Columbia GSAPP portfolio

HOLLY BAKER

Master of Architecture
2022-2025

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statement

A deep understanding of digital relations and reciprocal infrastructures guide the body of work presented in this portfolio. These overlapping interests culminated in my Advanced VI studio as part of "Data Mourning" which set out with a three-fold ambition: To expose erased histories, design for community repair, and provide space for stewardship and resistance. From transforming a Manhattan waterway into neighborhood laundromat to proposing pavilions for people targeted by Facial Recognition Technology, my first year at GSAPP facilitated a range of studio explorations. My second year gave me the opportunity to strengthen my ability to synthesize research into design and develop a strong interest in discourse around technology through both my design and elective seminars. My time at GSAPP has clarified a strong ambition to write, research and design as a form of a combined practice with an ever exciting feedback loop. Special thanks go to all my collaborators listed in the following works, without whom dialogues and discourses would not have travelled this far.
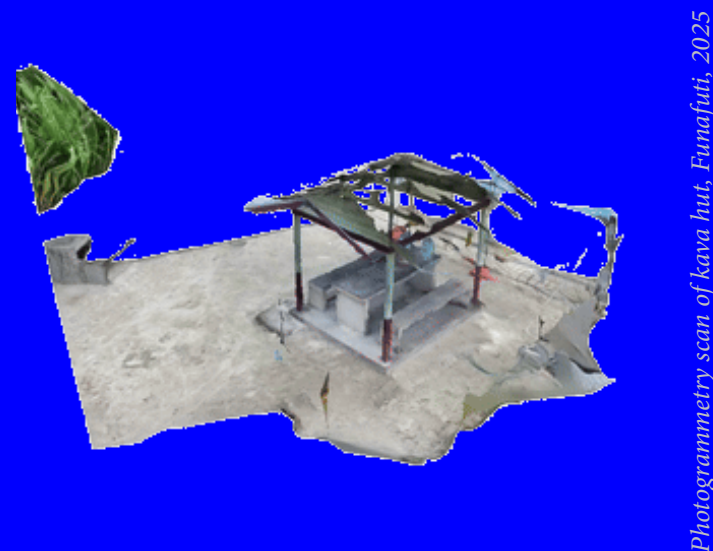
servers
sensors
ships

