PORTFOLIO

Project 1
The Seasons in the City
Architecture Design
Fall 2022

Project 2
Disabling Modernity
Urban Design & Architecture Design
Spring 2023

Project 3
Way to the Cave
Site Tour Guideline
Summer 2022

Re-Thinking BIM

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The Seasons in the City

ADVANCED STUDIO V / GSAPP / Fall 2022
Instructor: David Benjamin
Location: Time Square, New York, USA
In Collaboration with Hetian Guan
Research & Design: 50%, Drawings: 40%, Model Making: 70%

In addition to being highly relevant to ecological issues, building materials also influence public awareness and social culture. The publicity impact of glass curtain walls in high-rise buildings in the 20th century drew public attention to technology and development, and the use of glass in high-rises proliferated as a result. We want to re-wrap the glass buildings with the short-life cycle, naturally degrading mycelium as the shading system, and the bamboo scaffoldings involved in the long-term maintenance and renovation process. Putting the propaganda of environmental protection in the most prominent position, and exploring new ways of living and new forms of cities for people.
One particular crisis involved disagreements over how to protect the Secretariat Building from excessive heat and glare. Le Corbusier preferred stone facades but the rest of the board preferred to minimize natural sunlight and use of over-glazing. Experiments were undertaken to discover the most heat-efficient material and Le Corbusier’s brick-slated lac to tint glass. Koolhaas has described these (at times tactics) architectural collaborations as “enablers”, as teamwork often perverts the master’s initial style and contributes to the more oligarchic elements of a building.
Scenario

We choose Times Square as the starting point. In the context of Local Law 97, we can foresee a continuous renovation of high-rise buildings in Times Square. The renovation process will interrupt the normal operations of the building while generating significant carbon emissions and consuming labor, and after the high-rise is wrapped for a few months, it will be business as usual. We want to make a semi-permanent system with two low carbon materials, bamboo as a permanent scaffolding to reshape the exterior of the building, and mycelium as a seasonal shade on the façade periodically; the new system will redefine the renovation process.
Carbon Footprint of a US-Standard Mycelium Brick

We calculated the carbon footprint per unit mycelium throughout the process according to the laboratory scale, the whole process is carbon negative, and the consumption of sterilization will be further reduced in industrial scale.

Mycelium Factory

1500 Broadway was built in 1970 with a massive hvac system, with equipment floors occupying two levels of space on the middle and roof levels respectively. By installing a shading system and increasing natural ventilation, we were able to reduce the working time of the HVAC system by 70%, thus saving space for the mycelium plant and collection unit.

We selected agricultural waste as substrate, which is transported from the farm to the mycelium plant for manufacturing in April each year; the mycelium shading panels are installed in May and gradually decaying and falling on the façade until the end of autumn.
Seasonal Quality

In the process of making mycelium model, we found that the growing of mycelium shows a quality of seasonal from growing to decaying similar with tree leaves. This quality is followed by its texture change which led to our focus on the aesthetic quality of the material.

Shading Billboards

Starting from the simplest form of shade, we wanted to maximize the volume of the mycelium without overly affecting the view of the interior. The inner curves of the mycelium panels form an interesting space in the room, while the outer curves add to the effect of the street view. The cross-level volume of the collection device will make it more visible as well.

Collecting Unit
Mycelium Shading Board

In order to avoid additional carbon emissions during the manufacturing process, the mycelium shade is manufactured using a combination of manual and mold. Four inches is the maximum size of mycelium that can be exposed to oxygen for normal growth, and this is the most basic module for the shade. The smallest mold unit is a 4 inch high, one inch wide strip of mycelium, which is stacked together and filled with mycelium after a week of incubation, bamboo is used to hold the layers in place. Each shade will occupy two spaces outside the curtain wall panels and will be 8 feet wide. The initial height varies from 5 feet to 8 feet.
Disabling Modernities

ADV STUDIO VI / GSAPP / Spring 2023
Instructor: David Gissen
Location: Vienna, Austria

Urban Design:
In Collaboration with Yiji Gao, Candice Ji, Polina Stepanova
Research & Design: 25%, Drawings: 25%
Architecture Design: Individual

The Postsports Park Site sits in the inner area of the district of Hernals (17th district) of Vienna. This very large, terraced area includes athletic fields, parks, housing and an elementary school. The center of the site has been leased for almost 100 years by a Viennese sports organization that is looking to revitalize its facilities and to make them more welcoming and usable. This part of the site has several full-size soccer fields, tennis courts and other sports facilities.

If we take a look at the plan-view of our site, we can see that about 70% of the site area is occupied by sports field & facilities, including tennis, running track and hockey – almost all of these are high-impact sports requiring repeated impacts or collisions with a hard surface or object, that place a significant amount of stress on the body’s joints and bones.

