STUDIO WORK

- SEPULVEDA DAM ART AND AGRICULTURE
  SPRING 2022

- SEISMIC FIELD
  FALL 2021

- WATER AFTER OIL
  SUMMER 2021

ELECTIVES

- SOLAR FOLIES- OPTIMIZATION
  GENERATIVE DESIGN
  FALL 2021

- UNDERWORLD
  ULTRAREAL
Sepulveda flood basin is a 2400 acre flood control basin located in San Fernando Valley that currently consists of a series of programs, recreational areas, a water reclamation plant and wildlife reserve. Sepulveda Dam is the threshold that is located at the lowest point of the basin that controls the water level and protects surroundings during a flood, but due to its operational purpose and flooding risk, the surrounding of the dam is left as vacant spaces. This proposal aims to bring an opportunity for residents and visitors to occupy this area. The program includes transitional housing program, art center and agriculture center on the embankment next to Sepulveda Dam spillway.
Master Plan of Sepulveda Flood Control Basin Proposal with 100 year flood level indicated
Collaborative drawing between all studio members

Detail Plan
The surrounding ground near the building is transformed into level agriculture field

Art Gallery Level
Agriculture Administrative Level
Agriculture Planting Level
Short Section
The narrow width of the building allows visual access to the dam area and wildlife reservation

Circulation Diagram
The Agriculture Center located on the lower level has ramp access to maximize access when carrying seeds and product
Earthquakes as a catastrophic event are defined by human perception. When every step we make is causing the Earth to vibrate.

Seismic field will utilize the motion of people as a new way to generate energy and to experience earthquakes. Kinetic floors and motion sensitive membranes are placed throughout the island to enhance visitor’s perception of earth not as an element but also as a part of the dynamic structure of the island. With visitors entering the island, the static ground plane will be activated and form an interactive experience that will enhance the perception of earth and earthquake.
Seismic Field consists of three notions, the above water field that represents the creation aspect of earth, a field where motion and energies are created. The below water field that recollects the destruction of past earthquakes, and the battery tower that harvest and store the energy.

The most motion intensive programs such as gathering space and motion experience arena are within in the inner circle, and the motionless activities are at the outskirts of the island.

Programs arrangement is inspired by the concentric form of seismic waves of earthquake. Battery exhibition which is the energy core is at the center, simulating epicenter of earthquake.

Level 2 is the Earthquake Museum level that consists the motion experience caves and AR/VR rooms.

Level 3 is the Earthquake education level for rescue simulations and precaution training.

Recreational area consists a large scale gathering hall for public use, exterior walkway and administrative area.

Above water Level

Below water Level

Interior of Battery Tower with battery storage spaces
With movement of visitors, energy will be created and transported to battery tower.
The orange area shown in the axon are paved with kinetic flooring to maximize energy harvested, including circulation and museum and gathering programs within the island.

Earth is not only seen as building material in this island, it’s also a living element that moves according to the activities of people. Spatial configuration that floors and ceilings are together lead people to experience a more fluent and flexible way of visiting, which means earth plays multiple roles of guidance, structure and support.

The island let people become the main body of the earthquake—the motion of earth. They are not only led to experience the motion, but also encouraged to produce motion, and then, energy. People are more close to the earth element in this island than anywhere in NYC.
Crude oil, as one of the most dominating extraction industries in the world, exploits tremendous amount of water daily for the extraction and production process. By exploring the intricate water cycle behind the crude oil extraction taskscape, this proposal is trying to visualize the invisible relationship between water and oil in order to evoke awareness of the current water crisis.

Before oil extraction, a process called hydraulic fracturing that extend the lifespan and flow rate of oil wells takes place for each well. This process contaminates the underground water reservoirs and transforms the surrounding lifes and landscape. By analyzing existing data and focusing on the water cycle impacts caused by the hydraulic fracturing process at multiple scales, our approach and evoke awareness of this water crisis.
The map has an underlay of general mineral resources around the world, with colored dots representing top 3 countries with most reserves corresponding to each element. There is an accumulation of mineral resources in countries that have more complex geological compositions. The flow lines are following trading routes of the top 3 producing countries to top 3 importing countries for each element. The map suggests that the distribution of extracted materials is highly dependent on the producing countries and the shipping industry.

