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This proposal aims to mitigate the impacts of climate change by creating a scalable and sustainable model of rural living. With a predicted 1.5°C rise in global temperature by 2040, many areas of the world will become uninhabitable. In order to mitigate and adapt to climate change, we should:

1. promote the growth and use of local sustainable materials
2. design dense rural communities with resilient low carbon architecture
3. establish a sufficiency mindset and circular economy with integrated waste-streams

In Japan, climate change has resulted in intense weather events that cause damage to people’s well-being, infrastructure and the economy. We are proposing to implement this model in Kamikatsu, Japan by calibrating to the nuances of local conditions and stakeholders. The new settlement will slowly revive the town’s forest industry, promoting the growth of native forests & restoring biodiversity to increase carbon sinks for a more sustainable future.

70% of Japan’s surface area is covered with forests, a crucial role in absorbing carbon, but only 0.2% are harvested for domestic wood supply. A reforestation policy led to the proliferation of Japanese Cedar trees, due to its high yields and growth rates. However, this caused the overgrowth of cedar trees and the resulting monoculture wiped out the region’s biodiversity.

The 2 cities that we visited during our travel week inspired some of our strategies. Hida (the forest city, where 93% of the city is covered by forests with an impressively diverse 2,100 species of plants and Kamikatsu (the Zero waste village), where the population sorts their waste into 47 categories and thus, 80% of the waste is recycled back as resources.

We explored the local architecture of traditional Japanese roof and structure system, built from local wood, and to take this vernacular language and densify it. The 3 phases of our proposal will have cedar forest clearing and thinning for the construction of new dwellings and planting diverse species of local trees. The act of forest thinning and replanting diverse species will accelerate the increase of carbon sequestration. The cedar will be used for all the different parts of the dwellings, the column and roof structures, and wooden screen walls.

As for new ways of living, we were inspired by the Onsen Concept, the idea of sharing the most intimate spaces with the community, and also the Tatami room concept, where we can densify the housing units by using only one room for flexible programming. This eliminates construction redundancy in building, and overall less area needed per resident. The units are flexible with no fixed furniture and storage spaces are located along the walls, thus catering to the resident’s needs.

As the forest and demographics of the town begin to change, we imagine that this movement of rural living can be a positive feedback loop for both humans and for the climate.
FUTURE OF KAMIKATSU IN 2050

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RURALISM | COLUMBIA GSAPP | ADV 6 STUDIO

PHASE 1
DWELLINGS

WOOD PROCESSING

WASTE SORTING

PHASE 2
DWELLINGS

Biodiverse Forest

PHASE 3
DWELLINGS
Living Cores is a medium-density housing project located in the culturally rich community of the Melrose Neighborhood on the intersection of 151st St. and Melrose Avenue, South Bronx, New York. This project aims to provide pleasant and efficient homes for the community in terms of light and air, while also encouraging engagement with neighbors and the public through a series of shared spaces which take the forms of balconies, building cores, and a public central courtyard.

By placing the residential buildings around the central courtyard and using single-loaded open air corridors, we are maximizing the opportunity for light and air by providing two open sides for every unit. We hope that these design decisions may increase energy efficiency because light and air will be accessible in all the rooms of the units.

Living Cores uses wood as its primary architectural material due to its natural, renewable, and sustainable qualities, with a much lighter carbon footprint compared to steel or concrete. Wood requires the least amount of energy in multiple aspects of the building process including manufacturing, transport, installation, maintenance, and disposal. Aside from its environmental aspects, we also chose wood due to its cost efficiency, lightness, and warmth of space. Eight-foot wide CLT wall panels are used as the main structure that go from the ground floor all the way to the roof level. These panels are embedded in both directions of the walls for lateral stability. Plywood panels with wooden wall studs are used as the finish for the non-structural walls.