Advanced VI studio
Marina Otero Verzier + Dan Miller
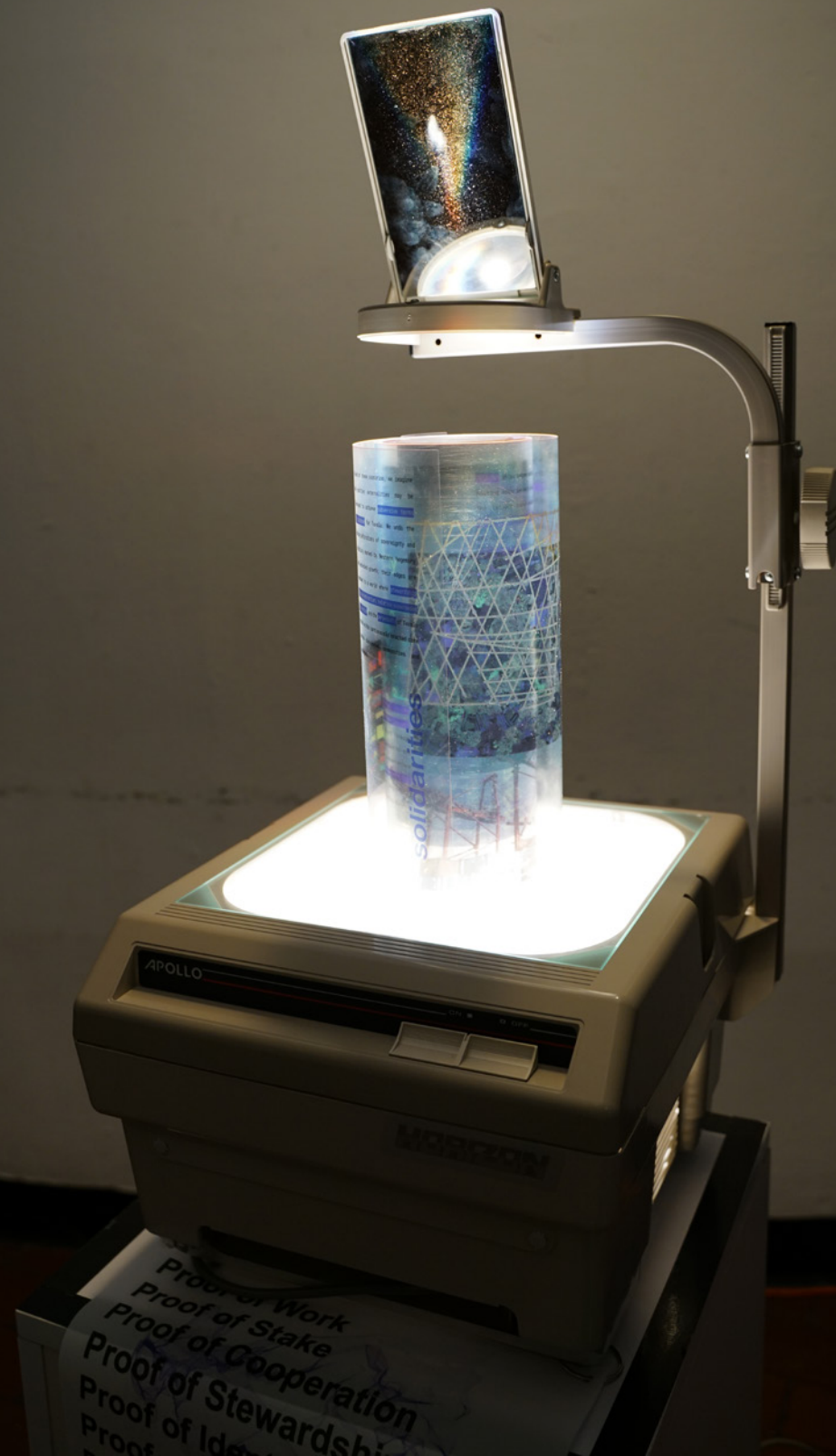**Collaboration with Andre Barros + Vickie Jiang**
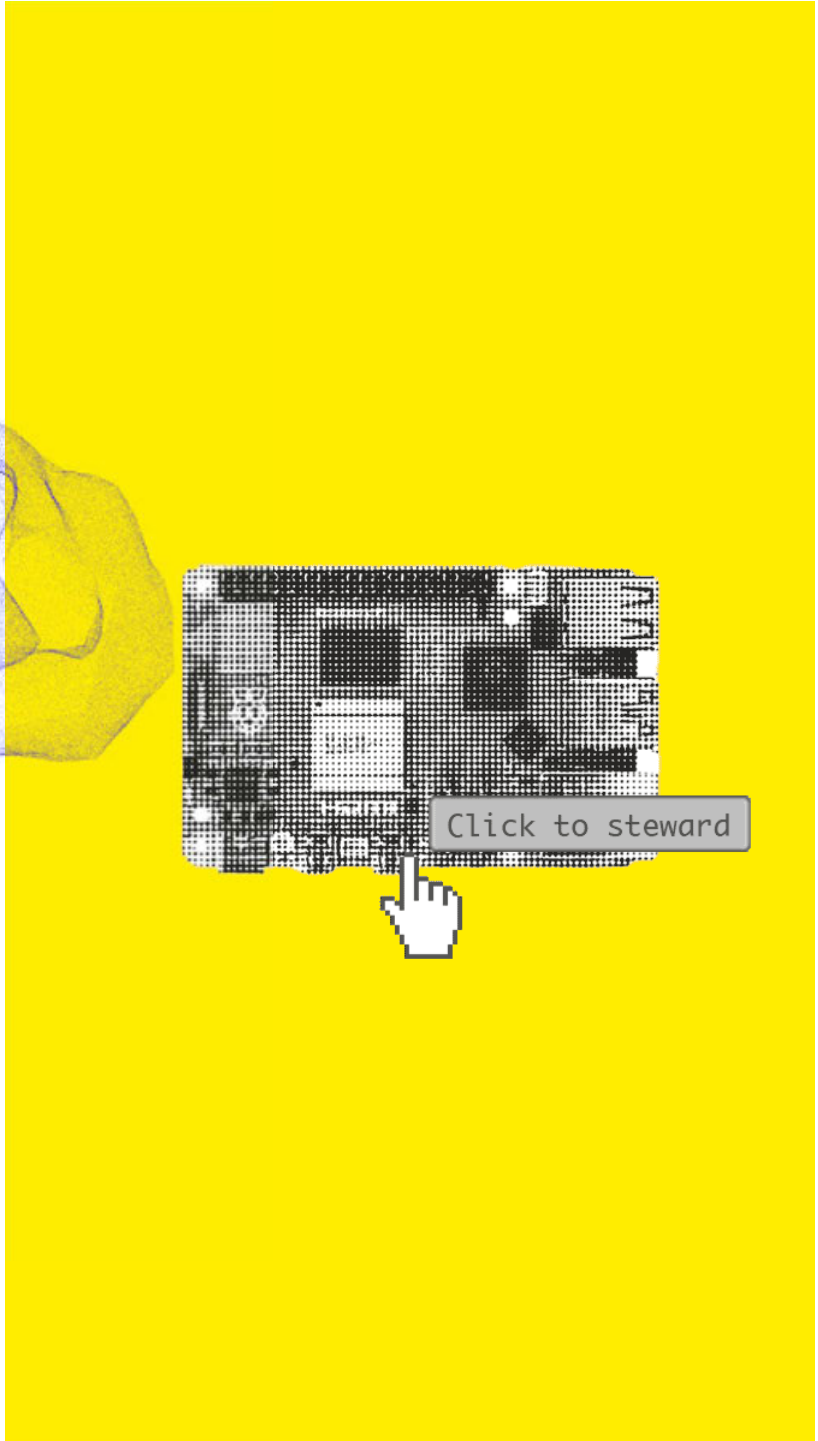**Tuvalu, South Pacific**
Spring 2025