Most extraction methods involve excavating the earth surface, blasting and alternating the original landscape. The extracted ore, liquid or gas is then refined through various methods until it reaches the purity required for production. The refining process of resources often takes place in large scale factories off site and involves input from many professions and companies. For mineral and metal extraction, open pit mining is the most common and conventional. For oil and natural gas, wells are drilled a few thousand feet deep underground to reach oil and gas shale formed millions of years ago.
The highlighted dots each represent an oil well; there are three urban areas that depend on this water source within the range, Bigwell City, Dilly and Cotulla. Each dotted circle is a simulation of possible contamination to the water source from the oil well taskscape in the area.

We approached this invisible relationship of water after oil by putting these invisible contamination that occurs underground into a more visible form that highlights the consequence of each oil well.
Front Elevation
1. Inflatable Balloon: Suspension Force
2. Wind Turbine: Water Flow Acceleration
3. Informative Sensor: Data Dissemination
4. Water Tank: Water Collection
5. Suspended Cable: Ground Attraction
6. Water Pipe: Water Transportation
7. Oil Well: Fracking Liquid Injection

Inflatable Balloon
* keep the whole device suspend

Lighting Fixture
* indicate rainwater quality
* automatically change from blue to red

Wind Turbine
* launched by wind force
* accelerate speed of water collection

Condensation Unit
* collect water from air

Ceramic Filter
* purify collected water

Water Container
* support purifying process
* buffer for flow velocity of water

Elastic Water Pipe
* transport purified water to water tank

Suspension Wire
* attach the whole device to the ground
* detect wind power and adjust length

Informative Sensor
* record contamination data
* send data to satellite
* share data with mobile application

Water Tank
* collect purified water
* descend the whole device to ground
* inject purified water to underground

Suspension Wire
* attach the whole device to the ground
* detect wind power and adjust length

Post Restraint Plate
* fix suspension wire

Water Tank Supportor

Elastic Water Pipe
* transport purified water to aquifer

Oil Well

Moist = Air Condensed Water
Moist + Wind = Quick Air Condensed Water
Rain = Rain Water Collection
Rain + Wind = Quick Rain Water Collection
“Central Park Solar Folies” is a design proposal to suggest a possibility to make better use of the abundant sunlight that shines on Central Park. More specifically, we are introducing a multi-layer system of single column supported solar panels in the meadows located in Central Park. Great Hill, one of the highest points located at the northwest corner of the park, is selected as the site for this study.

Fall 2021
Location: Pier 84 at Hudson River
Type: Artificial Island
Instructor: Bernard Tschumi, Valeria Paez Cala
Collaborate work with Zihan Sun, Enfeng Xie, Haozhen Yang
Environmental Elements
- Sunlight data of New York City
- The height, size, and location of trees

Manual Inputs
- Height of solar panels
- Radius of 3 types of solar panels

GH Parameters
- Coordinates of center of solar panels
- Rotation angle of each solar panel

Model Generation Process
1. Sunlight analysis of site
2. Divide the site into different areas according to the sunlight hours
3. Center point collision & packing
   - Colliding when they are intersecting
   - Packing when they are far away
4. Distribute center points of 3 types of panels in different areas
5. Generate 3 types of panels and columns

Objectives
- Sunlight Hours for Solar Panels

Constraints
- Cull panels intersected with trees
- Cull panels overlapping with other panels

Explore
- Design generation
- Scale: Optimal, Selected

Design 428
Fall 2021
Type: Electives
Instructor: Phillip Crupi, Joe Brennan
Collaborate work with Zihan Sun