ARCHITECTURE COMES TO LIFE

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“Architecture comes to life” embodies an exploration of architecture as a dynamic system that interacts with its surroundings, adapts to changing conditions, and evolves over time. Rather than simply a static object, buildings and spaces are living organisms that respond to the needs and desires of their users, as well as the climate, culture, and context in which they exist.

This exploration is divided into chapters that cover multi-scale design, from landscape to urban environments, buildings, and objects with various material experiment. Through books, physical objects, and digital drawings, the goal is to inspire and stimulate human imagination, emotion, and creativity. Architecture is seen not just as a functional necessity, but as an emotional expression that embodies values, meanings, and aspirations.

When architecture resonates with people’s sensibilities and aspirations, it becomes alive and meaningful, shaping and reflecting the cultural identity of a society. Overall, “architecture comes to life” suggests that architecture is a complex and multifaceted practice that involves social, cultural, aesthetic, and environmental dimensions.
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HYBRID WATERSHED MACHINE FOR JAMAICA BAY

Imaginations for a different kind of labour

GSAPP Adv Studio IV 2022
Professor Marco Ferrari and Elise Hunchuck
Collaboration with Weiyu Xu and Xiényí Deng
QUESTIONS FOR WATER

Water is everywhere. It is shapeless, but when it runs through different media, it takes the shape of the media and becomes the proxy for it. Focusing in Jamaica Bay, NYC, our research and design project treated water as a proxy for understanding urban conditions. It consists of a study upon flow of water, and a series of small low-tech machine intervention for modifying and improving the coastal landscape.

What is the role of water in contemporary coastal urban context?

Can we still call water a natural system if it is highly controlled and manipulated by humans? How does water foster ecological impact on coastal geology?
Hybrid Watershed Machine for Jamaica Bay

Machines that collaborate each other on landscape

Evaporation from land surface and vegetation

Evaporation from oceans

Infiltration

Pipeline

Residential area

Upper border from creek bridge

High marsh tidal marshes

Low marsh floodplain

Tidal mudflat

Subtidal submerged
Our project studies a certain geological condition shaped by water - the salt marsh degradation in urban vicinity. As shown on the map, salt marsh is coexisting with a lot of coastal cities.
The lawn and planting green infrastructure can help to mitigate storm overflow in CSO, thus reducing the unwanted pollutants in sewage system that will outfall.

During storm weather, the impervious hard surface will create a lot of water run-off, which will be captured by catch basins.

IWPCP and water pump stations are responsible for the water treatment process to reduce pollutants before the sewage outfall.

The underground sewage system including combined sewage and separated sewage.

During heavy storm weather, there will be overflow in CSO system, and the untreated water will directly get into the natural watershed.

Humans change the coastal wetland landscape into hard stone edge, which changes the water behavior.

The underground soil condition will be gradually changed after the spontaneous and unspontaneous water is mixed.

High marsh area is able to capture a lot of storm water and storm flows of CSO.
Jamaica bay's spontaneous watershed shows the flow of water through different media of surfaces under the influence of gravity, wind and etc. Water flows freely without human directed direction.
Jamaica bay’s unspontaneous watershed contains external forces, such as capturing, pumping up, and dumping out water, which move water from urban environments to coastal areas.
Humans have been inventing machines to produce labour, profits, and values. However, machines in our project are invented as imaginations for a different kind of labour on landscapes. Instead of exploiting the landscape, the ‘labour’ is actually playful way for human and all species to experiment, interact with landscape. Hybrid machines on Jamaica bay act as a way of emerge hybrid water action, dealing with different problems in salt marsh degradation—pollution, sea level rise and erosion.
Each machine filters, replace, mixing, splash, and capture the water in a theatrical and playful ways of interacting water.
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STORYTELLER CHUKOTSKY

Traveling education center for indigenous people in Russian Arctic area

GSAPP Adv Studio V 2022
Professor Leslie Gill and Khoi A. Nguyen
The Storyteller Chukotsky project aims to preserve the endangered Indigenous languages and cultures in Chukotsky, Russia, by providing recording, editing, and archiving studios that will be available for daily use by local people.

The project consists of two parts: a permanent landscape that implies temporary program by design, and a temporary part that changes according to seasonal usage. This temporary part includes a performance hall and a portable unit that can be plugged into the existing landscape for recording, editing, and archiving purposes.