From north to south, the elevation change of our site is 21 meters/70 feet which is a rough equivalent to 120 steps... this steep slope is noticeable for anyone trying to go through our postsportsplatz. With this in mind, we recognize that for a resident who needs to go through our site to access those amenities, they will have to climb an equivalent of 6 floors, which is already inaccessible to begin with. The physical barrier of the site with its edge condition and typography presents an opportunity for us to leverage these conditions and make improvements.
Site Design

We identified similar patterns between the precedent building Alterna and our site, which are the mismatch from the city fabric, barriers to neighborhood, encased communal spaces and facilities, and strong emphasis on athleticism and vitality. To disable these features, we identified key words as design values. **We first integrated the four corners back to the surrounding city fabric by adding extensions to the existing buildings on site.** For the remaining open space, it became an open axis in the city hosting a diverse range of activities. We are keeping part of the professional sports courts on the site, and to reduce the strong emphasis on athleticism, we are **repurposing some of the sports fields into spaces promoting other types of activities, welcoming a more diverse group of users.** People using the site are no longer just those actively running and jumping, but also those playing, walking slowly to enjoy the park and changes of tactile on the ground, or sitting down at the center plaza to watch others.
Bath House

One of the largest steep slopes on the site is under the soccer field in the centre of the site, and I have designed this part of the building in depth to demonstrate the possibilities of the excavation strategy. The new buildings are essentially situated on the steep slope between the playing fields while the largest plaza replaces what was once a professional soccer field. In contrast to the existing overly intense sporting atmosphere of the site. The main function of the design is a very static bathing area so that the site is now arranged from the outside to the inside forming a spatial structure of forest, sports fields and public bath house.
Four Courtyards

At the same time the site takes on the role of linking the east-west and north-south directions of the site. So I've chosen to design different courtyards to accommodate the inward use of the baths and the public circulation. The first courtyard is called a court of water which is surrounded by the related spaces of the baths in a fragmented manner. Its most distinctive feature being the continuous arcade, which forms the facade of the square. It is a space rich in visual communication. The baths and courtyard under the soccer field quietly transformed the exclusivity of the professional sports fields in the underground space.
Way to the Cave
Anthropocene Museum 5.0

ADVANCED ARCH DESIGN STUDIO / GSAPP / Summer 2022
Instructor: Kabage Karanja & Stella Mutegi
Location: Central Park, New York, USA
Research In Collaboration with Sixue Long, Mengyuan Wang, Huifeng Zhang, Margy Bozigevich
Guideline Design: Individual

The designer regards Manhattan as a museum of discomfort and envisions three galleries. The first gallery is called “comfort”, where the designer perceives the modern city as a modern cave of comfort, while modern architecture takes the human body as the protagonist and wraps people’s bodies with the spatial design logic of modular man, which aims to create comfort, but in the process, comfort conceals many problems. To challenge this spatial logic, the second gallery “found danse” depicts the spatial potential of ramble in Central Park, referencing the interaction between Lenape people and nature, ramble is considered as the foyer where the dancing activities take place and people become intimate with the site and each other. The third gallery is called “position yourself”, for this part, the designers developed a guide to the site. Derived from his own experience in the site, by depicting a series of spaces in the ramble cave, he propose the best way to experience the site and an entrance path that is completely natural and allows for barely entry. If the tour is guided, visitors can learn to position themselves on the site, in this way discomfort opens up more spatial and experiential possibilities.
Mapping Processes

20,000 Years Ago

1780s

“Contraction”

1850s

Seneca Village

Central Park & Grids

1900s

The Skyline

21th Century

Measure the “Obstacles”

There is little uncertainty about the success of these measurements; they are at least sufficient for most situations.

"The result, of course, is a ubiquitous and standardized built environment, one that looks the same in New York as it does in Anchorage or Albuquerque. The experience and challenge of spatial discovery are consequently impoverished, with differences blended into the lowest common denominator and finally eradicated. Every place, regardless of special characteristics, begins to look and feel alike—neutral, flat, and bland."

James Corner - "Taking Measures Across the American Landscape"
A Modern Comfort Care

“What’s not visible here or even deeper down?”

“Discomfort”
Discomfort

On a smaller scale, we can see how modern architecture creates a comfortable environment. This is my dormitory on 111th Street, the heating ducts, the delicate furniture, the lighted windows are all designed to follow the human scale, these comforts limit our possibilities, we gradually can only make specific postures and movements to cater to them, we sit we lie down, we stand at the bar. What problems does this bring? As shown in the modular man illustration, there is only one diagram of the human body and figures, and there is no doubt that we have overlooked too many things. To conclude, the Manhattan showroom demonstrates the potential problems of comfort.
1 Rock Steps
The muddy ground, the wet rock walls, the space where you cannot straighten your upper body, and the branches hanging over your head to block your view, together constituted an uncomfortable experience, but this brief discomfort was not annoying...
3 “Opera Theater”
After the cave is closed, the huge rocks become the center of gravity of the space and the fallen trees form as natural scenery suspending the light and water. The audience needs to climb up the rock walls or watch the show under the trees.

2 Dancing Path

Tribes of native Americans would dance and sing in the woods. They considered the dancers as the messengers to the gods through dance. The dancers often wore headdresses or masks, and their movements were coordinated as an indistinguishable experience. But this brief dance could not destroy...

1 Rock Steps
The muddy ground, the wet rock walls, the space where trees cannot grow. Your taper body and the branches...