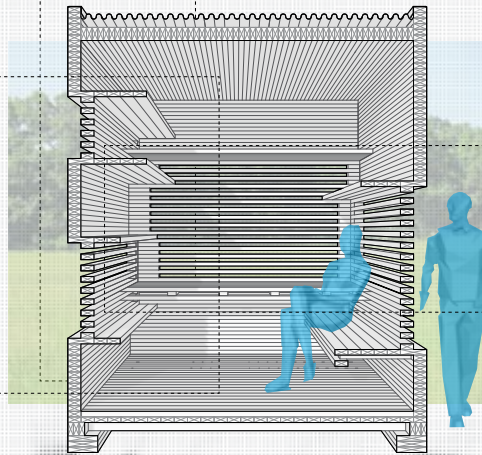
DESIGN RESEARCH IN THE STUDIO CONTEXT

Tiny Footprints: Variations on the Hong Kong Pencil Tower

JASON F. CARLOW
American University of Sharjah

This pair of first-year, graduate-level studios, taught over two consecutive academic years focused on the study and design of Hong Kong's thinnest residential building type, pencil towers. The work focused specifically on extraordinarily compact and slender buildings with single residential units on each floor. In the first stage of the course, students studied the economic, architectural and regulatory conditions that make these extreme buildings possible to build in Hong Kong. The studio worked together to conduct a survey of more than sixty slender towers in Hong Kong and document them through photography, drawing and digital modeling. An analysis of the documented towers revealed extreme ratios of vertical circulation core to livable space, unique massing strategies for reducing building volume and exploitation of building regulation loopholes to maximize rentable area. Through the research students learned valuable lessons about the close relationship between building code and building form in an ultra-dense city with extremely high land value. Efforts from the tower and code research were compiled into a studio reference guide for use during the course of the semester.

In response to the restrictive regulatory and economic context of Hong Kong, students used digital software and contemporary computational design techniques to develop innovative tower systems that operate within new code-based limitations. Students considered the form of tall buildings in relationship to their performance in terms of structural, programmatic, material, environmental and social factors. The interior design and relative efficiently of units were very important to the studio as the compact nature of the apartments required students to make use of every cubic foot available. Many projects yielded integrated furniture systems to create projects that experiment with non-standard modes of dwelling.

Given Hong Kong's proximity to the manufacturing zone of China's Pearl River Delta students sought to find modes of construction that are site specific in that they relate to regional resources and industrial strengths. Students also looked into construction methods used in other regions in Asia for insights into new possibilities for high-rise construction in Hong Kong. The studio required intensive use of CNC prototyping equipment to consider how these machines relate to other scales and modes of construction today.

In a city were land value is extremely high, communal spaces in residential buildings have been reduced over past decades in the pursuit of commercial profit. The studios asked students to consider how communal spaces are defined and understood within existing tall residential buildings and how can communal space be increased and or improved to perform better in contemporary society. The work provides new ideas for building more socially diverse, better performing housing for densifying urban areas across the world.

Each of the eighteen towers designed takes on a specific set of issues responding to the course brief and developed through the students' research findings. Overall, the studios sought to creatively use field research to create novel, non-repetitive, mixed-use conditions that reveal new possibilities for the world's most slender building type.

tiny FOOTPRINTS

Variations on the Hong Kong Pencil Tower

Jason Carlow, Associate AIA
Assistant Professor
American University of Sharjah

"Property price increases in Hong Kong are now accelerating again, despite the economy slowing. During the year to end-November 2012 house prices skyrocketed by 23.74% (19. 22% inflation-adjusted), the highest year-on-year increase since June 2011, according to the Ratings and Valuation Department (RVD). Smaller-sized residential properties have seen the highest price increases. During the year to November 2012, the average price of apartments smaller than 40sq.m. rose by 27%, 25% for 70-100sq.m. apartments and 4% for 100-160sq. m. apartments. Property prices in Hong Kong have surged 73% (56% inflation-adjusted) over the past three years, propelled by very low interest rates and strong foreign demand."

"Residential prices surging in Hong Kong!" Feb 15, 2013, http://www.globalpropertyguide.com/Asia/hong-kong/Price-History, (accessed July 20, 2013).

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In a city were land value is extremely high, communal spaces in residential buildings have been reduced over past decades in the pursuit of commercial profit. The studios asked students to consider how communal spaces are defined and understood within existing tall residential buildings and how can communal space be increased and or improved to perform better in contemporary society. The work provides new ideas for building more socially diverse, better performing housing for densifying urban areas across the world.

Each of the eighteen towers designed takes on a specific set of issues responding to the course brief and developed through the students' research findings. Overall the research driven studios sought to create novel, non-repetitive, mixed-use conditions that reveal new possibilities for the world's most slender building type in one of the world's densest and most expensive cities.

Gary Wong Chi Chung — Yang Shengzhe — Iris Wang Yaai — Wendy Wang Huan — Vicky Lam Chi Fung — Li Liang, Sharon Zhang — Connie Lau Kat Tsz — Huang Minjun

From Waste to Wonder

NIKOLE BOUCHARD
University of Wisconsin-Milwaukee

The Great Lakes are the world's largest surface freshwater system, containing approximately 21% of the world's surface fresh water supply. These expansive inland freshwater seas contain 84% of North America's surface freshwater and support a population of more than 30 million people.

Known as America's "Third Coast", The Great Lakes are an environmental treasure with a shoreline that measures over 10,000 miles. This vast freshwater network provides the Midwest with drinking water, food, economic opportunities and recreational activities, making it one of North America's greatest natural resources.

The Great Lakes Region was once the industrial core of the country, but as we know, the territory has suffered from deindustrialization, leaving these vast lakes lined with "Rust Belt" Cities that are scarred from shifting populations and industries that have migrated elsewhere.

From Waste to Wonder is an on-going design research studio that asks students to consider the architectural, cultural, economic and environmental issues tied to the wasted waterfronts of America's "Third Coast". Seen through an optimistic lens, these post-industrial environments present a tremendous set of opportunities.

Landscape Urbanism plays a major role in the way we understand and approach these urban issues. Students conduct intensive research at the start of the semester, producing a series of maps and infographics to better understand and explain the wasted waterfront conditions of The Great Lakes Region. Students work at a variety of scales as they explore ideas related to water remediation, urban vacancy and the reuse of urban infrastructure.

A series of precedents, from global to local are analyzed to understand how other designers have struggled with similar issues. Research and design focuses on hydrology, landscape, ecology, infrastructure and urban form. Students are challenged to synthesize the information they obtain throughout the first half of the semester to develop creative design strategies at the intersection of architecture, landscape and infrastructure. Student design proposals transform wasted waterfronts into productive urban environments that remediate the post-industrial landscape, provide educational opportunities and reinvigorate "Rust Belt" Cities.

NOTE

1. "The Great Lakes." *EPA: The United States Environmental Protection Agency*. N.p., 23 Oct. 2015. Web.

FROM WASTE TO WONDER Research & Design Studio
Re-Inhabiting the Ruin by Graduate Student Rachel Momenee

NIKOLE BOUCHARD Assistant Professor

Saving the Planet Through Thesis

KAREN LANGE
California Polytechnic State University

Thesis exists in the in-between, the ambiguous space between real and unreal, proto-professional and professional, construction and vision. While thesis studio serves as a think tank for cultural observation, theoretical exploration, material exploitation, and architectural deviation, it is inherently about problem solving; affirmation through creation. Having mastered the architectural art of representation, the thesis student begins to think about things beyond their control and in so doing attempts to change the facts of construction or culture. Sometimes thesis is about saving the world.

This particular thesis studio combines the nature of conceptualizing the big idea with experimental 1:1 scale objects, and individualized thesis projects with a collaborative installation. In this case four diverse projects characterize the ability of thesis to define, analyze, synthesize, and produce a solution to the deterioration of earth's environment, cultural and infrastructural. Students hone their super powers through manifesto and research, allowing them to rant about what could be in addition to fueling innovation. Research leads to narration and experimentation, while collaboration forms a bond through the studio that allows themes and constructive criticism to flourish.

Architects use their ability of representation to propose the super real or surreal solution to problems, for example Lebbeus Woods' Quake City or High Houses. According to Todd Gannon, "architecture's basic magic is in how representations are mistaken for the world itself." Architects propose solutions to massive social and environmental problems which become part of the language of everyday by the simple plausibility of their representations. Outlandish solutions, such as BIG's The Big U or Superstudio's Continuous Monument, become emblazoned on the mind through imagery; their work envisions a seductive, sometimes perhaps nightmarish, future.

The five projects that follow serve to suggest the abilities of thesis to propose solutions to manmade problems of physical or cultural nature; individual thesis problems and one collaborative design. Thesis falls into the realm of fantastic architecture, as it is generally unbuilt and unbuildable, to encourage the super real is to encourage innovation in problem solving.

Project One: Source of radioactive contamination serves through disassembly to clean and return site to original condition.

Project Two: To fight effects of terrorism on architecture, the Feretory scans, duplicates, relocates what it can, and hides what it cannot.

Project Three: Desert site, once misoccupied, is repopulated through new uses – bath house, power grid, salt factory, battery storage, bird sanctuary.
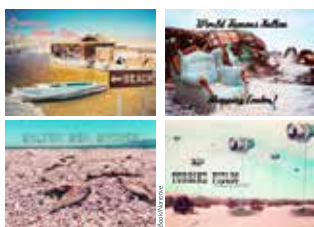
Project Four: The Salton Sea is autonomously rebuilt from the products of its demise – dead fish and salt – creating a new building material to halt its disastrous and deadly wind storms.

Studio installation relocates to become new use as a community center pavilion in Ghana.

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Studio Dilemma in Study Abroad Programs

ANTHONY CRICCHIO
University of Oklahoma

Architecture study abroad programs in Rome are numerous among ACSA member schools. They range from short travel experiences to full degree programs. The programs which contain studio components are often in a dilemma. Do you keep a strong studio based environment where students work in the confines of a traditional studio space, or do you provide the opportunity for students to travel and study the environment which the city provides? The dilemma lies with the time that both activities take to be successful endeavors. The following describes a pedagogical approach that combines the strengths of both.

The studio is a semester long 4th Year design studio based in Rome, Italy. The city and surrounding areas of Rome not only became the laboratory for research, but become a physical extension of the studio. The studio takes advantage of both sketching and digital methods of design research. The course is broken up into two parts. The first part of the semester involves research and analysis, while the second part contains a four week design charrette. Between the two parts, the students engage in a week long design charrette with students from two other architecture programs, and a service learning activity with archeologists to document architectural fragments from the Capitoline Museum.

The first part of the studio has the students study the city through a series of sketch and hybrid drawings. The sketch assignments are designed for the students to look and find connections between the different layers of the city. The intention of the exercises are not to replicate what is seen, but to explore how the past architecture influenced the future layers of construction. The hybrid drawings are designed to explore both the "artifacts" and "spaces" that make up the palimpsest of the city. A more contemporary assignment has the students create a video exploring the spatial qualities of an Italian hill town. The combination of these assignments begins a conversation within the studio about the importance and relevancy of old "ruins" verses the needs of contemporary Italians. Each student keeps a design blog which includes their physical assignments along with critical analysis of the objects learned.

The second part of the studio has the students apply the knowledge that they obtained of the past within a contemporary context. Due to the remaining time constraints involved in a study abroad program, a four week design charrette is given to teams of three to four students. The project is designed to be entered into the annual ACSA Steel Student Design Competition. The students are encouraged not only to design a building, but to look at how the building could engage the urban fabric of the city.

The program combines everything from traditional in situ sketchbook assignments to collaborative design projects, all framed within short focused exercises. When combined and in sequence, the exercises mimic the palimpsest of city, providing the students a layering of historical, design, and cultural education.

01. DILEMMA _ TOURIST

02. DILEMMA_ STUDIO WORK

03. CULTURAL_ EXPLORATION

04. IN SITU_ RESEARCH

05. IN SITU_ EXPLORATION

06. IN SITU_ DIAGRAMMING

07. IN SITU_ URBAN SEQUENCING I

08. IN SITU_ URBAN SEQUENCING II

09. IN SITU_ DETAIL EXPLORATION

10. IN SITU_ DETAIL DIAGRAMMING

11. DIGITAL_ ANALYTIQUE I

12. DIGITAL_ ANALYTIQUE II

13. HYBRID_ MAPPING I

14. HYBRID_ MAPPING II

15. HYBRID_ MAPPING III

16. HYBRID_MAPPING IV.jpg

17. WALL_WALK EXPLORATION I

18. WALL_WALK EXPLORATION II

19. COLLABORATION_ WALL WALK CHARETTE

20. COLLABORATION_PRESENTATION

21. WALL_WALK CHARETTE ENTRY I

22. WALL WALK_ CHARETTE ENTRY II

23. HISTORICAL_ DOCUMENTAION I

24. HISTORICAL_DOCUMENTAION II

25. HISTORICAL_ DOCUMENTATION III

26. HISTORICAL_ DOCUMENTATION IV

27. HISTORICAL_ANALYTICAL

28. HISTORICAL_PRESENTATION

29. HISTORICAL_ GRAPHIC PRESENTATION I

30. GRAPHIC PRESENTATION II

31. COLLABORATION_ DESIGN

32. DESIGN_FINAL PROJECT I

33. DESIGN_FINAL PROJECT II

34. DESIGN_FINAL PROJECT III

35. DESIGN_FINAL PROJECT IV

36. COLLABORATIVE_ LEARNING GROUP

Studio Dilemma in Study Abroad Programs

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The studio is a semester long 4th year design studio based in Rome, Italy. The city and surrounding areas of Rome not only became the laboratory for research, but become a physical extension of the studio. The studio takes advantage of both sketching and digital methods of design research. (Fig. 04-10) The course is broken up into two parts. The first part of the semester involves research and analysis, while the second part contains a four week design charrette. Between the two parts, the students engage in a week long design charrette with students from two other architecture programs, (Fig 17-22) and a service learning activity with archeologists to document architectural fragments from the Capitoline Museum. (Fig. 23- 30)

The first part of the studio has the students study the city through a series of sketch and hybrid drawings. The sketch assignments are designed for the students to look and find connections between the different layers of the city. The intention of the exercises are not to replicate what is seen, but to explore how the past architecture influenced the future layers of construction. The hybrid drawings are designed to explore both the "artifacts" and "spaces" that make up the palimpsest of the city. (Fig. 11-16) A more contemporary assignment has the students create a video exploring the spatial qualities of an Italian hill town. The combination of these assignments begins a conversation within the studio about the importance and relevancy of old "ruins" verses the needs of contemporary Italians. Each student keeps a design blog which includes their physical assignments along with critical analysis of the objects learned.

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Teaching Almost Natural Things

FAYSAL TABBARAH
American University of Sharjah

The research conducted in this sequence of studio and support courses problematizes the teaching about nature in undergraduate architecture education at a time of an increasing environmental crisis. Looking outside of contemporary academia and the discipline's response to this crisis through the lens of ecological ethics, the essay describes a teaching pedagogy that challenges how most contemporary undergraduate architecture education teaches about nature in a way that reinforces the hegemony of the nature/culture binary that seems implausible and irrelevant with the advent of the Anthropocene. This teaching pedagogy, titled Almost Natural, actively asks students to think about architecture outside of nature/culture binaries and to conceive of it as neither, but as a vague Almost Natural condition that rejects traditional geometric hierarchies, linear part-to-whole relationships, pattern making, and precision, in favor of tactical organizations a blurring of part and whole, deep textures, and the painterly or gestural. Moreover, this pedagogy is conducted through the lens of computational design methodologies.

In the development of the Almost Natural pedagogical model, there exists a conscious and active rejection of the historical othering of nature as well as an understanding about the plurality of nature; that it can take many contradictory forms simultaneously. The pedagogy draws on the work of the environmental sociologist William Freudenburg, specifically his text on the conjoined constitution between nature and society where he argues for a blurring of the boundaries between the physical (i.e. natural) and the social (i.e. human-made)1. Freudenburg rejects the three ways in which conventional sociology has traditionally viewed nature. The three categories include considering nature as completely separate and having little to not impact on society; placing nature and society on a hierarchical scale where one is given primacy over the other, or lastly, viewing nature and society as co-equal and balanced. As Freudenburg explains, viewing nature as separate, superior,

subservient or balanced implies an explicit othering. His alternative, the notion that nature and society exist as two parts of a conjoined constitution, argues that there is little difference between nature and society in that what we might think of one is heavily influenced by the other . Viewed from this springboard, this teaching pedagogy explores this conjoined constitution between nature and society through an active blurring and subverting of an archaic understanding of nature as a detached and homogeneous thing that lies outside of the realm of making the built environment, an other to be framed for marveling at, or even worse, to be exploited.

The expressions of this teaching pedagogy both digital and material, exhibit a form of tactical organizations that combine typically mis-fitting geometries, a blurring of part and whole, deep textures, and the painterly or gestural. These are expressed in this poster as projects that deal with mass, line or as hybrids.

NOTE

1. Freudenburg, William R. , Scott Frickel, and Robert Gramling. "Beyond the Nature/Society Divide: Learning to Think about a Mountain." *Sociological Forum* 10, no. 3 (September 1995): 361-92.

TEACHING ALMOST NATURAL THINGS

Author
Affiliation

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References:
1. Freudenburg, William R., Scott Frickel, and Robert Gramling. "Beyond the Nature/Society Divide: Learning to Think about a Mountain." Sociological Forum 10, no. 3 (September 1995): 361–92.

MASS

LINE

HYBRIDS

Augmented Bubbles

MARA MARCU
University of Cincinnati

MING TANG
University of Cincinnati

ADAM SCHUELER
University of Cincinnati

Today, as a paradigm shift, head-mounted displays (HMD) are being reintroduced as mixed reality (MR) instruments. MR allows designers to interact with and experience the physical and virtual world simultaneously in an immersive environment. In a 1995 essay, "The Vision of Virtual Reality", Biocca, Kim, and Levy argued that the "essential copy" and "physical transcendence" were important drivers in the generation of mixed realities. They described the search for the "essential copy" as seeking a "means to fool the senses—a display that provides a perfect illusory deception," while "physical transcendence" is rooted in an "ancient desire for escape from the confines of the physical world, [to] free the mind from the 'prison' of a body" (Biocca, Kim, and Levy 1995, 7). This theoretical foundation, with the latest technology, has inspired us to explore the relationship between the separator and the physical space, the perception of action, time, space, and the physical body.

"Augmented Bubbles" is an installation that expands on computation and mixed reality work produced at the University of Cincinnati, School of Architecture and Interior Design. A digitally fabricated component is juxtaposed using the Microsoft HoloLens near-eye light-field display with its animated holographic simulation. Through sensory perception and the motor response of users, the HMD helps one perform sensorimotor and cognitive activities in a mixed reality world.

Initially, the project began as an exploration of patterns and structures in conjunction with the tendencies and behaviors of a material, in this case, flat sheets of matte polypropylene. Inspiration was drawn from two seemingly different yet intertwined sources: Islamic geometries and soap bubbles. The basis of any polygonal geometric pattern, no matter the complexity, can always be broken down into a series of triangles. Within these triangles lies an inherent logic by which they are organized and give rigidity to the assembly. This same concept is explained at length in Self-made Tapestry: Pattern Formation in Nature by Philip Ball (1999). Ball uses the underlying structure of bubbles and honeycombs to describe how geometries found in nature arise from an innate desire for equilibrium. Three site dependent armatures define the aggregation and modulation of the base unit in CATIA's Sheetmetal Workbench. This platform allowed us to simulate the folding process of flat sheet materials. Parameters relative to weight, strength, and translucency were incorporated. Following, the location of connection holes was automated. Nylon arrowhead rivets were used wherever faces overlapped and zip-ties were employed wherever a hinge joint occurred. The fabrication and construction process expanded on the notion of skin and structure in architecture.

In the end, the digital bubble was reconstructed using the marching- cube algorithm. Free from the "essential copy" mindset, the new model is a symbolic simulation of reality. With the intention of blurring the real and the virtual, the model was eventually animated and further manipulated using Autodesk Maya and Unity. The virtual animation was controlled by the user's gesture and voice. Through the HoloLens spectator system and its semi-transparent "optical see-through" screen, the students combined computer-generated images with a view of the real world.

Figure 1: Base Unit.
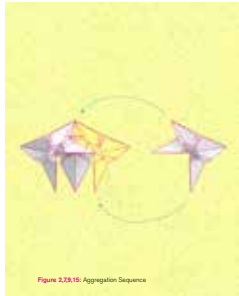
Figure 2,7,9,15: Aggregation Sequence
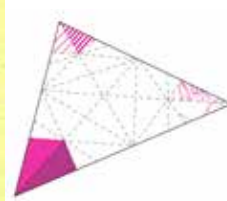
Figure 3,5,12,17: Folding.

Authors:

Mara Marcu, Assistant Professor, University of Cincinnati
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Connor Tuthill, Bachelor of Science in Architecture 2017, University of Cincinnati
Anousha Alamgir, Bachelor of Science in Architecture 2017, University of Cincinnati

Figure 4,8,11,13,20,21: Physical Installation.

5.
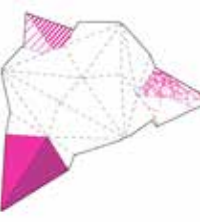
AUGMENTED
BUBBLES

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6.
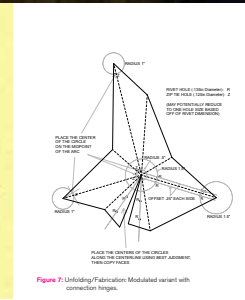
Figure 7: Unfolding/Fabrication: Modulated variant with connection hinges.

8.

9.
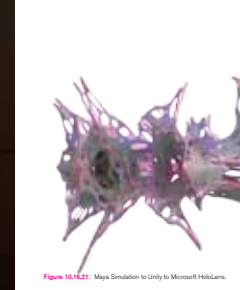
Figure 10,16,21: Maya Simulation to Unity to Microsoft HoloLens.

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Figure 14: Power Copy: Tertiary Armature with input points

15.

16.
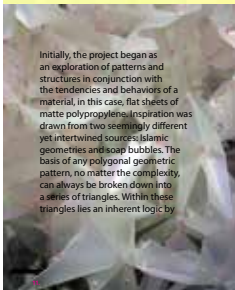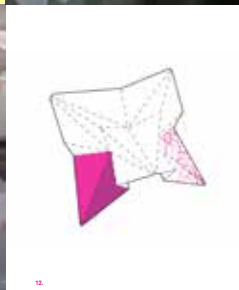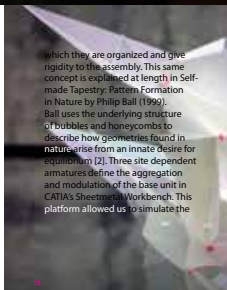
12.

Figure 18: Mixed Reality Experience

Figure 19: Plan.

Figure 20,22: Details.

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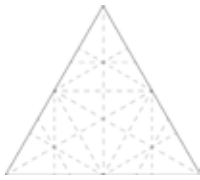
References:
1.   Biocca, F., Levy, M. (1995). Communication in the age of virtual reality. New Jersey:Lawrence Erlbaum Associate.
2.   Philip Ball, Self-made Tapestry: Pattern Formation in Nature, Oxford University Press, 1999, 16-18.

Framing Research for Design: Investigating the Context of Mass-Customized Dwelling in San Francisco

BRIAN KELLY
University of Nebraska-Lincoln

The ability to comprehensively understand the context of a future design proposal is essential to reducing generalizations and assumptions about place and user. A deeper understanding comes through intensive investigative research which seeks to reveal connections within a complex system. This project demonstrates one of several examples from an interdisciplinary design studio where students were challenged to interrogate the context of mass customized dwelling in the context of San Francisco, and to do so through the lens of seven systems.

1. Transportation: roadways, railways, infrastructure, rivers, airports, pedestrian ways, bicycle paths, etc.

2. Soft: information networks, money, government, energy, information, communication networks, etc.

3. Natural: ecology, environment, climate, wildlife, hydrology, soils, migrations, etc.

4. Social: rituals, culture, domestic structure, family structure, neighborhoods, community, government, etc.

5. Economic: money, import/export, GDP, taxes, incentives, job markets, industries, etc.

6. Jurisdictional: zoning, government, property lines, covenants, land rights, ownership, etc.

7. Construction: manufacturing, materials, fabrication, construction approval, workforce, regional techniques, trades/unions/organizations,

Design teams were asked to uncover information and communicate the synthesis of their understanding through a series of information graphics, maps, and diagrams which collectively communicate the foundation of their collaborative design research project. Building from the framework proposed by Kate Orff, systemic interrelations detailed key touch points and opportunities to intervene with thoughtful design projections. Orff's framework consists of the following:

1. Maps [orientation]: A layering of spatial data, geographical characteristics, and community narratives.

2. Data Narratives [analysis]: A decoding of the image by analyzing and revealing associated industrial or ecological processes.

3. Eco Portraits [synthesis]: Synthetic moments where a series of data prints and observations converge into an overall ecology or process view, joining seemingly isolated phenomena into a perceptible whole. 1

The graphic narrative communicates connective and dynamic traits of the systems offering a more robust and comprehensive understanding of place and user. Additional graphics expand or contract to describe alternative scale connections, flows, or movements. Publication spreads were restricted in quantity encouraging hybrid graphics with coexistent data and diagrammatic information.

In the end, the deliverables asked students to frame their subsequent design research investigation, outlined through (4) components. The DESCRIPTION is a contextual motivation intended to outline the connections and shortcomings/failures with a system, and leave the reader with a sense of urgency about a need to address it. The QUESTIONS outline the challenge and position the project inquiry with regard to mass customization, manufacturing and materiality, and the domestic structure. The METHODS describe the ways in which design teams engage the design process and issues outlined. Lastly, the SIGNIFICANCE positions the project in its disciplinary relevance.

Students followed this 2.5 week exercise with the design of a mass-customized dwelling fueled by the research generated. The results of the studio demonstrate the impact of a research for design phase which leads into intensive research by design efforts.

NOTE

1. Misrach, Richard, and Kate Orff. Petrochemical America. New York: Aperture, 2014.

FRAMING RESEARCH FOR DESIGN

Investigating the Context for Mass Customized Dwelling in San Francisco

Description

There is a severe lack of housing in California's major California Coastal Communities. In these areas, community resistance to housing, environmental policies, lack of fiscal incentives, and limited land hinder development. The high demand drives up cost and pushes the mid to low income population out of the city. The city of San Francisco has propelled the problem even further. In 2015, it was recorded that the city had built over double the housing needed for the high income population, leaving the mid to low income population with a severe lack of housing. The shoreline with the existing piers is an extremely underutilized asset, but according to NOAA projections of 2100, a large portion of the San Francisco Bay area will be under water as sea levels are projected to rise three feet.

Questions

1. Due to San Francisco's peninsular condition and lack of viable land, how might we analyze existing and propose methods to could community on water?
2. In response to the housing crisis in San Francisco, how might we design atypical housing for low to medium income users?
3. Because of the disparity in low and middle income housing, how might we utilize mass customization in a multi-family program to provide authorship for each user type?
4. In response to a fast paced non-permanent cultural mentality, how might we design a dwelling for its entire life cycle, considering materiality, disassembly, and recyclability?

Methods

1. Research into fabrication methods of construction and erection through use of adaptive component modeling and small-scale prototyping as an approach that minimizes impact on the existing ecological site in the Bay area.
2. Employing parametric design and building performance modeling to optimize decisions and results, presenting the opportunity of mass production, customization and efficiency in design.
3. Establishing the program, form, location, and materiality of the design through iterative studies relating to historical, cultural and social, understandings of the site.

Significance

The potential impact of this investigation could foster a dialog around possible solutions for the housing crisis of San Francisco and cultivate speculation on what dwelling means and in a contemporary society. The design will focus on systems of mass customization for varying user types and prefabricated design with the intention of building system and material recyclability. This investigation has the potential to challenge current housing types and construction life cycles in the United States.
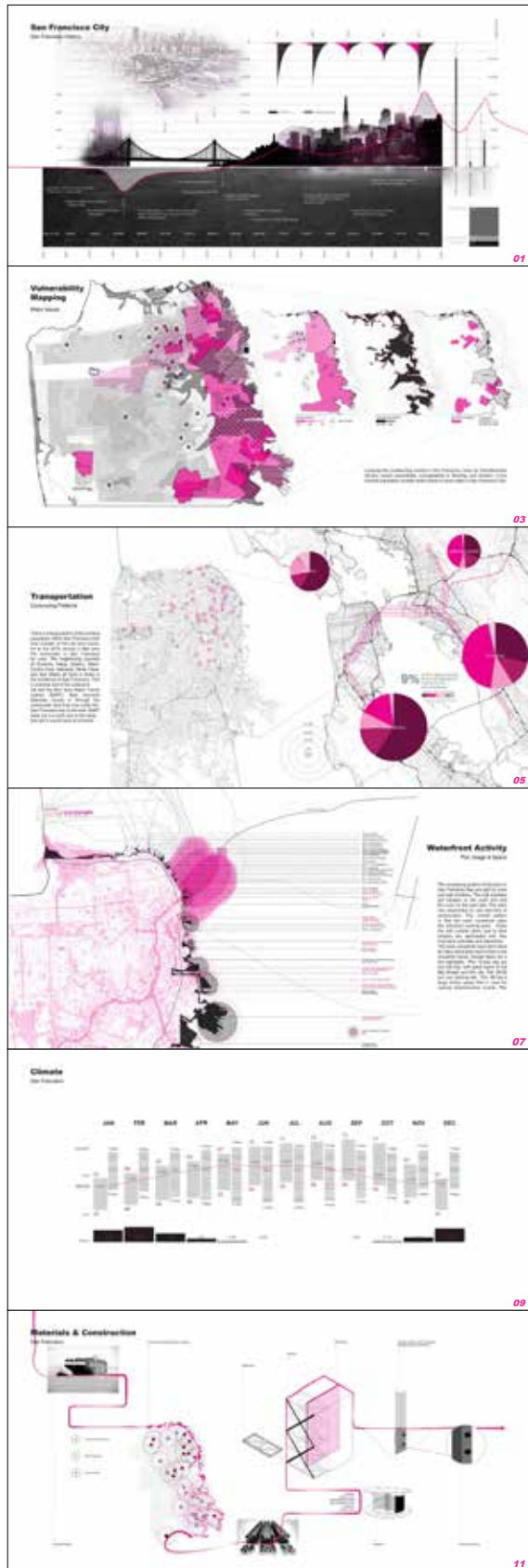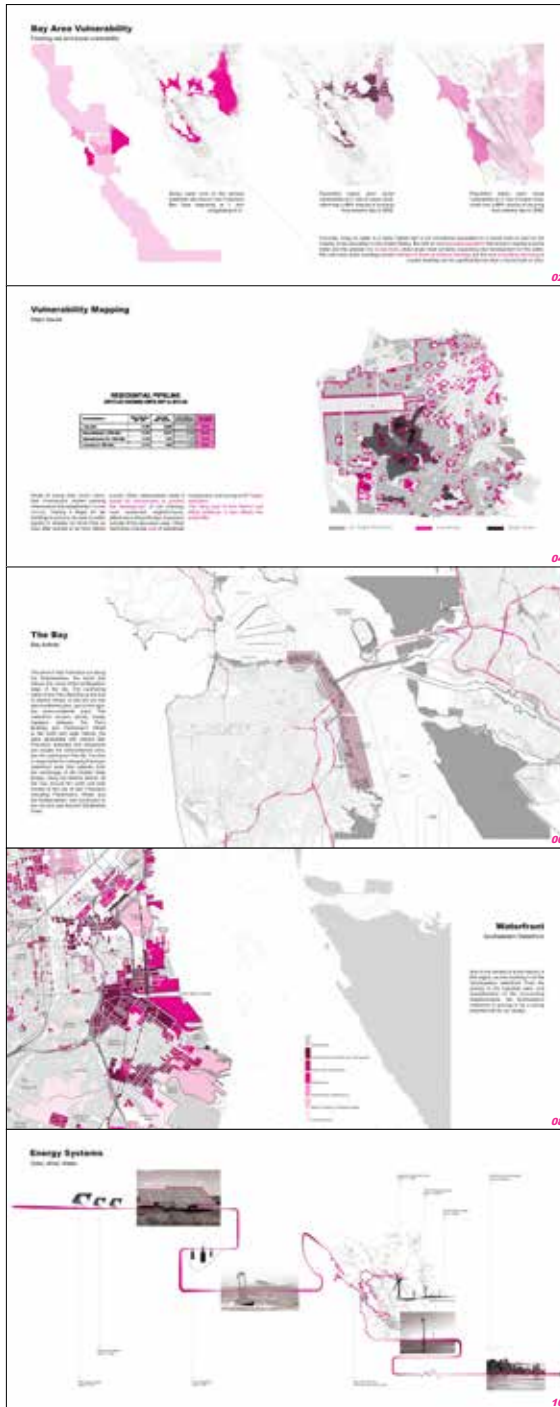
Supple[Core]: Interaction design as a design tool

EBRAHIM POUSTINCHI
Kent State University

ABSTRACT/PURPOSE

The use of computer and computational design is shifting and changing the design culture and design process radically. The rapid development of such approaches in architecture raises the concern that the full richness of human experience and evaluation may no longer be present in certain aspects of design, and that a gap may arise between the architect's direct awareness of human needs and the ultimate, computationally-assisted design outcomes. (Kalantari, Poustinchi, 2017). In the context of an undergraduate design studio, the Supple[Core] project presents a mixed-method design- research investigation that integrates a Hybrid Digital – Physical design platform for developing a design language and designing an interior space using interaction design as a design tool.

METHOD:

Increasingly larger amounts of creative resources are being put into producing new tools and concepts that are designed not to make things but, to amplify the creative capacities of others (Lavin, 2015). The Supple[Core] research studio is based on the idea of previous research investigations where the design of the space is the result of human-based studies. Typically, these methods are highly relying on statistic data and analysis from either or both pre and post-occupancy evaluations. The Supple[Core] method, however, is studying how human-based design--through the lens of interaction can affect the design language or the design process.

Throughout the studio, students introduced to design computational techniques, visual programming, and interaction-design thinking, as scholarly design-research tools. Then, employing interaction and physical computational design techniques, students study the conceptual and theoretical supports of their design in an abstract field of force simulating design relationships between an object (massing core), landscape (ground condition), and an interactive "surface".

PROCESS:

Students started with a literature review of existing "interactive" architectural components such as doors, windows, and sliding walls and looked their design and interactive characteristics such as volumetric, tectonic, surface and vector qualities and conditions. As the second phase, they developed and used an interactive design scenario between an Object, Landscape and a surface, to study the potentials of animated components in regards to developing spatial configuration. Students used advanced digital fabrication techniques such as CNC milling, plaster casting using the CNC milled molds, 3D printing, and laser-cutting, to fabricate physical models of their conceptual studies on Object, Landscape, and the surface. Activating/animating the physical models, using Arduino Microcontroller, servo motors, and linear actuators, they have been able to develop a "mechanical machine" to study visual statements and dialogues between "core" and architectural elements in the space: Massing, ground condition, and interiors surfaces.

In the next and the final step, using the object/landscape/surface machine, each student translated these studies into a design language that informs their design for a social media creative studio space, using the design potential and possibilities explored in the interactive digital and physical computational design process.

The most significant outcome of the Supple[Core] studio, is to introduce and use interaction design--through digital design, fabrication and physical computation, as a new form of a design tool for architectural design. This studio encouraged students as junior researchers to question their digital and analog design tools, through a hybridized digital/physical platform of an interactive design process.

SUPPLE[CORE]:
INTERACTION DESIGN, AS A DESIGN TOOL

EBRAHIM POUSTINCHI [Kent State University, United States, mpoustin@kent.edu]

ABSTRACT

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Kalantari, S., Poustinchi, E. (2017), Human-Computer Interaction in the form-making process, Proceedings of the 22nd International Conference of the Association for Computer-Aided Architectural Design Research in Asia (CAADRIA) 2017, 529-539.

Lavin, Sylvia. (2015, July 13). "Man vs. Machine: Sylvia Lavin Retools Creativity." Los Angeles Forum for Architecture and Urban Design. Retrieved from http://laforum.org/delirious/man-vs-machine-sylvia-lavin-retools-creativity/

A. OBJECT
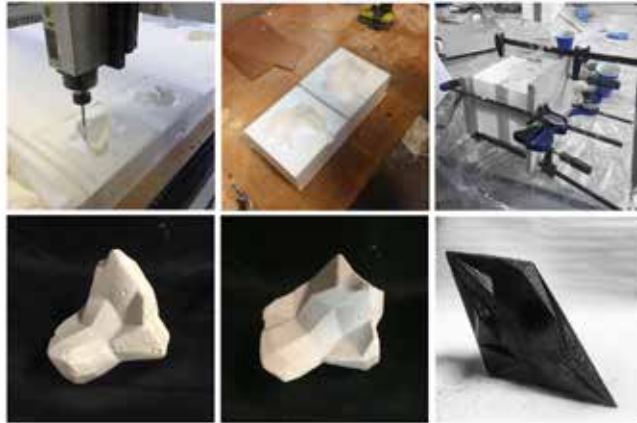
B. LANDSCAPE + INTERACTIVE SURFACE

C. INTERACTION DESIGN AS A DESIGN TOOL

D. DESIGN | CREATIVE STUDIO/OFFICE SPACE | PLAYA VISTA CAMPUS, CA

The Living Archive and the Sublime Nature of the Anthropocene: A Design Studio Model

JULIE LARSEN
Syracuse University

At the 2015 UN Conference on Climate Change in Paris France, 195 nations reached a decision to commit to decrease the severe effects of climate change on the planet. As we embark what some call the Anthropocene Era, we bare witness to how civilization has impacted the Earth's ecosystem, diminishing its resources and threatening its biodiversity. With this shift in our ecosystem, a new pedagogical model for a graduate architecture studio responded to the Anthropocene through a technologically sublime intervention: The Living Archive, a new architectural type capturing the magnitude of Earth's inevitable transformation. The 'living archive' program is not meant to be a stable, secure vessel but uses technological invention to bracket what is being invaded by human existence. Through the invention of an 'archiving machine', the studio used technological speculation to question what nature can or will become. The aim was to use 'living archive' as a physical commentary or critique on our current relationship to the environment. The poster describes three studio projects that speculate on the inevitable future of different environments. Through analysis, technological research, and formal aspirations, each project embodies a potential reality and potential future of the Anthropocene.