In 2022, Tuvalu proposed their intent to formally transition into a digital nation. While the country is predicted to be fully submerged by sea level rise within the next fifty years, it faces another threat –digital colonialism– where tech giants like Meta and Bitcoin Satoshi Vision have already approached the government to aid their transition to digital governance. To resist alignment with corporations that actively contribute to the demise of Tuvalu's physical future, while embracing technology's potential to preserve culture, Tuvalu needs a technological and ecological institution rooted in its values. We propose organizing bioregional stewardship through a Decentralized Autonomous Organization (DAO) that centers Tuvaluan values and recognizes the vital role of non-humans in the continuation of the region.

The architecture of our proposal takes the form of kava huts: a pre-existing infrastructure interspersed across Funafuti. At the moment, these huts are shaded spaces for rest, drinking kava, sacred practices, and community discussions. We propose the huts act as physical portals to access the DAO; an interface where people on Tuvalu can participate in decision-making and collectively form "rituals" to vote off-chain. A solar host would participate and upload decisions, at the pace of sunshine, not reliant on diesel as fuel like the majority of the islands. The DAO comprises three instruments– servers, sensors, and ships–which constitute a web-like worlding generating agency to respond to instability for both humans and non-humans.

Photogrammetry scan of kava hut, Funafuti, 2025

VI   V   IV   III   II   I

solidarities

Proof of Work
Proof of Stake
Proof of Cooperation
Proof of Stewardship
Proof of Identity

gathering

Proof of Cooperation
Proof of Stewardship
Proof of Identity
Proof of Connection
Proof of Friendship
Proof of Love
Proof of Consensus
Proof of Repair
Proof of Accumulation
Proof of Change
Proof of Care
Proof of Conflict
Proof of Extraction
Proof of Replenishment
Proof of Growth
Proof of Devotion
Proof of Empathy
Proof of Submergence
Proof of Fatigue
Proof of Regeneration
Proof of Silence
Proof of Salinization
Proof of Bleaching
Proof of Saturation
Proof of Turbidity
Proof of Obliteration
Proof of Depletion
Proof of Migration
Proof of Erosion
Proof of Reclamation
Proof of Resistance
Proof of Scarcity
Proof of Dispersal
Proof of Balance
Proof of Interdependence
Proof of Abundance
Patience

Distributed Flows
& Oceanic Networks

What kinds of infrastructures and institutions can persist when land and sovereignty are unstable?

