This project for a winery in Baja, Mexico investigates two forms of excavation as a method of construction that is designed to balance cut and fill of the land. This project researches and uses the work flows of available mechanical digger equipment and explores how a banal construction technique, such as excavation, might become architecture and infrastructure. The project uses the digger, site cast concrete and primary on-site rocks and earth mass to create a winery and fog harvesting system that engages the experiences of the earth and air.

The winery is positioned to both embrace the site as a secluded native landscape and to harvest ground water run-off. Fog that blows in from the west wind is collected water for winemaking and the COLEF center.

We researched and have developed a new and replicable method of cast and excavation earth construction that utilizes a typical small road excavator, a common piece of equipment in Ensenada. Our excavation construction system is designed as a balanced system of out of fill. Earth that is excavated and dug out to create the winery, is relocated on site to form a set of sloped berms that support the fog catching mesh.
Canopy Plan derived from the excavation path and tangent circle geometry. Vertical Fog Catcher wrap along the path, while horizontal canopies are hung by cables ties on the berms. Concept structure model shows how the tangent circle layout work structurally for fog catcher.
Programs are organized along the road of compacted dirt for digger. Each program has one side open to the outside and another side contacting with earth. The roof of the lower programs become the outside terraces for upper programs.

**Excavation Depth, Program, Temperature**

The earth acts as a thermal mass, "flattening out" both daily and annual temperature fluctuations. The deeper into the ground, the greater the thermal stability. A 2m deep excavation, result in 15-20 degree, is suitable for 1st fermentation and pressing. A 4m deep excavation, result in 9-13 degree, is suitable for 2nd fermentation and In-Barrel Aging. Earth Tubes are used to bring earth temperature up. Fermentation tanks are placed on each of them.

Fog Catcher are decritized and fold over to create shedded space on the top of the rock cast pieces. They act as outdoor patio space.
The water harvested by the fog catcher go along the gutter, and gathered eventually into the central reservoir. Several small pools were designed along the path to both meet the requirement of the maximum travel distance of harvested water before evaporation and the need to create a lively atmosphere. Besides the typical winery usage, the water also participate in the radiant heating and cooling system of the building and by exposing, increase the humidity in program needed such as aging space. Besides all the practical and environmental usage, the water is also one of the key element that composed of the spatial experience of this winery. It elevate this water harvesting infrastructure into a spiritual oasis in the Baja desert.
This project constructs relationships between two contrasting materialities, earth and fog. The site leaves traces of these on the building itself, concentrating the essential experience of the terroir. Excavation and fog catcher are elevated beyond conventional applications to influence building form, materiality, and performance. Borrowed earth becomes the formwork for rugged earth masonry structures. Berms created from displaced earth structurally support the suspended fog catcher system. Each system requires only a simple, transportable set of tools.
This pavilion is named in Chinese "Qing Xing Ting", which is taken from a famous local poet Yang Jiong’s poetry: “Several bamboo, densely forest-like. Half-room in the shadow, and a nice afternoon looking out of window.” This project is located at the north entrance of Yingchuan Village, facing the pond, backed by orange trees field, above the existing sewage treatment equipment. We hope to design a place that can provide shading for villagers in the hot weather, and be used for citrus sales during the winter season. In order to frame the view towards the pond across the site and to avoid putting extra structural load on sewage treatment equipment underneath, we used bamboo and fiberglass as the main building material to design a long span structure of up to 20 meters. Based on the dimensions of bamboo, and the material characteristics of being subjected to bending and tension, we use it as cables with a certain stiffness, and give different adjacent structures with different structural depths. In between the upper cord and lower cord, bamboo rods are randomly placed to add rigidity to the roof system. The high tensile strength of fiberglass allow us to pre-stress the roof structure, further increasing structural stability. Meanwhile, the excellent weatherability of fiberglass protects the perishable bamboo structure. The twisted bamboo surface on both sides of the building is the main support structure, with the restroom and storage room hidden behind.
The design takes advantage of the layout of existing facilities to define space. The electric box protruding from the ground is incorporated into the new sink design, dividing the space, organizing the circulation and echoing the lowest point of the roof. Flip cover bamboo chairs are designed above the sewage wells that protrude from the ground, and a seating area facing the pond is formed by the treatment of ground height.