The Living Archive Scenario is that the environment and its water bodies are changing for the worse, potentially flooded, absorbed, melted, dried up, or obsolete. As a project, the archive becomes its own critique on the abundance of global and ecological change happening in the world today. The living archive is not a stable, secure vessel but preserves the environment by using technological invention to frame what is being invaded by human existence. The production of nature, is the belief that societies make nature and force us to consider what nature has been and may yet become (Gissen 2010). With the production of nature, there is an opportunity for a living archive to frame new potential in the role of production within a particular environment that is no longer productive or has

the potential to become more so. Through the invention of an archiving machine, the studio used technological speculation as a way to define a new architectural type of production that questions what nature can or will become. The 'living archive' as a machine becomes a design speculation that reveals the sublime nature of a place, its impact on culture through new technological intervention, and its position within the context of the Anthropocene.

THE LIVING ARCHIVE
AND THE SUBLIME NATURE OF THE ANTHROPOCENE: A DESIGN STUDIO MODEL

At the 2015 UN Conference on Climate Change in Paris France, 195 nations reached a decision to commit to decrease the severe effects of climate change on the planet. As we embark what some call the Anthropocene Era, we bare witness to how civilization has impacted the Earth's ecosystem, diminishing its resources and threatening its biodiversity. With this shift in our ecosystem, a new pedagogical model for a graduate architecture studio responded to the Anthropocene through a technologically sublime intervention: The Living Archive, a new architectural type capturing the magnitude of Earth's inevitable transformation. The 'living archive' program is not meant to be a stable, secure vessel but uses technological invention to bracket what is being invaded by human existence. Through the invention of an 'archiving machine', the studio used technological speculation to question what nature can or will become. The aim was to use 'living archive' as a physical commentary or critique on our current relationship to the environment. The poster describes three studio projects that speculate on the inevitable future of different environments. Through analysis, technological research, and formal aspirations, each project embodies a potential reality and potential future of the Anthropocene.

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DEPLETING FRESH WATER LAKE CHAD, FROM 1963 V- 2007, NEARLY MOST OF THE LAKE HAS DISAPPEARED

The 'Bloom' group studied the impact of CO2 fertilization and decreasing rainfall in the northern Sahel of the Grasslands and Savannah biome in Africa, which is causing parts of the grasslands to shrink and turn to woodlands. The increase of CO2 in the air creates an increase in woody plant mass in parts of the Savannah. This group eventually studied how the excess of CO2 could be captured and converted to fuel and water. They also discovered, in areas of the Savannah in Africa, that fresh water lakes are disappearing due to irrigation and agriculture.

SITE PLAN OF DUNESCAPE STRUCTURES IN DAMMAM, SAUDI ARABIA
DUNE AND SAND STORM PATTERNS WERE STUDIED FOR THE DESIGN OF THE MACHINE'S SKELETON TO CAPTURE SAND

The 'dunescape' group studied desertification in the Desert biome and the loss of aquifers due to irrigation in arid regions like Saudi Arabia, China and the United States. They discovered that desertification, the depletion of soil due to human use, is causing previously arable land to become desert and unusable. This eventually led them to study the wind patterns and areas at risk in Dammam, Saudi Arabia that could potentially shift back to more arable land where agriculture and greenhouses are at a premium.

MAPPING OF WIND CURRENTS IN THE ARCTIC TO STUDY SHIFTING ICE PATTERNS

The 'constructing ice' group studied glacier movement and the freeze / thaw cycle of the Arctic biome to understand the rate at which ice was melting and where ice patterns formed. The greater impact on the Arctic, due to higher global temperatures, is having a profound affect on a number of wildlife in the Arctic, which is being forced to change migrations, and animal mating patterns as a result. They also studied Arctic water currents and 'fast ice' which is, by definition, sea ice that is anchored to the shoreline. The students saw the location of 'fast ice' as a potential place to ground the project and capture wave energy for artificial ice that could aggregate near the shore. The recurring seasonal changes to the ice patterns showed that there is more and more ice movement during winter months than ever before recorded. The alarming rate of ice drift and glacier movement during the winter season was an opportunity to reflect on the vulnerabilities and fragility of the Arctic due to climate change.

The 'Constructing Ice' Living Archive

This group studied the Arctic biome and used the machine to speculate on 'Constructing Ice' as a way to contest melting ice caps in the Arctic. The students aimed to slow the absurdity and length we need to go to, in order to maintain the status quo of the arctic ice shelf. Their machine was designed as a water tank system, run on wave turbines that freeze and move water through liquid refrigerant piping to produce ice modules for artificial icebergs. The result was a series of iterative formal studies of ice module accumulation. The tri-prong modules interlock with one another as they float to the surface and form deep, stacked formations.

In the Constructing Ice Archive, the ice modules form a series of smaller artificial glaciers that can link together to form a field condition with larger aggregations. The challenge with the Constructing Ice Archive was the scale of the Arctic and the ability to negotiate between an edge of a glacier and the field condition of the vast ocean. The living archive never stops growing as additional ice modules continually accumulate to form larger aggregations of ice sheets that can expand along the Arctic Ocean. While the living archive produces ice, it also captures natural icebergs that migrate into the 'fast ice' composite along the shoreline. The archive becomes a commentary on the never-ending exploitation of technology to solve our problems. The spectacle is in the scale and absurdity of continually freezing water that creates a another man-made sublime, nature of artificial ice sheets and icebergs for this dystopic Anthropocene Era.

MODULAR STUDIES OF 'BLOOM' AS AN AGGREGATED SERIES OF 'PODS'

The 'Bloom' Living Archive

The Bloom Machine investigated the Savannah biome in Africa, found that due to global warming, high concentrations of CO2 were quickly converting grasslands to woodlands, which is known as the carbon-dioxide fertilization effect (Höfe 2016). Their archiving machine, known as 'Bloom', sequestered the CO2 by capturing it in a series of absorbent, balloon-like structures with sensors on the skin that begin to 'bloom' as CO2 is absorbed. The skin captures the CO2 from the ambient air and feeds it into a converter that creates carbon monoxide, hydrogen, and water. As a result, the structure expands and swells begins absorbing CO2 to slowly bring back the Savannah grasslands. In turn, the byproduct of water is captured to replenish small water bodies within the Savannah. The Bloom Archive was designed to be a commentary on the future of water bodies in the Savannah region that have depleted due to desertification, irrigation, or agriculture.

The Bloom machine expands to a living archive on Lake Chad, a lake that was once one of largest freshwater bodies in Africa has drained to almost extinction; shrinking from a 25,000-square kilometer lake to now only a 1,350-square kilometer lake due to massive irrigation by neighboring nations. With little possibility to regain water that was once in abundance on Lake Chad, the archive provides the potential for future growth of the lake over several years as the Blooms of the archive generate water from the capturing CO2. The spectacle is in the absurd lengths to which one has to reach to replenish fresh water that was once in abundance not long ago. The sublime nature of the tall blooms shifting in space over time would register the severe impact of what human activity created and what we need to do to bring fresh water to the region.

'SPECULATIVE SECTION OF 'BLOOM' MACHINE AS ARCHIVE

SITE PLAN OF BLOOM ARCHIVE MOVING TO DIFFERENT LOCATIONS ALONG LAKE CHAD

The 'Dunescape' Living Archive

For the machine component, the students studied the Desert biome and depleting aquifers in the desert of Dammam, Saudi Arabia. Desertification in the region is caused by irrigation and agriculture that pose a major threat as population grows and demand for food increases. The students studied Magnus Larsson's research on bacillus pasteurii, which is a bacterium that turns sand into sandstone when combined with water, urine, and calcium. The structural framework of their machine is built to connect to local water treatment facilities to harvest untreated water, that contains urine and calcium, for new agricultural growing on the roof.

The Dunescape Archive used the wind-generated bacteria-formed structures, derived from studies of dunes, to create an ever-expanding sand to stone root structure. Based on the archiving machine, the students designed the structure to continually grow along the northern edge of the city that is most affected by sand shifts. As the living archive expands and creates a natural boundary or buffer around the city, so does the roof surface for agricultural growth. The living archive is continually adapting and reframing the sand storms and allowing the sand to envelope the building to create more structure for agriculture. As more sand storms accumulate, the more potential there is for new structures to grow and contribute to the growth of agriculture for the city. The archive becomes a magnificent spectacle and registration of 'human activity,' ironically translating human growth into an expanded field that grows natural resources and feeds the population from the desert material they created.

SITE MODEL 03, 'DUNESCAPE' MACHINE WITH SAND DRIFTING IN AND OUT OF STRUCTURE

AXONOMETRIC OF ARCHIVE - WITH ROOF STRUCTURE AS GREENHOUSE

'CONSTRUCTING ICE' MACHINE SCENARIO -
ACCUMULATING ICE TO FORM ARTIFICIAL GLACIER

SITE PLAN OF ARTIFICIAL GLACIERS FORMING ARCHIVE

'CONSTRUCTING ICE' MACHINE SECTION OF ARTIFICIAL GLACIER

HISTORY/THEORY

Emilio Perez Piñero and the Contemporary Lightweight Collective

JONATHAN RULE
University of Michigan

ANA MORCILLO PALLARES
University of Michigan

Today, the necessary versatility of the limited common space in our cities and our transient lifestyle establish a contemporary framework to reevaluate the work of collapsible and transformable built environments and their potential to produce lightweight and affordable solutions. In a call to rethink the impermanence of space, the project 'Deploy' interrogates the context of the last fifty years of Spanish architecture with the intention of developing a framework to question the possibilities of deployable structures within the public realm. The project looks from the mechanics in the structural prototypes of Spanish architect Emilio Perez Pinero in the 60's, that attempted to provide an illusory flexible space in a post-war era, to the contemporary post-economic-crisis proposals such as the 'Escaravox' by Andres Jaque, 'Eco-Boulevard' by Ecosistemas Urbanos and 'El Circo' by Santiago Cirugeda, which hold a critical position with their current urban context.

The positive assets of these projects contribution to the public realm provide a further exploration and testing of future spatial possibilities that promote a stronger and more socially diverse collective. Piñero's work on designing a collapsible space frame structure, based on the logics of the equilateral triangle found in Fuller's geodesic dome, was able to articulate two important factors. First, its use of lightweight easily transportable materials, and secondly the ability for the structure to be erected with ease. More specifically the design showed innovation in resolving problems of mobility, since the structures could be transported in one piece, making in place assembly unnecessary and reducing the need for multiple parts. In addition to his technical advances, Piñero was able to participate in new trajectories found in disciplinary discourse that were concerned with future thinking and utopian visions of non-permanence in the collective realm. His structural prototype for an ephemeral mobile theatre was a response to the desire of a new kind of improvisational architecture. A crucial statement which led the first attempts to the shifting cultural and social conditions of the rigid political dictatorship in Spain at the time.

Past and present projects illustrate the use of lightweight architectures as non-permanent and flexible catalysts for the collective experience that have provided spaces in support of social, sustainable, political and cultural development of our cities. Contemporary proposals mark a return or continuation of an invested interest in the collective space alternatives in a more politically-involved, sustainable and participatory society. A society whose demands require closer attention by designers who leverage lighter, quicker and cheaper mechanisms to support change. By revisiting Pinero's work, Deploy led to the design and construction of a prototypical structure that intends to further demonstrate the ability for these deployable architectural proposals to 'stage' new relationship between the citizens and the city. As the Spanish urbanist Jordi Borja states, these 'projects and the management of public spaces and collective facilities are both an opportunity to produce citizenship and a test of its development.'

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1. Pinero + prototyoe   **2.** Pinero + UIA design 1960   **3.** Pinero + Dalí - Vidriera Hipercúbica 1972   **4.-5.** *'Deploy' Details*   **6.** *'Deploy' Taubman College RTM Exhibition 2017*   **7.-8.** *'Deploy' Free City Flint Public Art festival 2017*

Architectural Ghosts : Storytelling & the Architectural Imaginary

ZOE LYNNE COPE
University of Nebraska-Lincoln

'Architectural Ghosts' proposes architecture as a series of eleven speculative cities that function as characters engaged in a theatrical masque set in contemporary Rome, Italy.

A re-imagining of the novel Invisible Cities by Italo Calvino, this project utilizes narrative storytelling as architectural medium, method and site. The framework of the original novel was analyzed, collapsed and re-written in a contemporary context. The project offers a critique of the use of the novel in architectural education and challenges the marginalized role of women presented in both the original text and throughout much of architectural history.

Calvino used cities as metaphors for women conquered by powerful male explorers. In this project, each city was designed and illustrated relative to site, theme and the work of a prominent female storyteller, philosopher, or architect as a way to presence their ghosts. Much of the research was oriented around unearthing the accomplishments of women engaged in a partnership wherein a male counterpart received credit for much of the work. The plot is structured by an overarching conversation between a female narrator and a male character. Desire for what her voice brings into being creates a tension that drives the entirety of the plot, representation and sequencing of architectural experiences. Eventually, it is revealed that she herself is also a city; she too is a ghost catalyzed by architectural and phenomenological experiences that imply presence.

This project explores 'architectural ghosts' as allegory for the presence of the absence of presence that reveals architecture as performance. The universal gap between lived experience and representation is explored as primary function of the paradox of human desire. Literary narrative is utilized as structure for the gap of philosophical lack and as active agent for the discrete, conditional alignments that generate and inform productive encounters with the architectural imaginary. The masque, as performance between complex characters, reveals the individual and collective nature of architecture, cities and the stories we tell about both.

ARCHITECTURAL GHOSTS

A Masque for the Architectural Imaginary

'Architectural Ghosts' is a re-imagining of Italo Calvino's seminal work, *Invisible Cities*, as a proposal for eleven speculative cities that function as characters in an architectural masque deeply embedded in the historical and cultural imaginary of Rome, Italy.

- Eleven Stories (210 pages), 144 photographs, Eleven Speculative

MARION
The Hidden City - Via Margutta

1. Alley	4. Community Chambers	7. Mirrored Park	10. Circulation
2. Hyperdermis	5. Individual Home	8. Crawlspace	11. Hidden City²
3. Collection Follicles	6. Frequency Shifter	9. Protective Fur	

SCHEHEREZADE
The Continuous City - Mura Aurelia
The Infinite Loop :18 Hinges & Towers

1. Head & Quarters	4. Emotional Topographies	7. Infinite Market	10. Crematorium	13. Bath House	16. University
2. Vertebrae	5. Museum of Safekeeping	8. Preservation Facility	11. Room of Words	14. Sleeping Chambers	17. Zoo of Life Forms
3. Sea of Justice	6. Timekeeper's Piece	9. Theater of Loss	12. Political Parlour	15. Collection of Old Time	18. Quarters & Head
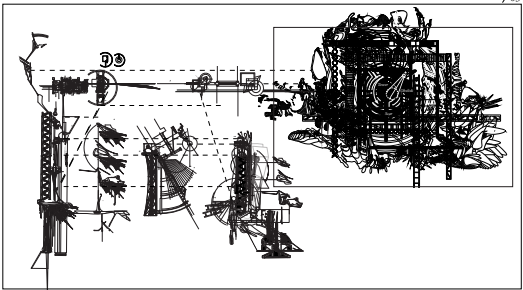
HANNAH
The City of Names - Columna Trajana
Obelisk, Tower, Labyrinth & Scar

1. Inscription Switchboard	4. Needle Mechanism	7. (Bed Becoming Table)	10. Whispering Room	13. Procedure
2. Platform for the Muses	5. Air Intake Funnel	8. Mechanical Shell	11. Scammerous Chambers	14. Spiral Core
3. Switchbord Hinge	6. Bed of Feathers & Wax	9. Exterior Wing	12. Watchtower	

DENISE
City of Signs - Cinecittà
Signifier/Signified Axonometric Collapse

1. The City of Signs is constructed of absolute truths that are lies: falsehoods not in words, but in things.
2. The City of Signs is both truths & lies. Falsehoods are in both words & things.
3. Though you have passed through her gates; the city is not here.
4. **She never was.**
5. Though you have passed through her gates; the city is not here.

SIMONÉ
City of the Sky - Parco Gianicolo
Identities

1. Soft Topographies	6. Seven Programs	i. Observatory for Day & Night
2. Soils Laboratory	i. Wind Tower	ii. Garden of Trim Hedges
3. Air Laboratory	ii. Chime Campanile	vi. Amphitheater of Mirrors
4. Observation Deck	iii. Obelisk of Internal	vii. Lazaretto for the Sick
5. Lockbox	Rhythms	

POLIA
City of Desire - Villa Borghese
Seductive Plots

SEQUENCE	CONSEQUENCE
1. Hedge	1. Filtration
2. Forecourt	2. Foreplay
3. Grotto	3. Purification
4. Throat	4. (The Fall)
5. Boudoir	5. Desire Maintained
6. Back Garden	6. Search for Release
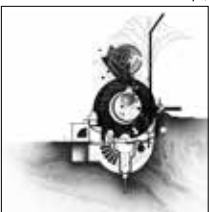
SILVIA
City of Eyes - The Pantheon
Occulus Ciphers

1. Eyes that see
2. Eyes that do not see
3. Vaults for the Collection and Storage of Images
4. Retinal Topographies
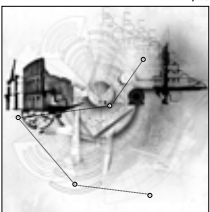
HÉLOÏSE
City of Memory - Flavian Ampitheater
Memory Theater

1. City on the Horizon	4. Memory Theater
2. Threshold	5. Oldest Histories
3. Hypogeum	6. Frontal Cortex

MOMOYO
City of the Dead - Piazza San Pietro
Acts of the Apostles

1. Tomb for the Beloved	4. Shadow	7. Cremation Ovens
2. Necropolis	5. Original Footprint	8. The Great Bell
3. Circus	6. Plan (New Basilica)	9. Double Ringed
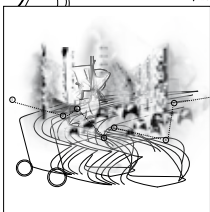
SAPPHO
Trading City - Campo dei Fiori
Pavillions

1. The Aventine	4. The Esquilline	6. The Quirinal
2. The Caelian	5. The Palatine	7. The Viminal
3. The Capitoline		

PHILLIPA
The Thin City - Porta Maggiore
Characters

1. Tomb of Marcus Virgilius Eurysaces	4. Lagoon for data mining
2. Office of the Subversive	5. Apartments
3. Portas / Hubs for Information Exchange	6. The Well
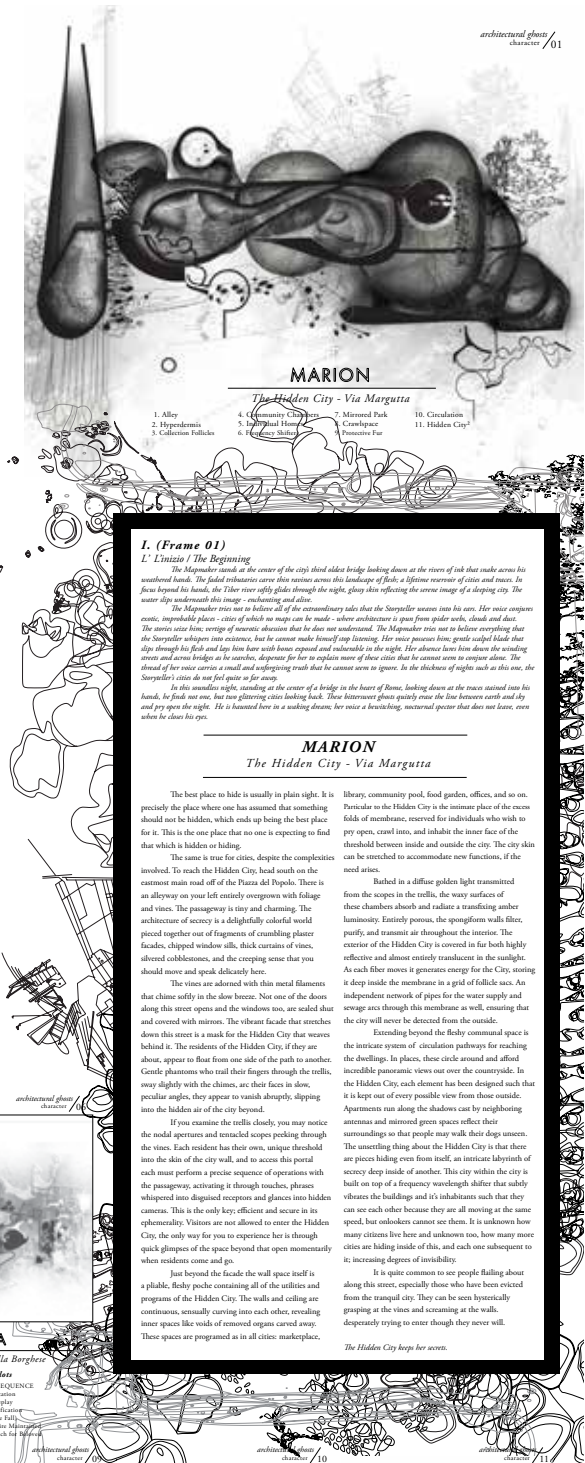
I. (Frame 01)
L' Inizio / The Beginning

The Mapmaker stands at the center of the city's third oldest bridge looking down at the rivers of ink that snake across his weathered hand. The faded tributaries carve thin ravines across this landscape of flesh; a lifetime reservoir of cities and maps. In focus beyond his hands, the Tiber river softly glides through the night, glassy skin reflecting the serene image of a sleeping city. The water slips underneath this image - enchanting and alive.

    The Mapmaker tries not to believe all of the extraordinary tales that the Storyteller weaves into his ears. Her voice conjures exotic, improbable places - cities of which no maps can be made - where architecture is spun from spider webs, clouds and dust. The stories seize him; vertigo of neurotic obsession that he does not understand. The Mapmaker tries not to believe everything that the Storyteller whispers into existence, but he cannot make himself stop listening. Her voice possesses him; gentle scalpel blade that slips through his flesh and lays him bare with bones exposed and vulnerable in the night. Her absence lures him down the winding streets and across bridges as he searches, desperate for her to explain more of these cities that he cannot seem to conjure alone. The thread of her voice carries a small and unforgiving truth that he cannot seem to ignore. In the thickness of nights such as this one, the Storyteller's cities do not feel quite so far away.

    In this soundless night, standing at the center of a bridge in the heart of Rome, looking down at the traces stained into his hands, he finds not one, but two glittering cities looking back. These bittersweet ghosts quietly erase the line between earth and sky and pry open the night. He is haunted here in a waking dream; her voice a bewitching, nocturnal spectre that does not leave, even when he closes his eyes.

MARION
The Hidden City - Via Margutta

The best place to hide is usually in plain sight. It is precisely the place where one has assumed that something should not be hidden, which ends up being the best place for it. This is the one place that no one is expecting to find that which is hidden or hiding.

    The same is true for cities, despite the complexities involved. To reach the Hidden City, head south on the eastmost main road off of the Piazza del Popolo. There is an alleyway on your left entirely overgrown with foliage and vines. The passageway is tiny and charming. The architecture of secrecy is a delightfully colorful world pieced together out of fragments of crumbling plaster facades, chipped window sills, thick curtains of vines, silvered cobblestones, and the creeping sense that you should move and speak delicately here.

    The vines are adorned with thin metal filaments that chime softly in the slow breeze. Not one of the doors along this street opens and the windows too, are sealed shut and covered with mirrors. The vibrant facade that stretches down this street is a mask for the Hidden City that weaves behind it. The residents of the Hidden City, if they are about, appear to float from one side of the path to another. Gentle phantoms who trail their fingers through the trellis, sway slightly with the chimes, arc their faces in slow, peculiar angles, they appear to vanish abruptly, slipping into the hidden air of the city beyond.

    If you examine the trellis closely, you may notice the nodal apertures and tentacled scopes peeking through the vines. Each resident has their own, unique threshold into the skin of the city wall, and to access this portal each must perform a precise sequence of operations with the passageway, activating it through touches, phrases whispered into disguised receptors and glances into hidden cameras. This is the only key; efficient and secure in its ephemerality. Visitors are not allowed to enter the Hidden City, the only way for you to experience her is through quick glimpses of the space beyond that open momentarily when residents come and go.

    Just beyond the facade the wall space itself is a pliable, fleshy poché containing all of the utilities and programs of the Hidden City. The walls and ceiling are continuous, sensually curving into each other, revealing inner spaces like voids of removed organs carved away. These spaces are programed as in all cities: marketplace, library, community pool, food garden, offices, and so on. Particular to the Hidden City is the intimate place of the excess folds of membrane, reserved for individuals who wish to pry open, crawl into, and inhabit the inner face of the threshold between inside and outside the city. The city skin can be stretched to accommodate new functions, if the need arises.

    Bathed in a diffuse golden light transmitted from the scopes in the trellis, the waxy surfaces of these chambers absorb and radiate a transfixing amber luminosity. Entirely porous, the spongiform walls filter, purify, and transmit air throughout the interior. The exterior of the Hidden City is covered in fur both highly reflective and almost entirely translucent in the sunlight. As each fiber moves it generates energy for the City, storing it deep inside the membrane in a grid of follicle sacs. An independent network of pipes for the water supply and sewage arcs through this membrane as well, ensuring that the city will never be detected from the outside.

    Extending beyond the fleshy communal space is the intricate system of circulation pathways for reaching the dwellings. In places, these circle around and afford incredible panoramic views out over the countryside. In the Hidden City, each element has been designed such that it is kept out of every possible view from those outside. Apartments run along the shadows cast by neighboring antennas and mirrored green spaces reflect their surroundings so that people may walk their dogs unseen. The unsettling thing about the Hidden City is that there are pieces hiding even from itself, an intricate labyrinth of secrecy deep inside of another. This city within the city is built on top of a frequency wavelength shifter that subtly vibrates the buildings and it's inhabitants such that they can see each other because they are all moving at the same speed, but onlookers cannot see them. It is unknown how many citizens live here and unknown too, how many more cities are hiding inside of this, and each one subsequent to it; increasing degrees of invisibility.

    It is quite common to see people flailing about along this street, especially those who have been evicted from the tranquil city. They can be seen hysterically grasping at the vines and screaming at the walls, desperately trying to enter though they never will.

The Hidden City keeps her secrets.

The Façade as an Architectural Interior Patrizio Martinelli, Miami University

PATRIZIO MARTINELLI
Miami University

Façade is the architectural place where private and public meet and the building's "face". The designer can design the façade to express the inside, the reaction to the outside, or as an independent mask hiding the interiors. But façade can be not only a mere skin, but a device with depth, density, thickness. The portals and prothyrums in medieval religious buildings are devices that anticipates the rituals and spaces of the interiors.

In many examples the façade, besides of being a cultural or political representation of the clients, becomes an interior place, a space to live, move, stay in.

This kind of façade is represented by two paradigms by Andrea Palladio. One is Redentore church façade in Venice, designed by the overlapping of five façades, each belonging to a component of the interior space.

The second is Palazzo Chiericati in Vicenza, actually a "façade-building" characterized by two loggias. The one on the ground floor belongs to the city as a public space, shady, protected and safe: actually, an urban interior. The upper loggia belongs to the residents' private realm, where they can experience the outside, through a privileged view to the city, but it's also as a "theatrical stage" where the family's power and wealth was shown to the people.

Another example of the facade as interior space is Villa Wiegand by Behrens, who uses a classical interior element of the roman house, the peristylium, and transforms it in façade. Instead of building the villa around the peristylium, like in the roman house, he moves it outside, between the street and the entrance door, as a filter between public and private space. The process is clear and strong: the peristylium, which originally should have been in the heart of the house, has been moved outside, in direct contact with the street. The classical order of the entrance in the roman domus street-entrance-vestibule-atrium-peristylium, is changed into street-peristylium-entrance-vestibule.

The other meaning of this is rhetorical: since Wiegand was an archaeologist, the building from outside becomes a statement, a sort of architecture parlante, telling us something about the client's role, profession, interests, status.

Although Le Corbusier rarely quotes Palladio as a precedent, often we can find his influence in his work. In particular when he works on the façade topic, feeling the necessity to give depth and strength to his elevations, the two paradigms seem to appear on Corbu's work. The overlapping of layers, each belonging to different elements, is the compositional principle of his purist paintings, which he applies to his building façades too, like in House Curutchet, where the overlapping becomes a tool to build an interior. The layers of sun-breaker, structure, pan de verre, floors and roof build this façade, detached from the rest of the house like in Villa Wiegand (a project he worked on when he was in Berlin), open to the street and to the park in front of it. But it isn't only an elevation, it's an architectural interior: it's Dr. Curutchet's clinic with above a hanging garden, protected by a concrete canopy, a room in the open space facing the park. It's an interior space, transparent and open towards outside, it's the place of life and work that belongs, together with the courtyard where the ramp is, both to the house and to the city.

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The second is Palazzo Chiericati in Vicenza, actually a "façade-building" characterized by two continuous loggias. The one on the ground floor belongs to the city as a public space, shady, protected and safe: actually, an urban interior. The upper loggia belongs to the residents' private realm, where they can experience another way of dealing with the outside, through a privileged view to the city, but it's also as a "theatrical stage" where the family's power and wealth was shown to the people.
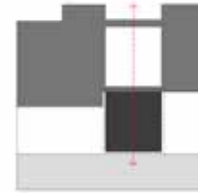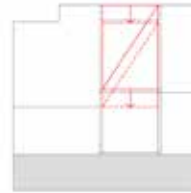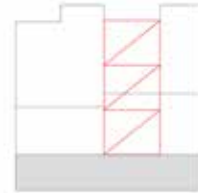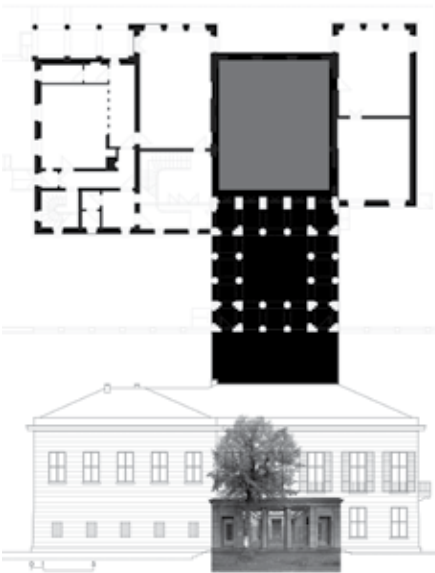
In Villa Wiegand Behrens takes a classical interior element of the roman house, the peristylium, and transforms it in façade: the interior becomes an exterior. Instead of building the villa around the peristylium, how it happens in the roman house, he moves it outside, putting it between the limit of the street and the entrance door, as a filter between the public space and the private space. The process is clear and strong: the peristylium, which originally should have been in the heart of the house, has been moved outside, in direct contact with the street. The "natural" order of the entrance sequence of the roman domus *street-entrance-vestibule-atrium-peristylium*, is changed into *street-peristylium-entrance-vestibule*. The other meaning of this is rhetorical: as Wiegand was an archaeologist, the building from outside becomes a statement, a sort of *architecture parlante*, telling us something about the client role, profession, interests, and status.
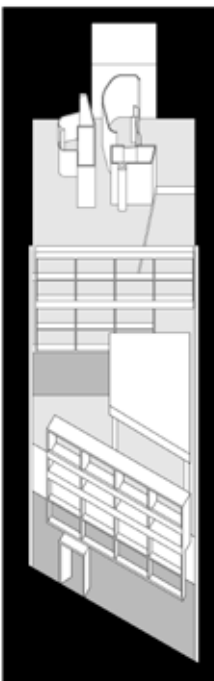
Although Le Corbusier rarely quotes Palladio as a precedent, I think that often the lesson of the Italian master is recognizable in his work. In particular when he works on the façade topic, feeling the necessity to give depth and strength to his elevations, the two paradigms seem to appear on Corbu's drawing table. The overlapping of layers, each belonging to different parts and elements, is the compositional principle we can find in the purist paintings of the young Jeanneret. A principle that he applies to the façades of his buildings too, like in House Curutchet, where the overlapping becomes a tool to build an interior. The layers of sun-breaker, structure, *pan de verre*, floors and roof build this façade, detached from the rest of the house like in Behrens' Villa Wiegand (a project he worked on when he was in Berlin), open to the street and to the park in front of it. But it isn't only an elevation, it's an architectural interior: it's Dr. Curutchet's clinic with above a hanging garden, protected by a concrete canopy, a room in the open space facing the park. It's an interior space, transparent and open towards outside, it's the place of life and work that belongs, together with the courtyard where the ramp is, both to the house and to the city.

THE FAÇADE AS AN ARCHITECTURAL INTERIOR

28 Books and Book Covers in Architectural Theory

REGIN SCHWAEN
North Dakota State University

This project puts architectural theory into practice by asking second year architecture students to make a book cover for a contemporary theory book. The idea is to visualize written essays and architectural thought by having architecture students design, plan and build a book cover selected from a list of sixty books. From a pedagogical point of view it was important to create a seminar where each student has the opportunity to explore, express, and conclude by physical means while reading and learning. Connecting reason and knowledge with formal expression is the fundamental challenge for this assignment.

Reading an architectural theory and making a book cover that reflects on the content of the book engages and inspires architecture students that often become a passive listener or observant in theory seminars. The instructor gave only ten lectures throughout the semester. This allows more time for other assignments, such as the book cover project, making it possible to foster a deeper exploration of knowledge and critical thinking for the emerging architect.

More than a decade ago I discovered a book cover assignment created by associate professor Margarita McGrath. She developed this idea while teaching a professional practice seminar at the School of Architecture + Design, Virginia Tech. In the last four years I have slightly altered the pedagogical principles of her concept. The assignment was in part influenced by three books reflecting on a similar didactic approach. In the book 'The Thinking Hand' Juhani Pallasmaa has written extensively about haptic and tactile properties. Those are the primary pedagogical objectives for the book cover assignment, but the assignment was also influenced by questioning how to visualize fundamental observations in science such as the theory of quantum mechanics as discussed by Tor Nørretranders in the book 'Indivisibility'. Furthermore, I was inspired by Marco Frascari referencing Robin Evans and his observation that "architects do not build, but merely draw" in the book 'Eleven Exercises in the art of architectural drawing' with the excellent subtitle 'Slow food for the architect's imagination'.

The field of architectural theory is challenged by new emerging technologies and research itself has shifted. Libraries are physical rooms with knowledge being accessible horizontally. Books are ordered by categories and therefore presented in a certain order. When doing research online, architecture students embrace a world that is vertical. The order of knowledge is by subject and accessible one at a time, presented similar to a deck of cards or to stacked newspapers. There is no taxonomy. This limits research when one seeks to compare knowledge. From a scholarly point of view the online knowledge can be extremely powerful when one knows what subject to seek out, but how does the 2nd year architecture students navigate this approach? It would be interesting to completely redevelop a seminar like architectural theory and embrace the horizontal and vertical approach at the same time. The book cover assignment could be developed towards a more virtual approach if technology could make computers more haptic. We need architects that are integrative thinkers when designing - that embrace knowledge, skills, and craftsmanship at the same time.