Click to steward
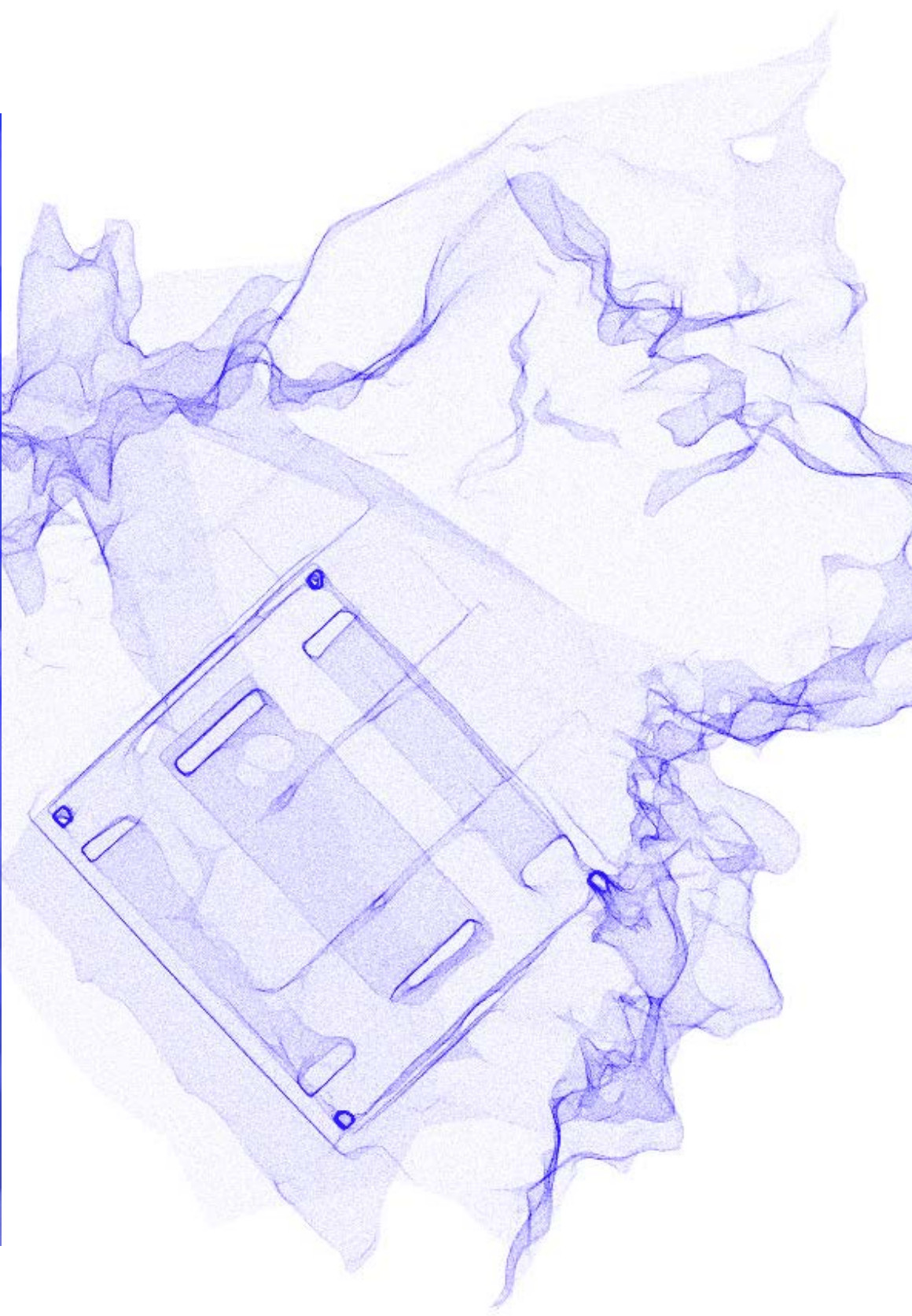
By aligning digital and ecological sovereignty, a communal interface could challenge extractive economies and ensure that Tuvalu's virtual and physical futures remain interconnected and self-determined

An example of scalar sensing was evidenced through the "Foram Sand Project": a collaboration between a group of scientists from the University of Tokyo and the Department of Environment in Tuvalu between 2009 to 2014. Their research revealed a delicate but fundamental reciprocity: if coral reefs and tiny forams — single-celled organisms whose shells contribute to two thirds of Tuvalu's beaches — remain healthy, then the slow, patient work of natural sand formation would keep up with rising sea levels. The atoll becomes a living breakwater, and the foram a sensor in itself, accumulating through their own ecological vitality.