In all of the units, the kitchen and bathroom share a plumbing wall that goes all the way to the roof, increasing efficiency in material use, energy, and construction. Moreover, with over 45,000 square feet of terracing green roofs, we are able to funnel water to the building cores and down to the rainwater cistern below grade, allowing us to collect 1,342,140 gallons of rainwater annually, which can be recycled into 11% of the building’s projected annual water usage.

Plywood fins wrap around the core facade, filtering sunlight to create a warm and inviting space for residents. The core’s double-height plantase spirals against the plywood fins and around the residential shared spaces, allowing the circulation to be lit by natural light and a form of passive engagement with neighbors of the building.
CORE SCENARIO PLANS

- ground level
- kids play area
- yoga area

CORE VIEWS

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UNIT AXON

UNIT PLANS

two story unit a
level 1
two story unit a
level 2
two story unit b
level 1
two story unit b
level 2
single story unit
cross ventilation
Just as humans accelerated existential change to our world's ecosystem, this project hopes to accelerate the regrowth of life, propagating and creating a symbiosis between humans and nature. We are taking a stance of welcoming the entropic process as part of the natural cycle of life, which creates a constantly changing and emerging new nature. “Life: Propagated” will act as a substrate which allows organisms to live, grow, and exist in its reemerging life sustaining environment.

As a result of the limestone mining, new microclimates are distributed inside the terracing quarry, defined through three factors that shape the habitats for new lives: which are sun exposure, soil pH, and humidity. Through increasing entropy, the microclimates create a new order and new life ecosystems.

As much as possible we try to avoid disturbing the microclimates by designing spiraling paths around the existing levels of the quarry that also connect vertically through staircases, and allow natural growth for flora around the paths. The quarry is quietly alive, growing, feeding, constantly changing, and flora and fauna species slowly adapt with the water level change and propagate to higher ground as time goes by.

We also mapped out the possible life cycles of different threatened fauna that can live in symbiosis in one big ecosystem. Each species has its own lifecycle and habitat needs, such as the birds feeding off of the dragonflies, and the dragonflies needing some humid soil shallow waters to reproduce, and butterflies feeding off of the flowering plants nectar and reproducing on the oak trees, also microorganisms in the soil and waterfowls feeding off of aquatic vegetation.

For the building, our approach is to reorganize, redistribute, and reconfigure these existing resources on the site. By carving in and building around, we aim to reorganize new negative spaces for humans and species to inhabit, interact and observe. At the same time new mounds will be made out of dug out soils from the site.

The 3 levels of our building, the roof level, ground level, and underground level, will be for flexible use but we are proposing that it can facilitate and invite:

- aquatic and land biology researchers
- local communities
- flora and fauna species

By embracing nature to reclaim the land, we hope that our project can be a model where humans and nature can live in symbiosis, and where significant change in our mindset can be implemented away from human centric design but towards a life centric design.
LEFT: SITE MAP OF THREATENED SPECIES

MICROCLIMATE PLAN
MICROCLIMATE DIAGRAM

COLLAGE OF SITE HISTORY AND IMAGINED FUTURE

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HANGING CRYSTAL QUARRY MODEL

CRYSTAL VITRINE MODEL
The Continuum of Farming, Stewardship, and Spirituality is a sequence of multi-purpose spaces that exist along a 1.5-mile circular path connecting three farms, a monastery, and a community center in the Hudson Valley of New York. Acknowledging the breadth of programs that exist on-site, the project seeks to provide a platform on which the three programs of farming, stewardship, and spirituality can hybridize to bring about a spatial and institutional model that introduces new modes of practice between existing stakeholders. The programmatic hybridity is translated through a combined architectural language of wood, corten steel, and rammed earth along the sequence of spaces.

In the pre-1600s, the land was originally inhabited by the Native Mohican tribe where they lived as stewards of the land, honoring and respecting nature, also living in tandem with the different seasons harmoniously. However, the site was occupied by iron mining establishments in the late 1800s where the land was disrespected and destroyed. The invasive process of iron mining, from drilling into the earth, and then blasting it with explosives to dig huge pits causes significant damage to the vegetation, soil, and waterways, while also exposing humans to highly toxic pollutants.