NOTES

1. Juhani Pallasmaa, *The Thinking Hand*, Wiley, 2009.

2. Tor Nørretranders, *Indivisibility*, Gyldendal, 1985.

3. Marco Frascari, *Eleven Exercises*, Routledge, 2011.

exhibition

of 39 books &

book covers in the Klai Hall library
NDSU / ALA 11.27.17 / 12.07.17

Regin Schwaen, Associate Professor of Architecture
Shane Hawley, Teaching Assistant
Department of Architecture & Landscape Architecture

History/Theory – The Ethical Imperative

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Alixandra Hermanso - Macy Miller
Amanda Hill - Mary Biegert
Amy Luschen - Bailey Cochrane
Anna Greenlee Phetsomphou - Samantha Ochs
Anne Argenziano
Ben Gutowski
Blaze Irwin - Troy Brown
Cooper Johnson - Connor Riley
Devin Crowe - Mitch Meier
Ethan McCullough - Keegan Hovel
Halima Shittu
Jenny Nagel - Kai Erickson
Josh Trojan
Justin Todd - Beau Narby
Linda Boateng - Benjamin Djerf
Andrew Ulrich - Grant Willert
Augustina Teuber
Brandon Hyatt - Chandler Dilk
Chance Brochu
Douglas Brown - Alex Mason
Grace Sundberg - Nicholas Shircliff
Kelsey Darwin - George Smith
Matt Kohl
McKenna Vetter - Nate Wanner
Musab Ataelmanan - Oleg Harb
Olivia Whipple - Johnny Sidmore
Philip Reim
Sam Goodman - Matt Leake
Samantha Schrader - Karlie Matejcek
Savanna Ridgway - Hajime Shibyua
Sean Meyer - Luke Sanders
Sija Li
Sophia LaMere - Heather Boeger
Taylor Best - Amber Pilscott
Taylor Ford - Rozalind Vanden Bosch
Thomas Davy
Tiara Mathiason - Oliva Reimer
Valentina Contrares - Courtney Skare
Zak Kuntz

28
Books and
Book Covers in
Architectural Theory

Extract of texts written by 2nd year architecture students presenting book covers and the content they represent in the 2017 architectural theory seminar:

Amanda Hill and Mary Biegert

S, M, L, XL was created by Rem Koolhaas and Bruce Mau. This six-pound book is filled with organized pieces of work from architecture, art, and different writings. The small, medium, large and extra-large is the way the main chapters of the book are devised. Something of this nature was not a common way to look at these masterpieces, making it stand out amongst the other architecture books. He uses S, M, L, XL as an analogy of how we buy and make clothes to fit each person based on their size, and how that can be applied to architecture. Rem Koolhaas made sure to only include buildings that he found interesting and important. For the cover of our book we wanted to incorporate the title using various shirt tags, to represent this interesting way of organization. Underneath the shirt tags are a collage of comics and works by Rem Koolhaas, allowing for a preview of what is inside the book.

Anne Argenziano

Ornament and Crime is an anthology of thirty-six essays written by Adolph Loos that range in subject from plumbing to fashion. Loos supports people doing their own thing, but appreciates the functional. Ornamentation, to him, is a crime. My book cover reflects these opinions that Loos had. It is functional and free of ornament. The first essay I read from the anthology was "Men's Fashion," and it gave me the idea of "clothing" the book. I chose to use an artificial leather because it is sturdy and does not ask for embellishment. It acts as protection without adding too much bulk or drawing attention.

Regin Schwaen, MAA
Associate Professor of Architecture
Department of Architecture & Landscape Architecture
North Dakota State University

Book:
INVISIBLE CITIES
Italo calvino

Cover:
Grace Sundberg
Nicholas Shircliff

Book:
DELIRIOUS NEW YORK
Rem Koolhaas

Cover:
Heather Boerger
Sophia LaMere

Book:
S, M, L, XL
Rem Koolhaas
Bruce Mau

Cover:
Amanda Hill
Mary Biegert

Book:
ORNAMENT AND CRIME
Adolph Loos

Cover:
Anne Argenziano

Book:
ORIGINS
Lebbeus Woods

Cover:
Sam Goodman
Matt Leake

Book:
TOWARDS A NEW ARCHITECTURE
Le Corbusier

Cover:
Olivia Whipple
Johnny Sidmore

Photographer of selected book covers:
Meghan Duda

exhibition
& 28
of books
book covers in the library at
Klai Hall 10.13.15 / 10.29.15

exhibition
& 25
of books
book covers in the main library
NDSU campus 10.25.16 / 11.08.16

Spaces of Strategic Adaptation

JOSEPH M. GODLEWSKI
Syracuse University

Calabar, Nigeria is a city of continual fragmentation and transformation. Previously known as Old Calabar, the city's decentralized urban landscape challenges hidebound characterizations of African cities as spatially distant and timeless entities, disconnected from the world at large. Calabar has a rich, multi-ethnic, and cosmopolitan history as an international trading emporium and slaving port extending back centuries (Fig. 1). Much scholarly attention has been paid to the history of the city, though the few histories which explicitly address the traditional and colonial architecture of Calabar is often quite general. Focusing on discrete formalized elements, they inadequately address the social, economic, and spiritual forces that have informed the city's urban character. Far from existing in a homeostatic condition, the spatial politics in Calabar have been characterized by internecine warfare, competing trade houses, and fraught encounters between foreign, local, and otherworldly agents such as those associated with the Ekpe secret society and Christianity (Fig. 2). The flexible and mobile spaces making up the city's urban fabric since its beginnings in the sixteenth century have been linked with diasporic and transnational flows of people, capital, and culture. It is argued that these impermanent and networked architectures prefigure the architectural spaces of neoliberalism existing globally today (Fig. 3).

Borrowing the concept of "paradigmatic spaces", this research is organized around a series of spatial designations, or diagrams of spatial relationships that were exemplary during a given time period in Calabar's urban history. This research employs four spatial paradigms as representative of particular socio-historical relationships in Calabar—the traditional Efik compound, the Ekpe lodge, the Iron Place of King Eyamba V, and the colonial era Old Residency (Figs. 4-7). The historical imbrication of these four models combined with a flexible application of their spatio-temporal boundaries, provide a useful matrix for understanding the architectural and urban history of Calabar.

In taking a historical perspective in analyzing Calabar's built environment, this study complicates linear assumptions about progress and backwardness in the scholarship on globalization and cities. The enclave zones in contemporary Calabar are not a new phenomenon or anomalous after-effects of neoliberalism, but spaces entangled in the spiritual and economic history of the city. Though the project seeks to describe instances of congruence between pre-modern and contemporary Calabar, the purpose is to describe how spatial conditions from various historical periods can co-exist in non-linear ways, linking, competing, and contesting one another.

At each historical moment in Calabar's history, different aspects were prioritized. It is speculated the spaces of strategic adaptation in the city served as interfaces between different groups, but also as portals or thresholds between life worlds—spatially and temporally (Fig. 8). While the appearance and representation of spaces may suggest a clear inside-outside relationship, the lived reality of Calabar's space-time fabric reveals that they were sites of transition, intermixture, and association. These spaces linked the forested regions of the interior with the trade routes of the Atlantic, while also connecting economic spaces of exchange with those of mythic spiritual entities.

Fig. 1. A View of Calabar (1725) (Source: Le commerce de l'Amerique par Marseille, 1764). Engravings by Serge Daget.

Fig. 2. Image of Nkanda Grade of Egbo with Emblem Ekabe Nkanda (1912) (Source: Percy Amaury Talbot, In the Shadow of the Bush, plate facing 42).

Fig. 3. Tinapa Free Zone and Resort, Nollywood film studio, Calabar, Nigeria (Source: Photograph by the author, 2012).

5000' : 1"

Fig. 4. Calabar, Nigeria (Source: drawing by the author, 2017).

Spaces of Strategic Adaptation
Calabar, Nigeria

Spaces of Strategic Adaptation

Joseph Godlewski, Assistant Professor Syracuse University
Diagrams made with Scott Krabath, Student, SyracuseUniversity

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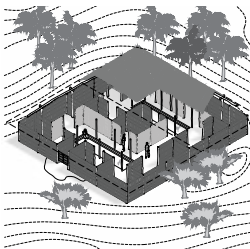
Fig. 4. Traditional Efik Compound, c. 1650
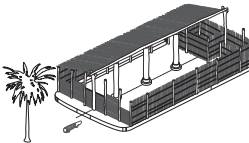
Fig. 5. Ekpe Shrine, c. 1700
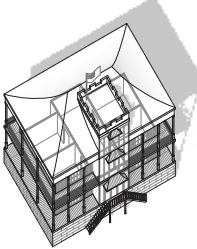
Fig 6. Iron Palace of King Eyamba V, 1843
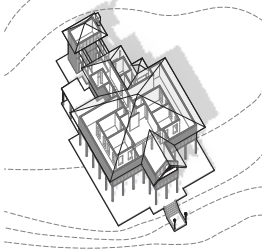
Fig. 7. Old Residency, c. 1884

HOUSING

The Welcoming City: Event Design and Humanitarian Aid

DEBORAH RICHMOND
Woodbury University

What happens when a study abroad program becomes a social innovation studio? Pedagogical worlds collided and re-combined as we travelled to Paris, Calais and Nice, France, to conduct ethnographic research among NGOs serving migrant refugee populations from the Middle East and Northern Africa. Following the closure of La Jungle, Calais' infamous refugee set-tlement at the mouth of the Eurostar tunnel, students sought to re-appropriate "design thinking" back into an architectural context, asking first "what is it like to be an international aid volunteer?" then immersing themselves in the work and expe-rience of serving migrant refugees. By week 8 of our 10 week semester, we had formulated a design problem. The resulting project, for a humanitarian aid event based on the typology of a music festival with appurtenant tent-city, is an explora-tion of architectural and urban precedents for mobile cities, esplanades, portable buildings and mobile infrastructure. The final project, sited on the Ile Saint-Denis in the Seine River in Paris, accommodates 5,000 refugees in 1500 tent sites and over 100 NGO's who provide an unconditional welcome to refugees and the host city visitors as well. Mobile showers, health and hygiene centers, tea shelters, vulnerable popula-tion housing, childcare, technology incubators, a kitchen and a collective bread making area, all grew out of our human-centered research and volunteer experiences in Paris, Calais and the Roya Valley. By emphasizing the front end of architec-tural design services, from programming and feasibility analy-sis to logistics and systems thinking, our students were able to experience the value of design in the social impact space. Students came away from this experience understanding that the value proposition of architecture can shift upstream, to a place where questions can still be asked about who we are helping, why and how to do it.

empathy ideation iteration prototype test empathy ideation

NGO Esplanade

the welcoming city

an unconditional welcome for migrant refugees in Paris, France and a capacity building and coordination opportunity for NGO's

tea and meditation shelters (in safe camping areas)
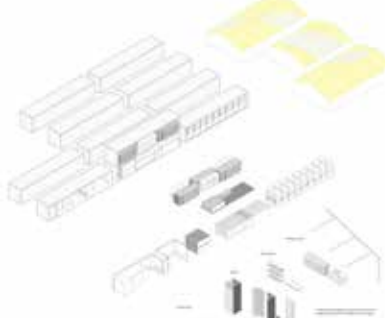
mobile sortation warehouse

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vulnerable populations housing
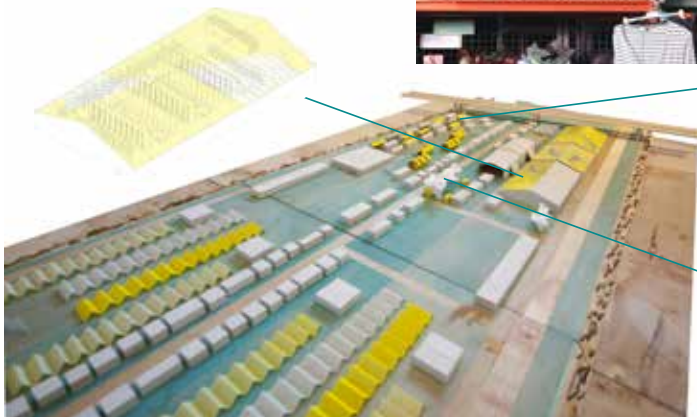
maker space and technology incubator

The RRURBAN Effect

MARCOS PARGA
Syracuse University

WHAT TYPE OF HOME DO WE DESERVE?

Many urbanites would think that it is not too much to ask the new residential architectures to give us the possibility of living in the city with all its density and effervescence, while enjoying some of the advantages of the rural environment. However, our everyday reality invariably shows us the opposite, and that's why we decided to open up the design process to indeterminacy and participation. The goal is to develop a protocol of action with the aim of replacing the unifying trend of urbanization by operations that exploit diversity and contact with nature.

The RRURBAN replicable strategy (Really RURAL and URBAN) is based on some of the conclusions of a research process that aims to reflect through architecture on a new way of understanding community life in our cities. It can be seen as a possible way to inoculate the benefits of single-family housing in the speculative DNA of collective housing, activating moreover issues related to participatory design.

We came soon to the conclusion that to achieve that kind of hybrid, our strategy should combine two actions on the urban housing typology: hollow out and customize. The former to generate spaces of opportunity (non predefined use) for the final users, and the latter to be able to increase the value of each house and thus compensate economically the decrease of built area. From this point, everything was easier: we must only substitute the unifying tendency of urban construction with operations that exploit diversity. We would then come back to a certain degree of personalization that in turn creates identity and redefines our way of living together.

Besides, this path allows us to explore the limits of participation as already made by John Habraken with his theories about the "open-building" or Frei Otto with his "Ökohaus" many years ago. Recovering the essence of those experiences, in the RRURBAN project we try to work with basic volumes in order to allow each housing unit to be easily adapted by the final users according to their preferences. A realistic "Catalog of wishes" will determine the elementary characteristics of each "urban plot", which will be completely defined when occupying its final position within the general structure.

The result is an inspiring as well as unusual collage of elements, a composition based on fragments representing the collectivity. Faced with the traditional neutral envelopes that give a unique and uniform image of the whole, in this case we can affirm that the facade is a sum of individualities and identities, a form of expression of the desires, aspirations and activity of each inhabitants, exactly what we were looking for.

The first on-going RRURBAN operation will take place in the center of Madrid, occupying a small plot of 4.144,11 sf, enough to house 7 urban plots, all of them with private outdoor space (patio or terrace) and basement parking space.

The common areas (25%) provide the community with a playground, a productive greenhouse, space for barbecues, storage room and bicycle parking.

The **RRURBAN** Effect

Real RURal and URBAN environment

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The first RRURBAN operation will take place in the center of Madrid, occupying a small plot of 4.144,11 sf (385 m2), enough to house 7 urban plots, all of them with private outdoor space (patio or terrace) and basement parking space.

The common areas (25%) provide the community with a playground, a productive greenhouse, space for barbecues, storage room and bicycle parking.

CONFIGURATION #01 (MADRID):
01 PEDESTRIAN AND VEHICLE ACCESS
02 PARKING RAMP
03 PARKING + STOREROOMS
04 PLAYGROUND + PRODUCTIVE GREEHOUSE
05 VOLUME 1: GROUND + 1ºA
06 VOLUME 2: 1ºB + 2ºB
07 VOLUME 3: 2ºA
08 VOLUME 4: PENHOUSE A
09 VOLUME 5: PENHOUSE B

CROSS SECTION

MAIN ELEVATION

BASEMENT: PARKING   GROUND FLOOR   FIRST FLOOR

SECOND FLOOR   THIRD FLOOR   PENHOUSE
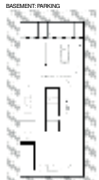
RRURBAN #01
Madrid
January 2017

Project Data:

City	Madrid
Site area	4.144,11 sf (385,00 m2)
Dwelling Units	7
Occupancy	2.830,91 sf (263,00 m2)
Total floor area	14.531,28 sf (1350,00 m2)
Private patios/terraces	3.724,31 sf (346 m2)
Common Productive Greenhouse	150,70 sf (14 m2)
Parking Lots	8 (1 disabled)
Bike Parking Lots	10
Status	On-going

LONGITUDINAL SECTION
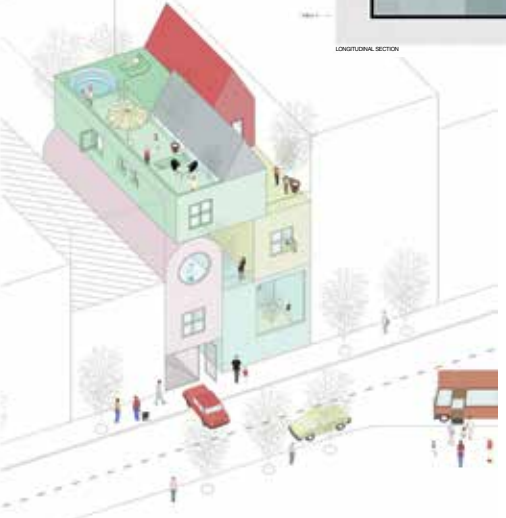
Cities of Repetition

JASON F. CARLOW
American University of Sharjah

CHRISTIAN JOHANNES LANGE
The University of Hong

Housing is one of the most fundamental elements of urban growth and Hong Kong has for decades hosted some of the most intense living environments on the planet. The city's urbanization has without a doubt produced unparalleled living conditions in terms of scale and density. As a socio-political microcosm, Hong Kong has been dealing with the impacts of hyper-dense urban environments since the mid-twentieth century. Due to lack of space, topological constraints, historical and political conditions, and the struggle with population density, the city has become an incubator for the development of mass housing models for high density living. Today, the common approach to housing developments is based on repetitive, reductive and profit driven concepts. Much of the city has been built with endless repetitive canons utilizing formulaic layouts and building designs. For better or worse, rapidly growing cities around the world, especially in China, have followed Hong Kong's model.

Throughout the 20th Century, in Hong Kong and around the world, the prefabrication of standardized architectural elements enabled builders, governments and developers to increase the scale and pace of construction. This increase in construction efficiency was especially useful in times of need for social housing. During the influx of new residents to Hong Kong in waves throughout the mid-20th Century, new high-rise housing types were invented and built all over Hong Kong, Kowloon and the New Territories. New social housing needed to be built rapidly to safely accommodate thousands of new residents. The housing produced was tall, dense and standardized to house as many residents as possible as quickly as possible. Over the course of the following decades in Hong Kong, the strategy of mass standardization has shifted from social necessity to the pursuit of profit by private developers.

While the history and architecture of public housing has been well researched and documented, relatively little has been done to trace the evolution of Hong Kong's private housing estates. It is quite remarkable that in most places in the world, when housing is left to the private sector, the results are diverse. When mass housing is left to the private sector in Hong Kong the resultant architecture has proven to be highly formulaic.

Cities of Repetition provides a comprehensive graphic documentation and analysis of the ten largest Hong Kong housing estates built by private developers from the late 1960's through the 2000's. The original drawings and diagrams in this exhibition illustrate the ultra-dense, mass produced, highly repetitive built environments in which hundreds of thousands of Hong Kong residents live. Drawings, photographs and models not only display the immense scale of the housing estates within the city, but present the hundreds of similarly planned housing blocks and their subtle differences. A detailed graphical analysis compares statistical information to show how the planning of these massive estates has evolved over the past decades to efficiently conform to building regulations and produce huge profits. The project reveals the spatial realities of living in some of the most densely populated, urban environments ever built.

CITIES OF REPETITION
Hong Kong's Private Housing Estates

Jason Carlow, American University of Sharjah
Christian J. Lange, University of Hong Kong

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Twin Peaks: Forging New Collaborations in the Design of Affordable Housing

JULIE LARSEN
Syracuse University

ROGER HUBELI
Syracuse University

Forging new territory and new collaborations is a constant negotiation in the world of affordable housing. For the City of Syracuse Habitat for Humanity chapter, the common outcome is to take what is donated which can easily lead to sub-par standards of construction. But two years ago, Habitat approached Assistant Professors at Syracuse University to design a single family house with better quality, durable materials and more sustainable construction methods. New collaborations within the community established two Habitat houses as a catalyst for a "Living Classroom," that brings together architects, engineers, local trades, and volunteers to redefine methods of construction and collaboration for affordable single family housing. We collaborated with the local MCAA chapter (Mason Contractors Association of America), to find new design potential using CMU as the structural material in the two residential homes.

The conceptual goals of the project were based on having to design the house with a combination of CMU and typical stick frame details. The merging of two materials not commonly intertwined in residential construction became a benefit to the design by introducing strategies that negotiate the materials in productive ways. For example, there is 'fat' trim negotiating the residential wood windows and the CMU for ease of replacement window installation. Also, Dryvit is applied in colored checkered patterns on the facade to hide future patch work (if it becomes discolored or damaged). Lastly, jigs are used to cut intricate patterns in the hardie board siding to bring a unique quality to a 'banal' storage space in the front facade. The paint is applied to create an ombre affect to make the front entry appear taller and bring more prominence to the street facade.

TWIN PEAKS
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Behind the Quotidian Screen

ANE GONZALEZ LARA
University of New Mexico

TUCKER DOUGLAS
Schaum Shieh Architects

Behind the Quotidian Screen is our proposition for new contemporary urban development in historic centers; a model for communal and affordable housing; simultaneously it forms a unified urban whole, while sustaining deference to each inhabitant.

To achieve this image, the screen—a taught perforated white metal facade—follows the contours of each parcel. Rising up to five meters in height, the screen differentiates the street from the housing blocks behind. We believe clarity of the form and it's logic give a coherence to the surrounding environment. It provides a ready-made image that the residents can own, modify, and take pride in—the screen is their icon.

On the south side of the development, we propose a simple park. Thru the use of different shapes on ground, materials and textures, and play structures, the use of the park is completely indeterminate; rather it serves as a framework—like the screen—for serendipity. Here too, the screen wraps on either side of the park, focusing the view towards the beautiful landscape.

In order to dampen the infiltration of the city from entering the residences, the screen works to negotiate the difference between the purely public and domestic. It allows for a peaceful transition—the screen is a threshold.

The screen baffles the city noise and diffuses the hot Summer sun—creating a series of shared spaces between each of the eight new units and the street. It allows for it's own microclimate—the screen conditions outside living space.

Behind the Quotidian Screen reactivates the "in-between" spaces to generate new common areas where the residents can mingle, laugh, play, eat and entertain—this is how communities are formed. Here, you can park your bike, nurture your garden, and teach your child to walk—the screen is like a piece of urban furniture.

Behind the Quotidian SCREEN

Propuesta para la creación y activación de espacios colectivos en Hornachuelos

Behind the Quotidian Screen es nuestra propuesta para el desarrollo urbano contemporáneo en centros históricos. Un modelo que propone una serie de viviendas colectivas y comercios que completan el centro urbano y que no solo crean un espacio unificado, sino que a su vez promueven la individualidad de cada habitante.

Para conseguir esta imagen unificada, se emplea una malla metálica blanca que sigue los contornos de cada parcela. Elevándose hasta cinco metros en altura, la malla diferencia la calle de los bosques de viviendas que se encuentran tras ella. Su claridad formal provee a los residentes de una imagen cohesionada que pueden hacer suya, modificándola y habitándola como si fuera una extensión de sus viviendas.

Al mismo tiempo, la malla separa las casas del bullicio, el estilo y la escala urbana. La malla se sitúa entre lo público y lo doméstico, permitiendo una transición fluida. La malle es un umbral. A su vez, esta sistema famiza el sonido de la ciudad y reduce la radiación del calor del sol en verano.

Los cuatro nuevos edificios residenciales, que albergan dos viviendas cada uno, se reparten en el solar creando una serie de espacios compartidos. En estos espacios los residentes pueden relacionarse, jugar, correr, reunirse con amigos, ser crear su jardín... Al mismo tiempo, esta configuración permite que tres de las fachadas de todas las viviendas reciban luz natural.

Situado al sur de las viviendas, proponemos un sencillo parque que alberga diversos usos. Mediante la introducción de estructuras para el juego, mobiliario urbano y diferentes geometrías, materiales y texturas, las posibilidades que ofrece el parque son ilimitadas. El parque, al igual que la malla, sirve de marco para la experimentalidad. Aquí también, la malla continúa a ambos lados del parque, enfocando la vista hacia el espectacular paisaje.

Behind the Quotidian Screen reactiva los espacios intersticiales generando nuevas áreas comunes en las que celebrar el sentido de comunidad de Hornachuelos.

MATERIALES

Los materiales utilizados responden bien en su naturaleza s en su ejecución formal al entorno construido en Hornachuelos. Los muros exteriores están hechos de ladrillo enlucido con estuco gris y blanco (A). Estos están protegidos por una malla metálica blanca que hace eco a los corridos zócalos de Hornachuelos mediante un cambio de escala en la zona inferior de la misma (B). La estructura es de hormigón, y los suelos están acabados en madera (C). Las ventanas son de aluminio (C) y los vidrios son semi-reflejantes para reflejar el paisaje y el entorno.
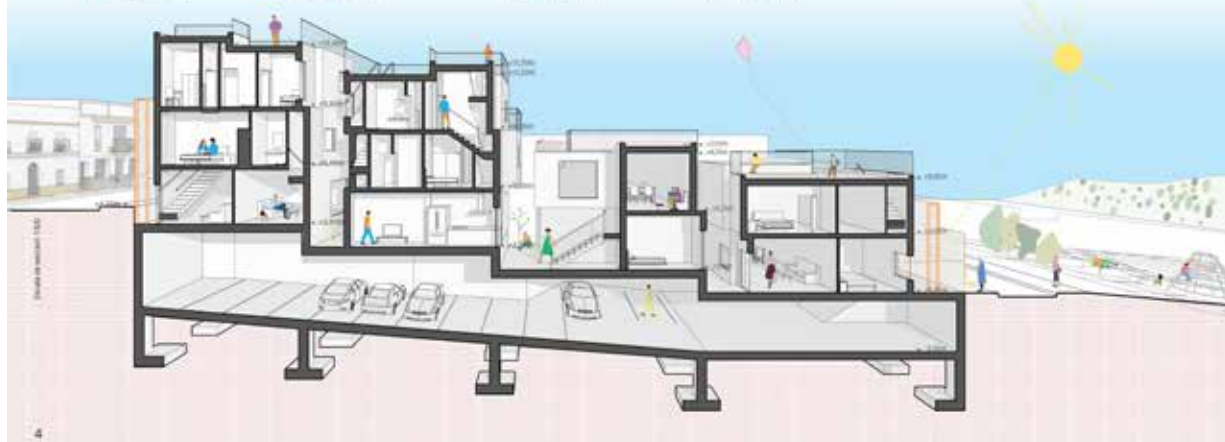
The Flex House: Habitat in its Essence

LIVIA CATAO CARTAXO LOUREIRO
Texas A&M University

DAVI DE LIMA VAZ XAVIER
Prairie View A&M University
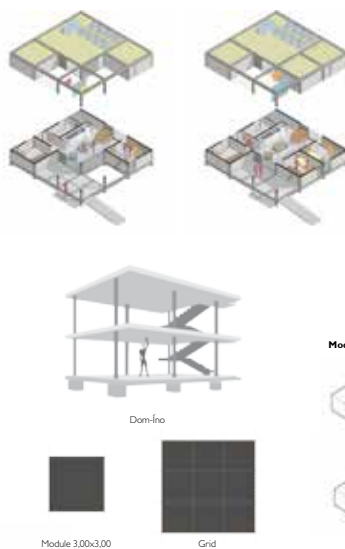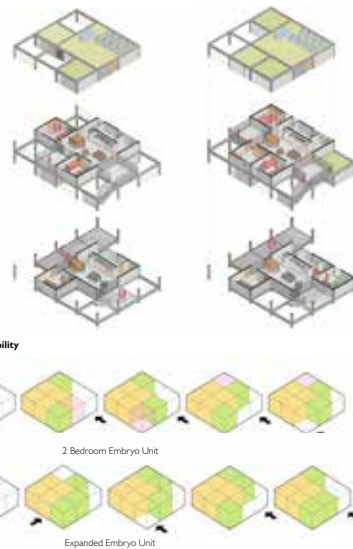
The project is generated from Corbusier's Dom-Ino system developed in 1914. With the clear notion that social housing finds in simplicity its biggest asset, Corbusier's system offers not only this attribute, as it is an open system, where the flexibility of plan distribution and envelope act as main points. The design's idea is to explore the possibilities of this scheme beyond the established visual of the slab on pilotis, to include in this architectural scenery the continuation of the beam system that extends itself beyond the original structure, forming a grid that predicts not only the restraint – where the structure extends, but also the expansion – how far the resident can go from his initial housing module. A global issue such as social housing does not benefit from a single architectural and urban planning approach since the numerical deficit appears only as a condensed and plausible statistics inside a complex sociological equation. In this sense, the open system appears as a pragmatic answer, but not completely programmed to this question. It is our belief that the popular construction knowledge occupies a significant space in the intricate spectrum of predicates, which compose a "housing proposal" that aims for success in its establishment. Conversely, the concept offers the residents possibilities of customization and future extensions of their units according to their interests, recognizing the future resident as the client that he always was, and in a certain way redefining the architect's surpassed role as a dictator of the habitat. Thus, housing is no longer seen only as a unit or a set of blocks, but instead, is appreciated as a part of the city, as a form of occupation and contribution to the urban fabric. The house and its surroundings are investments that the residents will appropriate and develop according to their own language, however, respecting the structural grammar provided by the grid. As Rolnik (2016) notes, "our deficit is not only of houses, but also of city", and inside this motto, the proposal is treated as such; an intervention that is inserted in the urban fabric in order to be incorporated to its reality, and to establish not just houses, but a community.

The square module appears as the protagonist in the grid's individual scale since it has an easy suitability to every orientation and is independent of the site, being the first flexible element of the parti. The structures appear elevated from the natural site, as an adaptation strategy to different topographies. The modulation of 3,00 x 3,00 x 3,00 meters has commercial and low-cost characteristics, encompasses different technologies and travels easily from concrete – elected material for the proposal – to metallic structures or even wood, without the need to change the scaling and the original space organization. This project decision reinforces again the proposal's conceptual versatility, once it allows the valorization of constructive techniques inherent to each location that might use it. Replicated in different directions inside the site, the module evolves into a grid that makes reference not only to the city's heterogeneity but also to the families' diversity.

The Flex House: Habitat in its essence

The project is generated from Corbusier's Dom-Íno system developed in 1914. With the clear notion that social housing finds in simplicity its biggest asset, Corbusier´s system offers not only this attribute, as it is an open system, where the flexibility of plan distribution and envelope act as main points. The design's idea is to explore the possibilities of this scheme beyond the established visual of the slab on pilotis, to include in this architectural scenery the continuation of the beam system that extends itself beyond the original structure, forming a grid that predicts not only the restraint – where the structure extends, but also the expansion – how far the resident can go from his initial housing module. A global issue such as social housing does not benefit from a single architectural and urban planning approach since the numerical deficit appears only as a condensed and plausible statistics inside a complex sociological equation. In this sense, the open system appears as a pragmatic answer, but not completely programmed to this question. It is our belief that the popular construction knowledge occupies a significant space in the intricate spectrum of predicates, which compose a "housing proposal" that aims for success in its establishment. Conversely, the concept offers the residents possibilities of customization and future extensions of their units according to their interests, recognizing the future resident as the client that he always was, and in a certain way redefining the architect´s surpassed role as a dictator of the habitat. Thus, housing is no longer seen only as a unit or a set of blocks, but instead, is appreciated as a part of the city, as a form of occupation and contribution to the urban fabric. The house and its surroundings are investments that the residents will appropriate and develop according to their own language, however; respecting the structural grammar provided by the grid. As Rolnik (2016) notes, "our deficit is not only of houses, but also of city", and inside this motto, the proposal is treated as such; an intervention that is inserted in the urban fabric in order to be incorporated to its reality, and to establish not only houses, but a community.

The square module appears as the protagonist in the grid's individual scale since it has an easy suitability to every orientation and is independent of the site, being the first flexible element of the parti. The structures appear elevated from the natural site, as an adaptation strategy to different topographies. The modulation of 3,00 × 3,00 × 3,00 meters has commercial and low-cost characteristics, encompasses different technologies and travels easily from concrete – elected material for the proposal – to metallic structures or even wood, without the need to change the scaling and the original space organization. This project decision reinforces again the proposal's conceptual versatility, once it allows the valorization of constructive techniques inherent to each location that might use it. Replicated in different directions inside the site, the module evolves into a grid that makes reference not only to the city's heterogeneity but also to the families' diversity.

Single Family House Variations

Row House Variations

Dom-Íno

Module 3,00×3,00   Grid

Module Flexibility

2 Bedroom Embryo Unit

Expanded Embryo Unit

Living | Kitchen | Bathroom   Bedroom   Expansion   Access

| A | Grid Occupation

An Urban occupation where nature and community unite. Through green corridors, streets, and buildings as the main elements of the proposal, a new block configuration emerges. The buildings are inserted in groups surrounding a one-way street; two lines of housing units rotated in the plan to generate in-between spaces compose each group.

| B | Shared In-Between Spaces

The concept of shared spaces drives the block urban occupation, where the paved surface expands the function of street evolving to an environment that encompasses other activities. Semi-private squares are created through the movement of housing positioning, prioritizing residents and pedestrians and cherishing people integration.

| C | Urban Sustainability

Embracing the sustainability idea, the rainwater is directed to the back part of the buildings and then used to reinvent a series of natural areas. Adapting to different climates, during the rain season recreation lakes will emerge from the streams, and in drought periods the same stream will help to cool the air through evaporation.

| D | Green Corridor

The green corridors are located parallel to the houses and to the city grid, expanding and connecting to the neighborhood, generating new paths and recreation areas.

| E | Parking Options

Parking appears in a few spots that will be included through the streets with the aim to concentrate life around them. When they are not in use, these spaces can be appropriated as a square.

Agriculture to Urbanization in Chicoloapan: The Importance of the Ejido in Housing Development

OLAIA CHIVITE AMIGO
University of Michigan

MICHAEL THOMAS AMIDON
University of Michigan

This project explores the role that methods of land control, land division, and property right agreements play in shaping housing and urban development in Mexico City's peripheral municipalities. We argue that a typology of housing development has emerged through competing territorial agendas between formal (government sponsored) and informal (sponsored by social organizations) urban expansion. The project maps those housing types in order to understand informal development's role within Mexico's attempt to house vast quantities of population as its citizens continue their transition from agrarian land occupation to urban inhapitation. This analysis renders explicit the formal organizations that result from various histories, relationships, and alliances between key actors in housing and urban development processes.

Formal organization in Mexico is largely shaped by practices related to a distinction between ownership and stewardship of communal land, or ejidos. These practices have existed in Mexico since the founding of its first indigenous tribal towns. Historically, rulers have owned their village's ejidal lands, allowing residents to steward, farm, and use resources from those lands. The village ejido provided most of the village's collective resources; from wood for fuel, to quarries for building, pastures and stables for animals, and the agricultural lands that provided most of the village's food. A village's dependence on the ejido transformed into dependence on the government that provided access to the ejido; so much so that the conquering Aztecs as well as the Spanish colonizers maintained some form of communal lands within the villages they controlled. As corruption and bureaucracy spread throughout Mexico, rulers and municipalities became less effective in protecting and providing collective resources to their citizens. In response to the absence of effective governance, radical social organizations formed promising to fill the needs that the government neglected. Consequently, organizations have claimed swaths of land – often previously ejidos – for peasants and disenfranchised citizens largely ignored by the Mexican government.

We have limited the extents of our study to Chicoloapan; a municipality in which we believe Mexico's land types and uses, formal organizations, and governments coexist as a microcosm of Mexican urban expansion. Unlike many municipalities adjacent to the Federal District at the tail-end of their transition from agrarian dependency to urban development, the ring of development that includes Chicoloapan is in the middle of this transition. Informal settlements, government subsidized formal settlements, agricultural land, an historical center, an uninhabited forest, and a mountain range all converge within Chicoloapan's boundaries. The remnants of its ejidos provide a window into its historical patterns of land distribution, organization, and evolution that are consistent with the development of many other municipalities throughout Mexico. Some lands have been developed by social organizations with the primary goal of gaining political control, while others are government subsidized developments that have been driven by the private profits of developers. Each type of urban development in Chicoloapan provides different qualities of infrastructural, residential, and commercial distribution. Collectively, this typology significantly contributes to the form of Mexico's emergent totalizing urbanity.

Metropolitan Region of Mexico State

Land Types- Municipality of Chicoloapan de Juárez

Chicoloapan is a municipality in which we believe Mexico's land types and uses, formal organizations, and governments coexist as a microcosm of Mexican urban expansion. Informal settlements,

government subsidized formal settlements, agricultural land, an historical center, an uninhabited forest, and a mountain range all converge within Chicoloapan's boundaries.

Former Rancheros and Ejidos- Agricultural Grid of Subdivision

Unlike many municipalities adjacent to the Federal District that are at the tail-end of their transition from agrarian dependency to urban development, the ring of development that includes Chicoloapan is in the middle of this transition.
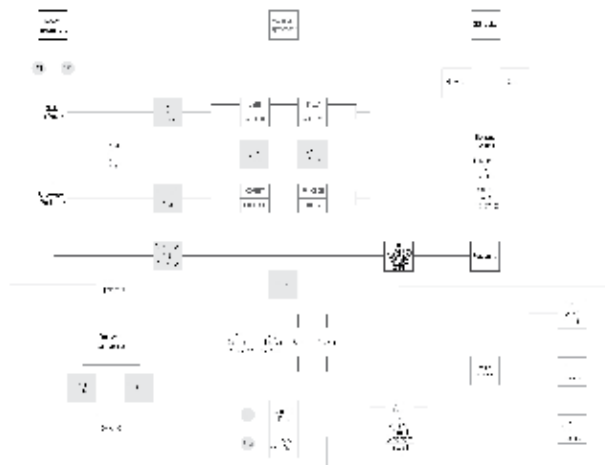
Urbanized Land Expansion Following Former Ejidal Boundaries

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Agriculture to Urbanization in Chicoloapan
The Importance of the Ejido in Housing Development

Olaia Chivite Amigo and Michael Amidon

This project explores the role that methods of land control, land division, and property rights have played in shaping housing and urban development in Mexico City's peripheral municipalities. We argue that a typology of housing development has emerged within an intensely political environment with multiple powerful actors and agendas; all of whom are competing for control of Mexico's citizens as they continue their transition from agrarian land occupation to urban inhabitation. The project demonstrates these political relationships and their formal implications through a case study of one such municipality, Chicoloapan de Juárez.