The project is of significant importance because there are over 40 endangered indigenous languages in the Arctic, and the Chukotka area lacks higher education institutions, making it even more crucial to preserve these cultures.
There is only one high school in Lorino and only primary education is available in most of the other villages. The villages are isolated and only towns and adjacent villages have paved roads; there are no railways, but there is a heliport and an airport. Lorino has a rich water source and its landscape is connected to nature through the waterway.
Seasonal changes

Winter

Summer

Fall/ Spring

Traveling education center
Storyteller Chukotsky have permanence basement landscape with temporary elements. Whole program works as an annual cycle with inflatable performance center, portable unit, snow dome by season.

**Early Summer**
- Map: June (14°C-25°C)
- Units delivered via air balloon

**Summer**
- Map: July (24°C–34°C)
- Temporal inflatable performance hall

**Late Summer & Fall**
- Map: Aug (13°C–21°C)
- Open space

**Winter**
- Map: Dec - Feb (−2°C–9°C)
- Completion of ice shell construction

Inflating pneumatic formwork, by using 3D membrane bag
Application of snow and water
Deflating membrane
EVERYTHING COMES TO LIFE

Instructions for animating non-living objects by making

GSAPP Adv Studio VI 2023
Professor Ada Tollia, Giuseppe Lignano and Thomas De Monchaux
To me, everything possesses a sense of liveliness, even if it may appear inanimate. Objects respond to external stimuli and undergo gradual changes in different scales of time and space.

For example, the rocks in Joshua Tree desert slowly erode and transform due to external stimuli such as wind, water, and geological movements. These are processes that happen in reaction to the objects’ environments rather than independent occurrences, leading me to believe that even seemingly lifeless objects are imbued with vitality.

I utilize discarded, abandoned, or ignored scraps of various materials, and through techniques such as stacking, pouring, cutting, threading, weaving, and inflating, I infuse them with energy with motility, volition, and reproduction. Making is a process of letting a structure act or react by itself. Each material relates to one another, creating a network of energy and emotion. The result is an object that breathes, runs, and even tears, much like us.
I find broken pieces of pavements in the Riverside park and stack them vertically. To connect those pieces together, I insert poured vertical columns made of Rockite naturally flow through gravity. First, I pour Rockite onto each group of rocks, creating a balcony space that showcases its fluidity as it spread across the ground. Then, I stack these groups again and pour Rockite on top to complete the structure. While the Rockite appears liquid on the surface of the rocks, it quickly solidifies to form vertical columns that interlocked the entire structure. The stacked Rockite on the suggests height while working as joints to connect the rocks together. The finished structure resembles a cake with flowing cream, resulting in an intriguing surface that captures the essence of its past fluidity.
주르륵 떨어진다 끝┃방울 끝
시 간을 타고 흐르는 추억

 Everything comes to life

Masonry that flows
As an IT student worker at Columbia, I often visit the hidden dumpsters on campus to dispose of used ink cartridges. On one such visit, I stumble upon a storage area filled with various signs, stools, and temporary construction materials. I end up borrowing four shiny light aluminum sign frames used to guide people during events on campus. I also pick up some dark heavy metal scraps from the metal shop.

Next, I cut the aluminum signs in four pieces and drill three to four 10mm holes into all the metal scraps. I then thread the aluminum and black metal pieces onto a rod and secure each end using coupling nuts. The metal scraps swing freely resembling small limbs about to take off running.
This is a process of stimulating metal to make it capable of walking.
B - B' Vertical section

Metal that walks
While wandering through Central Park, I collect a bunch of branches - some robust and rigid, while others more flexible and pliable. Seeing these differences reminds me of the human body, with its hard and flexible parts working together in harmony to facilitate movement.