sensing
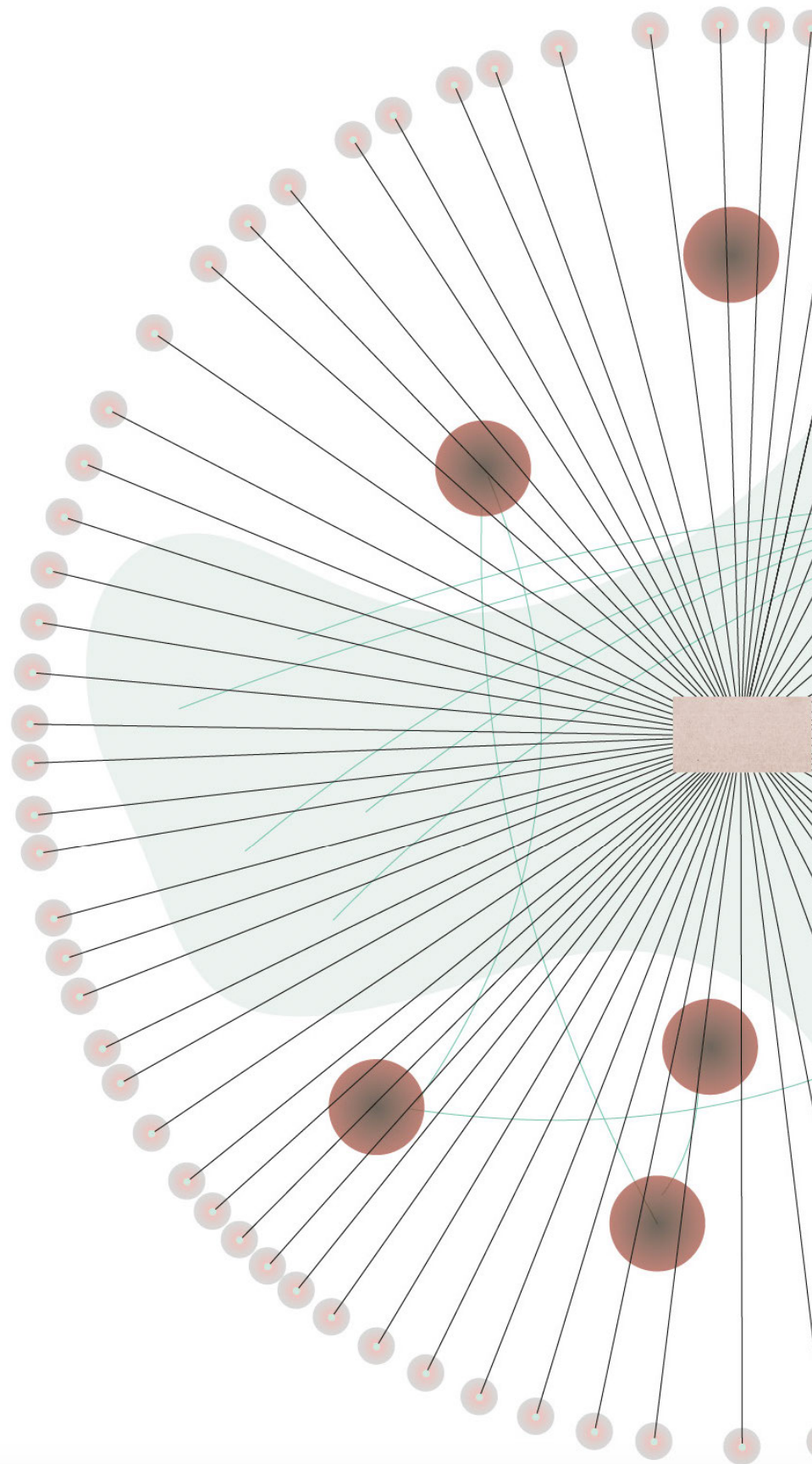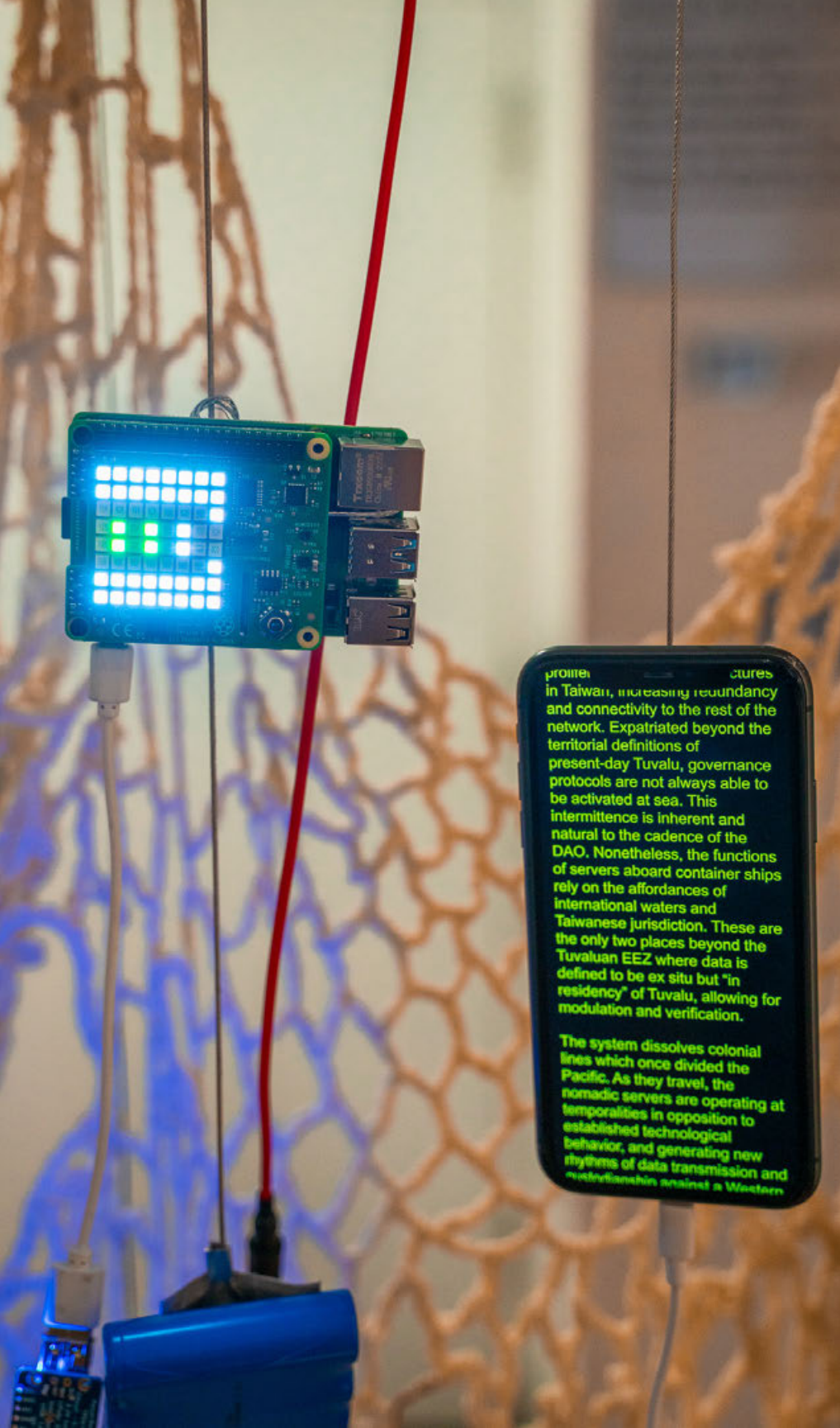
dark
matter