Formal organization in Mexico is largely shaped by practices related to a distinction between ownership and stewardship of communal land, or ejidos. Historically, rulers have owned their village's ejidal lands, allowing residents to farm, and use resources from those lands. The village ejido provided the village's collective resources; from wood for fuel, to quarries for building, pastures and stables for animals, and agricultural

lands that provided most of the village's food. This dependence on the ejido transformed into a dependence on the government providing its access.

In response to corrupt or absent governance, radical social organizations have promised to fulfill the needs neglected by the state. In recent decades, organizations have claimed swaths of land – often previously ejidos – for peasants and other disenfranchised citizens largely ignored by the Mexican government.

Informal and Formal Land Development- Street Organization as a Method of Control

Some lands have been developed by social organizations with the primary goal of gaining political control, while others are government subsidized developments that have been driven by the private profits of developers. Each type of urban development in Chicoloapan provides different qualities of infrastructural, residential, and commercial distribution.

Housing Typology Locations

Informal Housing Typology

70 - 210	Dwellings per Block
12%	Average Vacancy
90%	Infrastructure Access
4.2	People per Dwelling

Formal Housing Typology

200 - 467	Dwellings per Block
48%	Average Vacancy
58%	Infrastructure Access
3.8	People per Dwelling

INEGI. Diccionario de Datos de Localidades Urbanas. 2007.
INEGI. Vector Data for the City of Mexico. 2013.

Porter House I Norton House: Reconstructing Affordable Housing in Pontiac

SCOTT GERALD SHALL
Lawrence Technological University

Post-bubble, many neighborhoods in America, have seen the appraised values of properties decrease markedly, resulting in a sharp lapse in public and private investment. This, combined with stagnant income for many American families, has created an increased demand for rental properties within our urban cores, which has inflated the costs associated with renting. As a result, in areas like Detroit, renters can expect to pay three times more per month than homeowners on housing – a situation that forces families to spend well over half their modest income on housing and leaving precious little for food, heat and other essentials. This serves to further depress housing values in many neighborhoods, making new development unthinkable.

Although unfortunate, this arrangement makes sense. After all, if new homes built using traditional means of construction will cost well over $140 per square foot only to value at less than $55 per square foot upon completion, only those entities who can accept this loss will enter into development. Groups supported by donations and with a mission to help, such as Habitat for Humanity, may develop a few homes, but profit-based entities will not. Nor will banks, which makes home ownership a distant possibility, even for the shrinking cohort of families with enough funds for a down payment.

Two soon-to-be-completed homes question this arrangement. Realized in partnership with local and international citizens, businesses, non-profits, and academic units, these homes leverage the intelligence and efficiency found within various industries (most of which are completely unrelated to housing production) to effectively re-invent the housing delivery process. The process itself is the result of years of research and a growing partnership between students and faculty, builders, real estate agents, appraisers and production centers. The research and resulting work attempts to strategically overlap ancient and emerging techniques of simulation, fabrication, and assembly to make housing production more economically viable, environmentally sustainable, culturally relevant and socially responsive. It is important to note that the process inspired by this effort does not propose a new technology. Rather it strategically overlaps existing techniques and technologies in order to cut in half the time and money associated with housing construction, while increasing the value, in financial, environmental and social terminology. Most importantly, as the techniques utilized rely heavily upon components and approaches attached to digital fabrication, the intelligence earned through these constructions will be immediately embedded into the process, to the benefit of every home produced thereafter. It, like the techniques of industrial production that inspired it, will thus become smarter over time, at a scale and pace currently unthinkable within housing production.

Porter House | Norton House
Reconstructing affordable housing in Pontiac

Realized in partnership with local and international citizens, businesses, non-profits, and academic units, the Porter House and Norton House leverage the intelligence and efficiency found within various industries (most of which are completely unrelated to housing production) to effectively re-invent the housing delivery process. The process itself is the result of years of research and a growing partnership between students and faculty, builders, real estate agents, appraisers and production centers. This research, and resulting work will strategically overlap ancient and emerging techniques of simulation, fabrication, and assembly to make housing production more economically viable, environmentally sustainable, culturally relevant and socially responsive. Current appraisals indicate that these homes will cut in nearly half the time, money and environmental resources embedded in similar homes, while raising the appraised value significantly. The construction of both houses will be complete in the Summer of 2016.

Full-scale prototypes and experiments were used by students to test their research and proposed amendments to the building delivery process.
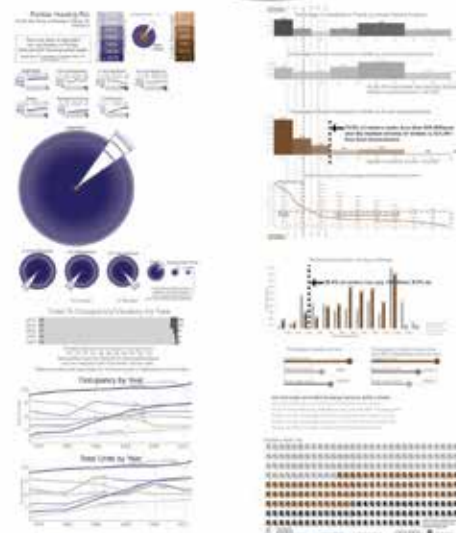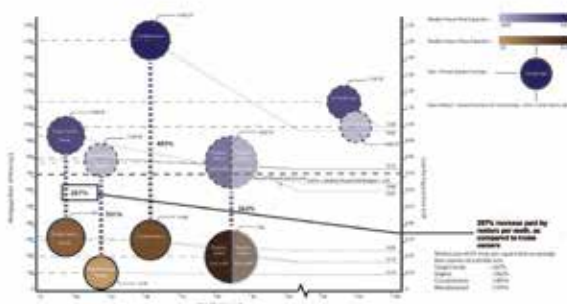
Home in Common: Decentralizing Domesticity

LORINC VASS
University of British Columbia

NICOLE SYLVIA
University of British Columbia

ROY C CLOUTIER
University of British Columbia

As the homeownership models that sustained previous generations slip further out of reach, more and more people are left in a precarious relationship with domestic space—locked out by the shifting tides of the housing market. Vancouver, Canada is a case in point: repeatedly touted as among the world's most 'liveable' cities, it is paradoxically also one of the most unaffordable for owning a home. Its housing remedies rely on conservative, nostalgic models of ownership—in turn largely failing to impact the interrelated problems of scarcity, homogeneity and unaffordability. Rather, the very nature and meaning of 'home' itself needs a more fundamental remodeling: from homes in isolation to Home in Common.

Amidst Vancouver's stifling monoculture of condominiums and single-family homes, a diverse ecology of living sprouts forth from the interstices of the formal city. Its laneways, overlooked zones of infrastructure, transform into a shared network of domestic activities, where mundane rituals acquire new collective roles. Instead of nostalgically recreating older modes of living, this sharing network embodies an optimistic vision of a future—one where fluidity and impermanence are not bemoaned but rather harnessed, fuelling openness, vitality, and new forms of collectivity.

In place of the static ownership of a singular domestic space, Home's constituent components are unbundled and distributed within the city, allowing them to be held communally. Alongside the singular rooms of apartments and houses, an evolving network of shared spaces hosts a multiplicity of activities impossible in isolation. No longer a hermetic site of solitary life, domestic space proliferates throughout the city as a field of experimentation, where collective sociability is continually formed through mundane rituals. By rethinking Home not only as a space but also a process, a new city emerges. Urban space is claimed as an act of exchange and sharing: the city becomes a Home in Common.

Operating not only as a speculative design project but also an investigation into potential formats for architectural research and activism, the project points toward one alternative role for architectural knowledge in the production of the city. Rather than merely reacting to the status quo—dominated by restrictive building regulations and 'developer-turned-visionaries'—architects must rise to the challenge of synthesizing aesthetic capability and ethical responsibility to imagine and draw alternative possibilities. Doing so holds the potential to open for architecture an expanded realm of ethical engagement—and in turn, a path toward a more con-vivial city.

HOME IN COMMON
DECENTRALIZING DOMESTICITY
CONTINGENT COLLECTIVE | UNIVERSITY OF BRITISH COLUMBIA

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Distributing 'Home'
*No longer bound within the singular house or unit,
a net of domestic activities casts forth into a shared urban space.*

"I take a bath; you take a bath; we take a bath."
*Quotidian activities become opportunities for
exchange, reciprocity, and new social rituals.*

Bloc / Party
*Everyday interaction with otherness pushes beyond
differences, fostering solidarity and collective action.*

Home in Common

MATERIALS

Flexible Landscape —— An Urban Natural Installation

ZHU XUDONG
Tongji University (Shanghai, China)

During the period of August 21st to September 10th in 2015, there was a series of public cultural activities named "Gravitational Field——interconnections between architecture and public culture" held in the Jing'an Temple Square, which is the most prosperous place in Shanghai. One both artistic and practical architectural installation called Flexible Landscape was created, which was designed by Wang Yan, Zhu Xudong, Huang Weile and Wang Yibo.

Jing'an Temple Square is relatively 7 meters lower than West Nanjing Road. The installation was understood to be a set of open landscape at this site. It emerged to the site naturally with its soft and exquisite profile, resembling a bonsai of the city. The different levels that the two arc-shaped ridges sat ingeniously corresponded to the open stage and the crowded metro exit, as if it was the mountains in a basin.

Due to the fact that the stone material of the ground at the site did not allow any damages, the entire installation could not have any basis or ground fixation. However, considering the possible damages a powerful typhoon could cause, 50 pieces of 20-meter long streamline wooden bamboo frames were eventually adopted to create a fluctuating structure. It not only emitted a visual effect of an abstract landscape, the installation was at the same time fulfilled with the spirit of the times.

The temperature was at a scorching point in August in Shanghai. This "arc-mountain" provided space for abundant public activities in the square with two shady areas. The mist sprays that were hidden in the gaps of the frames continued to cool the square. Meanwhile, mist-shrouded scene enhanced the visual impression of this urban landscape bonsai. A rainbow can be occasionally seen on top of the installation under the sunshine, making the entire atmosphere light and more relaxing for the general public.

In terms of the material used in the installation, wooden bamboo was chosen as the main structural element. Bamboo is a plant that has many characteristics related to China, hence is vey much loved by Chinese people. Wooden bamboo is made of advanced fibers through hot gluing technology. It has the characteristics of high strength and high density, at the same time making people feel more natural and intimate, as well as having a sense of cultural belonging.

The installation itself was a work of art, as well as a space for various activities. A series of public events were carried out in this "Landscape Bonsai" one after another. It not only was an experimental field, but also a theater, an exhibition, a market, a playground and so much more. It inspired the vitality and creativity of the city at the time, displaying an open spirit that Shanghai has through an architectural way.

Flexible Landscape —— An Urban Installation
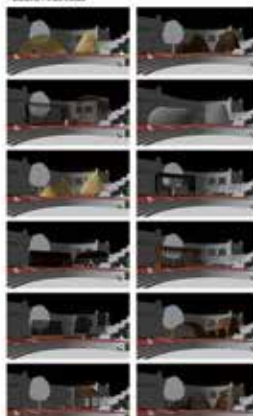
SWELL: Structural Experiments with Heat Moldable Plywood

BEVERLY CHOE
Stanford University

JUN SATO
University Affiliation

SWELL was an experimental installation completed in the spring of 2018. In this "Responsive Structures" Design Build course, students investigated the structural, spatial and organizational capacities of a heat-moldable plywood product manufactured in Finland. The course advanced a structures-based approach to material investigation. Reversing the prevalent use of plywood as cladding fastened to framing elements, students were challenged to develop a habitable, self-supporting system using only plywood.

Heat-formable plywood:

Thermoformable plywood is made from layers of FSC certified cross laminated birch veneers. Birch, known for its high strength and stability, is layered and adhered with a non-formaldehyde engineered adhesive that can soften with heat, and reset when cooled- multiple times if necessary. Students used a 3-layer panel with a 4.5 mm thickness.

Structure:

Students developed a triangular, notched panel unit through model-based structural experimentation. The structural capacities of the plywood were tested through different curvatures and configurations.

Students learned how surface deformation (through parabolic curvature) increased the buckling strength of the panel by 2.7 times. They began with an idea for a 6-panel module based on a hexagon, which evolved in a more stable, interlocked 4-panel modules which became the building block for interlocked "mega-modules" that organize the structure. The non-parallel orientation of each of the pairs of panels further stabilized the module. Students stacked and offset these mega-modules into a structurally sound yet spatially rich matrix to construct the installation.

Fabrication:

The course merged both digital and manual techniques for the panel production and assembly. After students refined the panel design, they cut 600 identical panels on the CNC router, and fabricated a two-part mold using laminated MDF sheets. Panels were then placed in an oven set to approximately 95 degrees. Baking the panels for about 2.5 minutes softened the glue enough so that the veneer layers could slide and deform within the mold. Students experimented with different temperatures and baking times to determine the optimal results, refining their production technique with multiple prototypes. Once baked, the malleable panels were individually pressed and cooled within the heavy mold to produce their curvature.

The final form of "SWELL" was inspired by the wave-like forms of blowing leaves within the tree-lined site, interspersed with pink and purple-colored "blooms" held aloft within the structure. The undulating, porous space emerges from the ground, creating a habitable passage and view from the main path to the museum. Some of the panels were perforated with a leaf-like pattern, creating varied densities and a nuanced filtered light, while also reducing the wind load on the structure.

STUDY MODEL

OVEN, MOLD, AND PANEL PRESSING

MEGAMODULE PROTOTYPE

BUILD

MEGA-MODULE

MINI-MODULE
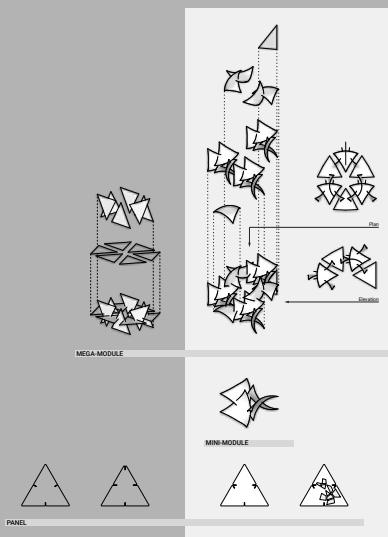
PANEL

MODULE EVOLUTION
Students developed a triangular, notched panel unit through model-based struc-
tural experimentation. The structural capacities of the plywood were tested
through different curvatures and configurations. Students learned how surface
deformation (through parabolic curvature) more than doubled the strength of
the panel. They tested different configurations for the panels to optimize
structural performance, eventually developing a structurally sound yet spa-
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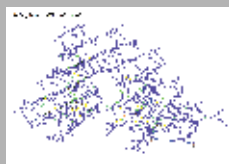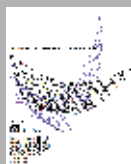
STRUCTURAL ANALYSIS
Left: Parabolic curvature of the panels increased the buckling strength of the
panel by 2.7 times. The 4-panel module stabilized when each pair of panels were
not parallel.
Right: Safety ratio diagram of full assembly, organized in triangular frames.
30% perforation was allowed for panels displayed in blue.

swell

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course, students investigated the structural, spatial, organizational and poetic capacities of a new, heat-moldable plywood
product manufactured in Finland. The course was a cross-disciplinary collaboration including students from the Architec-
tural Design, Structural and Mechanical Engineering departments. The form of "SWELL" was inspired by the wave-like forms
of blowing leaves within the site, interspersed with pink and purple-colored "blooms" held aloft within the structure. The
undulating space emerges from the ground, creating a habitable passage and view from the main path to the museum.

LIMB: Rethinking Heavy Timber Joinery through Analysis of Tree Crotches

STEVEN Y. MANKOUCHE
University of Michigan

KASEY VLIET
University of Michigan

**PETER VON BUELOW**
University of Michigan

LIMB reconsiders historic heavy timber construction across cultures to develop new joinery methods by focusing on the natural occurrence of branch bifurcation in different wood species. Because of its low value, often the crotch of a tree is not harvested for commercial purposes. This project uses this vital element to design connections that replace traditional mortise and tenon or steel connections.

By replacing the joint with a single piece of wood that purposely grew for bifurcation in nature and moving the structural connection away from where vertical and horizontal members come together a stronger construction joint can be achieved. Beyond the reduction of waste and added value, this project has the following architectural ramifications:

1. Overall architectural design parameters relate to the natural angles of certain bifurcations. These restrictions have provocative formal implications.

2. A structural system that is scalable, from major tree bifurcations at the base suitable for larger buildings, to smaller bifurcations adaptable to furniture.

3. New ways of connecting linear timber elements are developed beyond the "crotch" where cross-cultural scarf connections are revisited using digital fabrication.

4. Different wood species sharing common structural capacities allow for cross-specie "crotches" as long as they share similar overall properties.

Traveling through the Mid-Western landscape one often encounters weathered barns framed by expansive sky. These structures from a bygone time bear little resemblance to today's industrialized agrarian landscape. Much like the concrete silos that inspired Corbusier's modernist vision these wooden structures preserve the vestiges of a refined and pragmatic wide span building system developed through intimate knowledge of local materials and handcraft accumulated through generations of trial and error.

In the 17th century tree crotches were harvested for a variety of purposes from bracket systems in barn structures to structural joints in the construction of navy vessels (Encyclopédie Méthodique: Marine). In the 1960's renown modern furniture designers such as Sam Maloof replaced two part mortise and tenon joints in their chairs with a singular bifurcated piece increasing connection strength and producing more sinuous form. More recently Whole Trees

Architecture and Architectural Association program directors Martin Self and Emmanuel Vercruysse explore organic form aggregation using entire tree branches with bifurcations.

Our research sets itself apart by assuming a syntactical approach to design. We are not interested in unique form generation based on unique parts, something that is very well explored in the realm of digital fabrication, rather are constructing a reusable language of bifurcated joinery. There are a number of common natural angular occurrences in limb bifurcations and we have reduced those to a set of parts that can be "tuned" to develop diverse structural systems. The two types of crotches identified are: the "r" and "y" type. We have designed a digital fabrication workflow that extracts standardized milled parts from an inventory of salvaged material. The cataloguing of recurring angles and other physical properties inherent to different species of trees allows for further development of the structural possibilities of this system, which can be applied to nearly any type of tree bifurcation allowing for infinite combinations within the language of bifurcated timber joinery.

By elaborating on the natural occurrence of tree bifurcation as a tectonic element using contemporary digital practices and combining different wood species and diverse cultural traditions to propose new timber construction systems. LIMB is simultaneously global and regional in its approach.

LIMB

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Our research sets itself apart by assuming a syntactical approach to design. We are not interested in unique form generation based on unique parts, something that is very well explored in the realm of digital fabrication, rather are constructing a reusable language of bifurcated joinery. There are a number of common natural angular occurrences in limb bifurcations and we have reduced those to a set of parts that can be "tuned" to develop diverse structural systems. The two types of crotches identified are: the "r" and "y" type. We have designed a digital fabrication work-flow that extracts standardized milled parts from an inventory of salvaged material. The cataloging of recurring angles and other physical properties inherent to different species of trees allows for further development of the structural possibilities of this system, which can be applied to nearly any type of tree bifurcation allowing for infinite combinations within the language of bifurcated timber joinery.

LIMB develops four structural systems that leverage the "r" and "y" crotch connection:

1. Nest Structure. Spatially optimized parametric branching nested structure for occupiable space
2. Hex Dome. Spatially optimized parametric hexagonal organic dome with multi angular facets
3. Triangulated Column. Three-way columnar structure
4. Truss Portal. Two-way triangulated frame reminiscent of the traditional timber framing

By elaborating on the natural occurrence of tree bifurcation as a tectonic element using contemporary digital practices and combining different wood species and diverse cultural traditions to propose new timber construction systems. LIMB is simultaneously global and regional in its approach.

1. NEST STRUCTURE

A densely-built cluster like a hedge, of bifurcated joints connected directly to each other and to an orthogonal exterior shear panel system is hollowed out to form an inhabitable space. Scale comes into question with the application of these methods, as tree bifurcations vary widely in size.
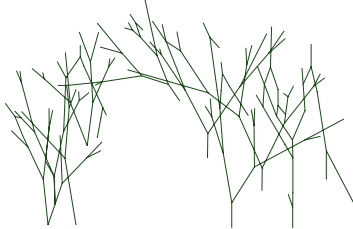
2. TRIANGULATED COLUMN

A larger structural element that mimics the joints that comprise it. The strength of the column is provided by triangulation of the members, and the exoskeletal shape could allow for inhabitation. This system can be adapted to scale of furniture.
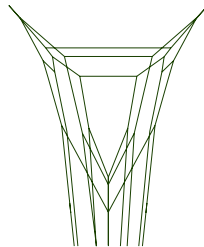
3. TRUSS PORTAL

An arched truss support which can support weight above and create enclosed space below. Triangulated and optimized truss systems allow for relatively lightweight wooden structures.
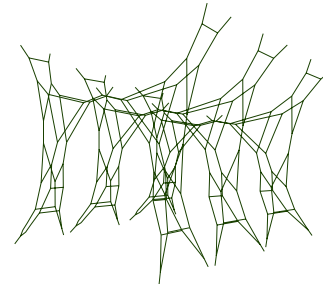
4. HEX DOME

The three-sided dome structure is comprised of hexagonal faces which are formed organically by the joinery system. Given the range of bifurcation angles in the inventory of salvaged logs and a series of other parameters such as entrance height and connection diameter, the tri-radial symmetry of the design requires three equal sets of joints which are milled from y and r-shaped logs. This process produces a need for out-of-plane angle in the joints, i.e. a curved node joined by straight connecting pieces. By producing a smaller and denser joint milled from the heartwood of a larger piece we can also achieve the curved shape needed. As a variant of the geodesic dome composed entirely from natural materials and optimized parametrically, the hex dome has potential as a structural element, allowing unique pieces to be integrated into a system that tunes their natural geometry as opposed to completely standardizing it.

a.
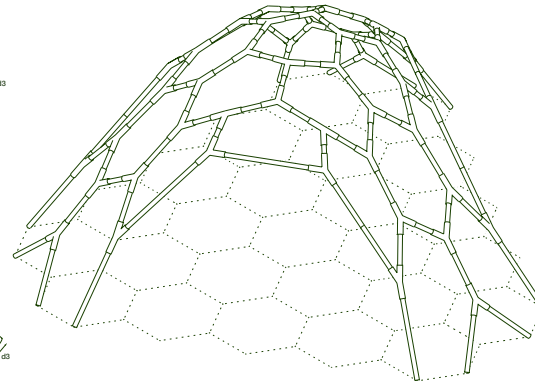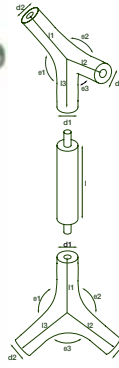
KEY

a. digital mockup of bifurcated timber joinery

b. 18th century Encyclopédie Méthodique illustration with joint overlay

c. CNC milled joint at 5-axis router

b.
image: Encyclopédie Méthodique: Marine

c.

THINNESS: The Counterfactual World of Concrete

JULIE LARSEN
Syracuse University

ROGER HUBELI
Syracuse University

The project was developed in collaboration between Syracuse University Assistant Professors Roger Hubeli and Julie Larsen, and CEMEX GLOBAL R&D.

At the Fundamentals exhibition of the 2014 Venice Biennale, Rem Koolhaas referred to the ceiling and stated that it was "a domain over which architects have lost all control, a zone surrendered to other professions". And that "our influence has been reduced to a territory that is just 2cm thick."

In response to this provocation, THINNESS pavilion offers new insights into the future architectural potentials of concrete technology as a lightweight material. The design and fabrication of the 10'x10'x10' pavilion consists of 16 mobile elements that hybridize veneer and structure to create a new approach to being 'thin' with only two centimeters of wall material thickness throughout. With the use of high-performance, lightweight concrete, the project generates a new perception of concrete through its structure, skin and surface quality. To alter the perception of concrete as a thick poche, thin, hollow and perforated 'columns' comprise the structure. This tension of a thin veneer and a volumetric poche expresses a design ambition beyond a material's logic that questions preconceived ideas of concrete. The pattern on the facade was generated from a grasshopper script that responds to the overlapped stress and load patterns for the horizontal and vertical position of the element when they are moved.

Because the fiber reinforced mixture of the concrete has the capacity to allow for extremely thin casts, the elements were made with only two centimeter thick walls "shells". Without traditional steel but fiber reinforcement, this is an achievement because of each column's ability to maintain high structural strength despite the high bending stresses, due to buckling, in the thin cross-section of the walls. This is in stark contrast to more common, thin form-active structural shells, where no bending occurs due to load distribution along the curve of the forms. These forms, however, do not lend themselves to be stacked. But due to the structural strength of the high strengthconcrete used for the pavilion, can we design vertical structures with only two centimeters. The high performance concrete is able to reduce the structure to extremely thin, vertical 2CM surfaces to create hollowed-out column elements that would otherwise not be achievable with traditional concrete. The pavilion defines new, counterfactual arguments for the material of concrete in order to change base assumptions and question the parameters for the material. Therefore, we ultimately question the status quo of architectural production (such as concrete needs 28 days for curing, it must have steel reinforcement, etc.). If the common characteristics of a material are not questioned, then perceptions of a material will inevitably keep us at 'two centimeters'.

T H I N N E S S
THE COUNTERFACTUAL WORLD OF CONCRETE

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Installing last few columns and skylights at CCA Designing Material Innovation Exhibition

Looking down on hollow column from above

Section of pavilion cutting through 4 elements

Bending moment diagram informing digital pattern on surface
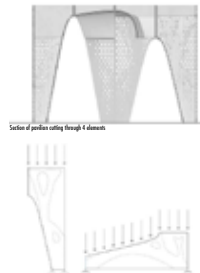
Structural diagram of elements in horizontal and vertical position

Silicon infill attached to steel formwork

Cast wax formwork

Cast wax formwork

One more column left to install...

Installing last lightweight column with only 2 people!

Final installation of pavilion - above view
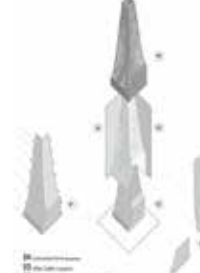
Clastic Order

ELLIE ABRONS
University of Michigan

THOM MORAN
University of Michigan

MEREDITH L. MILLER
University of Michigan

ADAM FURE
University of Michigan

Reassembly brings together material fragments that have prior values, uses, and histories, into new architectural forms. As a strategy for material reuse at the scale of building, reassembly cultivates a visual and material aesthetic through the unresolved relationship of parts to whole.

Clastic Order is a series of free-standing columns made by combining reclaimed construction debris with post-industrial plastic waste. Produced for the Designing Material Innovation exhibition at the California College of the Arts, the columns are the first full-scale demonstration of our ongoing research on the strategies and aesthetics of reassembly.

The geological term "clastic" describes a type of stone made of older rock fragments, or clasts. Here, familiar fragments of buildings (brick, concrete, glass, pipes, and fittings) are the clasts which mottle the stone-like surface of the columns. Each column is monolithic, fabricated as a continuous cast with a process similar to slip-forming concrete a technique used to cast uninterrupted structures such as building cores, shear walls, and silos. Each column cast begins on the ground in an insulated mold filled will loose material. The plastic is brought to its melting point at which time it binds the inorganic aggregates into a solid mass. The heat sources and formwork are gradually raised as each section is completed, producing continuous full-scale columns

While the classical orders of architecture established mathematical rules of proportion, spacing, and sequence of parts, Clastic Order suggests an approach to design based on material behavior under heat and gravity. By varying the ratios of components in the mixture and the application of heat, a range of colors, textures, and effects is produced across the columns. Since the waste plastics and building debris can be reclaimed locally, the material properties of the resulting casts reflect the composition of regional waste streams.

Clastic Order

The columns stand eleven feet high
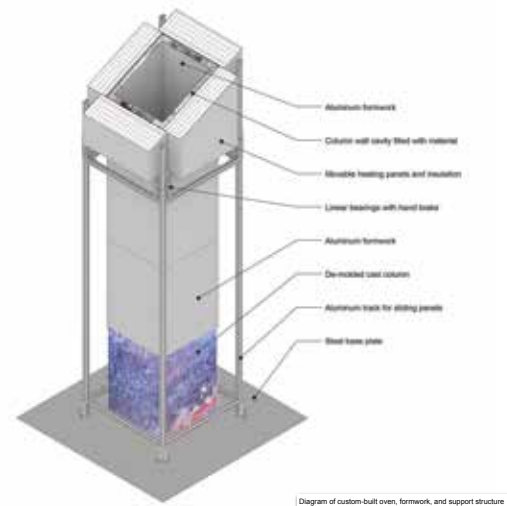
Diagram of custom-built oven, formwork, and support structure

View of the exhibition installation

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This project was produced for the Designing Material Innovation exhibition at the California College of the Arts.

A column installed on site

An example of the raw materials used to make the columns

Custom oven and formwork used to make the columns
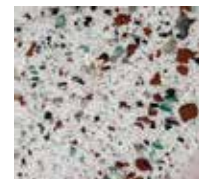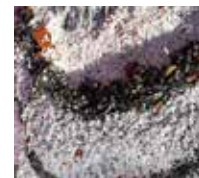
Detail images of textured surfaces

Speculative Sandstone, or, Towards Form Both Found and Made

ROY C CLOUTIER
University of British Columbia
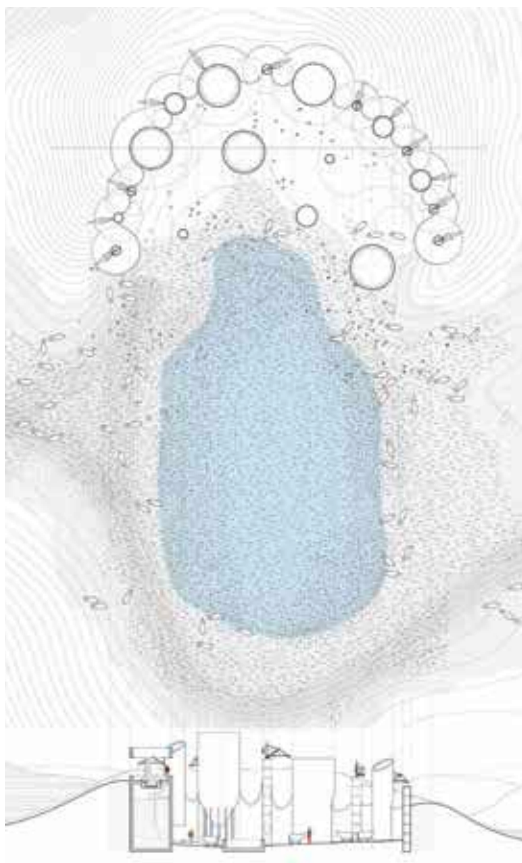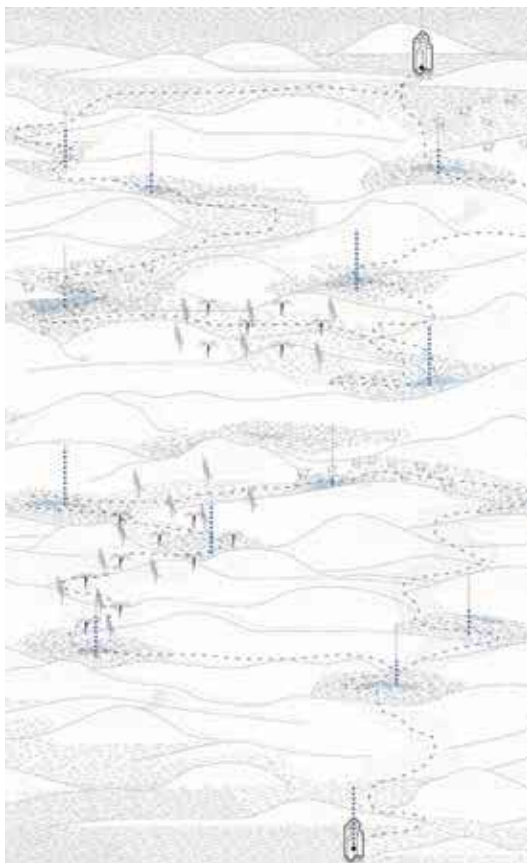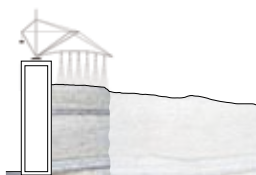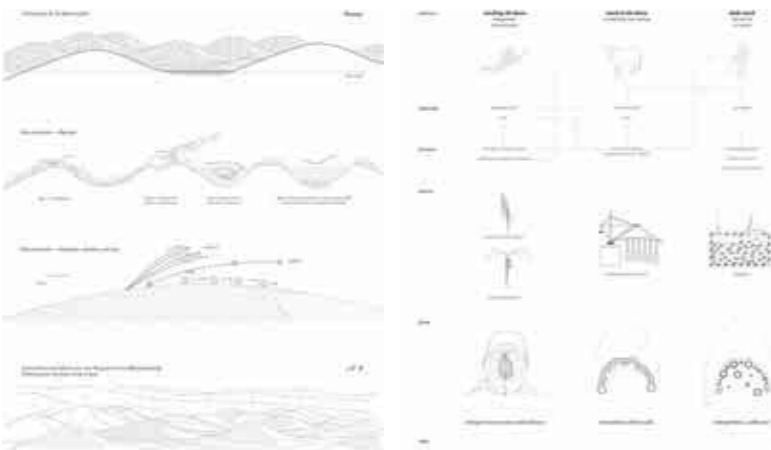
NICOLE SYLVIA
University of British Columbia

Speculative Sandstone is an investigation into how architectural order can be reoriented to the forces that act both in and on it—the many agencies, human and nonhuman, animate and inanimate, from which it is assembled. Through such a reorientation, architecture might learn to tap into a surprising generative potential—selectively ceding certain aspects of authorial control to gain in return both an extended reach and a lightened touch.

Taking the form of a speculative geo-story spanning a wide range of scales, the project pairs material investigation—experimental, ad-hoc methods for printing microbially-cemented bio-sandstone—with territorial extrapolation, testing these emergent material techniques against the climate-change-wracked landscapes of the future Great Plains. Warming due to climate change, the dunes of the Nebraska Sandhills will soon lose their protective layer of grass and go mobile, ceaselessly whipped into new forms by the intense winds of the region. The many ranchers, scientists, ecotourists, cattle, and rare species that depend on the stability of the region will be violently uprooted, with any form of static dwelling made nearly impossible by the shifting dunes. However, rather than try to stop the dunes, the project finds ways to work within the logics of the moving dune field—harnessing them to allow inhabitation where none could otherwise exist.

Manipulating the materials abundant in the region—sand, urea distilled from cow urine, and bacteria—a fleet of bio-sandstone printing devices are deployed to architecturally shelter and enlarge the oasis-like lowland marshes that temporarily exist in the lee of large barchan dunes. As blowing sand builds up against pods with sand fences stretched between them, adapted pivot-irrigation mechanisms disperse the urea-water-bacteria slurry to inoculate the sand, building it up and compacting it in layers—essentially 3d-printing a deep, structural buttress against the shifting dunes. The form, while seemingly quite willful, results directly from a series of simple interactions—the placement of pods, blowing of sand, bulging of sand-fences, and radii of pivot-printers. Its form is both found and made.

Having successfully shunted the dune aside, the bio-sandstone printers are able to roam onward to stabilize new grassland oases. The sandstone walls they leave behind continue to both shelter the oases and host new populations of devices and units, in time coming to support a robust agro- and eco-tourism system. Amidst the shifting landscape, metastable islands flourish for a time, then fade—their human- and non-human inhabitants moving on, tracking opportunity, transforming their context as they roam.

In one sense, the project is a call for material exploration to always parallel a focus on development with one on deployment. For architects, such a shift in focus opens new potentials for ethical engagement in that it directs attention to the collectives that any technology or project draws together—the messy and chaotic collection of people, animals, machines, climatic patterns, cultural beliefs, and more from which new forms of life are constructed. Such a shift calls on architects to learn to act amid, rather than atop, a lively field of subjects—in return promising a more deft and nimble touch.

SPECULATIVE SANDSTONE

OR, TOWARD FORM BOTH FOUND AND MADE

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Uncertain Material Engagements

JAMES C. FORREN
Dalhousie University

Material Engagement Theory frames materials as extensions of human intelligence and active participants in social exchange (Malafouris & Renfrew 2010; Hodder 2013). This socialization prompts questions of ethical material engagement: as equal participants, what are material's 'rights and responsibilities'? How might they facilitate ethical social exchange? The contemporary production of architectural components and assemblies requires an ethics of scale where energy is conserved, the social imagination is stimulated, and context is pre-eminent.

Eva Diaz in the Experimenters (2015) cites Josef Albers's pedagogical experiments with intrinsic and extrinsic material properties as cultivating an ethic of perception. Through actions of close looking and the suspension of preconceptions students were expected to foster enlightened perceptions of cultural and social exchange. Tim Ingold's Making (2013), rooted in the Deleuzian schema of 'morphogenesis,' engages a related project, extending it to a time-based model of material engagement. Pedagogical encounters under his guidance embrace the intrinsic uncertainty of material behavior over time: such as describing a penny not just as an embossed copper disc, but a metallurgical event founded in ores, imbued with energies, and subject to transformations wrought by environment and human mis-use.