After absorbing all the history, and understanding the current stakeholders of the site, we want to propose an intervention that will respect and connect with the indigenous ancestry through farming and as stewards of the land by remediating the soil and waters, and create safe spaces for healing and spiritual connection for the stakeholders.

Our aim is to create a new hybridity of spaces to blend farming, stewardship, and spiritual practices through a continuum of spaces that serve as a collective amenity to practice farming, soil and water remediation, and spirituality and consequently creating a living memorial of indigenous stewardship practices. Our proposal designates a circular band that unifies the multiple stakeholder sites, along which multipurpose structures are built for different activities while maintaining a constant sense of the surrounding environment.

1. Collective farming spaces - to cultivate
2. Soil and water remediation stewardship - to purify
3. Spiritual refuge - to reflect

The Continuum | Columbia GSAPP | Adv 4 Studio
LATE 1800s IRON MINE INTERPRETATION
SPIRITUAL SEED STORAGE

IRON LIVING MEMORIAL

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This project proposes to introduce a series of learning platforms for a K-8 school and the local neighborhood, which currently lacks safe and active community learning spaces.

On the ground, an urban connection between 9th and 10th street anchors the community platforms, i.e. the library, play spaces, and the gymnatorium, while also housing the two school lobbies. The platforms on the higher levels house the school’s learning spaces.

The two existing stair cores are preserved, and new timber structures become the spatial framework for the platforms. In contrast to typically enclosed learning spaces, they create a series of split level conditions, allowing opportunities for cross-platform visual connections and natural light and air to permeate throughout.

The classrooms always start with a homeroom, which acts as a transitional space as well as a home base for the students, instilling a sense of domesticity in a typically institutionalized space. A new central staircase threads across the multiple levels, whose landings are generously sized to allow for collaborative activities to take place. This circulation spine is where students, regardless of their grade, can learn together and participate in activities outside of the traditional classroom.

Altogether, this project aims to create a different spatial typology and educational experience for students during the weekdays and the local community in the evening and weekends. One that’s centered around flexibility, collaboration, and openness.
STRUCTURE MODEL

LEARNING PLATFORMS

| COLUMBIA GSAPP | CORE 2 STUDIO |

CLASSROOM SCENARIOS MODEL

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This study model is exploring spatial relationships of open, semi-enclosed, and enclosed spaces, by using simple paper modules of curved and rectilinear geometry. I was interested in manipulating the flow of light to interior spaces.
These scenes are exploring different opening conditions from interior to exterior.

These scenarios are exploring the ambience and softness of the curvilinear spaces and split level conditions.
This project looks into ways to improve the state of happiness of New Yorkers through a series of urban interventions in the form of Underground Alcoves in subway stations along Broadway. Transforming these stations from one of the most overcrowded and used public spaces with deteriorating physical conditions, into places which are socially active, well-illuminated, and use warm materials - essentially enhancing daily urban experience of commuters in the city.

Based on my research, the New York Department of Health found that 1 in 5 New Yorkers have symptoms of mental disorder, and 8% of adult New Yorkers experience symptoms of depression. One study from Science Magazine even rated New York as the unhappiest state in the country. Excessive noise, overcrowding, and neglected environments all essentially contribute to these issues.

A series of curved geometry can be arranged to create pleasant spaces for commuters. The semi enclosed spaces house a variety of programs that offer places for commuters to temporarily stop or slow down and be comfortable in their own pace. Skylights on top of the modules provide natural daylight and air to enter the underground alcoves, and on the plaza above, plenty of trees and stepped garden provide seating area around the openings. The entrance to the station starts from the north end of the plaza, utilizing the underground vacant retail space, with a gentle slope that create a more pleasing and seamless connection between the above ground and the subway level below. The height of the spaces gets higher as you walk down the slope.