To create something unique, I group the branches together into three distinct sets - one made of long, stiff branches, another of flexible ones, and a final group composed of shorter, rigid pieces. I then fasten them to a metal frame using elastic bands, allowing movement to transmit from the metal to the wood. To bring everything together, I utilize the flexible branches to connect the limbs, folding them in eight different places to achieve a bouncy movement. This assembly connects with the metal frame, and its distinct shape embraces and interacts with the other materials used. Overall, the result is a beautiful and dynamic object that demonstrates importance of balance and cooperation between hard and flexible elements.
Connect two robusts and one flexible.
A-A horizontal section detail

Wood that stretches
The desert is like a transformer. Wind it all day long, it goes through. Sometimes it covered by sand. Other times it dances with the branches in a fine line. It points on the sand, in the gentle slope and as the wind picks up, it dance along with the branches, dancing to the same wind. The night is a surprise to the desert. It transforms with the wind, and with the sand.
When I moved from Seoul to New York last year, packing was one of the biggest challenges I faced. I was unsure how to fit all my clothes into my luggage without taking up too much space. I decided to use vacuum plastic bags to create more room. I remember that my father even helped by using his body to compress them further.

When I arrived in New York and opened my luggage, they burst out. As I felt freedom when they burst out, I decided to use the same plastic bags in a different way. Instead of compressing them, I inflate them with air and put my clothes inside. Each piece of clothing holds its own story, memories, and emotions attached to it. As I fill the bags, I watch as they bloom like flowers, expanding with air.
Everything comes to life

Plastic that breathes

Inhale

EXhale
Everything comes to life

Plastic that breathes
ARCHITECTURE COMES TO LIFE

Visual / Building Tech / Material studies
05
FIRST AID KIT-OSAN

First Aid Kit for buildings by using chitosan as an self-healing materials

GSAPP Building Tech/ Visual studies
Making kin with bio materials, Fall 2022
Professor Christopher Woebken
"What if, in 400 years from now, all the buildings in NYC were made with bio-materials and we could fix our own apartments using a first aid kit for buildings?

Imagine using simple materials found in the kitchen, such as potato starch, eggshells, and shrimp shells. No dangerous tools required. And the best part? All the materials would be biodegradable, non-toxic, edible, and sustainable."
First Aid Kit-Osan is a biomaterial experiment that utilizes the self-healing properties of chitosan. The project showcases vision for sustainable and innovative future of architecture, where buildings are constructed with the second most abundant material in the earth, Chitosan.
First Aid Kit-Osan

Process of self healing

Shrimp shell
Calcium carbonate
Egg shell

Soduim Alginate
Methylcellulose
4% Acetic Acid
Ingredients:
Potato starch
Eggshells
Water
Glycerin

STEP 1: Wash them in water and boil them for about 15 minutes to kill all the bacteria. Strain the water and put the eggshells in a tray.

STEP 2: When they are completely dry, grind them to a fine powder in a grinder.

STEP 3: In a pan add the potato starch and the water and stir well until there are no lumps and the starch is completely dissolved. Heat the solution over low heat and stir constantly until it becomes a thick, translucent paste.

STEP 4: Remove from heat and add the eggshell and glycerin. Mix well until there are no lumps and a viscous, sandy paste is reached.

STEP 5: Transfer the mixture onto a flat surface or mold. Let it air dry.
Sodium Alginate, Methylcellulose, 4% Acetic Acid

Eggshell-potato-starch-shrimp based biomaterial
JAZZ BALLS

Interactive art/sound installation that playfully depicts Harlem Jazz history for children

GSAPP Building Tech
If buildings could talk, Spring 2023
Professor Sharon Ayalon
Collaboration with Claire Koh, Yilin Zhang, and Renwen Yu
If buildings could talk

The artwork is installed at a playground in Riverside Park in Morningside Heights. It aims to introduce the children and visitors of Morningside Heights to the jazz history of neighboring Harlem in a playful manner. It will evoke interest in one of the most significant roots of Harlem that have been overshadowed by the other mainstream reputation of the neighborhood.

The installation is made of ten sound modules that are installed along a railing of an appropriate height for children to interact. Each module will be made of a plushie ball and a rope, with electronic parts secured along the top of the speaker and along the rope. The visual side of the installation is inspired by musical notes - the foam balls on a cord. They are arranged in a way that hints at the tempo and the pitch of the sound module.
The Jazz Balls interactive art/sound installation playfully depicts Harlem Jazz history. It will introduce future generations to Harlem’s glorified tradition in a fun and educational way.

Each ball contains a unique sound of different chords, tempos and instruments used in a common jazz progression. Children can activate the installation by pulling the plushie ball at the end of the rope, which will play the individual sounds from the speaker. The accumulation of children playing could create the sound of an improvised jazz session.
Children could play these modules individually to familiarize themselves with the musical progression, or basic drum beats, or history of jazz. They could also stack them together to create their own unique piece of jazz.