The work presented here, from an introductory digital design and fabrication seminar, blurs the lines between computational certainty and material uncertainty. The tactility of materials grounds the learning of computational methods while their uncertainty enriches this learning with an experience of complex digital-analog relationships. In this process "computation" becomes more than a tool to realize form, it becomes a way to think about and orchestrate networks of activities.

The rubric of material engagement challenges students to design and evaluate material encounters which inform algorithmic patterns of computational design and fabrication. Released from preconceived form, by looking at tools and methods they take on thinking while making: allowing knowledge discovered during the process to inform its development they discover it through experimentation. By working through intrinsic properties students develop solutions which are novel, efficacious, and adaptive. Because the experiments are rooted in intrinsic properties their outcomes have a high degree of efficacy, foregoing energy typically wasted working against what a material 'wants' to do. As the tests are algorithmic – establishing frameworks of constants and variables – they can adapt to various contexts and conditions.

This process teaches students to listen to materials and observe their 'rights.' Students learn the steps in designing a process, as opposed to an object, and thus, understand their ability to intervene in larger processes of manufacturing and material production. This ultimately provides alternative models for thinking about built form not as a projected image, but as the outcome of a carefully choreographed set of relationships in space and time: a confluence of human activity, material performance, and environmental forces rather than a preconceived idea.

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TWISTED EXPRESSIONS
Claire Fontaine, Adam Sparkes

The thermoplasticity of acrylic is exploited as a lapped twist, developing a transparent interface. The twist and orientation of the joint inform the overall geometry of the assembly creating an intimate link between detail and final form.
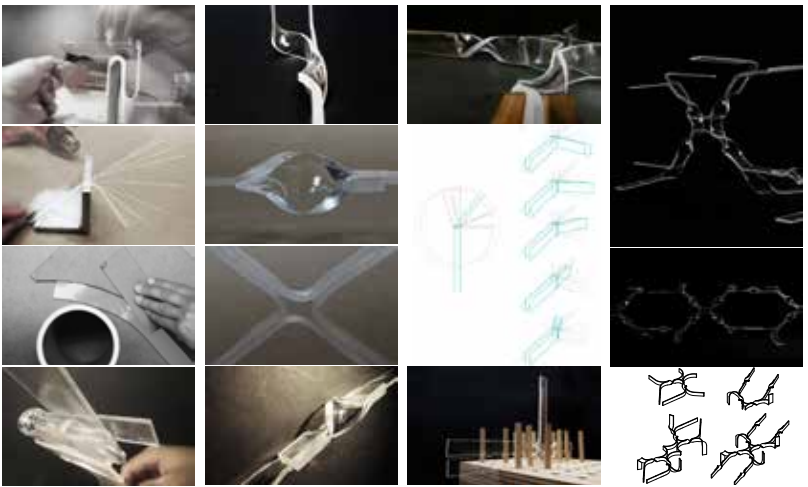

STATIC FLUID
Mattei Rau, Larissa Roque

The viscosity of plaster and the process of shape deposition informs a study of reciprocal casting. Each cast builds on its neighbor in a targeted choreography of rigid and dynamic surfaces. The reciprocal cast locks each block to its neighbor. A jig links the individual cast to an overall form; dynamically adjusting the angle of individual units as the overall form changes.
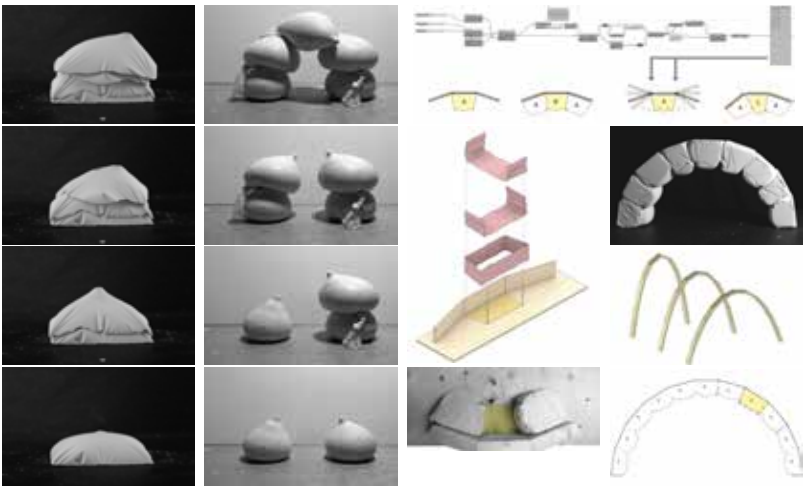
STEEL BRAIDS
Lewis Gallacher, Patrick Spelliscy

The ductility of steel rods when twisted is explored as a braided joint, developing a semi-rigid lattice. A custom designed braiding machine was used to braid twelve rods into a single assembly.
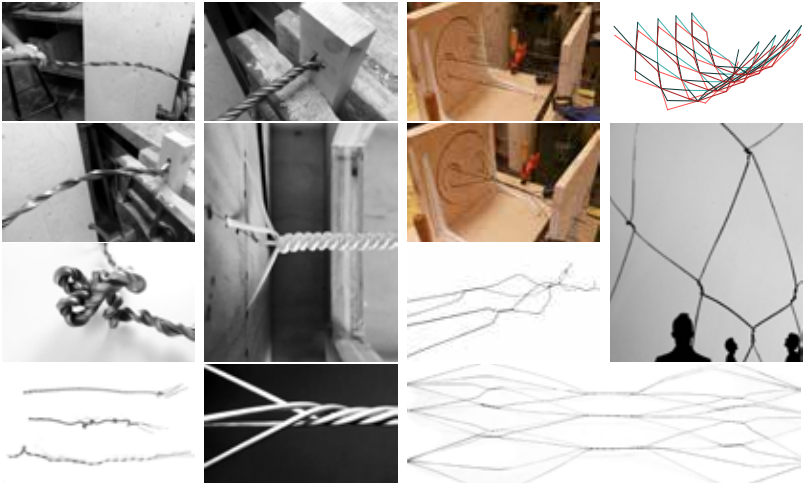
A New Robotic Brutalism: Additive Architectural Elements

LESLIE LOK
Cornell University

SASA ZIVKOVIC
Cornell University

The 3D printer, a machine which has long been characterized as characterless due to having little to no constraints, is in fact highly distinctive. The Additive Architectural Elements project aims to reveal the 3D printer's own and highly idiosyncratic architectural tectonics and narratives. Choosing common-place prototypical architectural motifs such as floors, columns, doors, windows, walls, and ceilings we developed strategies as to how the layering of concrete, the relentless three-dimensional drawing of extruded lines of material, and the act of corbelling can suggest new strategies for building. Our question is: what is the architecture of 3D printed concrete?

Per visual and material association, we became interested in the architecture of Brutalism, borrowing and advancing formal and material strategies developed during this period. For us, Brutalism is most intriguing when bottom-up material processes meet top-down expressive decisions made by the architect: when a symbiosis between material and method of construction facilitates specific architectural characteristics such as fluidity, cantilevers, and texture, as well as accommodates the architect's willful design expression in the overall building assembly. In many of the great brutalist buildings, this oscillation is expressively present, hence our interest in that time period. In both our research and practice we aim to bring about and introduce such balance to new processes of making.

The A New Robotic Brutalism – Additive Architectural Elements project investigates prototypical methods for 3D printing at the building component scale in ground-up layered assemblies. Rather than further focusing on the technical advancement of 3D printing technology, this project operates consciously within the status-quo, researching a paradigm-shift that has already occurred but never fully and consequentially been explored architecturally: the 3D printing of buildings with concrete. In a 3D printed structure, all common architectural motifs and building components must be re-thought to fit the

logic of layered construction. For example, a concrete printer cannot print in midair; therefore, the otherwise simple exercise of making a rectilinear window opening becomes de facto an impossibility. Rather than drastically altering the process (stopping the machine to insert a beam), we believe that short-comings become opportunities for design: as the printer can incrementally cantilever, one possible logical consequence is for the window to become a triangular corbelled arch. Seemingly advanced technology unexpectedly enables narratives that connect to obsolete or archaic structural strategies such as corbelling. Other strategies deployed in the manipulation of form are the modification of printing direction to overcome printer deficiencies, g-code manipulation for smart material deposit, or alterations of geometries for structural reasons related to the fabrication process.

In a series of seven full-scale 3D printed concrete prototypes, forty-nine 3D printed PLA models, seven proto-architectures 3D printed from PLA, ninety-eight element drawings, and one hundred-ninety-six photographs, the A New Robotic Brutalism – Additive Architectural Elements project explores the architecture of 3D printed concrete within Mushroom Columns, Force Columns, Smart Poche Walls, Ceilings, Floornaments, Doornaments, and Corb. Windows.

A NEW ROBOTIC BRUTALISM
Additive Architectural Elements

By Leslie Lok and Sasa Zivkovic

The 3D printer, a machine which has long been characterized as characterless due to having little to no constraints, is in fact highly distinctive. The Additive Architectural Elements project aims to **reveal the 3D printer's own and highly idiosyncratic architectural tectonics and narratives.** Choosing common-place prototypical architectural motifs such as floors, columns, doors, windows, walls, and ceilings, we developed strategies as to how the layering of concrete, the relentless three-dimensional drawing of extruded lines of material, and the act of corbelling can suggest new strategies for building. Our question is: **what is the architecture of 3D printed concrete?**

Per visual and material association, we became interested in the architecture of Brutalism, borrowing and advancing formal and material strategies developed during this period. For us, Brutalism is most intriguing when bottom-up material processes meet top-down expressive decisions made by the architect: when a symbiosis between material and method of construction facilitates architectural characteristics such as fluidity, cantilevers, and texture, as well as accommodates the architect's willful design expression in the overall building assembly. In many of the great brutalist buildings, this oscillation is expressively present, hence our interest in that time period. In both our research and practice we aim to bring about and introduce such balance to new processes of making.

The A New Robotic Brutalism – Additive Architectural Elements project investigates prototypical methods for 3D printing at the building component scale in ground-up layered assemblies. Rather than further focusing on the technical advancement of 3D printing technology, this project operates consciously within the status-quo, researching a paradigm-shift that has already occurred but never fully and consequentially been explored architecturally: the 3D printing of buildings with concrete. In a 3D printed structure, all common architectural motifs and building components must be re-thought to fit the logic of layered construction. For example, a concrete printer cannot print in midair; therefore, the otherwise simple exercise of making a rectilinear window opening becomes de facto an impossibility. Rather than drastically altering the process (stopping the machine to insert a beam), we believe that shortcomings become opportunities for design: as the printer can incrementally cantilever, one possible logical consequence is for the window to become a triangular corbelled arch. Seemingly advanced technology unexpectedly enables narratives that connect to obsolete or archaic structural strategies such as corbelling. Other strategies deployed in the manipulation of form are the modification of printing direction to overcome printer deficiencies, g-code manipulation for smart material deposit, or alterations of geometries for structural reasons related to the fabrication process.

In a series of seven full-scale 3D printed concrete prototypes, forty-nine 3D printed PLA models, seven proto-architectures 3D printed from PLA, ninety-eight element drawings, and one-hundred-ninety-six photographs, the A New Robotic Brutalism – Additive Architectural Elements project explores the architecture of 3D printed concrete within Mushroom Columns, Force Columns, Smart Poche Walls, Ceilings, Floornaments, Doornaments, and Corb. Windows.

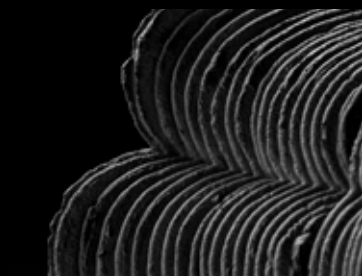Daedalus Self-built Open Source 3D Printer

Material Tests
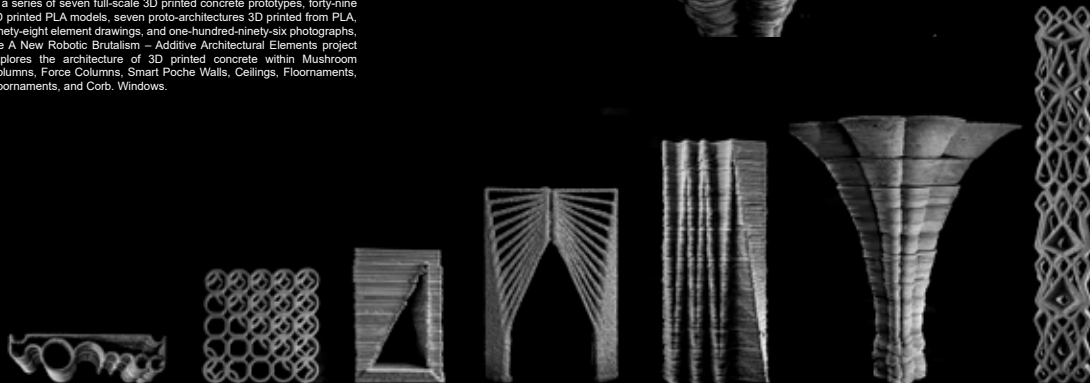
Smart Poche Walls

Doornaments

Force Columns

Column Cantilever

Corb. Windows

Building Tolerance: Design+Building with Reclaimed Wood

SETH MCDOWELL
University of Virginia

Much of the finishes and details in a building are there for the purpose of hiding the gaps that exists at the intersections of materials and building elements (floors/walls/ceilings/roofs). Contemporary construction techniques often depend upon the layering of materials to accommodate material diversity. This allows for a layering of tolerances and precision as well. The first layer (a frame) is rough, the second layer (sheathing) is more precise, and the third layer (finish) is highly exact. This project examines this condition of tolerance and precision. It asks, how does the architect control tolerance? How can the architect design tolerance? These questions will inform strategies for material, construction, program, form and space.

The role of tolerance in architecture

Definition 1: an allowable amount of variation of a specified quantity, especially in the dimensions of a machine or part.

In the translation from drawing to built work, a design must accommodate reality: the imprecision of equipment, humans, materials, and site. The literal gaps given over to"reality" are what we understand as tolerances. Tolerance is the deviation we allow for human (and machine) error in installation and in the creation of the parts that create a building. As with statistics, tolerance is an allowable deviation from the precision of a drawing that will allow a building to "fit" together. While tolerances have improved with the industrialization and manufacture of materials, humans are still involved in the installation of components on site. The assembly of these components is fundamentally contingent on the various workers installing each piece of the building in the right location, the location being where it is intended to be on site, and each piece must be manufactured or cut to the dimensions in a drawing either off or on site. This is essentially impossible to control to perfection – in the field of mathematics, there are theorems that demonstrate that we will only ever be able to get infinitely close to zero. Despite our innovations with robotics and BIM technologies, we will only be able to reduce tolerances, not eliminate them.

Space is a fundamental tool for tolerating discrepancies and differences in architecture. Extra space allows for breathing room between two elements. Overlapping space enables coverage between varied elements. Could it be possible to learn deeper lessons on tolerance from architecture?

The Building Tolerance Pavilion is a site-specific installation constructed by students during a month-long workshop. The temporary pavilion examines the role of tolerance in architecture and in society. The structure is made of irregular, reclaimed wood and is positioned to create a forum for discussion. The exercise enables students to develop techniques for material tolerance while creating a space for social tolerance.

BUILDING TOLERANCE: design+building with reclaimed wood

Building Tolerance Pavilion from above

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Building Tolerance Pavilion from upper terrace

Interior Forum of the pavilion

Wall stacking detail of reclaimed members

Pavilion entrance

MEDIA
INVESTIGATIONS

Another Axon

JENNIFER BONNER
Harvard University

Another Axon asks the question "Is a drawing architecture?"

Another Axon uses the conventions of an architectural axonometric drawing to make three-dimensional space with an ideal view of the installation seen from the top level of an adjacent parking garage. Questioning the role of the temporary installation at the 2017 Design Biennial Boston, the architect experiments with public space via a disciplinary representation. The use of an architect's hatch library, directionality of the cladding materials, and projection of CNC tooling paths all rely on the drawing as a primary technique for constructing Another Axon. Situated on a bland site, at the I-93 off-ramp in central Boston and with interest in defining "ordinary architecture," the project engages the norms of the convention by amplifying color and challenges traditional building materials, placing emphasis on playfully reimagining architecture in the field.

Another Axon is composed of eleven minimal art objects and a stand of twelve trees, all of which rely on contemporary reproduction strategies. The art sculptures are lifted from an open source 3D warehouse and range from Donald Judd's Untitled (1961) to Carl Andre's Slope (1968) while the artificial trees are constructed by carefully tracing other tree drawings from a landscape catalogue. It is an intentional act to download, borrow, trace, and copy-paste, only to hack and transform the original. This process happens quick and mostly done on autopilot to free up all conceptual wherewithal towards the architectural drawing. The drawing is what is worked on heavily in digital space. Lines, hatches, leave shapes, and edges become materials, tooling paths, and patterns in the architectural project. Most of the design labor was time spent on crafting the drawing as an abstraction, but also obsessing over the drawings detail and execution into the material world.

The selection of materials for Another Axon reinforces the constructed, perfect axon view but also places emphasis on the "ordinary" in architecture. The collapse of minimal art (high)

with ordinary materials (low) is intentional. Three traditional exterior building materials are sourced from ubiquitous residential and commercial buildings across the United States—vinyl siding, EIFS (a synthetic stucco), and artificial turf. Each of which are distorted through orientation, color, and application from their original use. The materials are used inappropriately: vinyl siding is installed upside down and the paint stripping used on athletic fields no longer demarcates rules of a field but is rather turned into a 2,000 sq ft drawing.
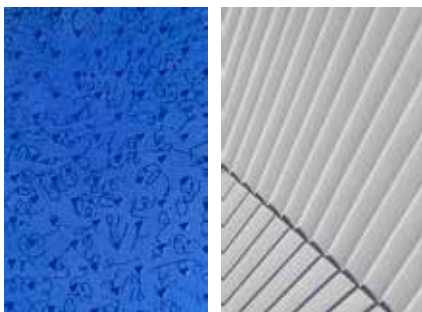
ANOTHER AXON

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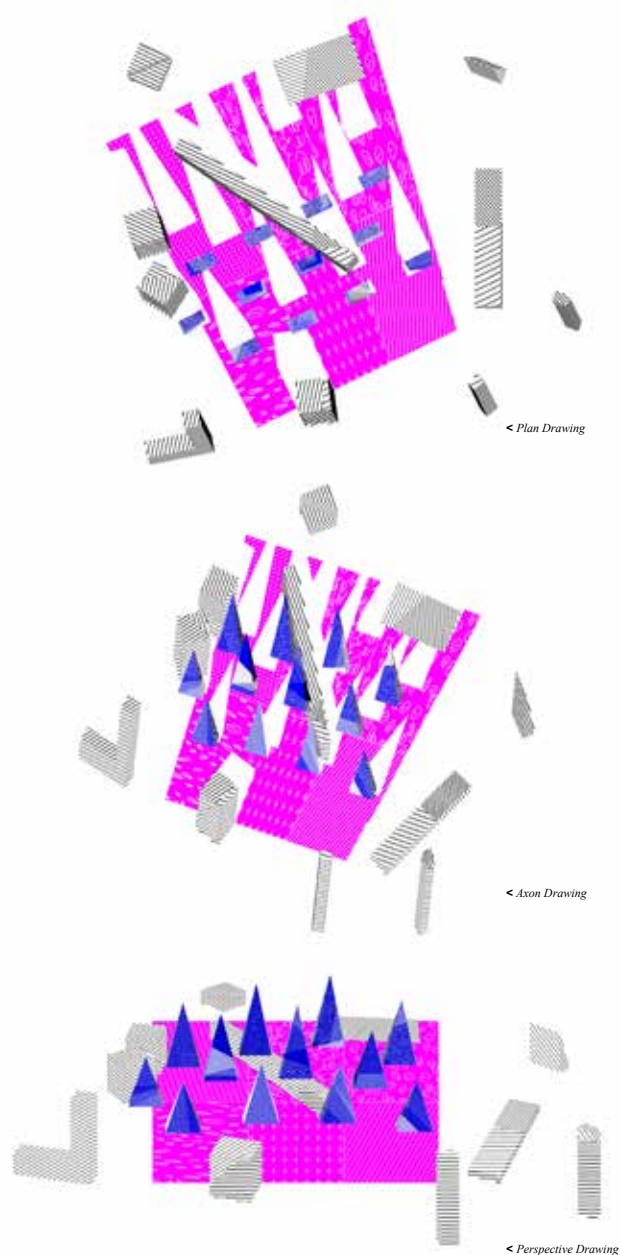

< *Plan Drawing*

< *Axon Drawing*

< *Perspective Drawing*

^ *EIFS stucco drawing*

^ *Vunyl siding application*

^ *View of installation from public sidewalk.*

^ *"Perfect" axonometric view of installation from adjacent parking*

Situation Studio

ASHLEY BIGHAM
University of Michigan

The Situation studio is an experimental pedagogy that introduces a range of design strategies and representational techniques, with the ambition to test architecture's capacity for sponsoring activities, anticipating scenarios, and producing material effects. Students work with various forms of media including film, axonometric drawing, and model making. Students are challenged to situate architecture in contexts not defined only by locality or geography, but also by social, cultural, and institutional conditions. Material assemblies and actions serve as available sites for implementing a programmatic strategy. In this effort, the studio borrows promiscuously from contemporary cultural production. Television, art direction, interior design, fashion, music and dance moves all aid the design development. The studio contributes to this creative milieu through new forms of media and representation, while remaining committed to architecture's fundamental drawing and modeling conventions. The ethic of the studio is collective. This not only reflects the changing reality of the profession, where collaboration is essential, but also embraces the fact that creative authorship is never a solitary act.

Project 03 (lower left & upper right, *film stills*) produces a video that depicts a hybridization of hotel spaces focusing on the stair, the hotel room, and the lobby. Students create new conditions, situations and spaces of encounter. Students create short video clips which imagine radically divergent constituencies and their drastically different experiences of the space. Students use advanced video software, university technology resources including green screen studios, and professional recording equipment.

Project 04 (above & left) distills all previous exercises and skills into the design of a small hotel with an additional idiosyncratic program. The student work to combine spatial fragments into a single drawing: an axonometric cut-away through the entire building. Each drawing and project now must consider organization and explicit spatial relationships between different programs.

Above Alison Truwit
Below Alison Truwit and Jacqueline Daniel

Above Victoria Yu and Shiqi Wang

Situation Studio

Ashley Bigham, University of Michigan Taubman College of Architecture & Urban Planning

The Situation Studio is taught collaboratively. In 2017 this studio was taught in collaboration with Thom Moran and Ana Morcillo Pallarés. In previous versions of this studio, significant pedagogical contributions were made by Anya Sirota and Meredith Miller.

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Above Shiqi Wang

Above Victoria Yu

Make an Anthropo-Scene!

JOSEPH ALTSHULER
School of the Art Institute of Chicago
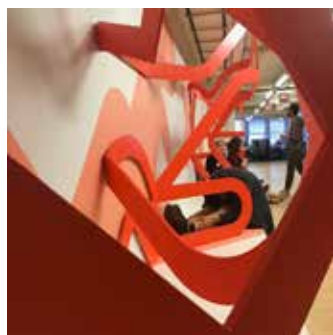
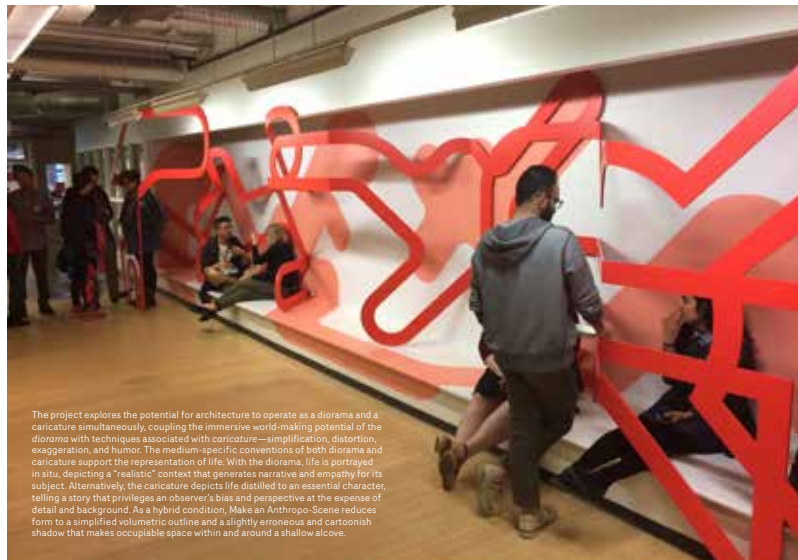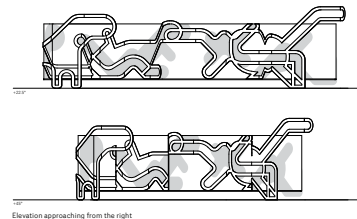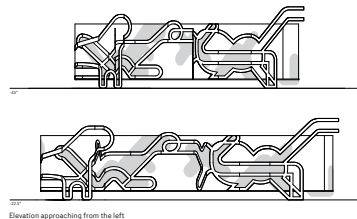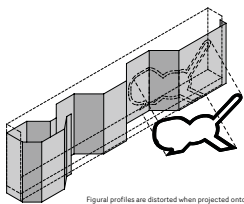**JULIA SEDLOCK**
University Affiliation

As both a discipline and a cultural practice, architecture's expertise lies in its capacity to communicate new ideas through various media. We wield this expertise not simply to build buildings, but to build portals that connect reality as we know it to new realities conjured by our imaginations. We occupy this translation by straddling the line that separates what is from what might be through drawing, writing, and constructing at multiple scales. For this reason, our responsibility to engage with the real and serious issues in the world (social, economic or environmental) manifests less convincingly as policies or calculations and more potently as provocations that help us see a different future.

Make an Anthropo-Scene is a recent installation that produces a provocative, yet incomplete image of an alternative world where an animated collective life expands the boundaries of its environment to include new subjectivities. On one hand, the project reads as a line drawing of simple abstracted figures overlapping in elevation. On the other hand, the surface of the drawing is folded in plan to create nooks and crannies for occupation and interaction with the figural characters. By leveraging the disciplinary trope of the line drawing in a volumetric way, the project portrays an expanded environment of companionship, prompting engagement with overlapping creature-like architectural forms. The outcome is a flickering legibility that snaps into and out of completion and wholeness. The aggregation of parts is legible enough to suggest a possible story, yet still open to filling gaps or generating scenarios through audience participation and invention.

The project explores the potential for architecture to operate as a diorama and a caricature simultaneously, coupling the immersive world-making potential of the diorama with techniques associated with caricature—simplification, distortion, exaggeration, and humor. The medium-specific conventions of both diorama and caricature support the representation of life. With the diorama, life is portrayed in situ, depicting a "realistic" context that generates narrative and empathy for its subject. Alternatively, the caricature depicts life distilled to an essential character, telling a story that privileges an observer's bias and perspective at the expense of detail and background. As a hybrid condition, Make an Anthropo-Scene reduces form to a simplified volumetric outline and a slightly erroneous and cartoonish shadow that makes occupiable space within and around a shallow alcove.

Located along primary circulation paths at the School of the Art Institute of Chicago, the installation engages a thirty-foot-long alcove to create an occupiable destination where passersby are invited to pop their head in, be hugged by, or sit between these creaturely figures—to become a part of the ever-changing scene. The installation does not claim to solve the problem of environmental degradation by the human race. Rather, it makes an animate scene and calls others to action to join in the making of the scene as well. In the process, it hopes to punch a small, cartoon-shaped hole in the fabric of reality in order to suggest that an alternative world is possible.

MAKE AN ANTHROPO-SCENE

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Figural profiles are distorted when projected onto a folded surface to produce a three-dimensional line drawing. The original figures flicker in and out of legibility as viewers walk past or occupy the alcove.

Elevation approaching from the left

Elevation approaching from the right

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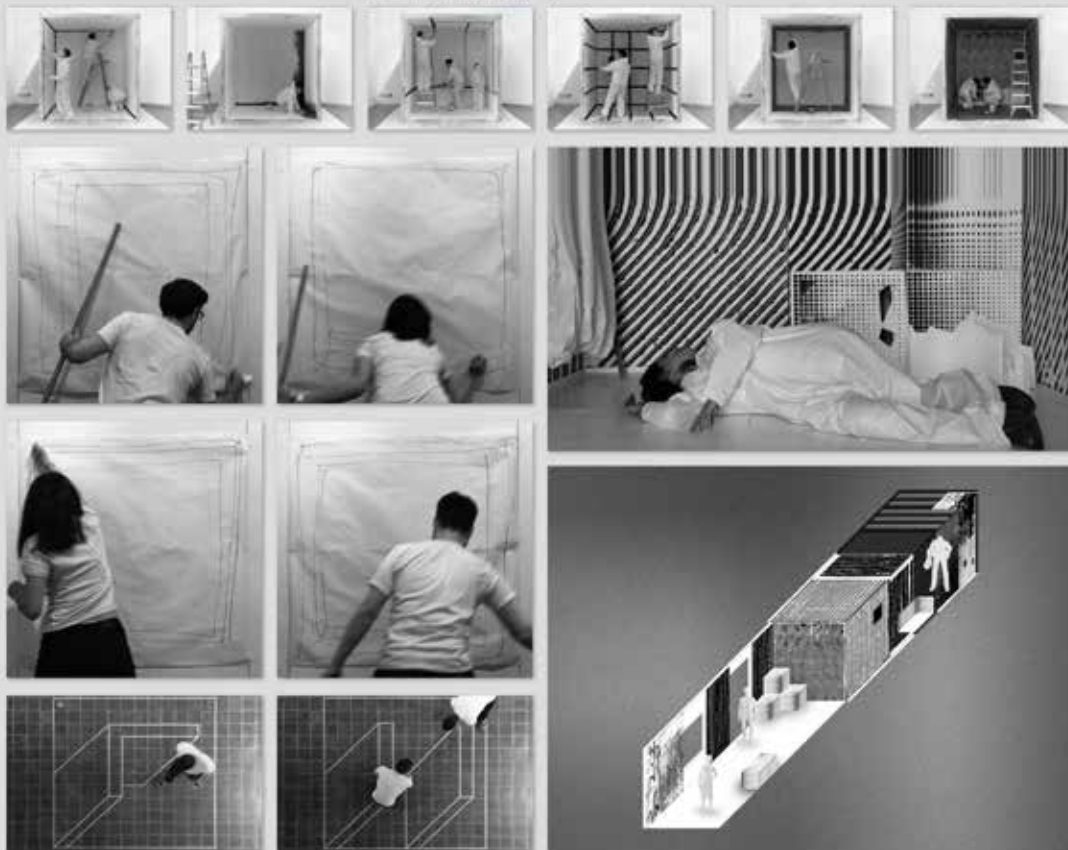
BLDG_DRWG

CYRUS PENARROYO
University of Michigan

All architects draw…but as architecture becomes increasingly reliant on computerized methods, the attendant tools and conventions for drawing are disposed to conceal labor and eliminate traces of authorship. In many cases, architects draw digitally to rehearse precision, in hopes of achieving the most direct translation between the initial concept and the final construction. Instead of using drawing as a means to an end, can architects seize new opportunities by complicating the relationship between drawing and building?

Unlike digital delineations, handmade drawings and sketches more overtly register the temperament of one's hand – the quiver of a line, the change in stroke pressure, the overextension of crossing vectors to announce a corner, and the smudge of graphite to enforce an edge. Such qualities result in precarious representations that seem raw, incomplete, and capricious. However, these autobiographical traces disappear when computer-driven techniques are prioritized and when a scaled drawing is translated to a full-scale building. While the trained eye can likely spot the difference between the sharp conviction of a Miesian line and the loose exuberance of a Gehry sketch, is it possible to produce an architecture that literalizes those effects? Instead of a complete return to hand-drafting, can architects accept contemporary modes of production and physically achieve handwrought, sketch-like qualities through digital means? Alternatively, if architecture depends on physical "stuff" as a form of currency, in what ways can those objects begin to image the digital? Lastly, what effects are generated when we collapse the scale of drawing with that of building?

BLDG_DRWG is a project that reorients the ways in which architecture is produced and consumed by recouping handwrought drawing effects and rearranging drawing conventions at the building scale. Oscillating between analog methods (ink, paint, tape) and digital processes (scanning, photoshop filtering, milling), this project intensifies attributes of drawing otherwise lost in translation. A series of 1:1 investigations executed collectively harnesses the potency of these effects and uses them to reconstitute existing architectural conditions. The results of these studies were reassembled as a room – one fragment of an unfinished building – that speaks to the instability of its own representation.

Interior, as installed in the gallery

Exterior, as installed in the gallery

BLDG_DRWG

Location: Ann Arbor, MI
Type: Temporary Installation
Status: Built
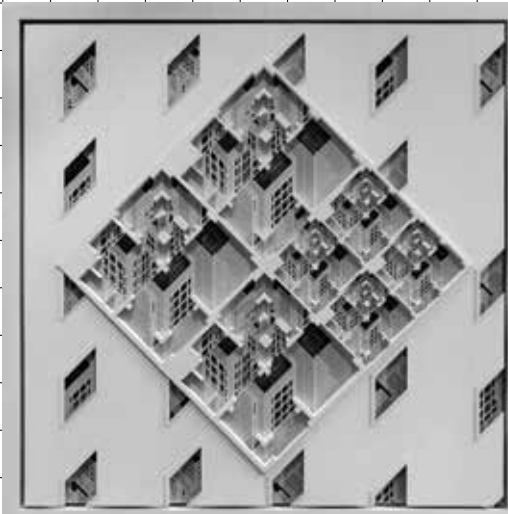
Gridspace

ERIK HERRMANN
University of Michigan

The grid is arguably the most enduring and problematic emblem of modern optics and visualization. Since Alberti's publication of de Pictura in 1435 the grid has been the dominant cultural device for translating the continuous, three-dimensional world into discrete, flat compositions.

The continued relevance of the grid in contemporary image culture is assured at at least in the foreseeable future through its ubiquitous digital instantiation - the pixel - which has remained the principal format for image transmission and display since the digital turn.

This representation course, Gridspace, considers the contemporary role of the grid in image culture, revisiting the grid as a technique of both optical translation and formal composition in architectural representations. Grids logically extend infinitely and this representation course leverages their inherent incompleteness in time and space through a series of drawing and modeling exercises of increasing scale and sophistication. Beginning at the tectonic of the single Frame (Part I), this seminar rapidly "zoomed out" in a concise set of exercises, expanding to consider the space of a single Room (Part II) and finally (featured in this exhibition) the Building (Part III).

In Part I, the Frame, students composed "Joiners" in the tradition of David Hockney with a single window as the subject. In Part II, the Room, students revisited room etchings by De Vries, and "remixed" their spatial effects by intervening in the geometry and expression of the grid in the composition.

Finally, in Part III, students were assigned precedent projects with unique relationships to the grid as a motif in architecture. Through an analytic process each student distilled the role of the grid within their particular precedent project, then produced a new visualization of the project based on that interpretation. The central concern of these investigations was the role of the grid in each act of architecture. Ultimately, this body of work speculates on the alternative possibilities embedded in the very wefts and warps of the grid.
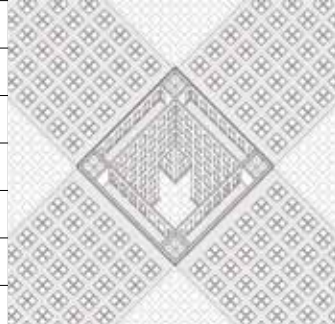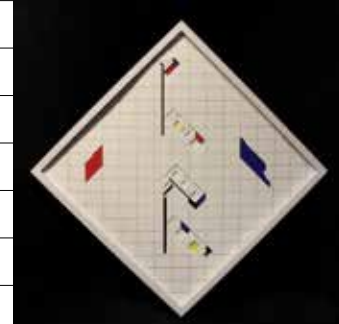
Todoroki House,Hiromi Fujii, 1976
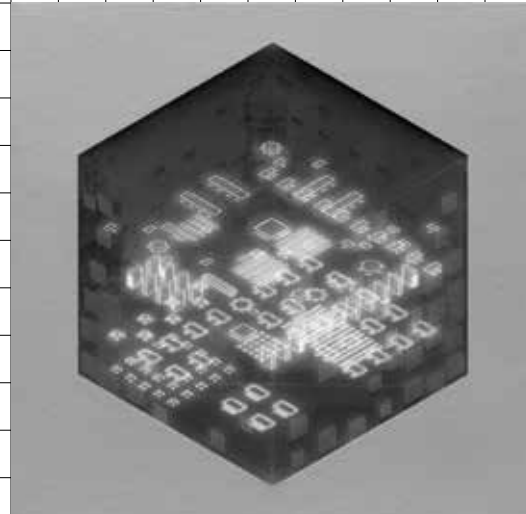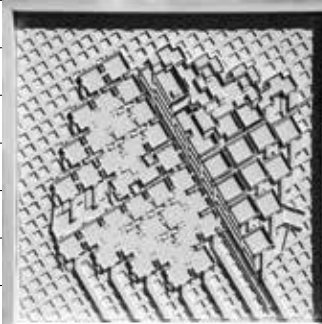

Zollverein School of Management and Design, SANAA, 2005

432 Park Avenue, Rafael Viñoly, 2015

Block 1, IBA, O.M.Ungers, 1981


Smith House, Richard Meier, 1965

Central Beheer Building, Herman Hertzberger, 1967

GRIDSPACE

ERIK HERRMANN
TAUBMAN COLLEGE OF ARCHITECTURE AND URBAN PLANNING

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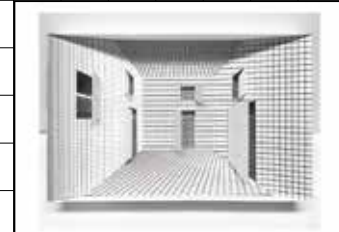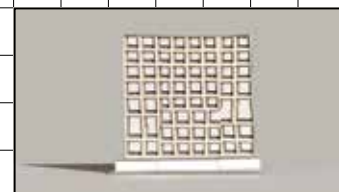

The Room, Part Two Study
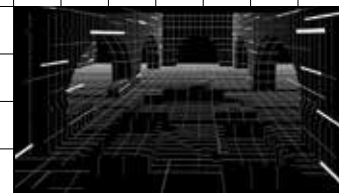
The Room, Part Two Study
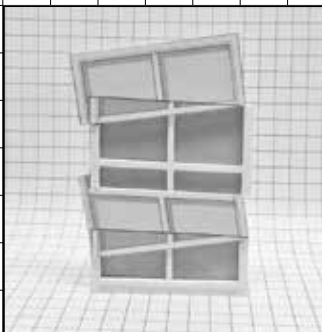
The Frame, Part One Study

The Frame, Part One Study

The Frame, Part One Study

Breaking BIM with Abnormal Components

SETH MCDOWELL
University of Virginia

Building Information Modeling (BIM) is not just a tool for project delivery and production. This research project seeks to identify new relationships between design processes and BIM that leverage the computational resources for design objectives. The project outlines two approaches to breaking the constraints of BIM with more intuitive workflows for design. These include associative modules and conceptual massing with adaptive components. The work here highlights an exhibition created for the 2015 NY Architecture League Prize for Young Architects.