Advanced V studio
David Benjamin
Redhook, NY
Fall 2024
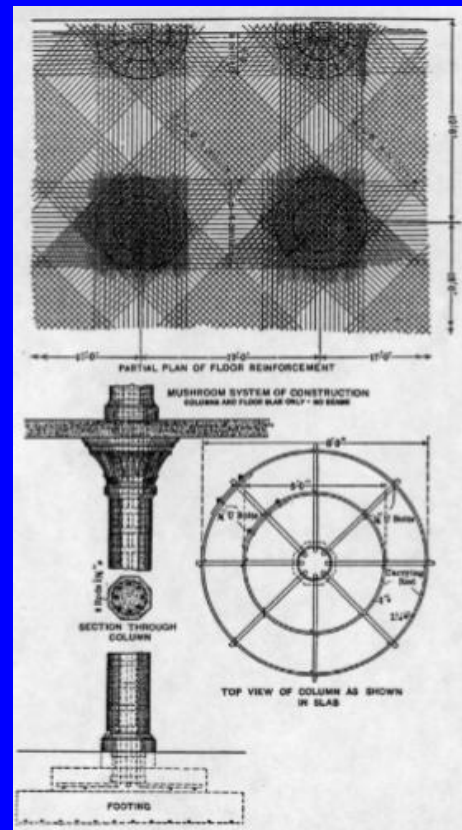
C. Turner, details of mushroom slab construction (1905)