Irregular bamboo struts are placed randomly in between the upper cord and lower cord with all directions, adding rigidity to the roof structure. The irregularity of bamboo as a natural material is not avoided as typical modern construction but celebrated in the arrangement of the bamboo struts. Thus, the design gains its contemporary meaning.
The 22-meter pavilion frames the view, just like a traditional Chinese landscape painting unrolled in front of you.
At night, the lights hidden in the foundation and on the upper side of the tension cables lighten up the structure. The pavilion becomes an icon of Yingchuan Village.
Studies of bamboo details and joints. The final 1:1 mockup includes a simplified version of the tilted bamboo wall and joins which enables the tension member (here the plastic membrane) smoothly turn its corner and bring down the tension.
Detail Footing Design

Experiment on construction sequence and angle finding on footing for tilted wall, using PVC pipe to simulate steel pipe.
Final 1:1 structure mockup on-site, built one-third of the design depth, using plastic fabric as the tension member to simulate fiberglass.
Roof typology, here is the dome, is used and manipulated in our design. Historically speaking, the dome was an intensely hierarchical and centrally form. Unlike other traditional roof typologies, such as pitched roofs or flat roofs, which usually have uniformed space underneath, or barrel vaults, which create linear space, domes typically create centralized and static space, forcing people to look up and create a sense of monumentality through both people’s reaction and the scale of the structure. It usually symbolizes serenity and power, seen on churches or palaces. Architecturally speaking, it was used as a shape making tool in the sense that the form of the structure is exactly how people sense the interior space. Due to its unique formal quality and standing in architecture history, the dome has become a symbol of classical order and rarely appears in modern or contemporary architecture.

What if we reconsider archetypes, here specifically roof, be treated as purely form cleansed of its associative surplus (function, context, iconographic definition), which offers the opportunity for its transformation. Here we ask, What are the qualities of architecture in perpetuity? Can we associate architectural flexibility as a typological problem of elongated permanence rather than ephemerality? Can the typology be redefined here with the counterintuitive proposition, that “type” is indeed dynamic, fluid, and evolving entities?

Our design proposal can be considered a response to these questions in its specific context. A grid was generated from the surrounding urban fabric while being rotated to challenge the grid and strength the boundary condition.

Artists’ oddness were expressed through the rotating grid, which challenges the banal normative grid around. The concept of living is deconstructed and represented diagrammatically in our project. The social space is extracted from each living unit and becomes a common living room on the third floor while leaving the private bedrooms and bathrooms in each separate unit (which are accessed by separate stairs for each one of them). Here, the dome is the main instigator of the project, but it is freed from its original function, context, and iconographic definition. Different from the monumental scale, centrally, serenity classical model of the dome, here the dome act as human scale, vernacular, scattered individual living units. The mixed play between the traditional and contemporary use of dome gives the dome all the possibilities to be associated with architecture history and context, while also setting it free as a typology from any of these. Its how we use architecture history to create something new, conceive flexibility as a typological enigma, or to say, achieve spectacular through vernacular.
The design reaches complexity and contradiction through playing with classical architecture language and typology. For example, all the units are similar, while cropped by the site boundary, different profiles were shown. The sectional quality is also expressed through the elevation, which blurs the boundary between these two. All the archetypes used in this building are symmetry, while due to the rotation and the asymmetry of the site, it gives a sense of unbalanced while appear ordered at first. The design incorporates a relentless grid as a background, while none of the design moves are either modernists or classicists.

Each individual unit is composed of a dome as a shape making tool on the top, a dome as a space-making tool inserted as a void, and arches supporting beneath as structure tool. Some units were connected to form a larger space while other in-between spaces become skylights penetrating through the building. Because of the changing of poche figure with each unit, four different spatial types were stacked within a single building. Thus, the idea of flexibility was investigated based on the overlay of the relentless rotated grid and the variation of certain plan typologies through different manipulation of the dome as archetypes.
Plan changes from a open plan, to a multiple corridor plan, to a multiple room plan, to individual room plan.
The building is designed as a collection of individual masses aggregated serially through the grid, while trimmed by the site boundary, creating openings and showing the section condition even on the elevation. The relationship between artist and visitors are also expressed. The juxtaposition of gallery and studio space re-conceptualizes on how art is consumed and experienced. Those inverted arches allow visual connection without physical access. Gallery becomes a theater and studio space becomes a stage, where artists work as actors, fluctuate and advertise their artworks through displaying their working process and making up beautiful stories. Here again, the flexibility of the floor plan enables the studio space also be able to turn into gallery space when there is a larger exhibition.
The site is located in an abandoned quarry in Rockridge, Oakland, and I intend to explore a poetic alternative to the current careless abandonment of quarries in Oakland. The project incorporates a Planetarium and a Geological Exploratorium and captures Genius loci, celebrating the timeless quality of the stone, sky and water, while relinks surrounding urban fabric that are currently disconnected.
**Diagrams**

The series diagrams show the relationship between the project and the site, the way programs are organized, the conceptual thinking behind the project and how the exhibits are perceived by visitors.