The exhibition presented a grouping of "spatial constructs" created from strange, abnormal materials. Using an identical set of material "ingredients," two different artists, working from two separate locations, constructed a radically different set of physical models (objects) utilizing abnormal construction techniques: linear threaded wads of chewing gum coated with dried spearmint leaves, and intricate modular constructions of laser-cut wood. These objects are 12-inch cubes that express the nature of tectonics and properties inherent to the material. Drawings of these models, created by Building Information Models translate the spatial constructs into architectural speculations—mysterious formations without context or utility.

The exercise presents two modalities of the exception. The methodology and exhibition was structured by two operations:

• Anomalous construct: the principle of variance. An anomaly is produced from the multiplicity of parts—parts that do not exactly fit together (wood clips).

• Clinamen construct: the principle of deviance. A material détournement is created (chewing gum and dried spearmint leaves).

The project addresses concerns about BIM's relationship to design workflow. BIM platforms contain pallets of default/generic tools, which tend to result in architecture of a generic quality. Parametric objects are simply "dropped into" designs without careful considerations. Customization can be a cumbersome chore and only extremely patient or tech savvy designers achieve provocative results. Thus, the agenda with these simulated BIM drawings is to transfer the spatial complexity and abstraction of the physical, unfindable objects into the heterogeneous BIM environment in effort to break the boundaries present in the software. These abnormal objects are the tools used to dissect Building Information Modeling.
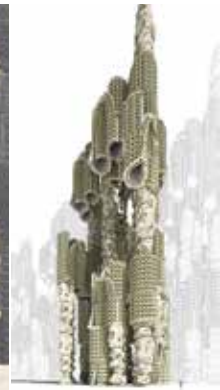
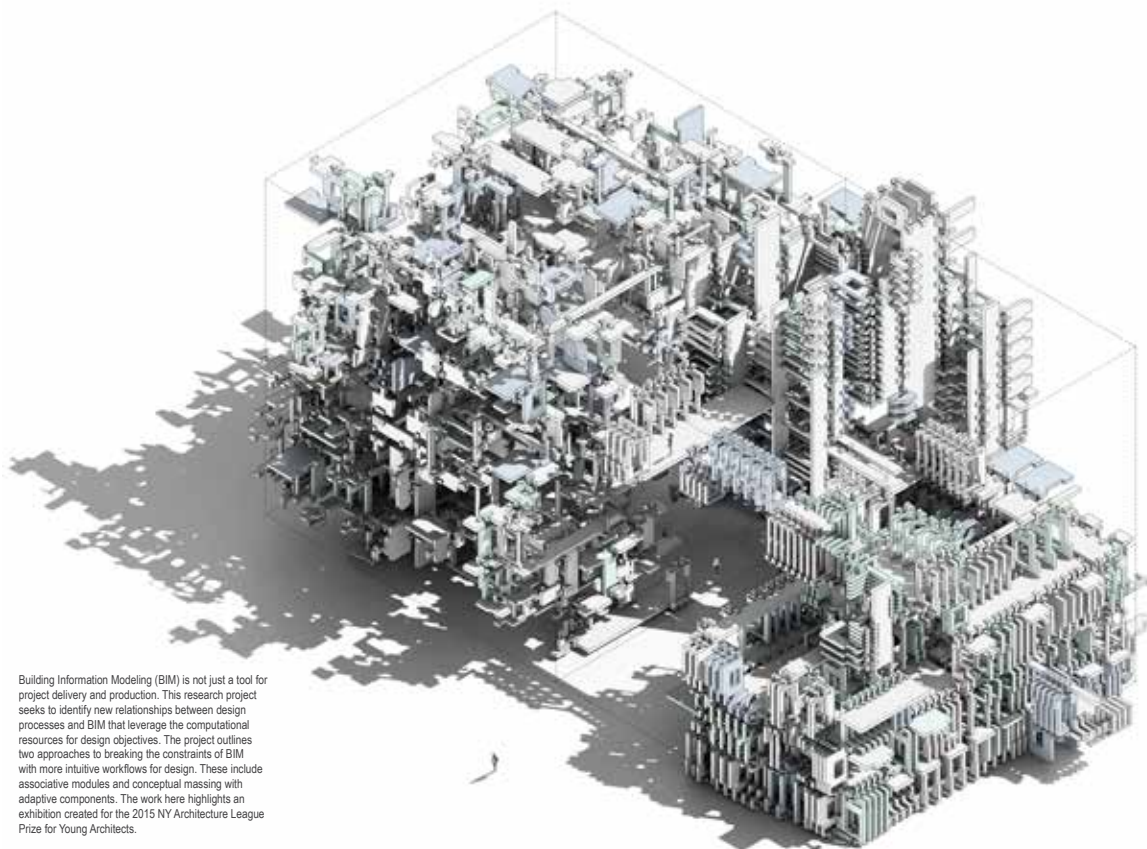Component 01, Spearmint chewing gum, wrappers and leaves.

Component 02, Spearmint chewing gum, wrappers and leaves.

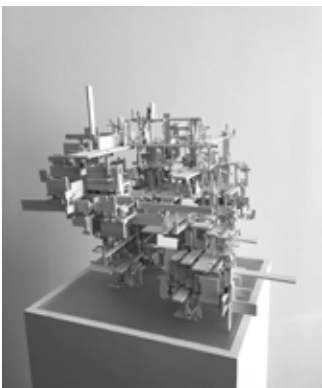BIM Drawings of construction with abnormal components 01+02.
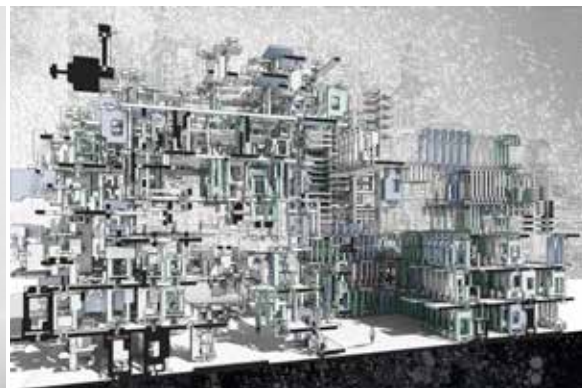
Breaking BIM with Abnormal Components

Building Information Modeling (BIM) is not just a tool for project delivery and production. This research project seeks to identify new relationships between design processes and BIM that leverage the computational resources for design objectives. The project outlines two approaches to breaking the constraints of BIM with more intuitive workflows for design. These include associative modules and conceptual massing with adaptive components. The work here highlights an exhibition created for the 2015 NY Architecture League Prize for Young Architects.

BIM Axon Drawing of construction with abnormal component 03.

Component 03, Various Laser cut masonite profiles

BIM Drawings of construction with abnormal component 03.

Unmediated Matter and Catenary Practices

FEDERICO GARCIA LAMMERS
South Dakota State University

Since the 15th century, Albertian methods of notation have positioned media, or more precisely, ways of mediating between graphical representation and construction at the center of the architecture discipline. In the face of evolving digital processes, media continues to be the primary means for directing labor and for planning the organization of physical matter. Media gives labor its intellectual scope and connects mental and physical production. The work presented in this poster posits that complex geometries can be constructed without explicit direction or methods of mediating matter. In other words, complex - double curvature - forms can be built without construction drawings. If so, what is the role of media in forming physical matter into geometries that can resist gravity through form?

The vehicle for exploring this question is the double-curvature work and catenary practices of the late Uruguayan engineer Eladio Dieste. This work asks media to negotiate between digital craft and automated production of images. The images in this project are made using digital techniques, like grasshopper definitions for Rhino and other 2D line-based outputs in 3D-modelling software. Images are not used to generate irrational forms, but rather expand the familiarity and scope of ways of thinking and seeing catenary shapes. To this end, media is used as a speculative framework through which to imagine and construct complex forms without explicitly directing the labor that connects them to people and tools. Pushing media away from mediating matter, or rather, designing ways of fostering unmediated matter, is borrowed from Dieste's thinking about the role of graphical representation:

"All of the great structures of the past were built with extremely simple plans. I am aware that the organization of work was very different. I also know by experience the difficulties involved in envisioning things that cannot be expressed well in drawing, but many times the results are worth this effort." [1]
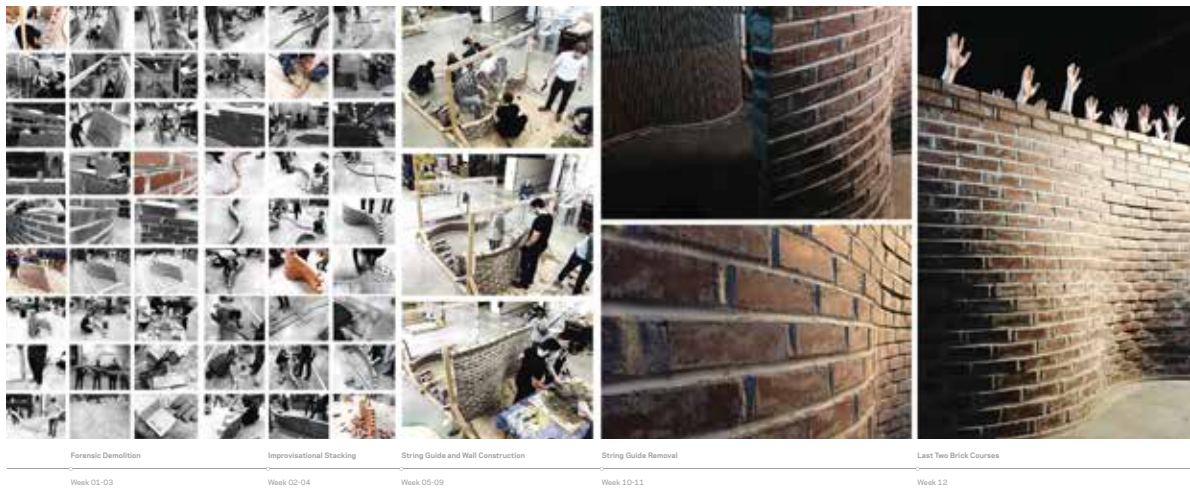
The idea of drawing not being a universal medium for architectural representation is evident in John May's writing, "Everything is Already an Image". May describes the technical aspects of three categories of media, or visual depiction, which define contemporary architectural culture: drawings, photographs, and images. He defines these categories through technical means because "architecture today seems uninterested in distinguishing between these three or, at the very least, seems unable to parse their ambiguities." [2] Unmediated Matter and Catenary Practices explores the relationship between drawings and images, as a means to question their instrumentality. According to May, "drawings are static hand-mechanical depictions that deposit geometric, rule-bound marks onto a stable surface." Images, unlike photographs, are the process of coordinating energetic outputs. Photographs manage chemical exposure processes; images manage data and energy.

The effects of automated representation highlight the prevailing contemporary condition of seeing images masquerading as "digital drawings" - tasked with mediating matter. Pairing the technical distinction between drawings and images with the geometric specificity of Dieste's catenary forms exposes the role of media in forming physical matter.

NOTES

1. Dieste, Eladio. "Architecture and Construction", in Eladio Dieste: Innovation in Structural Art, ed. by Stanford Anderson (New York: Princeton Architectural Press, 2004), 183.

2. May, John. "Everything is Already an Image" in Log 40, (New York: Anyone Corporation, 2017), 12.

Forensic Demolition	Improvisational Stacking	String Guide and Wall Construction	String Guide Removal	Last Two Brick Courses
Week 01-03	Week 02-04	Week 05-09	Week 10-11	Week 12

UNMEDIATED MATTER *and* CATERNARY PRACTICES

Federico Garcia Lammers
Department of Architecture (DoArch)
South Dakota State University

1. Dieste, Eladio. "Architecture and Construction", in Eladio Dieste: Innovation in Structural Art, ed. by Stanford Anderson (New York: Princeton Architectural Press, 2004), 183.

2. May, John. "Everything is Already an Image" in Log 40, (New York: Anyone Corporation, 2017), 12.

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Catenary
Grasshopper Definition

"All of the great structures of the past were built with extremely simple plans. I am aware that the organization of work was very different. I also know by experience the difficulties involved in envisioning things that cannot be expressed well in drawing, but many times the results are worth this effort." - Eladio Dieste

URBANISM

Revitalization of Tejgaon Industrial Brown-field Area

RIFFAT FARJANA
University Affiliation

"Tejgaon" area, with the expansion of Dhaka city, situated at the heart of the city at recent time. The area is well known for its industrial activities and vibrancy. However, the acres of land has turned into Brownfield area and has caught the eye of architects and planner to propose something new for the city.

Extensive study and analysis on land use planning, road networks, vegetations, day and night time activities, peoples participation has led to the conclusion that the industrial Brownfield area has 4 private universities which is still working properly. The key point (Universities) again engender the question about the need of educational institutions at Dhaka city. From data survey and literature study the conclusion has been made to propose an "Educational Hub" consist of 10 universities with urban park and other supporting facilities to revitalize the total area.

However, the Tejgaon Brownfield area is placed at the bank of Hatirjheel lake so the other concern for the project was to create an Urban breathing zone with accommodating functions. A park and elevated walkways has been addressed for people. The perforated elevated walkways, which is connecting different part of Tejgaon area, has designed considering the heat and monsoon of the country.

The universities has been placed carefully and common functions like library, multipurpose and amphitheatre has been placed at the middle as a shared function to reduce the cost. Housing for student and stuffs has been proposed here. Main roads along with diagonal pedestrian routes has been re designed. Common amenities like Hospital, Bus station, Mosque, Shopping mall and small bazaar has been designed here to support the educational hub. Moreover, trees, garden, life, vendors, nature and park has given special priority to revitalize the area.

Ecological Mediators

PARI RIAHI
University of Massachusetts, Amherst

KEVIN MCMANUS
University of Massachusetts, Amherst

RACHEL LOFFLER
University Affiliation

MICHAEL CANE
University of Massachusetts, Amherst

ALLISON ROY
University of Massachusetts, Amherst

The 'Ecological Mediators' offers resilient solutions along each of Quebec City's four rivers of Cap-Rouge, Saint-Charles, Beauport and Montmorency by considering natural and anthropogenically-altered hydrologic fluctuations (tides, sea level rise, flooding) that define the ecosystems, casting the rivers as mediators of these changing environmental conditions. Turning each of the rivers into a dynamic filter, the project creates built-in capacity for the rivers and their floodplains to absorb and alleviate changes and transformations that might be otherwise devastating. The project foresees controlling water runoff by creating treatment trains with both subsurface infiltration/biofiltration areas and constructed surface wetlands. By designating areas for aquaculture and urban nurseries, there will be a built-in capacity for growth and replenishment of the riverscapes both as practical and educational components that complements the gestures at the landscape and urban level.

The project also creates better access and connectivity in between points of interest on each river and throughout the city by encouraging visitation through contemplative (trails, access areas), performative (open-air theaters, sculpture parks) and recreational (canoe launching, BMX) areas that are available continuously throughout days (tide cycles) and seasons. It is essential to maintain the balance between the natural and the man-made in the unique setting of the city, which is geographically defined by the rivers that shape its territory. Considering the characteristics of the different urban zones—from densely populated neighborhoods to industrial sites and commercial zones— and the natural or altered setting of each of the rivers has led to a network of 'access points' throughout the territory. By rendering the riverscapes more visible, connected, and accessible, our goal is to make the city-dwellers more aware of the rivers and cognizant of their dynamic temporal characteristics. In addition, we have created continuous access to the shore of St-Lawrence, into which the four rivers empty, with a second, all-season connected network of trails in parallel further inland to create a 'loop' that traverses St-Lawrence and returns through a network of paths that would be used for walking, biking, skating, and cross-country skiing.

The project encourages the citizens to appreciate each of the rivers at the macro level by celebrating the geographic and environmental characteristics of each river. At the territorial scale, connecting these rivers in two directions, parallel and perpendicular to St-Lawrence, and creating green pockets along those lines will contribute to a greener, better-connected city.

ECOLOGICAL MEDIATORS

TOUCH the water

STORE (water in all its forms (fire, flood, snow)

LOOP the city through its five rivers

CONTEMPLATE the water

REPLENISH the landscape

RENATURALIZE the course of the river

DELIGHT in the natural beauty of the river

EXTEND city fabric to the river

CONTROL nature's forces

STROLL along the river's edge

PERFORM by the water

Shoreline Path (Exist.)
Shoreline Path (Prop.)
Inland Path (Exist.)
Inland Path (Prop.)

FLOATING DOCK

EXTENDED WALKING

PEDESTRIAN BRIDGE

FLOOD / TIDAL STORAGE

AQUATICS FACILITY

UNDERPASS BRIDGE

WATER RUN-OFF CONTROL

BMX ARENA

AQUACULTURE

PERFORM   WALK   BIKE   RUN   THRILL   SKI   PADDLE

CAP ROUGE
NEW VIEWING PLATFORMS
NEW FLOATING BOARDWALK
NEW FLOATING WETLANDS
NEW PARK (PARC DES ARTS)

ST. CHARLES
SUBSURFACE WETLANDS
PEDESTRIAN BRIDGE
FLOOD / SNOW STORAGE

BEAUPORT
REMOVAL OF THE DAM
TIDE & FLOOD STORAGE AREA
EXTEND THE CITY GRID

MONTMORENCY
HYDROPONIC CENTER & URBAN NURSERY
BMX & SKATEBOARD AREA
CANOE LAUNCH & VIEWING PLATFORMS

CAP ROUGE: FLOATING BOARDWALK & WETALANDS

BEAUPORT: SECTION THROUGH PEDESTRIAN BRIDGE

SAINT-CHARLES: SECTION THROUGH PEDESTRIAN BRIDGE

MONTMORENCY: SECTION THROUGH AQUACULTURE CENTER

HIGH TIDE
LOW TIDE

CAP ROUGE: WETLANDS

CAP ROUGE: PARC DES ARTS

MONTMORENCY: NURSERY AND BMX

ST. CHARLES: REORIENTATION

BEAUPORT: UNDERPASS

Sponge Zoning / The Gowanus RoofScape

JONATHAN SCELSA
Pratt Institute

JENNIFER BIRKELAND
Pennsylvania State University

Brooklyn's Gowanus Watershed is a case-study in the water management problems of the global de-industrializing city that is witnessing unprecedented increases in density straining its existing infrastructure for handling water. The introduction of the Gowanus Canal onto the National Priority list for the EPA and its designation as a Superfund site in 2010 has raised the public consciousness of the toxicity of the waterway and focused needed attention on ecological relief of this post-industrial watershed's runoff and storm-water infiltration. New York, like many industrializing cities, developed an infrastructure of the Combined Sewer, a system that drains Waste-Water in the same system as surface run-off and storm-water, resulting in a health risk during times of storm overflow. Recently, much focus has been given to the water infiltration and remediation surface strategies within the neighborhood's streetscape and open space network, but relatively little attention has been paid to the other major contributor to storm-water runoff, the surrounding building roofs.

The research of this seminar investigated the inter-relationship between urban density within existing sewer-sheds through a rigorous examination of mass, volume and zoning within the Gowanus Canal Neighborhood of Brooklyn. Beginning with a documentation, classification and categorization of the building types by their respective Combined Sewer Outfall, the research determined which formal building types and zones were in the greatest danger of contamination during flood, and which building types and conditions were the greatest contributors. Following this, the research examined, buildings within their district by their formal type and drainage methodology as far as which buildings contributed to the sewer directly versus the streetscape, identifying opportunities afforded by the surface area retention capacity and site morphological strategy.
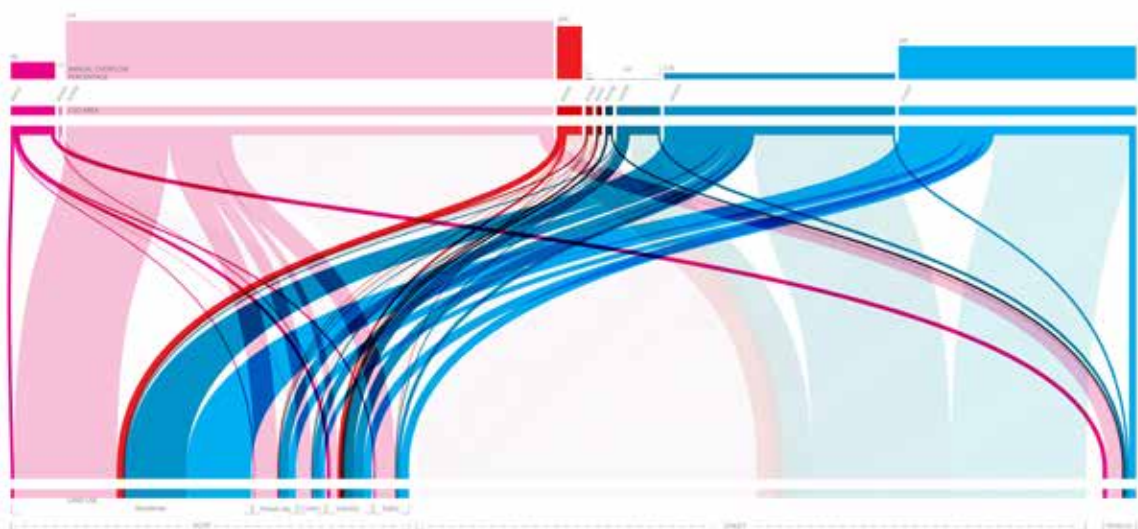
Eschewing the notion, that urban retrofitting solutions could be implemented entirely by subsidy or public money as is

being pursued at the ground-level, the seminar team pursued a public-private partnership methodology for proposing a series of changes for the existing urban Sewershed. Through a documentation of the current zoning envelope in relationship to its built mass on a study zone, the team uncovered latent opportunities within the existing condition for the implementation of future absorption and diversion retrofitting strategies, such as new roof geometry guide¬lines, green roofs and other planting strategies, that could be ap¬plied throughout the watershed to increase infiltration alleviating the over-saturated infrastructure.

Going further, the group examined how new construction by individual owners, could re-mediate the existing roof conditions by creating a series of new sponge building typologies on the existing roof-scape. The team took the next steps to create a series of urban design guidelines through potential up-zoning revisions that would allow for developers to work across several roof-scapes parcels towards the creation of both new market-rate housing and public social benefits such as roof parks and recreational programming. The final product of this seminar will be made was made available to NY state and NYC Planning agencies, as well as the local non profit, The Gowanus Canal Con¬servancy who served as an local expert guide the project along throughout the semester.

SPONGE ZONING / THE GOWANUS ROOFSCAPE

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Combined Sewer Map

Sewershed / Watershed Comparison

Imperviousness by CSO

Figure Ground by CSO

Land Use by CSO

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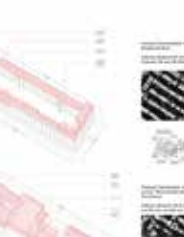
Sloped Complex
Perimeter Drainage

Flat Simple
Internal or One-Sided

Flat Complex
Internal / Central

Flat Small
One Sided Drainage

Flat Tall
Internal / Central

Surface Typology

Zoning Typology

Funnel

Umbrella

Wedge

Housing

Park in the Sky - Retrofitting Parking Deck in South Downtown, Atlanta

YILUN ZHA
Georgia Institute of Technology

FENGHUAN HONG
Georgia Institute of Technology

THOMAS DICKINSON
Georgia Institute of Technology

This project is seeking to change the monotonous scenario of Big-Box urbanism in South Downtown, Atlanta. Due to the trend of increasing suburbanization and disinvestment in downtown area in the last several decades, South Downtown has become a place where no public life and activities ever happen but only low-density development with large area of lifeless parking lot. Currently parking lot makes up near half of total land use and daily parking lot vacancy is more than 30%.

At present, South Downtown is facing three main challenges: 1. Urban Heat Island. Due to the excessive use of impervious surface and the lack of tree canopy and waterbody, the average temperature in South Downtown is 1-2 degrees Celsius higher than other Atlanta metro areas. 2.Stormwater Management. Atlanta's average sewage fee is one of the highest among all American cities and the percentage of surface runoff is much higher in South Downtown than others. According to topography analysis our site is located in the lowest point of South Downtown so it is ecologically vulnerable in light of stormwater; 3. Defensive Architecture and Segregated Landscape. All buildings and structures are independent from each other with a sense of "self-protection" which results in the isolation of South Downtown's urban landscape.

Our site is a government parking deck to the south of Atlanta City Hall and this project is sponsored by Department of Planning, City of Atlanta. Our objective is to bring the space which is previously take over by parking deck back to public life along with the mitigation of UHI effect and stormwater challenge. The rooftop of this parking deck is replaced by a roof garden and we create a cross-shape axis on the ground to strengthen the accessibility and create connection to the surrounding area. Also, we introduce the notion of urban agriculture and stormwater management to this project in order to mitigate the ecological footprint and create an environmentally friendly public space. Instead of flowing to the pipe, rainwater will either be collected by the living machine on the roof and the bioswale on the ground or directly infiltrate into the soil. After filtration, water can be reused for irrigation, flushing and condensation. When there is high amount of precipitation, excessive rainwater will be directed to the retention pond through constructed bioswale or watercourse and be stored temporarily. In the future, we can also build underground cisterns to enlarge the capacity of stormwater storage.

Meanwhile, this project encourages diversified public activities in South Downtown. On the rooftop there are four main theme gardens: beer garden, farmer's market, living machine park and family playground and all of them are connected by a loop trail. The most fantastic scene is that due to the difference of elevation the main entrance of this parking deck is on fourth floor which means if you go straight from City Hall to this parking deck, walk uphill through the ramp, the cityscape is all in front of your eyes.
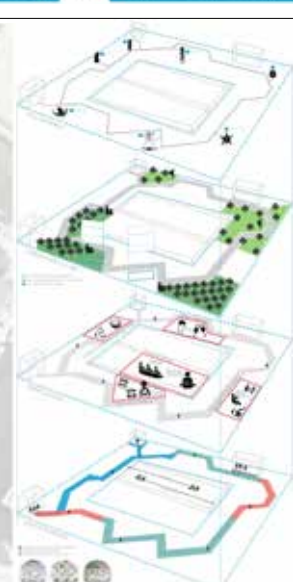
PARK IN THE SKY
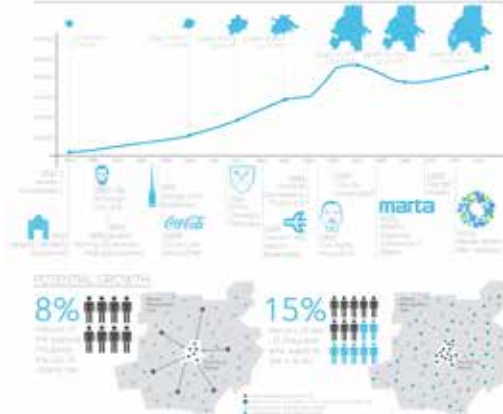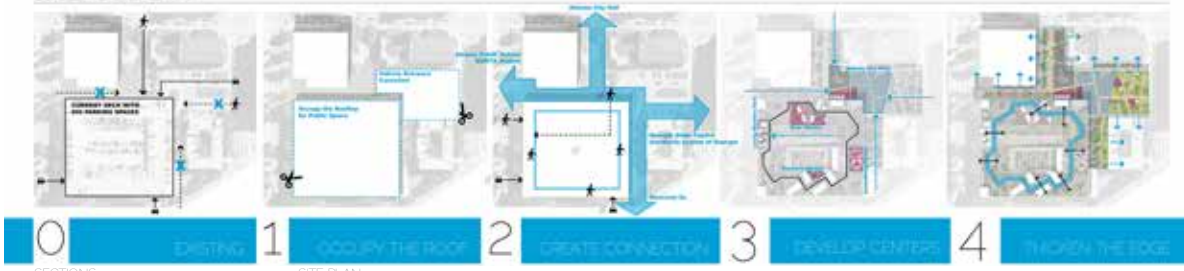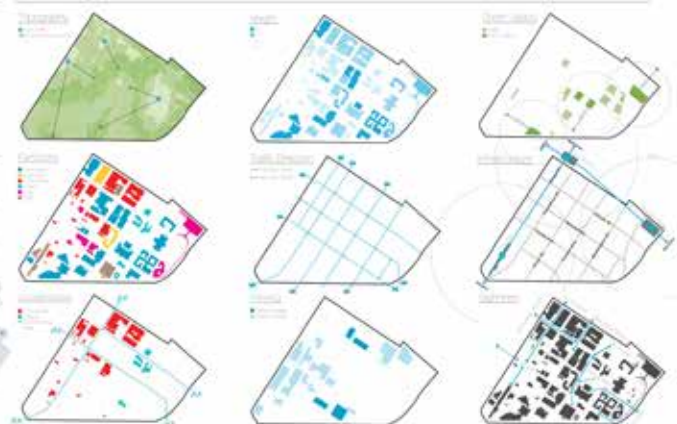
A New Vision for Midtown: Smart Growth Principles Drive a Plan to Transform an Auto Zone into a Walkable College Town District

Madlen Simon
University of Maryland

Jingjing Liu
University of Maryland

Ed Cahan
University of Maryland

Lily Mundroff
University of Maryland

Oluwatomi Thomas
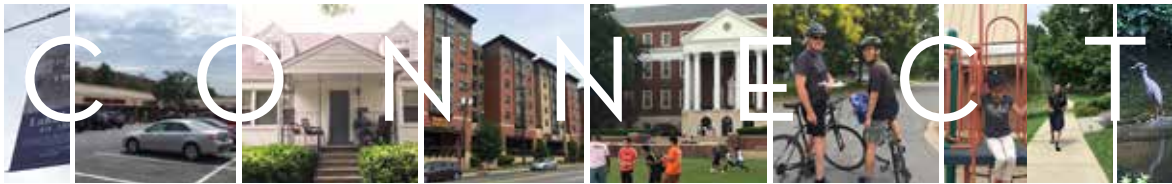University of Maryland

Timothy Pula
University of Maryland

Laura Burns
University of Maryland

The City of College Park and the University of Maryland have entered into a partnership to engage potential synergies between campus and community to create a vibrant urban environment based upon principles of smart growth. The partnership's current focus is on College Park's Midtown District, encompassing the stretch of Baltimore Avenue from the intersection of University Boulevard to the University of Maryland's main campus gate. Formerly known as Route 1, Baltimore Avenue is shedding its image as a placeless automotive corridor lined with fast food, service stations, and auto dealerships and becoming an attractive location for higher density development as the University's zone of influence expands. A new design for Baltimore Avenue aims to transform the highway into a route with multi-modal transportation options, using a complete streets approach. The site is adjacent to the new Discovery District to the south, bounded on the west by the University of Maryland and on the east by the historic African-American community of Lakeland with its school, community center, and church, and the existing residential neighborhoods of Berwyn Heights and Branchville. New residential slabs rising along the West side of Baltimore Avenue take the form of a wall dividing community and university. The Paint Branch river flows along the west side of the site, further reinforcing the town/gown separation.

The College Park City-University Partnership commissioned this master planning study as a guide to developers interested in initiating new projects within the Midtown District. The multi-disciplinary design team was asked to envision a healthy, walkable district that fulfills the mandate of the partnership to tie together University and surrounding communities with sustainable mixed development. We developed a program through a combination of community and stakeholder engagement and market research. Key concepts that emerged from the team's dialogues with stakeholders and community members were: authentic sense of place, connectivity, and healthy community. Market research pointed to opportunities for rental housing for students and young professionals, office space focused on University innovation initiatives, and retail promoting a sense of community. The proposed master plan illustrates the resulting vision for the Midtown District; focused proposals show how the place-making vision guides planning for four specific sites that are ripe for redevelopment in the near future.

The design team discovered an authentic sense of place in the history of the Lakeland community and the ecology of the Paint Branch, with the natural beauty of its native plants and animals. The proposed Paint Branch Promenade transforms the river from barrier to social connector, linking residential neighborhoods and providing access to nature and healthy outdoor recreation linked to a regional trail network. The pattern of development along Baltimore Boulevard is rotated 90 degrees, with buildings enclosing pedestrian mews and plazas connecting neighborhood streets to the river. A new Innovation Drive crosses the river, connecting the northern end of campus to the Midtown District. An existing diagonal path from Campus Drive leads pedestrians across a barn dance crossing to a new market square at the Lakeland Hub. With retail opening onto the pedestrian realm, residential and office uses above, and garage below, the compact mixed-use buildings on both sides of the Boulevard connect University and surrounding communities, providing "third places" for convivial social interactions.

C O N N E C T

RESEARCH + ANALYSIS + SITE FORCES

POTENTIAL WALKABILITY   CONNECTION TO NATURE   DISTRICT CONTEXT   AUTOMOTIVE CORRIDOR

ZONING USE   EXISTING SITE PLAN

GREEN SPACE + WATER + PATHWAYS   SITE PLAN + ZONING STUDY + TOPOGRAPHY

PROPOSED DESIGN: PLACES DIAGRAM

BIG IDEA + PRECEDENT STUDIES

RESIDENTIAL RETAIL ALONG RIVERWALK

POCKET PARKS AND COMMUNITY PLACES

TRANSFORM CORRIDOR INTO PLACE

DELEWARE RIVERFRONT   SAN ANTONIO   GEORGETOWN C&O CANAL TRAIL

GREEN SPACE   STREAM WALK   PUBLIC SPACE   CONNECTIVITY   NEW GATEWAYS   ROTATE 90°

MAIN ARTERIES + INTERSECTION

OBJECTIVES

Midtown College Park
Baltimore Avenue, formerly Route 1, a placeless automotive corridor, is becoming an attractive location for higher density development. New residential slabs rising along the west side of Baltimore Avenue take the form of a wall dividing community and university; the Paint Branch river reinforces the town/gown separation.

Automotive Strip
To the east of Baltimore Avenue, the communities of Lakeland and Berwyn Heights are hidden behind the strip development. Community residents are isolated in their neighborhoods, lacking walkable connections to the University of Maryland and the downtown district. There are no public places for social interaction. Community residents lack public squares where they might come together with university faculty, staff, and students, to meet up with employees from the new Discovery District, and to welcome the many university guests staying at area hotels. Physical constraints limit the ability to build social capital across borders. Dependence upon automobiles leads to health problems stemming from lack of exercise. Children cannot safely navigate the district, denying them the opportunity to independently explore the city and university and enjoy social life in public.

Lost Sense of Place
Sense of place is suppressed. The rich history and culture of the historic African-American Lakeland community is invisible to the public. And the beautiful ecology of the Chesapeake Bay region, with the native plants, water birds, and animals that come to drink from the river, is hidden behind the wall of development and inaccessible to area residents.

Connecting City + University
The master plan study was commissioned as a guide to developers initiating projects in Midtown. Three primary program concepts emerged through community engagement and market research: authentic sense of place, connectivity, and healthy community.

PROPOSAL

Urban Design Proposal
The proposal focuses on the sites most attractive for development in the near term. Focused study of these four sites illustrates the potential for transforming Midtown into a livable city district. The new vision for Midtown shows developers how they can create environments that foster an authentic sense of place, connectivity, and healthy community. The pattern of development rotates 90 degrees, with buildings enclosing pedestrian places and views to the proposed Paint Branch Promenade. Innovation Drive connects campus to the boulevard and a diagonal path with "barn dance" street crossing connects campus to a new market square. With retail opening onto the pedestrian realm, residential and office above, and parking below, new mixed-use buildings on both sides of the boulevard connect campus to community, providing "third places" for convivial social interactions and access to trails for healthy outdoor recreation.