Existing subway stations’ materials are arguably unpleasant because most have grey tiles as the flooring with no natural skylight. So to alleviate the commuter experience in subway entrances, I chose materials that improve comfort through bright and warm textures and colors. Wood as a lightweight material that is simple to assemble or disassemble for the structure of the alcove and using fabric material with light colors and translucent qualities as the wall coverings inside and outside of the alcoves which allow more light to enter the station from the skylight openings. I was also experimenting with terrazzo as the flooring by mixing warm colored marble aggregate in light colored concrete.
This watercolor paper model explores the atmospheres of the alcoves, using layers of the modules to manipulate light and shadow.
ONE TO ONE SCALE MODEL

This model explores a one to one scale production of the alcove modules. The process uses 2 layers of 3/4 inch thick plywood utilizing CNC machine to cut the curved frame, and dovetail joint to connect the vertical and horizontal members. Sheer non-elastic fabric were nailed on the top and bottom of the frames to create a soft wall that filters natural light.

This exercise also explores casting terrazzo with different colored aggregates and use of coloring to create a bright and warm feel for the flooring of the alcoves.
KinetiCity is a net-zero park intervention located adjacent to the Bushwick inlet in Brooklyn, New York. The project serves as an innovative and sustainable proposal for community and systems engagement through the study of flooding levels and incorporation of renewable energy and water collection systems. KinetiCity revolves around the idea of movement; movement inherently produces energy, and it is all around us. We capitalize on natural movement to produce energy that then serves our site programs in a closed loop system. These methods are also reflected on site with one main built element, a circular building which hosts indoor programs such as urban farming, communal cooking and market spaces, which overlook the East River and kinetic park.

KinetiCity is focusing on community engagement through movement, by having programs that promote activities such as kinetic paths, kinetic recreation areas, kinetic skate parks, and kinetic playgrounds. The energy harvested from these programs will support other engagement programs such as outdoor light gardens, fountains and water play areas. Integrated rainwater collection systems and photovoltaic panels will also generate energy and supply water for the urban farming systems.

The site has 3 strategic entries from the south, north, and center of the site, which connect the pedestrian path to McCarren Park. These 3 entries connect with the kinetic paths that undulate around the site, which collect kinetic energy from people walking, jogging or biking. The kinetic energy harvested can power landscape installations such as the water spouts and light gardens.

The circular building on the north part of the site is elevated above ground level to avoid flood zones. This building is the only built indoor program which houses the hydroponics farm supported by the rainwater collection and solar energy system. This structure will also house supporting community programs such as a mix of restaurants, learning kitchens, and a farmers market.
This project was inspired by the painting ‘Flower in the Wind’ by Agnes Martin because of its ethereal and spiritual qualities. It has subtle, sun-faded, warm, earthy colors and blurriness that create a calming and serene effect to the viewers. It also has many slim and organized vertical lines that repeat throughout the whole piece.

I was inspired to create a facade that can exude this spiritual and calming experience to the user from both the exterior and interior of the building, by using a repetitive, warm-toned vertical screen. Using wood as the main material, manipulating the bright and strong sunlight of California, lowering its intensity and creating beautiful shadow effects in the interior. Also creating a blurry glow from the exterior at night.

**SYSTEM DESCRIPTION**

**WT-1**: Wood Screen, Stainless Steel Frame, Aluminum, Wood, Insulating Glass, Unitized Curtain Wall System.

System consists of vertical wood batons attached to operable stainless steel frames, connected to the steel reinforcement within the vertical aluminum mullions of the curtain wall units. Insulating glass is four-sided structural silicone glazed onto unitized aluminum and wood frames of thermally broken, custom profile extruded aluminum attached to wood mullions. Surface two of the glass has a silver appearance low-E coating, with low reflectivity and have color neutrality. Spandrel areas are on the interior of the glazing clad with wood panels. System is anchored to the building structure at the top of the concrete slab.