The electronic parts are made of a circuit board wires, push button and a piezo speaker. Since the piezo speaker may not be loud enough to adequately deliver the sound to the visitors, we made special speakers out of paper plate and cups that face down towards the users (children). The installation is accompanied by a brochure that describes the installation, a brief jazz history of Harlem and several notable figures.
Audio circuit/ Battery

Speaker with reflection panel

Squeeze ball that represent notes
### Background and Beat

<table>
<thead>
<tr>
<th>Number</th>
<th>Background Beat</th>
<th>Description</th>
<th>Title</th>
<th>Artist</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Excerpt from: Lick No. 1 - Left Hand Variations</td>
<td>Blues Piano Lesson #11</td>
<td>Walking Bass (I - VI - ii - V) - Two Chord/Bar</td>
<td>David Magyel</td>
</tr>
<tr>
<td>2</td>
<td>Excerpt from: Dynamic Jazz Beat</td>
<td>Backing Track 120 BPM (royalty free)</td>
<td></td>
<td>Jim Dooley</td>
</tr>
<tr>
<td>3</td>
<td>Excerpt from: Lick No. 1 - Left Hand Variations</td>
<td>Blues Piano Lesson #11</td>
<td>Walking Bass (I - VI - ii - V) - Two Chord/Bar</td>
<td>David Magyel</td>
</tr>
<tr>
<td>4</td>
<td>Excerpt from: John Goldsby</td>
<td>Solo Double Bass Performance of “Sweet and Lovely”</td>
<td></td>
<td>John Goldsby</td>
</tr>
</tbody>
</table>

### Jazz of Harlem

<table>
<thead>
<tr>
<th>Jazz of Harlem 1:</th>
<th>La Vie En Rose - played by Louis Armstrong</th>
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</thead>
<tbody>
<tr>
<td>Jazz of Harlem 2:</td>
<td>Take the A Train - piano solo by Duke Ellington</td>
</tr>
<tr>
<td>Jazz of Harlem 3:</td>
<td>Strange Fruit - By Billie Holiday</td>
</tr>
</tbody>
</table>

### Sound Effect

- Sound Effect 1: Hi-Hat
- Sound Effect 2: Tom
- Sound Effect 3: Snare
There will be four modules containing general beats made of piano, drums(x2), and double bass, three modules containing pieces performed by the famous musicians of Harlem (La Vie En Rose by Louis Armstrong, Strange Fruit by Billie Holiday and Take the A Train by Duke Ellington) and three modules containing sounds of a specific drum (hi-hat, tom, snare) for interactive purpose.
LAST MAN ON EARTH

Storytelling with 3d modeling and rendering

GSAPP Visual studies
Techniques of Ultrareal, Fall 2022
Professor Phillip Crupi
Collaboration with Andy El Set, Deniz Mahir, and Karolina Dohnalkova
In the year 2430, the world had changed beyond recognition. The Earth had become a desolate wasteland, and humanity was all but extinct. The only known human left alive was a man, stranded in the middle of the arctic region in Svalbard.

At first, the man was surviving in a cave, living off whatever he could find or hunt. But as time passed, he started to scavenge for scraps of ruined trains, satellites, and machines. Using his survival skills, he gradually built his own shelter, turning it into a work of art. Despite his impressive construction, the man's life was a lonely one. He had no one to talk to, no one to share his experiences with, and no one to care for his only companion: his memories of a world that had been long gone.

In fact, the man was surviving in a cave, living off whatever he could find or hunt. But as time passed, he started to scavenge for scraps of ruined trains, satellites, and machines. Using his survival skills, he gradually built his own shelter, turning it into a work of art. Despite his impressive construction, the man's life was a lonely one. He had no one to talk to, no one to share his experiences with, and no one to care for his only companion: his memories of a world that had been long gone.
As time passed, he grew more and more desperate for companionship. One day, he saw a faint light in the distance. It was a glimmer of hope in his otherwise desolate world. He knew that the light represented the possibility of other survivors.

Without hesitation, he lit his last red flare and sent it shooting up into the sky. It was a desperate plea for help, a beacon of hope that would hopefully bring other survivors to him. He waited anxiously, unsure if anyone would see his signal.
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