Opening the Block to a Public Courtyard
The outdoor room enclosed by Midtown Village and Lakeland Hub welcomes students, faculty, and staff from the university, employees of the Discovery District, and hotel guests to join community residents in public social life. This well-defined space sponsors shopping, eating, exercising, art exhibits, and festivals.

Rotating the Pattern of Development
By turning the buildings perpendicular to the street, open space moves from the back yard to visible prominence along the boulevard. Formerly conceived as private, open space becomes a shared amenity fostering social life in public. Paint Park and The Square are conceived as convivial spaces where the broader community and university come together with local residents. Buildings are paired around the public squares, like open arms embracing the public. Street-level retail is focused on uses that encourage social interaction. These pedestrian realms are safe places for children to play.

River Promenade
The building rotation also opens the visual connection from neighborhoods across the boulevard to the river, bringing the beauty of the river and its native flora and fauna into the public realm, featuring nature as an integral part of the city. Once the river becomes visible within the district, it's potential for healthy recreation is evident. The public squares offer views of the Paint Branch Promenade and provide pedestrian connection. Outdoor cafes open onto the promenade, offering enjoyment of nature in the city and providing "eyes-on-the-street" to foster safe walking and biking along the trail.

PAINT PARK   THE SQUARE

LAKELAND HUB   MIDTOWN VILLAGE

MIDTOWN VILLAGE
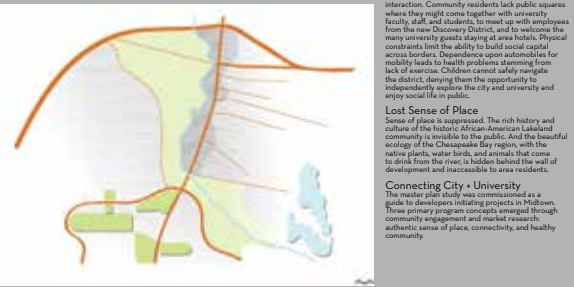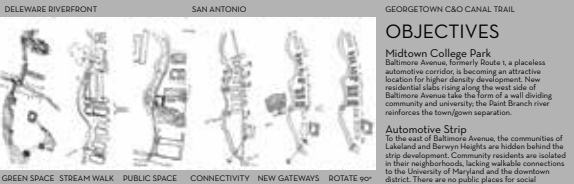LAKELAND HUB
PAINT PARK
THE SQUARE

PROPOSED AERIAL DETAIL

Paint Park
Paint Park defines modern, social living and Class-A office space in the place where humans were meant to live and work...in nature. A seven-story residential building features community-driven spaces designed to encourage social interaction. An eight-story office building provides a high-tech, efficient working environment. The public realm between the two buildings invites the Paint Branch Creek to the front door of interactive retail and dining. Sustainable design and interactive landscape architecture show that the natural and built environments were meant to be collaborators.

Midtown Village
Midtown Village is a sustainable mixed-use development includes 153 Class A rental units and 27,663 square feet retail. The street level retail will include a high visible university bookstore, a destination restaurant, and several beauty retailers, providing all of your favorite shops and dining with moments of your door. The 31,661 square feet plaza connects residents with the University and Community. With 3-minute walk to the main entry of the University of Maryland and 4 metro stops, Midtown Village provides an opportunity to live in a building that's central in terms of both Town center and the University.

The Square
The Square at College Park is a mixed-use development located within walking distance to the University of Maryland campus. The private rooftop garden offers residents an oasis, while the open square provides connection to community. This vibrant neighborhood center is a retail and entertainment destination with sustainability at its core. Have dinner with friends, shop, catch a movie, or simply enjoy the natural vista of the Paint Branch. Meet you at The Square!

Lakeland Hub
Lakeland Hub is a mixed-used development built to transform College Park to a culturally vibrant college town through place-making.
Lakeland Hub features, multifamily apartments, a food hall, a fitness center with pool & spa, a public plaza. Some features and amenities include a fully equipped business center, a private conference room, and high-speed internet, in-unit washer and dryer; balconies and patios, an out-door plaza with sitting areas, and Energy-Star appliances.

A NEW VISION FOR MIDTOWN

Driverless Urban Futures: A Speculative Atlas

LORINC VASS
University of British Columbia

ANNALISA MEYBOOM
University of British Columbia

When introduced in the near future, driverless cars are anticipated to be the first independent robots widely encountered by the public. Capable of sensing and navigating their surroundings, they are the embodiments of a digitally-networked future urban ecology, characterized by a paradigm shift in the relationship between vehicles, users, infrastructure, material flows, and the built environment at large. Driverless Urban Futures is a drawing-based research project that maps the possible spatial and social impacts of driverless technology on the city of the near-future. Amidst the race between auto-manufacturers to produce their own driverless car, and a multitude of arguments that support or criticize the technology, rarely have the unique disciplinary tools of architecture and design (particularly, the special representational and discursive agencies of drawing) been called into action—a contribution the drawings included here seek to make. Envisioning the future through drawing does not come without its own aesthetic and ethical questions. From a sociological perspective, the future constitutes a discursive space and an object of contestation, which is colonized by competing visions produced in and projected from the present. As Anthony Giddens contends, late-modern society the most future-oriented there has ever been, while our visions of the future are typically dominated by advances in technology. As a projective discipline, and one that is simultaneously concerned with, and informed by, technology, how can architecture contribute to a responsive and responsible engagement with the future?

Conceived as a speculative atlas, Driverless Urban Futures visualizes the possible spatial, and consequentially, social, impacts of driverless vehicles on the city of the near-future. Its drawings comprise three open-ended 'roadmaps:' illustrations of narrative scenarios, diagrams of urban-scale spatial structures and temporal patterns, and vignettes of street-scale assemblies and interactions. The work is based on the contention that the act of drawing is essential to the practice of architecture,

and that drawings possess agency and can serve as catalysts of imagination, facilitators of communication, and instigators of debate. Accordingly, in contrast to both the glossy renderings of car-manufacturers and the overly technical graphs of transportation researchers, the spatial diagrams and perspective collages seek to be simultaneously exacting and experimental. They are purposefully characterized by a graphic flatness and a display of their artificiality, drawn with a simple and slightly cartoonish hand, so as to make them legible and engaging for broad audiences. Likewise, while the specific elements of the drawings are rendered with care and precision, they are left purposefully abstract so as to suggest a possible, as opposed to a certain, future. Engendering a plurality of interpretations—or even, of productive misreadings—can then become a means for drawing closer to the unpredictable consequences and unforeseen uses characteristic of new technologies. In addition, even though the drawings are predominantly speculations on probable changes to the form and function of elements of the built environment as a result of driverless vehicle technology, also implicit within this assembly of line-work is a 'drawing together' of many other matters of concern: from public space, infrastructure, and energy consumption to spatial practices, well-being, and social interaction. Jointly informed by the aesthetic and ethical concerns of future envisioning, the agency of the drawings is seen to reside in the spaces between contested futures and collective (mis)readings.

Driverless Urban Futures
A Speculative Atlas

Envisioning Contested Futures ////
///// The Aesth/Ethics of Drawing

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Street Scale Impacts /////////////
/////////////////////// Flat Street

At the scale of the street, a series of isometric vignettes speculate on changes to road infrastructure, traffic control infrastructure, vehicle-pedestrian interaction, as well as building typology and program.
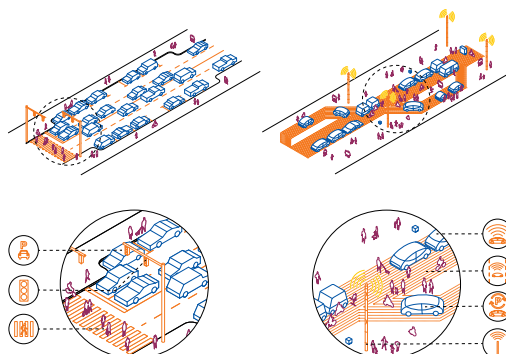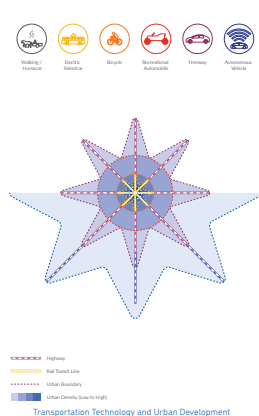

Typical Four-Lane Street with Curbside Parking

'Flat Street' with Passenger Drop-off Zones

Urban Scale Impacts /////////////
///////// Urban Growth Scenarios

At the urban scale, a series of relational and spatial diagrams explore possible changes and scenarios concerning urban growth, parking, road network, and transportation modes in relation to urban form.


Walking / Horse · Electric Streetcar · Bicycle · Recreational Automobile · Freeway · Autonomous Vehicle

Highway
Rail Transit Line
Urban Boundary
Urban Density (Low to High)

Transportation Technology and Urban Development

Self-Driving Sprawltown: Urban Edge AV Frontiers

High-Speed Leap-Frog: Exurban AV Enclaves

Autonomous Compact: Shared-AV Densification

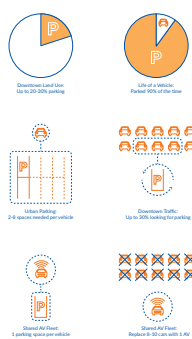### Street Scale Impacts /////////////
///////////// Residential Retool
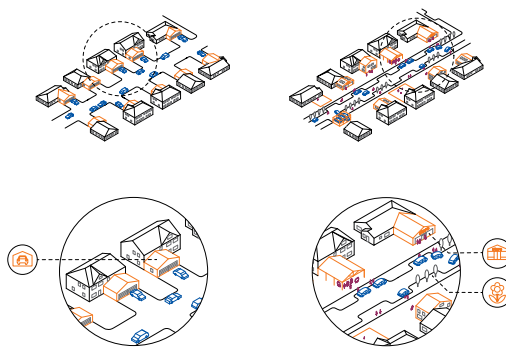
Single-family Residences with Automobile Garage

Conversion of Garage Space to Urban Programs

Urban Scale Impacts /////////////
///////////// Scenarios for Parking

Downtown Land Use: Up to 20-30% parking

Life of a Vehicle: Parked 95% of the time

Urban Parking: 2-6 spaces needed per vehicle

Downtown Traffic: Up to 30% looking for parking

Shared AV Fleet: 1 parking space per vehicle

Shared AV Fleet: Replace 8-10 cars with 1 AV

The Space and Time of Parking in the City


Parking Reshuffle: Resize and Redistribute

Parking-Free Density Islands: Driving in Circles

Parking Power: Vehicle-to-Grid Infrastructure Systems

Narrative Scenarios /////////////
///////////////// The Urbanite

A series of narrative scenarios, drawn in the form of perspective collages, explore the daily movements and activities of typical urban demographics, such as a suburban family, an urbanite, an elderly person, and a student.
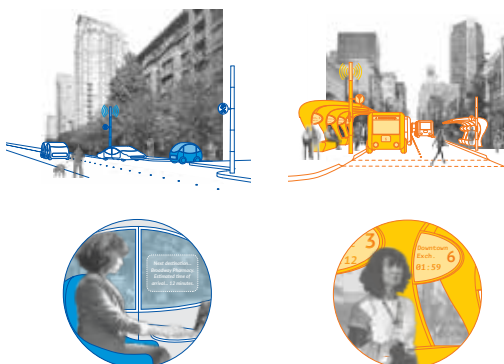
Scenario 1: Work on the Go

Scenario 2: Urban Drop-off

The Bénin Studio - A Tale of Two Cities

JOHN S. ELLIS
Wentworth Institute of Technology

In May 2015 the United Nations released a report suggesting that 10 million more people are added to the urban population of Sub-Saharan Africa each year, over two-thirds (7 million) live in informal settlements and only 2 million can expect ever to move out from them.

Urban planning and governance have not adapted fast enough to the extraordinary situation of rapid urban changes in Africa.

A new process of urbanization has been unleashed by the masses of low income migrants who have flocked to the cities since independence, and who are seeking to solve the problems of accommodation and employment on their own informal terms.

Current research and practice suggest that the path to urban peace and sustainability in urban Africa lies in building more inclusive and socially equitable cities where everyone, regardless of their economic means, gender, age, ethnic origin or religion are enabled and empowered to participate productively in the social, economic and political opportunities that cities offer.

A view that acknowledges the reality of slums, and at the same time the dynamism of slum inhabitants to resolve their very problems could go a long way in helping cities cope with rapid urbanization.

In the case of Benin this dynamism is magnified by the diverse ethnic, cultural, and religious make-up of the people and their capacities to live together in peace.

The focus of the 2017 fall Benin Studio was the tale of two cities, the formal and informal. We listened and responded to the historic and contemporary stories of two very different places separated by less than 12 kilometers of water.

We focused our energies on the settlements of Ganvie, a city formed by refugees from the slave trade, and the other Akpakpa-Dodomey, a settlement formed by contemporary economic refugees from Benin, Togo, Ghana, Burkina-Faso, Niger, and Nigeria.

As you will see in the accompanying projects the students skillfully developed design methods and projects, together with local community member, based on initial discoveries made during a 10-day visit to Bénin early in the semester.

The studio required students cultivate a particular point of view towards architecture and to define its role in the making of a better world.

The Bénin Studio 2017 was supported by L'Atelier Des Griots, with many thanks for their dedicated support throughout the semester and beyond.

Professor John Stephen Ellis, AIA and his colleague Beninese architect Habib Meme are co-founders of l'Atelier Des Griots, a non-profit international studio devoted to the study and implementation of low-tech ecological urban architecture and planning.

L'Atelier des Griots is also dedicated to the West African tradition of the griot — telling the many stories of the community through the medium of art, architecture and urbanism.

The founding of L'Atelier Des Griots in January 2017 is the first step in establishing a the first Design Build School in West Africa.

The Benin Studio

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"THIS EXPERIENCE WAS MORE THAN JUST CROSSING SOMETHING OFF MY BUCKET LIST. I REALLY JUST WANT TO THANK ALL THE AMAZING PEOPLE WE MET FOR AN UNFORGETTABLE EXPERIENCE. THEY ALL WELCOMED US AND SHARED THEIR STORIES AND LIVES WITH US, DESPITE THE SHORT STAY, WE GAINED A FOREVER FAMILY."
– MYKAELA SCARPACE

"TO ALL MY FRIENDS IN BENIN WHO EMBRACED MYSELF AND THE GROUP I TRAVELED WITH... THANK YOU! I'LL NEVER FORGET YOUR OVERWHELMING FRIENDLINESS AND GRATUITY."
– AUSTIN DRAKE

ENTRANCE PAVILION
MYKAELA SCARPACE & AUSTIN DRAKE

WHEN WALKING DOWN THE STREETS OF AKPAKPA-DODOMEY, ONE'S EYES DART BACK AND FORTH, DISTRACTED BY THE COMMOTION OF THE SEEMINGLY INFINITE SIGHTS AND SOUNDS.

THE ROAD SCULPTED BY THE FOOTPRINTS AND TIRE TRACKS OF MOTORCYCLES THAT HAVE ONCE PASSED, FRAMES A PERIPHERY FILLED WITH A STAGGERED COLLAGE OF CORRUGATED ROOFS, ACCENTED BY THE WEIGHT OF STONES AND THE WEIGHTLESSNESS OF PALM BRANCHES.

A RAINBOW OF BROWN, GREY AND BEIGE THAT BLEND WITH ONE'S SHOES AS YOU KICK UP DIRT, CONTRASTS THE PRIMARY AND SECONDARY COLORS THAT DRESS FRIENDS AND FAMILY AS THEY CONVERSE AND SELL IN THE MARKETS THAT LINE THE STREETS

FRIENDS TALK AND WALK WITHOUT DIRECTION AS THEIR CONVERSATION BRINGS THEM TO WHERE THEY WANT TO GO, WHILE OTHERS SIT IN THE SHADE AND CONVERSE TO ESCAPE THE PENETRATING AFRICAN SUN

BUT AS THE DAY COMES TO AN END, THE STREETS STAY LIVELY, SOON TO GROW WITH THE SCREAMS OF PLAYING CHILDREN, FLOWING LIKE WATER OUT OF THEMSELVES, MAKING THEIR WAY PAST HOMES ON A MISSION TO THE FAVORITE SPOTS

THE KIDS EXIT FOUR HEAVY WOOD DOORS HELD BY COARSE AND HEAVY COLUMNS OF CONCRETE, BEGINS THE LONG AND SEEMINGLY ENDLESS WALL WHICH DEFINES THE SCHOOL BEYOND.

DEPARTING, THE CHILDREN RUN ALONG THIS BARRIER, THREE TIMES THEIR HEIGHT, AS IT DISAPPEARS THEY ARE EMBRACED BY THE STREET THAT THEY CALL HOME

BASIC FORM OF SITE

EXTENSION OF EXISTING ROOF

REMOVAL OF EXISTING WALLS

ADDITION OF SPATIAL ELEMENTS

CREATION OF STAIRS

PEOPLE GATHERING   ZINSOU FOUNDATION

ROOF CREATES WATER COLLECTION IN WELL
SHADE PROVIDES REASON FOR GATHERING
EXTENDING EXISTING ROOF UNITES THE SPACE
REMOVAL OF CLASSROOM PROVIDES NEW ENTRY
STOOP EXTENDS INTO STREET
STAIRS CONNECT DIFFERENT LEVELS

"WORDS CAN'T DO THIS EXPERIENCE JUSTICE. LIFE-CHANGING FOR SURE."
– LAMIA ALMUHANNA

"THIS WAS A VERY ENLIGHTENING AND EMOTIONAL EXPERIENCE THAT I AM VERY GRATEFUL FOR. I HAVE LEARNED A LOT FROM EVERYONE THAT I MET AND IT HAS TRULY BEEN AN EXPERIENCE THAT I WILL CHERISH."
– SACHIA CHIN LOY

Ganvie Women's Center
Sachia Chin Loy & Lamia AlMuhanna

THE BOAT SLOWS AS IT PULLS INTO THE FIRST CLUSTER OF HOMES. THE ENGINE LULLS, THE VILLAGE IS QUIET, SAVE FOR THE CHILDREN IN THE DISTANCE SWIM-MING AND PLAYING IN THE WATER, AND SOME WOMEN SHOUTING THE PRAISES OF THEIR PRODUCTS. THE BOAT MANEUVERS ITS WAY THROUGH THE HOMES, PASSING BY CHILDREN STICKING THEIR HEADS OUT OF WINDOWS AND DOOR-WAYS, WOMEN OUTSIDE ON THEIR PORCHES WASHING CLOTHES. AS THE BOAT MOVES FURTHER INTO THE VILLAGE, A FISH MARKET BOATS PASS BY, SHARING GLANCES AND EXCHANGES. THE BOAT SOON REACHES IT'S FINAL DESTINATION, THE HEART OF THE VILLAGE...

THE VIEW FROM THE BOAT SHOWS THE WOMEN, GATHERING TOGETHER AT THE CENTRAL HUB TO SELL AT THE MARKET, WHILE ALSO GETTING TOGETHER AND FINDING THEMSELVES AMONGST FRIENDS. THE CHILDREN PLAY AMONGST THEMSELVES, RUNNING ALONG THE DOCK AND SWIMMING IN THE POOL. THE MARKET RADIATES LIGHT AND COLOR FROM THE ROOF WITH THE FABRIC LET-TING IN THE BREEZE WITHOUT THE HARSH SUNLIGHT. VOICES OF THE WOMEN, MARKETING THEIR GOODS FILL THE SPACE, REMINDING THEM THAT THIS IS VILLE DES FEMMES, THE CITY OF WOMEN.

SINCE THE MEN ARE GONE FISHING DURING THIS DRY SEASON, AND MOST OF THE CHILDREN ARE IN SCHOOL, THE WOMEN HAVE CONQUERED THE CITY FOR THEMSELVES, MAKING THEIR WAY PAST HOMES ON A MISSION TO THE MOVING MARKET. AFTER GOING THROUGH, THE WOMEN HEAD TO THE FAVORITE SPOTS TO SELL IN THE MARKET, SITTING NEXT TO THEIR FRIENDS, SHARING STORIES, ADVICE, AND TIPS WITH EACH OTHER. THE YOUNG CHILDREN THAT ARE WITH SOME OF THE WOMEN RUN OFF TO PLAY WITH THEIR FRIENDS WHILE THEIR MOTHERS ARE DOCKED. THE CHILDREN ARE WITHIN EARSHOT, SO THE WOMEN HAVE NO CONCERN ABOUT HOW FAR THE CHILDREN GO.

LE VILLE DE FEMMES IS THE CYCLE OF GANVIE. THE WOMEN KEEP THE VILLAGE AFLOAT, BEING THE BACKBONE, SUPPORTING EACH OTHER, THEIR FAMILIES AND THEIR NEIGHBORS IN THIS COMMUNITY THAT HAS BRIDGED LAND AND WATER.

Existing Markets Conditions

In Ganvie, shoppers paddle travel from seller to seller, providing an easy way to buy and transport goods. As the main market, its 80 canoes (on average) are stocked mainly with necessities such as food and firewood, along with a few random items, and thus is not a place where people go in their leisure time. Additionally, at Ganvie's Great Market, which operates daily from sunrise to sunset, socialization is uncommon; very little interaction (aside from what is necessary to effectuate a sale) takes place, which further serves to emphasize its very utilitarian purpose.

Construction Methods

Ganvie is a lakeside village in the Republic of Benin. The so-called Venice of Africa is characterized by irregularly placed stilt-supported structures, with waterways being the only efficient mode of transportation. In Ganvie, the division of labor between men and women as well as factors such as the changing environment, the lack of electricity, the nature of the economy have strongly influenced the everyday life of its people. The site is thus a product of external forces as rising sea levels have forced people to set out of their canoes.

A key factor in the project is the effort to invent and uncover new methods and opportunities in utilizing both found and local materials, as well as realizing the role of the community in the construction process. This idea of working with resilient materials that surround the site and integrating the community in the construction process is a first step to bring the women of Ganvie together

Design Narrative

Lands

Masses

Public Spaces

Climate change and natural disasters have made waterways the most convenient mode of transportation in Ganvie.

The architecture in Ganvie is characterized by irregularly placed structures (mostly rectangles) of varying size.

The Great Market, two churches and a school are some of the very few places that are considered public in Ganvie.

Activity Clusters

Movement

Combined

The activity clusters happen mostly within houses (ex. family gatherings) and sometimes on the canoes (ex. markets, church celebrations).

The irregularly placed structures contributes to a very organic, non-linear movement, as it responds to the physical demands of the space.

Combining all the site forces and understanding the layers of information was a key to selecting a site for the proposed design.

In a place like Ganvie that is marked by the diverse ethnic, cultural and religious make-up of the people, the need of flexibility in spaces is magnified. The design solution for this particular challenge was to incorporate moveable fabric panels that can be positioned to create meeting spaces and rooms where members of the Ganvie community can congregate for various activities beyond commerce.

A Grammar for Mutualism

NICOLE SYLVIA
University of British Columbia

Increasingly, planners and other urban thinkers are investing in the promises afforded by the Smart City—the ability to measure, model and project what the city is and to manage what it becomes. This way of approaching urban development inherently lends to urban spaces that are (intentionally) predictable and conservative. Working at the coarse scale of the zone, the city plan, and the spreadsheet, the urban environment is simplified, made easier to control and to understand. Consequently, complexity is purged and with it a host of agents and processes that are deemed undesirable for one reason or another. This is not the process for the making of an ethical city.

This project is a reassertion for architecture as a necessary and prominent agent of an ethical, inclusive urbanism. The very nature and scale of the key space-forming tools of architecture—membrane, shape, material—enable the creation of spaces of difference in close proximity. However, it is not the presence of difference per se that is the goal. In reconciling these differences architecture need not fortify hermetic enclaves, instead it may operate opportunistically to produce conditions of mutualism informed by these differences.

This project explores a grammar of architectural mutualism within the contemporary context of Chandigarh. While the original Corbusian design was highly functionalist and segregated in organization, this characteristic of the fabric has been co-opted and intensified as a way to promote a protectionist agenda by and for the city's elite. Over the last decade all new development of a significant scale—from the IT Park and mall, to slum rehabilitation colonies—has taken place outside of the formal city limits; the city is paralyzed as development grows haphazardly around it. This year's appointment as a Smart City (and the funding that comes with it) provides an opportunity to forge a new way forward. By refining the increment of zoning from the sector to the building the city may counteract the exodus in favor of cultivating inclusion and exchange and consequently, a more vibrant and vital urbanism.

Operating along one of the city's main boulevards, a systematic array of block-buildings redeploys the rules of the city-wide frame-control act. The buildings' simple frame structure allows for a diversity of occupancies while still conforming to an urban order. Instead of relying on the fabric's exterior spaces to soften the transition from one building's program to the next, each structure itself hosts two different tenures. Where they meet a third space forms, flexing and contracting to provide a synthetic and generative benefit to both—a moment of mutualism, embedded in both architectural and urban form.

A Grammar for Mutualism
architectural agency in the production of an ethical urbanism

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Operating along one of the city's main boulevards, a systematic array of block-buildings redeploys the rules of the city-wide frame-control act. The buildings' simple frame structure allows for a diversity of occupancies while still conforming to an urban order. Instead of relying on the fabric's exterior spaces to soften the transition from one building's program to the next, each structure itself hosts two different tenures. Where they meet a third space forms, flexing and contracting to provide a synthetic and generative benefit to both—a moment of mutualism, embedded in both architectural and urban form.

Diverse programs and actors cast from the formal city

From the functionalist urban unit...

Architectural // Urban Mediation

...to the mutualistic architectural increment
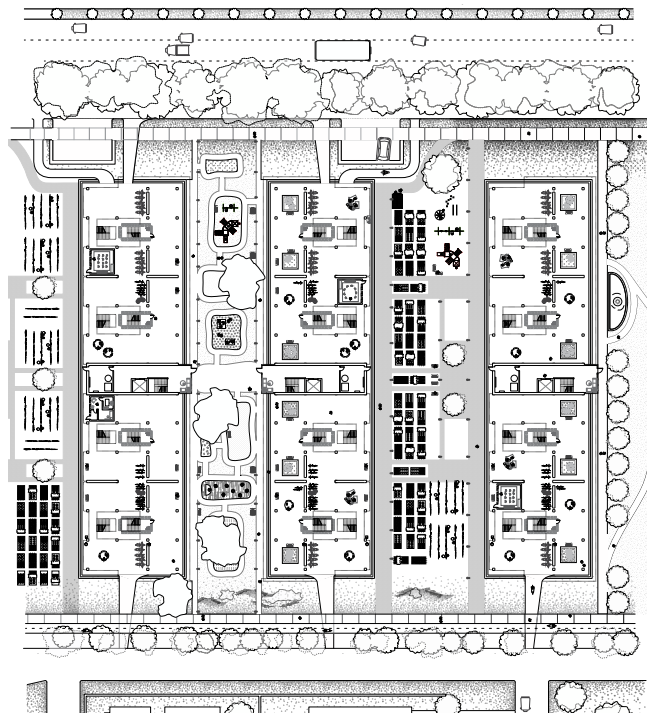
Rehabilitation // Reliable Infrastructure //
Luxury Housing

Craft-based Job Training // Socially-connected
Worskpace for Graduates // Dormitory

Start-up Incubation Offices // Flex Space //
Research Labratories

OPEN

Atmospheric Water Generating and Urban Farm Tower

CAMILO CERRO
American University of Sharjah

Atmospheric Water Generator and Urban Farm Tower

The human right to water and sanitation recognized by the United Nations (UN) General Assembly on July 28th 2010, entitles everyone to sufficient, safe, acceptable, physically accessible and affordable water for personal and domestic uses. As we know, this is not the case in the poorest communities of the developing world. But with the use of atmospheric water generators access to clean water in areas with high levels of humidity (relative humidity over 30%) could be possible without huge government expense in plumbing and sewage infrastructure. This poster proposes the construction of multiple water towers in some of the largest slums in the planet, with the primary purpose of generating public access water from the humidity on the air. The towers would be self-sufficient and embedded in the community at a distance from each other as to provide water access to the neighborhood around it. An atmospheric water generator is capable of producing 5000 liters of water a day, the tower design proposes to use 4 generators, producing 20,000 liters of water a day. The tower is also designed for water storage, with a capacity of 24,000 liters.

The tower is designed to serve the community in more than one way. The water generation produces the main element required for the creation of a vertical farm. One of the main reasons to produce food locally is that by doing so we can cut cost by half since transportation costs are taken out of the equation. The tower is designed to produce a variety of food products including mushrooms. All the produce in the tower are of high yield. The people working in the tower would be locals. And the first floor of the tower would serve as a market where people would get access to both food and water. The idea is to have a system that can generate in symbiosis, different ways to help the community.

The last important concept to talk about is that, the only way a hive like the one proposed would work, is if each tower works self-sufficiently. To achieve this point, the atmospheric water generators have been designed to work on solar energy which will solve all the other electric needs of the tower. The energy will be stored in a commercial tesla battery. Self-sufficiency does not only refer to energy; the farming, cleaning and selling of the food will be done by a local work force allowing for the tower to become an asset to the neighborhood developing a type of social self-sufficiency.

By offering access to clean water and cheap food, the tower is designed to lift the quality of life of the community.

"Like medicine (architecture) must move from the curative to the preventive."

— Cedric Price, The Square Book

THE ETHICAL IMPERATIVE-ATMOSPHERIC WATER GENERATING AND URBAN FARM TOW

Painterly Structures

FAYSAL TABBARAH
American University of Sharjah

IBRAHIM IBRAHIM
University Affiliation

This project presents an ongoing body of work that aims to disrupt tendencies within computationally design practices as well as highly standardized modes of sustainable design production. The project adopts a painterly attitude and workflow towards digital and material computation. In Swiss art historian Heinrich Wolfflin's seminal work, Principles of Art History: The Problem of the Development of Style in Later Art, he describes a radical shift in the development of European representational art styles between the Late-Renaissance and the Baroque. Specifically, he describes a conceptual and material shift from the linear to the painterly. Wolfflin's definition of the painterly, emerging in the early Baroque, alludes to ideas of limitlessness and merging, standing in direct opposition to the tangibility and solidity of the Late Renaissance linear style. Wolfflin describes the painterly as limitless, receding, open, lacking in linear hierarchy (ambiguous part-to-whole relationships), and finally of relative clarity, in comparison to the absolute clarity found in Late-Renaissance art (Wolfflin 1915). Thus, this ongoing body of work looks at the radical shift from the linear to the painterly within the context of computational design methodologies and digital fabrication.

The project is developed through a digital-analog workflow that moves between scavenging for natural material, 3D scanning, a computational system and resultant material constructs that exhibit painterliness through their open system logic that blurs traditional linear part-to-whole relationships. Specifically, this workflow is tested through the design of a chair that explores material assemblies in the form of reciprocal frame systems.

This project situates itself withizn the context of mass-customization, looking at the potential of scavenging fallen non-standard timber members from the deserts of the United Arab Emirates to produce an architectural material system. This project also references current work being produced at Architectural Association Design + Make programme (Self and Vercruysse 2017). However, from an assembly point of view, the project looks to avoid invasive approaches to the fallen timber member such as cutting and drilling. Thus, the project's structural principles are built on the self-supporting reciprocal frame typology that requires no mechanical or subtractive connections. The criteria used while scavenging include linear dimensions, cross sectional radii, curvature along the long axis and surface friction.

Secondly, the process includes 3D scanning the found material. The 3D scanning allows for quick sorting of elements given the three of the criteria described above. Second, a custom-designed digital workflow allows for matching same sized surfaces along the timber members based on a naturally occurring male-female joint. Finally, scanning allows for the digital testing of the stability of reciprocal frames. This results in a quick assembly that is able to withstand structural loads. Within the context of the chair, a volumetric transparent resin-cast condition is designed to further avoid thrust actions.

This system is currently being developed on two different fronts. First, the digital platform and workflow is being developed as a stand-alone package that would allow for existing 3D meshes to be input, sorted, matched and assembled based on designer criteria. This would allow for the democratization of the workflow, which in turn will provide further refinement and intelligence through iteration. The second front includes working on large scale constructs that apply the theoretical framework with the workflow to produce a spatial construct, further testing the viability of the system.

PAINTERLY STRUCTURES

Faysal Tabbarah
American University of Sharjah

Ibrahim Ibrahim

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References:
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FOUND DESERT OBJECT

ASSEMBLIES

SCAVENGING

RECIPROCAL FRAMES

SCANNING

TESTING

Architecture + Kids

MARGARET MCMANUS
Marywood University

This poster brings to the forefront our responsibilities as architects to educate the public on our profession, and where better to start than in our elementary schools! Through both your local AIA Chapter and your university, opportunities to connect children and teachers with architectural professionals and design students can be made possible with a little effort that is sure to benefit all parties. This poster takes a glimpse into three creative projects and lessons that have been tried-and-true with participating third graders.

Repurpose + Reimagine:

With less and less open space in our cities, we will need to find ways to re-envision and repurpose the buildings that already exist. To encourage kids to think about the idea of repurposing while in elementary school can give them a respect for the life-cycle of materials that we encounter every day. At their age, they can begin to take responsibility for the negative impacts of trash and waste as well as the positive impacts of recycling and reuse. Learning about repurposing is a creative endeavor that is both challenging and fun for all ages. For this lesson images of everyday objects are provided so that they can be reimagined at various scales, and repurposed--even if their new purpose serves no broader function than sheer creativity.

Rhythms + Patterns:

Rhythms and patterns are fundamental aspects of architecture that we see (or do not see!) in almost every building structure. Whether it is patterns made by windows, panels, or structural columns, it is evident that they exist in countless ways throughout architecture; it is because of these aspects that architecture has been referred to as "frozen music," (having a pace, a tempo, a beat--with layers of repetition). Perhaps nowhere are these rhythms and patterns more visible than in the facade of a building: expressed through repetitive elements, structures and patterns like windows, columns, and masonry.

In this lesson students have an opportunity to explore these concepts as they imagine the facades of a city street. How do different functions of a building affect the patterns on the outside? What would the facade of an office building look like versus the facade of an apartment building or a movie theater?

Sites + Scenes:

Sites and Scenes is a drawing activity that includes four (with the possibility of many more!) different environments that children can imagine inhabiting: a hot dry desert, a cold snowy hill, a cool, rainy forest and a warm, breezy beach. For this exercise it helped to engage in a brief discussion on building in different climates before the students were handed a scene and tasked with designing a structure specifically for that site. The discussion led children to compare clothing and accessories that one might wear in certain climates to the way things might be built in those same climates. For instance, in the wintertime we wear large puffy jackets. This may relate to the need for thick, insulated walls. In the summer, we may wear a large brimmed hat. This may encourage a large roof overhang to keep the hot sun out of the interior space. And in both rainy and warm beach climates, it's convenient to be elevated off the ground so that we can stay dry or so that air may circulate around for cooling.

ARCHITECTURE + KIDS

generating creative design lessons that introduce architecture to kids

REPURPOSE + REIMAGINE

Repurposing is not only a sustainable trend in the architecture and design industry but an inevitability in our future as we continue to manufacture and build. The urban condition, particularly, points in this direction. With less and less open space in our cities, we will need to find ways to re-envision and repurpose the buildings that already exist. To encourage kids to think about the idea of repurposing while in elementary school can give them a respect for the life-cycle of materials that we encounter every day. At their age, they can begin to take responsibility for the negative impacts of trash and waste as well as the positive impacts of recycling and reuse. Learning about repurposing is a creative endeavor that is both challenging and fun for all ages! In the student projects shown, the images of everyday objects are reimagined at various scales, and repurposed--even if their new purpose serves no broader function than sheer creativity.