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**Conceptual Collage**

These Collage with the photographs of the Bilger quarry and the artificial stone exercise provided conceptual foundation for the project.

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**Attitude**

This project is not trying to flaunt its form, propagandize its content or nest over the site. It accepts the constructed nature, transform the force of nature into architecture language, and it humbly submerges its monumentality underneath the water, only giving a few hints by the popping out skylights. It quietly waits underneath the surface like a silent stone, for the visitors to come through the cycle and explore the deep sensation in the heart intrigued by the light and space and the timelessness of the content.
Site Analysis

The series of 4 maps of the assigned site in relation to larger Oakland study conditions including existing connections (bridges and tunnels), crustal movement, regional hydrology and star orbiting. These studies transform directly or indirectly into the museum project: The outside walkway connects surrounding city fabrics as a bridge, featured in Bay area; The skylights shoot through the roof into the light and become a waving landscape coming in and out of the water, resembling Oakland’s topographical condition; People can experience the water from different layers, from top looking down, from the gallery on the same level, inside lagoon and touch the water and underneath the water in the stone museum; The project’s three layers of rings in plan resembles the orbiting of the planets, echoing the theme of timelessness.

Site Plan

The project site is at the intersection between the Oakland hills and the flats, College and Piedmont shopping areas, and below the Oakland and Saint Mary’s Catholic Cemetery, the Country club and CDA but there is a little if any connection between these areas. The walkway outside the museum establishes a connection between these isolated fabrics, forms a plaza with the existing shopping center while also acts as a buffer zone, offering a smooth transition between the hustle-bustle of Safeway and the Earth Observatory and Planetarium, between the artificial and nature. The circular shape of the inside circular gallery helps directing attention to the lagoon.
The project’s primary geometry in plan resembles the orbiting of the planets and the order of the universe, echoing the theme of timelessness. In section, the geometry is deconstructed to fit the local geological condition and celebrate the fact of the transient of the building itself.
Illuminated, or illuminates. Walking through the different layers of the museum, people can visit the Stone Exploratorium while enjoying the rich scenic environment the lagoon provides, sense the change of both space and time.

One is brought to awareness regarding the reality of water—it is an active part of the architecture. Rising and Falling between seasons, showing or hiding the museum, the water intrigue people’s sense of time.
This is a blunt architecture. This project is a stack of steel frames containing each program of YMCA. The geometry of the structure also has a graphical quality and acts like a billboard. In that sense, this building is a blunt representation of what the YMCA is, from function to branding. It resonates with Coney Island’s Populism and superficiality. The compact, stacked structure at the center of the site continued the developing pattern of the surrounding neighborhood — usually a tall structure within an open field. The stack maintains a large open field, also connecting to surrounding grassland — instead of using a typical two-level community building to spread over it — would also allow a park around the Y, insulating its occupants from grit and noise while enhancing the community. The stack also enables most of the programs to enjoy a seascape. The stack in the open field makes its own presence and establish the image of Y.
Ornamental Structure

The steel frame is a typical structure typology that’s best for its efficiency, and the architectural stack may seem like a conventional building process, but here each layer of the structure is acting as its own entity. By stacking these functionalist modernism structure and achieving an figural form, and articulate each of them with bright color, the structure echos the Coney Island’s past history of ornamental structure and remind people of the fantasy.
OLOID

MIT 2018
4.150 Geometric Disciplines
Instructor: Jeremy Jih

This geometry is the result of two interlocking Mobius ring generated from two interlocking circles. The interest is not only on the self-enclosed form of the geometry but also the challenge to give Mobius Ring a thickness in order to fabricate.

Geometry Model: Powder Print + Plastic String
The previous geometry is further discretized to build a techtonic model. The fins get their direction through the normal of the mobius surface, thus creating a rotating pattern. The inside and outside of the fins are colored differently to help the reading of the changing of the surface direction of the original geometry. The inner acrylic disk imply the two interlocking circle on which the whole geometry is developed.
Interior space has swallowed the earth. Some call it the endless interior. Others question the contemporaneity of this condition and claim that it has always been about the interior, and that we simply did not know it. After all, they say, what we call territory is nothing more than a kind of planetary interior. Thinking of the giant air-conditioned interiors of assembly plants, warehouses, self-storage buildings, flower markets, convention centers, distribution centers, and office buildings, there is more to these interiors beyond their immense scale and ubiquity, however.

First, consider their specific architectural manifestation of accumulation. As containers of an exponentially growing multiplication of cabinet of curiosities, they are contemporary monuments of constant collecting, accumulating and trashing of “stuff,” simply all that is junk of the junk-space. Second, despite the piles of material that they contain—from architectural elements, to material specification, to the various scales of objects—their exterior is almost always blank.