**LIST OF FACADE FEATURES**

System includes hinges on the stainless steel frames that are operable for glass maintenance access.

**PRINCIPAL MATERIAL FINISHES**

All wood on the exterior will be custom treated to prevent degradation from moisture and weather. Aluminum will have anodized coating. Stainless steel will be 304 type with 2B cold rolled finish. All wood visible from the interior shall be coated with clear varnish.
This project aims to communicate and understand the mechanical and structural systems of a Supertall building typology. By dissecting an individual building component and their interrelationships to each other, this set of drawings and diagrams communicates a comprehensive understanding of how Supertall buildings behave.
Chambers of the Met is a temporary gallery extension to the MET Museum, located in upper east side of New York City. The concept is to create engaging spaces with unique forms that filter natural light into the small galleries.

The forms were explored using watercolor paper, before being photographed and drawn into a bigger scale.

AXONOMETRIC
48" x 36"
Below is a collection of experiments using watercolor paper to create unique forms and light conditions for gallery spaces.

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This drawing is a compiled collage of a collection of sketches throughout my 4 months stay in Paris. The sketches were drawn at different times and locations all over Paris.

**COURSE**
DRAWING EVERYTHING

**CRITIC**
PETER O'BRIEN

**DATE**
SPRING 2019

**TITLE**
SPRING IN PARIS

**MEDIUM**
PEN ON MYLAR

This is an overlapping plan, elevation, and section drawing of an experimental prosthetic device, created from a piece of suit jacket. The purpose of this device is to measure the heights of buildings, when worn by the user.

Instructions on how to use:
1. stand 10 steps from building using attached measuring tape
2. point left hand to top of building
3. read the angle and height of building on key

**COURSE**
NEW YORK STUDIO

**CRITIC**
MIKU DIXIT

**DATE**
FALL 2018

**TITLE**
HUMAN HYPSOMETER

**MEDIUM**
GRAPHITE ON MYLAR
The food loop is a mixed-use housing and urban farm project located in the heart of Paris at Place de l'Hôtel de Ville and St. Jacques Tower. The housing and urban farm will house vertical aeroponic gardens with apartment units located above.

Modular rectilinear systems are flexible to deploy in the plaza depending on the program’s needs. An underground retail passage connects the plaza with the river that is one level below.
Below is a collection of massing studies using various materials, analyzing porosity for cross ventilation and light. The full project is featured in chapter 2 of this portfolio (Learning Platforms).

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<th>Course</th>
<th>Critic</th>
<th>Date</th>
<th>Medium</th>
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<tr>
<td>CORE 2 STUDIO</td>
<td>BENJAMIN CADENA</td>
<td>SPRING 2020</td>
<td>FOAM, CARDBOARD, CLAY</td>
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Below are study models experimenting with room layouts according to the flow of daily human routines. The full project is featured in chapter 6 of this portfolio (The Food Loop).

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<tr>
<td>PARIS STUDIO</td>
<td>ANTOINE SANTIARD</td>
<td>SPRING 2019</td>
<td>CARDBOARD, WOOD + METAL</td>
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This project explores representation techniques of an existing built architecture through drawing and physical model making. The drawing aims to portray the split level concept behind House NA by Sou Fujimoto, showing a section perspective of the house cut in the middle.

The physical model's concept is to create a 3D maze using an acrylic ball that will flow through the house made of laser cut acrylic. The user can see how people flow through the house, with many small rooms at different elevations. The orange acrylic room is the kitchen, which is the center of the house and the yellow rooms are the dead-end destinations of the house.

**ARCH DRAWING & REPRESENTATION**
LEXI TSIEN
FALL 2019 - 14 WEEKS
HOUSE NA - SOU FUJIMOTO
TOKYO, JAPAN
1/8" ACRYLIC

**ACRYLIC MODEL**