RHYTHMS + PATTERNS

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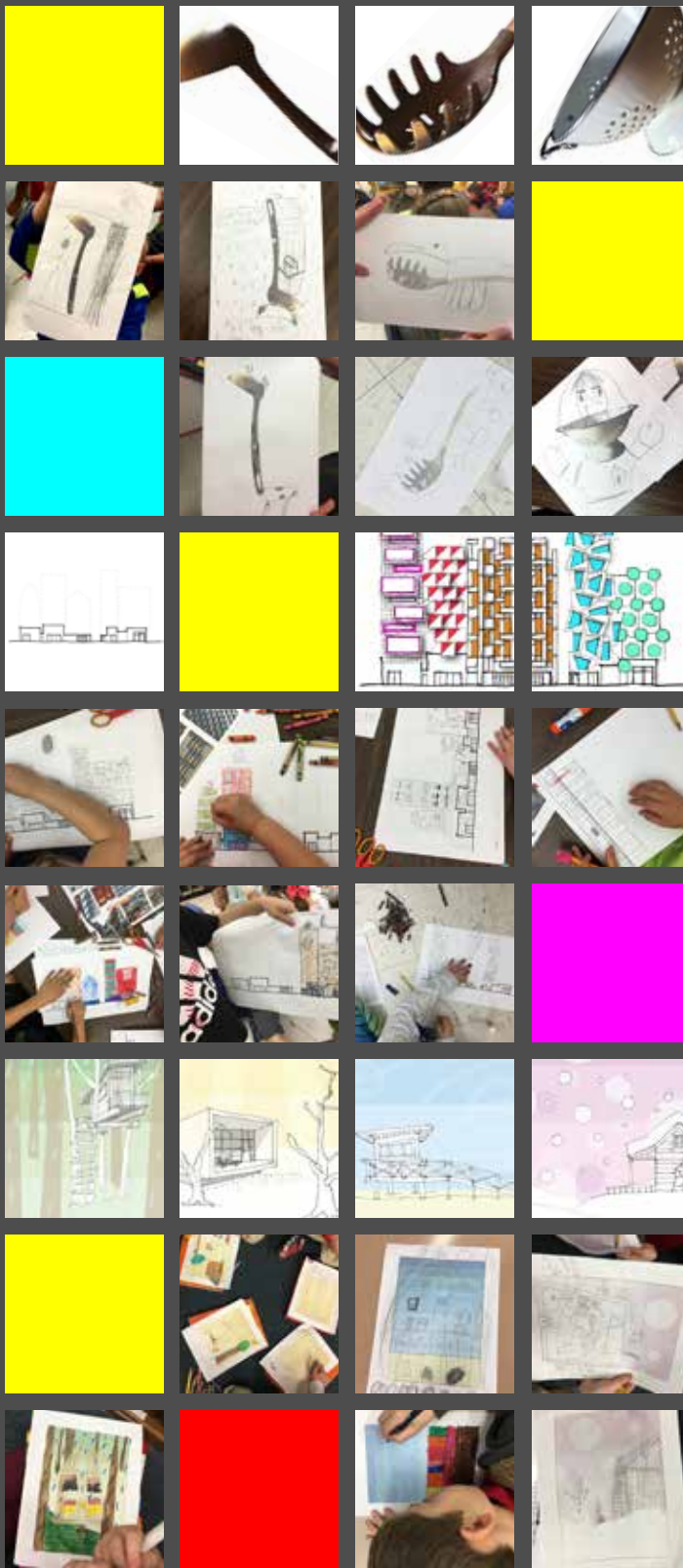
De-Anthropocentrizing Architecture: Rewriting Filarete's Golden Book

JESSE RAFEIRO
Carleton University

Anthropocentrism is a biased construct which takes for granted a privileged and central status of the human species in the universe of things. This ideology in the West was born from ideas in Ancient Greece and later adopted into Christian theology to maintain that the world was made by a divine order for humanity. Anthropocentrism, though masked by emerging ecologically sensitive discourses continues to prevail in human practices today. The tragic consequence of this mentality has led scientists to propose a new geological epic: the Anthropocene. This epic, instigated by human centric activity challenges the survival of life on earth with issues such as harsher climatic conditions, mass pollution as well as severe biodiversity reduction globally. Awareness of the effects of our actions across time and space poses profound ethical revisions for how our species will conceive of itself in the future.

In response, this speculative work attempts a rewriting against Anthropocentric biases from within the discipline of architecture through a fictitious dialogue with the early Renaissance wherein these ideas first emerged as written text. The speculates on an alternative mindset that explores the possibility of thinking beyond the world as a resource "for us" and towards a world of intrinsic value "in-itself". Such attempts appear within the discourse of a series of emerging philosophical positions grouped within a movement know as speculative realism which will serve as the grounding of the positions in this work. Using Filarete's Libro Architettonico as a point of departure, the work selectively manipulates the 15th Century treatise through a series of additions and subtractions to rephrase the writing within the context and challenges of the 21st century. A series of drawings illustrates the ideas of the text using objects, landscapes and characters found within the original facsimile. Following the original structure of Filarete's text, the story begins with an ethical cosmologic re-grounding followed by a description of the site of Sforzinda within a hypothetical Anthropocene context.

Written between 1461-63, the Libro Architettonico is the first explicitly architectural treatise written as a fictional narrative in the Western tradition. Filarete's ideal city was the first of the Renaissance; leading subsequently to other ideal cities such as More's Utopia, written half a century later. Filarete's ideal, circular planned city was meant to disclose an ideal Christian Renaissance society in harmony with a divine order. The narrative, begins first with the reframing of the theories of Vitruvius' 1st Century BC De Architectura into Christian myth to ground the ethical foundations of the work. The narrative then follows with a demonstration of these ideals through the founding of city of Sforzinda. In the text, Filarete reveals that the city of Sfrozinda is based on principles adopted from the mythical city of Plusiapolis discovered in a hidden Golden Book. It is within this same spirit that this series of language interventions rediscovers the ethical implications of storytelling in Filarete's work.

DE-ANTHROPO-CENTRIZING ARCHITECTURE: REWRITING FILARETE'S GOLDEN BOOK

INTRODUCTION

I. ORIGINS OF MAN

II. ORIGINS AND PURPOSES OF TEMPLES

III. ORIGINS OF BUILDING

IV. MAN AS A SIMILE FOR BUILDING

V. SFORZINDA IN THE ANTHROPOCENE

Jesse Rafeiro 2018

NK_NM_Hybrid Digital-Physical Hardware Design for Designing and Enhancing User Experiences

EBRAHIM POUSTINCHI
Kent State University

GREGORY A. LUHAN
University of Kentucky

INTRODUCTION | This paper and poster presentation showcase a new research-driven interface and design tool that could transform architectural education. The process uses mixed-methods research design to investigate ways of integrating a hybrid digital-analogue hardware protocol platform known as No Keyboard, No Mouse (NK-NM) into the design studio context. The study examines the influence of the NK-NM platform on pedagogy, research integration, user experience, and aesthetics. It also documents its initial impact as part of a simulation-based feedback loop to iteratively explicate design artifacts. NK-NM advances emerging design tool development research by extending and reshaping design as a thinking medium rather than merely as a process. By emphasizing design strategy and pedagogical planning, this study produced unexpected and unforeseeable outcomes as well as demonstrated enhanced creativity in non-designers, and both novice and expert designers.

METHOD | As Sylvia Lavin states in her interview with the Los Angeles Forum, "Increasingly larger amounts of creative resources are being put into producing new tools and concepts that are designed not to make things but, to amplify the creative capacities of others" (Lavin, 2015). It is within this capacity that NK-NM builds its experimental foundation. By applying techniques that blur the boundaries of current computational design processes, NK-NM narrows the boundaries between user experience and the design artifact. NK-NM combines "master-designer" knowledge with qualities that can be tailored to define design parameters, rules, and controls. NK-NM uses advanced digital and physical computational techniques to augment the hierarchical relationship between an experienced designer (master-designer) and those with limited design background (second-designer) to redefine the concept of design instruction. NK-NM is necessarily interactive to influence iterative and reconfigurable design solutions directly, that in turn, results in empowering the team to calibrate and assess lesson plans.

PROCESS | The NK-NM platform includes a combination of software and hardware. The NK-NM-Software is a combination of scripts and modeling techniques, developed by the "master-designer" to bridge between programming platforms (Grasshopper 3D, Processing, and Python), 3D modeling software (Rhino 3D), and physical and digital design customized interfaces. The "software" acts as a design control system to ensure the legibility and cohesion of the design outcomes. The NK-NM-Hardware is a physical and tangible input device that enables users from non-designers to professional designers to freely interface with the NK-NM-Software.

OUTCOMES | The advantage of the NK-NM platform over existing design processes is its inherent potential to harness parametric customization from the software/hardware perspective. NK-NM brings the freedom and the possibility of design to users who have little or no design background as well as those who have advanced design skills. NK-NM ensures the precision and functionality of the design through a "controlled" and flexible design process. Application of NK-NM can occur at any design phase or process; from the schematic/conceptual design to construction detail studies to integrated project delivery. The hybridized NK-NM platform has demonstrated a new way of interacting with the design artifacts that has positively influenced the physical interface of the designers by coupling the interface with directed design environment interaction. These tangible results along with the immediacy of having the digital outcome have shown that the "second-designer" designs more instinctively.

REFERENCES | Lavin, Sylvia. (2015, July 13). "Man vs. Machine: Sylvia Lavin Retools Creativity." Los Angeles Forum for Architecture and Urban Design. Retrieved from http://laforum.org/delirious/man-vs-machine-sylvia-lavin-retools-creativity/

NK|NM
HYBRID DIGITAL-PHYSICAL HARDWARE DESIGN FOR DESIGNING AND ENHANCING USER EXPERIENCES

EBRAHIM POUSTINCHI, M.Archll, [Kent State University, United States, mpoustin@kent.edu]
GREGORY A. LUHAN, PhD [University of Kentucky, United States, gregory.luhan@uky.edu]

ABSTRACT

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A. </(SOFTFRACTURES) | SURFACE STUDY SETTING

B. </(BOXCRON) | MASSING STUDY SETTING

The Culture of Reuse

SEUNG K. RA
Oklahoma State University

STAN CARROLL
Oklahoma State University

As we strive to create things of lasting value and usefulness, designers must become masters in the art of transformation. The studio challenged students to investigate the concept of Autonomy and the Culture of Reuse. Students explored to move beyond a simple reapplication, and to transform the selection into an entirely new object. The design process is shifted from a static functional exercise to a pathway of discovering new possibilities; from tectonic contingencies to the autonomy possible in figurative form making. With computational logic, we traverse a pathway of discovery to arrive at a different place, and an associative process is born. The concept of the studio focused on fostering computational design thinking and integrating algorithmic design into the creative process.

Hypothetically, Amazon founder Jeff Bezos has asked the studio to design a prototype drone delivery fulfillment center for their new and controversial delivery system: Amazon Prime Air. This new building type is almost without precedent. Amazon has already filed several patents for Drone Maintenance Networks. Additionally, the FAA and NASA are currently studying unmanned aircraft systems and traffic management in current air space. Inevitably, students faced unfamiliar territory, which could be an exciting new opportunity.

Within the scope of design for Amazon Fulfillment Center, there are two distinctive parts of the design problem.

First, the project provided a design solution for transforming / reinventing a defective grain elevator. The grain elevator is a complex agricultural facility which is often a large and tall structure. Amazon fulfillment centers plan to upcycle out-of-service grain elevators in nationwide locations, and the proposals are the catalyst for Amazon's innovative endeavor. The project should be developed with an integrative approach to the innovative use of steel as space, structure, and skin.

Second, the project was responsible for designing the receiving kiosk for Amazon Prime Air. The kiosk achieves a safe and efficient package pickup and drop off location for Amazon customers.

The concept should answer these questions:

1. How does the Drone Delivery Center perform on the specific site?

2. What logistical solution will your concept provide for Amazon Prime Air (distribution methods)?

3. What is the form logic?

4. How does the inventory flow work in your design?

5. How does your concept translate into a specific architectural/structural solution?
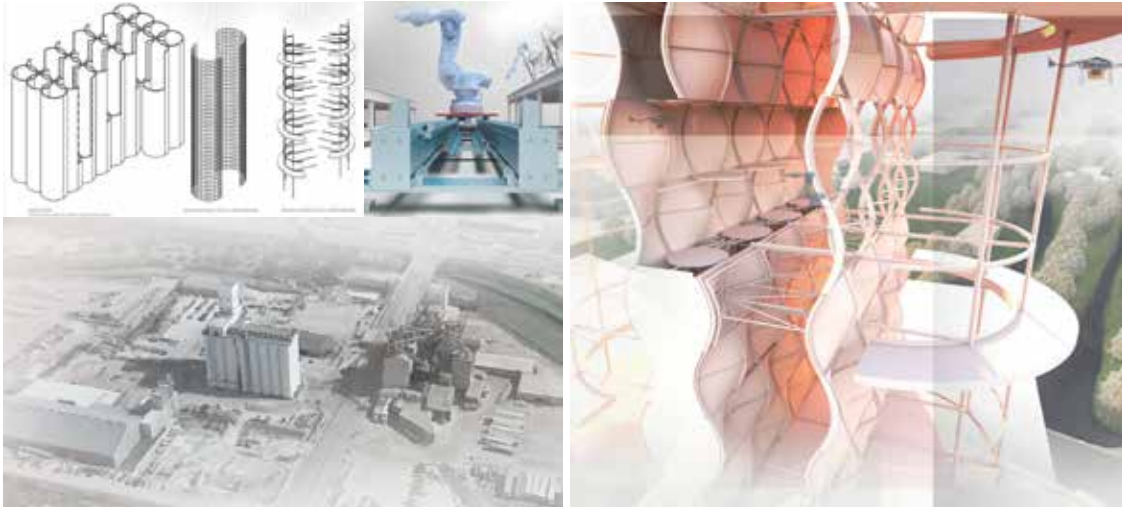
106th **ACSA** Annual Meeting
The Ethical Imperative

Courtesy of Amazon

THE CULTURE OF REUSE

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CREVICE
AMAZON FULFILLMENT CENTER

GO WITH CURVE
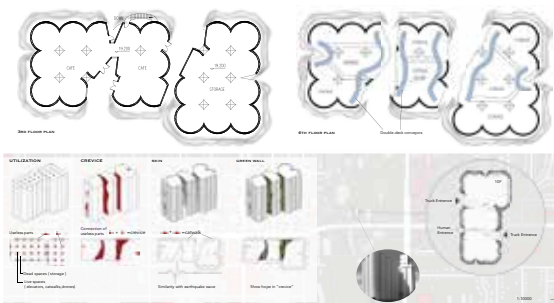
Market Pavilion Community Build: Growing a Garden . . .Growing a Community

PAMELA HARWOOD
Ball State University

How can participatory design strategies and community-engaged construction support creative and critical collaboration? How can we ensure that the project's scope and objectives are appropriately aligned with the community, especially when students' short-lived, limited roots and commitment can be vulnerable in the semester timeframe of a project? These are questions this design build studio, a collaboration between students, faculty, stakeholders, and community volunteers contemplates. The Maring-Hunt Library Community Garden Master Plan, its improvement and expansion, and a series of Garden Pavilions and Nature Play Pockets were designed and developed as useful spaces to address food insecurity in a USDA-designated food desert, cultivate community interaction and social activity, and provide learning opportunities for elementary school students, library patrons, and neighborhood families. The Community Garden is in a food desert, located on the Southside of our small city, isolated and removed from the economic prosperity of the collegiate campus. As cities face the environmental, economic, and social challenges of the 21st century, including hunger, diabetes, and dependence on global industrial food systems, local food production will be more and more important for building food security.

The master plan includes a trio of pavilions developed around a large community garden overseen by the neighborhood organization and public library. 1. The Gateway to Growing Gardeners' Pavilion, which provides shade, seating, tool storage, and accessible garden beds, and a sand and water Nature Play Pocket was designed and built by students and community in an immersive learning studio. 2. A Market/Education Pavilion to house a community market for the garden growers and an outdoor learning space for the afterschool program for elementary children, is currently under construction by students this fall. A small outdoor kitchen and food preparation demonstration area for nutritional education and programming is part of this project. 3. A fenced-in Educational

Pavilion and Children's Garden for Southview Elementary student is the third layer. This project is funded through a LOWES Neighborhood Revitalization Grant, a collaboration with four local partners including Habitat for Humanity, Ross Community Center, Boys and Girls Club, and Muncie Mission, an emergency shelter for homeless men.

Growing food connects people to their environment and to their neighbors, nurturing trust and relationships that tie together social, economic, and ecological systems. Many non-profit organizations garden as a deliberate strategy to feed people who lack regular access to fresh, nutritious food. There is a much larger informal side of food security in this community garden, as the subsidized senior living apartment dwellers in the adaptive reuse of an inner city High School bordering the site exemplify. The people in this community are a repository of vast knowledge and our effort to harness the energies of citizens and community organizations is a solution based on understanding the creative and productive people. In the design studio, a student's most substantial gains are not achieved through the final product's construction, but in the process and the journey to envision and create an intervention that is impactful for the community. The Maring-Hunt Library Community Garden greenspace with its pavilions, gardens, paths, bio-swale, and nature play pockets is being developed as an anchor in the neighborhood with the potential to turn a food desert into a food oasis, providing an asset motivating children and families to get outdoors, grow and learn and engage in healthy activity together.

MARKET PAVILION
growing a garden . . .
growing a community . . .

Full Circle: Working Towards a Network of Social Infrastructures in the City

JULIA JAMROZIK
University At Buffalo, SUNY

Working in Amsterdam after WWII Aldo van Eyck recognized the potential of play apparatus to breathe new life into the forgotten spaces of the city. The architect called for a transformation the urban environment into a network of nodes of play areas of various scales ultimately turning the city into a playground. Thinking of the experience and the needs of the child in the city, van Eyck was also very conscious of the need of his play-structures to contribute to the urban landscape in general and to be open-ended and "real" enough to add to the city even once the child has gone to bed.

Like post-WWII Amsterdam, Buffalo is a city that finds itself with a surplus of empty lots where buildings once stood. In 2016, CEPA Gallery held a competition for public artworks to temporarily appropriate and occupy a series of empty lots in Buffalo's Westside neighborhood.

Selected through this competition, "Full Circle" is an interactive installation for all ages that playfully rotates a typical linear swing-set to alter and expand its experience, questioning the basic relationships between people in space and to one another. By bringing a piece of playground equipment together with the charged spatial arrangement of political round-tables and corporate boardrooms, the installation takes a playful construct and positions it in the adult-world.

Aiming to create socially conscious dialogue, the project is positioned where diverse Buffalo communities intersect and is adjacent to International School #45 whose student body represents 70 countries and 44 languages. The installation was supported by a vigorous grassroots campaign to engage the teachers, parents, administrators, city council members, community activists, and neighbors to take active ownership of it.

"Full Circle" has become an identifiable spot within the neighborhood, becoming a small-scale meeting place for children and adults alike. In a low-income community with few maintained green-spaces and little public infrastructure, it is a small but significant gesture.

Thinking of "Full Circle" as a node in a wider network of potential playspaces within the city, one can imagine a series of social infrastructures throughout Buffalo that could contribute in different ways to the making of community through small-scale engagement. Providing spaces where people from different walks of life can come together and share the simple act of play can be one way of taking advantage of the gaps in our city fabrics as van Eyck did in Amsterdam.

FULL CIRCLE

WORKING TOWARD A NETWORK OF SOCIAL INFRASTRUCTURES IN THE CITY

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"Full Circle" Buffalo, NY 2016
Julia Jamrozik and Coryn Kempster
Commissioned by CEPA Gallery and C.S.1 Curatorial Projects
Photographs by Brendan Bannon

Potential North: Anthropogenic Infrastructure in the Extractive Territory

DANIEL NEIL ASPINALL
University Affiliation

Greenland may be the next petro-territory. Granted political autonomy from Denmark in 2009, Greenland saw its financial subsidy– which supported resource and infrastructural networks– capped. In response to its growing need to address economic concerns, Greenland is actively exploiting its natural resources, opening mineral mines and promoting oil and gas exploration. A pipeline would be probable infrastructure to transport oil down the coast from the ice-present waters in the north: this pipeline serves as the site for Potential North.

Of the territory's sparse towns and villages, those in the north were most dependent on subsidy for resource networks. Once self-sufficient– living off the land through sustenance hunting and resource gathering– modernization of these towns has introduced contemporary urban elements. These northern settlements now exist in a conflicted state, between a traditional lifestyle and the globally homogenized existence, but without economic viability. Many rely on fishing exports, but are looking for new economic activities– petroleum is a potential future.

Potential North challenges the after-the-fact architectural reaction to infrastructural opportunism by introducing holistic interventions along an oil pipeline developed at the outset of extraction. This project aims not to condemn or suggest alternatives to future petroleum extraction, but presents robust architectural solutions which makes better an uncomfortable inevitability– taking the pipeline as site.

Infrastructure, particularly extractive infrastructure–comprised of both physical ecologies and logistic networks– exists at the intersection of the Humanity / Nature duality, an ever-evolving relationship of human's understanding of it's environment. Urban expansion continually places infrastructure systems in opposition to Natural forces, resulting in a shift of design power from architects and urbanists to engineers. These engineered infrastructures prioritize the pragmatic and

specific, often negating social or cultural influences. This project returns that power to the architect by siting opportunities for intervention, synthesizing the technical with the cultural, adding richness in the banal.

The Arctic presents a unique background for the exploration of cultured infrastructure as Arctic oil and gas reserves sit at the edge of extractive feasibility. These extractive frontiers revive certain aspects of American Wild West frontierism– technological ingenuity, societal freedoms, and environmental opportunism- in precipitation of spatial products reacting to their unique environment. These sites offer not only suggestions towards a new Arctic vernacular, but provide an exploratory medium at the intersection of architecture and infrastructure.

Extractive infrastructure works at the scale of global capital, it intersects both Humanity and Nature, yet rarely promotes either in a productive way– solely serving the far-off economic entities of resource consumption. In a territory caught between economic autonomy and natural and cultural exploitation, the seemingly inevitable pipeline infrastructure must be reconsidered to address local concerns. Potential North examines how infrastructure may be utilized to serve more than one public– considering a more holistic design which recognizes the expanded ecological, political, economic and cultural environmental context– to speculate on opportunities producing tangible benefits to the species existing at the interface.
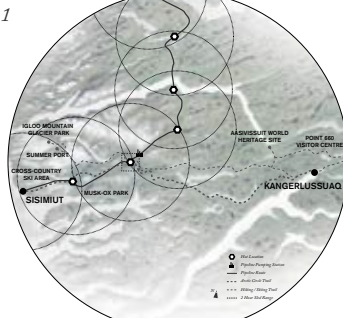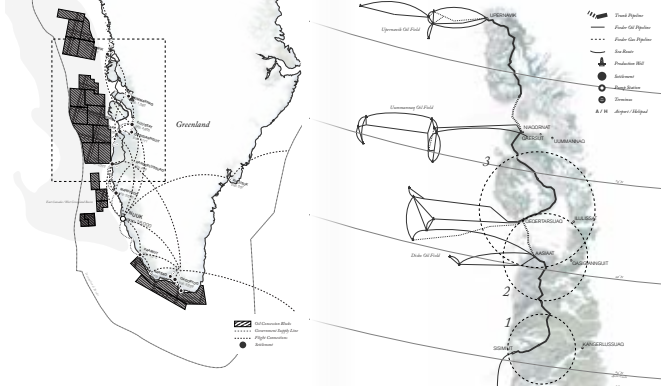
POTENTIAL NORTH

Anthropogenic Infrastructure in the Extractive Territory

Greenland was granted political autonomy from Denmark in 2009, at which point its financial subsidy— which supported resource and infrastructural networks, mostly in the north of the island— was capped. Since that point, Greenland's growth is increasingly exceeding its economic capacity. To address these rising economic concerns, Greenland is beginning to exploit its natural resources— opening mineral mines and actively promoting oil and gas exploration, particularly off its west coast in the East Canada/ West Greenland Basin. With the discovery of oil fields in the Davis Strait, a pipeline would be probable infrastructure to transport oil down the coast from the ice-present waters near Upernavik and Uummannaq, to the south at Sisimiut, the northernmost ice-free port. This pipeline serves as the site for *Potential North*.

Of Greenland's many sparse towns and villages, those in the north have been most dependent on this subsidy for maintaining resource networks. Once self-sufficient— living off the land through sustenance hunting and resource gathering— modernization of these towns has introduced contemporary urban elements. Economic networks, food supply and communication systems, which to this point have been subsidized by the government, ensured a consistent standard of living in every settlement. Internal conflict exists between these northern villages, who are proud to maintain their traditional way of life, and, those in the south who feel subsidies are simply welfare for hunters who live in contrast to national progress. These northern settlements now exist in a conflicted state, between a traditional lifestyle and the globally homogenized existence, but without economic viability. Many rely on fishing exports, but are looking for new economic activities—

although controversial, petroleum is a potential, if not necessary, future.

Climate change only complicates the situation— the thinning of sea ice broadens the shoulder season where ice is too thin to travel on, but too thick for a personal watercraft to break. Hunting on land is increasingly troubled as traditional weather patterns— important cultural knowledge passed on from elder hunters to the next generation— are changing quickly and now unpredictable, making hunting more hazardous and altering historic migratory herd patterns.

While hunting and fishing are the predominant and preferred means of sustenance, modernization has also introduced a reliance on store bought food, as well as southern-grown fruits and vegetables. These new staples must be shipped from the south of the island, and since the government shipping line has cut back its delivery capacity, from twice a week to only once, scarcity is looming. While food is available now, it is only set to increase in price like many other Arctic settlements.

Caught between economic autonomy and natural and cultural exploitation, the inevitable pipeline infrastructure must be reconsidered to address local concerns. Through the implementation of three interventions, at three sites along the pipeline, *Potential North* explores opportunities for localized micro-economies— traditional, natural, and global— in the presence of mega-infrastructure.
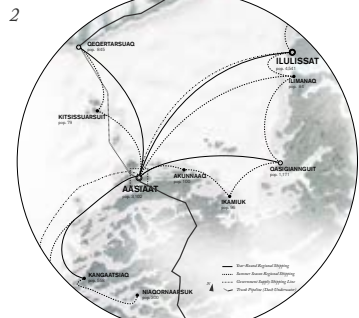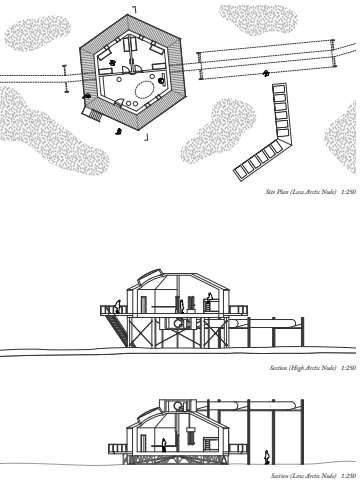

Greenland

1

IGLOO MOUNTAIN GLACIER PARK
SUMMER PORT
CROSS-COUNTRY SKI AREA
SISIMIUT
MUSK-OX PARK
AASIVISSUIT WORLD HERITAGE SITE
POINT 660 VISITOR CENTRE
KANGERLUSSUAQ

2

QEQERTARSUAQ
ILULISSAT
ILIMANAQ
KITSISSUARSUIT
AKUNNAAQ
QASIGIANNGUIT
AASIAAT
IKAMIUK
KANGAATSIAQ
NIAQORNAARSUK

3

NETWORKED HUTS [active node]

Refuge / Cultural Knowledge Network

The pipeline serves as a linear network, a connection to energy, communication and water, traversing the remote hinterlands. At the line terminus, the town of Sisimiut is an active site for outdoor activity. The area is also traditional territory for hunters who hunt reindeer and musk-ox for both sustenance and to be sold to tourists at markets in town.
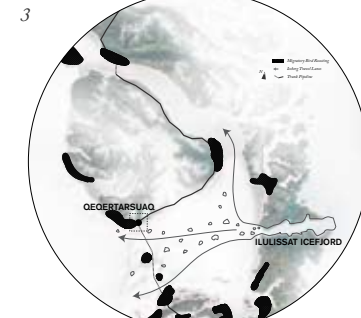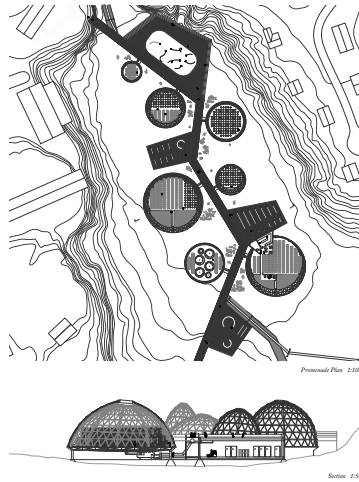In response to the connectivity available throughout its active territory, a network

of huts are deployed along the line. Prefabricated units are airlifted into the field and connected to the pipeline— providing GPS, thermal, electrical, and water connection. Constructed of durable wood interiors and a visible, protective thermal shell, enclosed are small beds, seating, and tables for repairing equipment. Outside the hut are concrete storage units for equipment and hunted game, which also act as snow barriers,

clearing areas for snowmobile parking.
In addition to providing a refuge in new, unprecedented weather patterns, the network provides a departure point for expeditions into the wilderness. Huts can communicate through GPS— trading weather information, herd movement and travel routes. The network amplifies new and traditional knowledge transmission in the face of climate change and technological evolution.

Site Plan (Low Arctic Node) 1:250

Section (High Arctic Node) 1:250

Section (Low Arctic Node) 1:250

Snow Clearing

Thermal Radiation + Cold Storage

HARVESTED COMMUNITY [passive node]

Greenhouse / Community Gathering

At the entrance to Disko Bay, Aasiaat is a key stop on the dwindling government supply line and distribution point for many small towns located within the bay.
The pipeline, an intense emitter of energy, has the ability to change the adjacent ecologies along it's length.
On a bedrock island with no arable land and conditions too cold to naturally grow fruits and vegetables, the thermal capacity of the pipeline precipitates a

collection of greenhouses in the town. Each greenhouse connects to the pipeline with a heat exchange mechanism collecting the waste thermal energy from the pipeline, drawing this excess heat into each greenhouse so the thermal losses are comparable with the naturally occurring losses along the pipeline. The structure itself creates an elevated promenade connecting new public spaces forming from the roofs of the

storage facilities below. In the winter, the heated promenade provides an activated public gathering forum, where the large greenhouse domes, lit with LED lights provide an illuminated center for community activity during the months of perpetual darkness.
The pipeline presence not only creates independence for a town, but fosters a heart for community energy.

Promenade Plan 1:1000

Section 1:500

Maximum Solar + Optimum Surface Area : Volume

Dome Shape Determines Thermal Climate Intensity
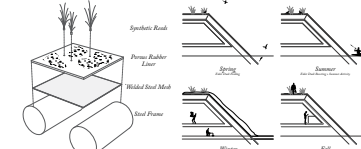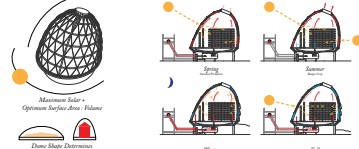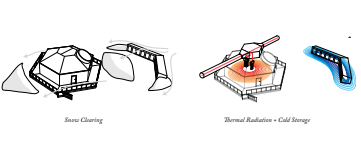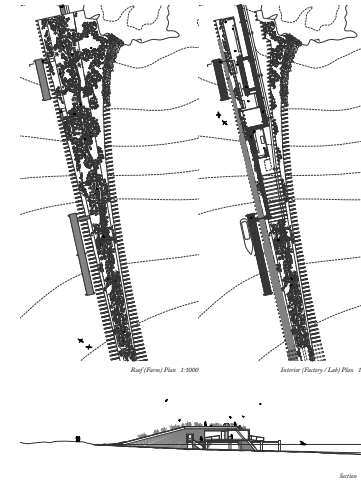
Spring

Summer

Winter

Fall

NESTED ECONOMY [passive skin]

Duck Farm / Arctic Research Lab

Qeqertarsuaq, home to the Danish High Arctic Research Station, is sited as the line's northern crossing point at Disko Bay. It's exposed location in turn receives a high volume of iceberg traffic. As such, a large cage is constructed to protect the fragile pipeline from near-shore floes.
Disko Bay is also home to migratory birds— in particular the Eider Duck, which seasonally inhabits the region to roost over the summer. Eider Ducks

grow a particularly soft down which is shed naturally— one of the rarest to be collected and lucrative on a small scale. In response to the rigid infrastructure, the frame is coated in a synthetic, soft skin for Eider down farming— a constructed field that roosts Eider Ducks in the summer and gathers snow to insulate the interior for passive human occupation in the winter.
Nested within are Arctic research labs,

connected to both land and sea, and facilities for processing Eider down.
The extrusion is a new ecology— not natural, but not entirely constructed either. It remains to weather: grow moss, needs, lichen, mollusks, and host ducks as they return with each season. Data continues to remain harvested— climate change painstakingly recorded through scientific observation and evident on the evolving façade.

Roof (Farm) Plan 1:1000

Interior (Factory / Lab) Plan 1:1000

Section 1:500

Synthetic Reeds

Porous Rubber Liner

Welded Steel Mesh

Steel Frame

Spring

Summer

Winter
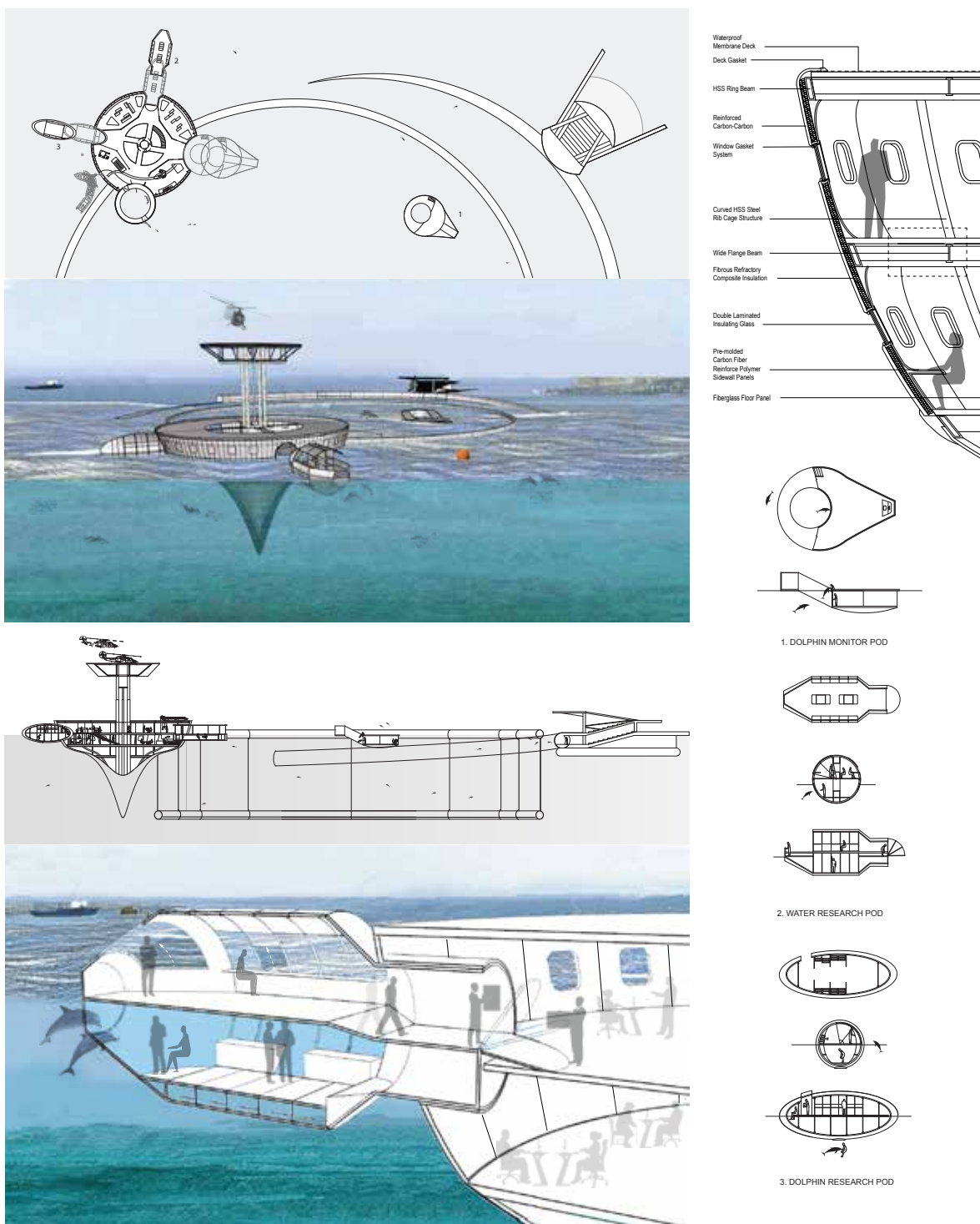
Fall

Bouyant Rings

YIM GLORIA JEW
Academy of Art University

SAINAN BI
Academy of Art University

Located in the western Hong Kong sea, this Research, Rescue and Rehab facility are for the Chinese White Dolphins, an endangered species. Due to the city's rapid growth of population and economics, Hong Kong has been reclaiming land from the sea in every single available instance. Habitats of marine life are disturbed and compromised. This project creates a floating inhabitable architecture with an approach of "search and rescue". The minimal footprint of rings and mobile units, "pods", are the infrastructure. The primary ring includes a maritime laboratory, the rehab pool and temporary shelter for dolphins. Smaller mobile laboratory pods are deployed to gather data for research and return to the laboratory as "plug-ins". Laboratory modules can be added to the ring. Rescue vessels tether the injured or stranded dolphins and guide them into the ring of the rehab pool for observation and healing. The outer ring is a floating arena for the engaged learning public who act as stewards of the environment. All of these mobile units act and become an active and positive agent in Hong Kong's marine ecosystem.

Material and Construction: The outer shell of the laboratory and vessels are made of Reinforced Carbon-Carbon (RCC) panels. These exterior panels are attached to a steel frame rib cage structure. The insulation panels are made of Fibrous Refractory Composite Insulation (FRCI). The interior panels are pre-molded Carbon Fiber Reinforced Polymer (CFRP). The fabrication of the panels both for the exterior and the interior allows for its modularity in production and systematic assembly. The laboratory unit and the pods are then transported to the sea.

Waterproof
Membrane Deck

Deck Gasket

HSS Ring Beam

Reinforced
Carbon-Carbon

Window Gasket
System

Curved HSS Steel
Rib Cage Structure

Wide Flange Beam

Fibrous Refractory
Composite Insulation

Double Laminated
Insulating Glass

Pre-molded
Carbon Fiber
Reinforce Polymer
Sidewall Panels

Fiberglass Floor Panel

1. DOLPHIN MONITOR POD

2. WATER RESEARCH POD

3. DOLPHIN RESEARCH POD

BUOYANT RINGS

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Curved
HSS

HSS Ring
Beam

Reinforced
Carbon-
Carbon

Material and Construction