Flatbed Junk is a very large building that treats the satellite image view of the roof as a territorial relief canvas. Its flat reading is fake as it mischievously hides its architectural content. All that junk reads mute when it is flat.
All that junks reads mute when it is flat
As Built - As Lived is a sampling of models within a model. The project piles together six models, each of which presenting the close-up view of an eccentric as-found detail located in the area spreading onto the Boro Park, the Kensington, the Ocean Parkway, and the Midwood neighborhoods in Brooklyn. While the grouping of these details is accumulative, non-hierarchical and flattened in terms of scale and category, their presentation is dead-pan in articulation. Similar to as-built drawings that reveal all changes made to the specifications and working drawings during or after construction, each of the six details is presented with its full articulation either as a three dimensional replica or a two dimensional projection of the detail’s perspective view as a relief model. These details are surrounded by several out-of-scale entourage objects that each depict diverse everyday activities in the city: a giant sweeper leaning onto a wall, an over-scaled abandoned bike on the street, barricades for construction, irregularly placed garbage cans right after another weekly trash collection or an overturned plastic bottle case after a weekend barbeque party, etc. Presented as—the seemingly ordinary but—the real participants of the collective image of New York, both the details (as built) and the entourage (as lived) gain a new meaning when assembled together as a possible souvenir for the city. In this way, As Built – As Lived is an invitation to consider the city as a pile of material accumulation and a set of incongruous subtlety.
Located between 7th and 12th Streets along Independence Avenue SW on the National Mall, the site includes the Smithsonian Institution Building (known as the Castle), the Arts and Industries Building, the Freer Gallery, the Hirshhorn Museum and Sculpture Garden, and the largely underground Quadrangle Building, which is home to the National Museum of African Art, the Sackler Gallery of Art and the S. Dillon Ripley Center.

BiG’s Master Plan will expand the Visitor Center and add a new Education Space beneath the garden, with access provided by peeling the edges of the landscape up. These design moves will also create clear connections between spaces and allow natural light to reach subterranean spaces. The plan will also reconfigure the entrance pavilions of the African Art Museum and the Sackler Gallery to increase their visibility. Other changes include updating mechanical systems and adding structural reinforcements to the Castle to protect against seismic activity.
Jefferson Drive to the north. The campus (the Hirshhorn Museum Sculpture Garden and its flanking tree panels) extends beyond Independence Avenue, S.W., to the south; and Jefferson Drive, S.W. to the north. A portion of the boundaries are predominately defined by Twelfth and Seventh Streets, S.W., to the west and east; approximately twelve acres of land along the southern half of the national mall. The site’s major South Mall Campus:

- Poor access to expanded Castle Visitor Center
- Garden too park-like
- Removal of 3 Quad anomalies
- Repair Quad roof
- Seismic Castle protection
- Repair atrium
- Repair South Mall connection
- Repairs to historic buildings
- Visitor Center connects East West Paths
- Daylight into the Castle
- Expanded Skylights bring Fore Court to the Castle

Cons
- Extents of excavation under Castle
- Garden too park-like
- Removal of 3 Quad anomalies
- Repair Quad roof
- Seismic Castle protection
- Repair atrium
- Repair South Mall connection
- Repairs to historic buildings
- Visitor Center connects East West Paths
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+ Hirshhorn Museum tunnel and garden walls restored
+ Accessible Freer Entrance
+ Repair Quad roof
+ Seismic Castle protection
+ Repair atrium
+ Repair South Mall connection
+ Repairs to historic buildings
+ Visitor Center connects East West Paths
+ Daylight into the Castle
+ Expanded Skylights bring Fore Court to the Castle

Historically Designated Places:
- The Castle
- Hirshhorn Museum
- Freer Gallery
- The Quadrangle
- The Hirshhorn Museum Sculpture Garden
- Jefferson Drive Tunnel
- South Mall Center Line
- Independence Avenue
- 9th Street Tunnel
- 12th Street

As the oldest and most iconic building on the National Mall, the Castle should remain prominent and clearly visible to visitors arriving from all directions. Its presence on Independence Avenue will also become important as the SW Eco-district continues to develop in the future.

Views to historical buildings on the campus will be maintained, restored, and improved to be clearly visible to visitors arriving from all directions. The entirety of the campus is located within the National Mall Historic District which is listed in the National Register of Historic Places. The historic buildings on the campus are currently individually listed in the National Register of Historic Places or have become important as the SW Eco-district continues to develop in the future.
New visitor center can galleries accommodate the program currently occupying the castle; gift shop, restrooms, visitor information, cafe.