With two billion tons of household waste produced globally per year, only 12% is recycled while the rest is incinerated or left in landfills to decompose. Pyrolysis presents a novel approach to waste; heating solids to high temperatures in an inert environment locks in carbon that would have otherwise been released into the atmosphere, and stores it within the pyrolyzed products of bio-oil and biochar. The design for a facility in Red Hook, Brooklyn, integrates pyrolysis as a large-scale waste processing system, and uses bio-oil and biochar to produce carbon fiber. The project creates opportunities for community engagement, including a meeting space for Alignment Assemblies; a system of direct democracy through decentralized incubation labs where citizens work together in finding the dark matter needed to expedite carbon removal.
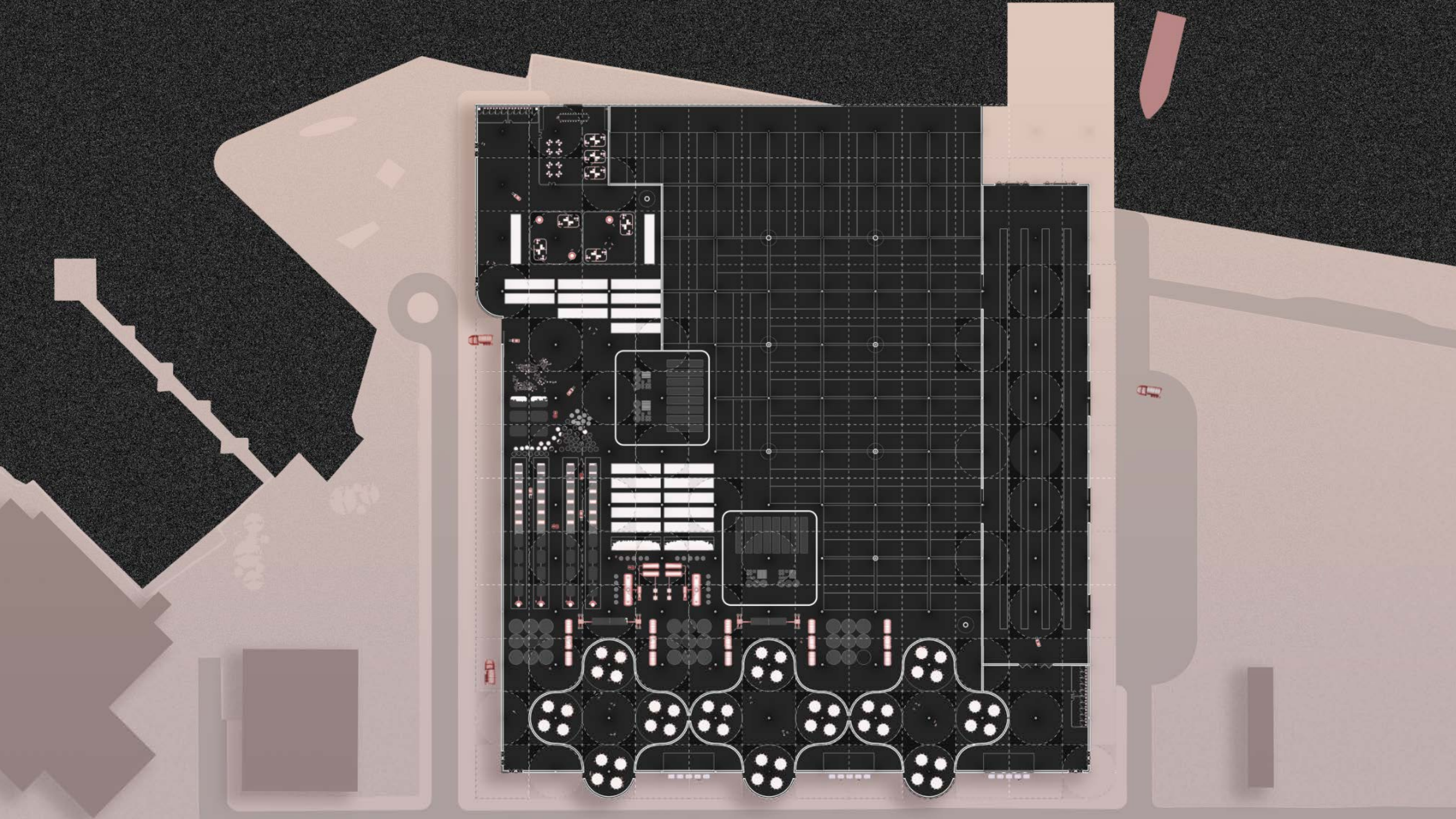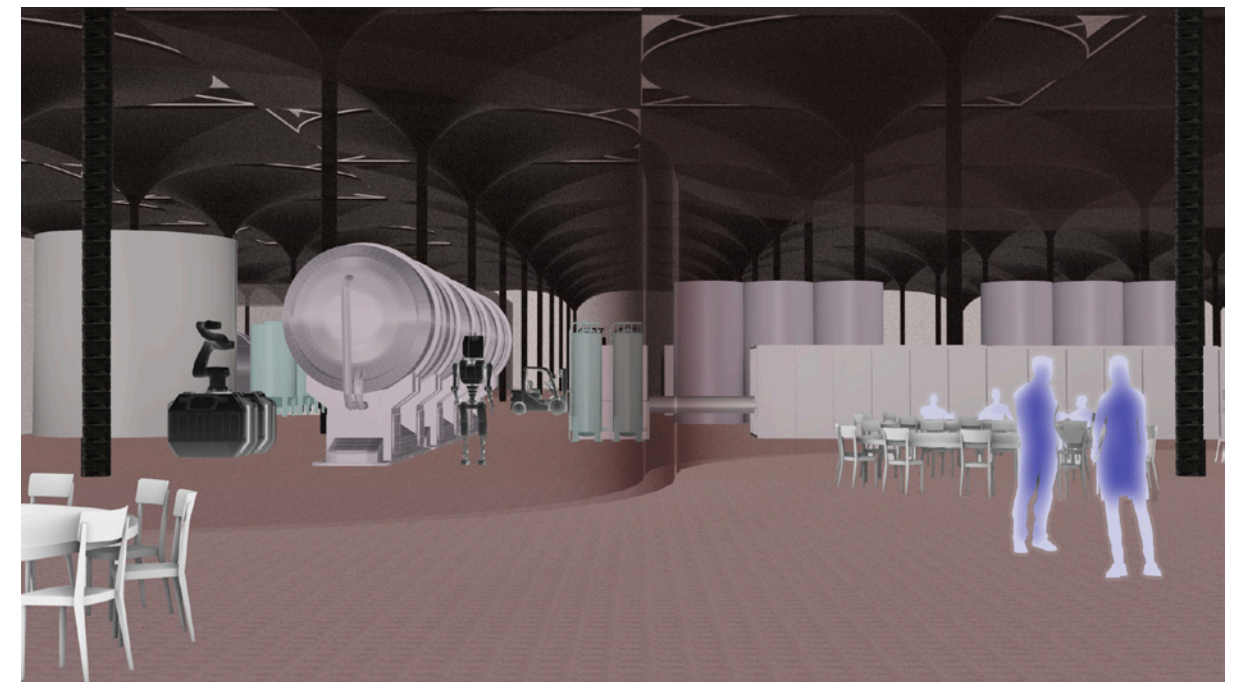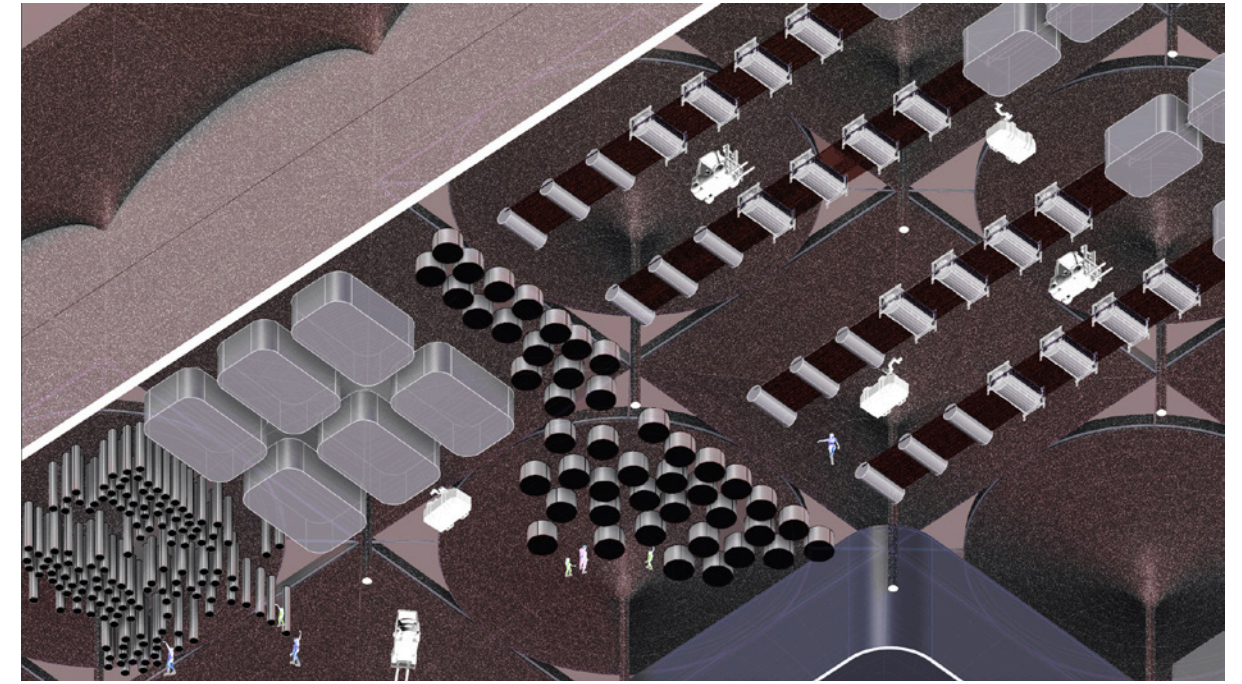
compostables   plastic   paper   agricultural biomass   paper pulp   garden/parks waste

PYROLYSIS

syn-gas   biochar   bio-oil

ORGANOSOLV

lignin   cellulose

carbon fiber structure

salty commons

Advanced IV studio
Alessandro Orsini
Ashokan Reservoir, NY
Spring 2024

Salt, upon dissolving in water, becomes invisible. The process of dissolving, dilution and disappearance is a synecdoche for the displacement of people from the Ashokan reservoir in Ulster County, New York. By direct consequence of these histories of dispossession, residents are fully reliant on private wells to access drinking water. When salt is used on roads to foster safe mobility during winter months, the invisible substance seeps through the surface to contaminate groundwater stores below.

Collective maintenance can be seen as a commoning practice, giving communities agency to resist consequences of negligence. During winter, the ground floor is active with salt maintenance practices with research laboratories above. During summer, the ground floor transforms into a rave space and stores salt in the funnels above for the following winter. In a contested territory between state and city, salt is a medium for mutual maintenance and care. The project bridges notions of exposing erased histories; it designs for maintenance and provides space for community stewardship and resistance.

View of West Hurley, territory taken for the Ashokan reservoir (1906). NYPL Digital Collection.

VI   V   **IV**   III   II   I
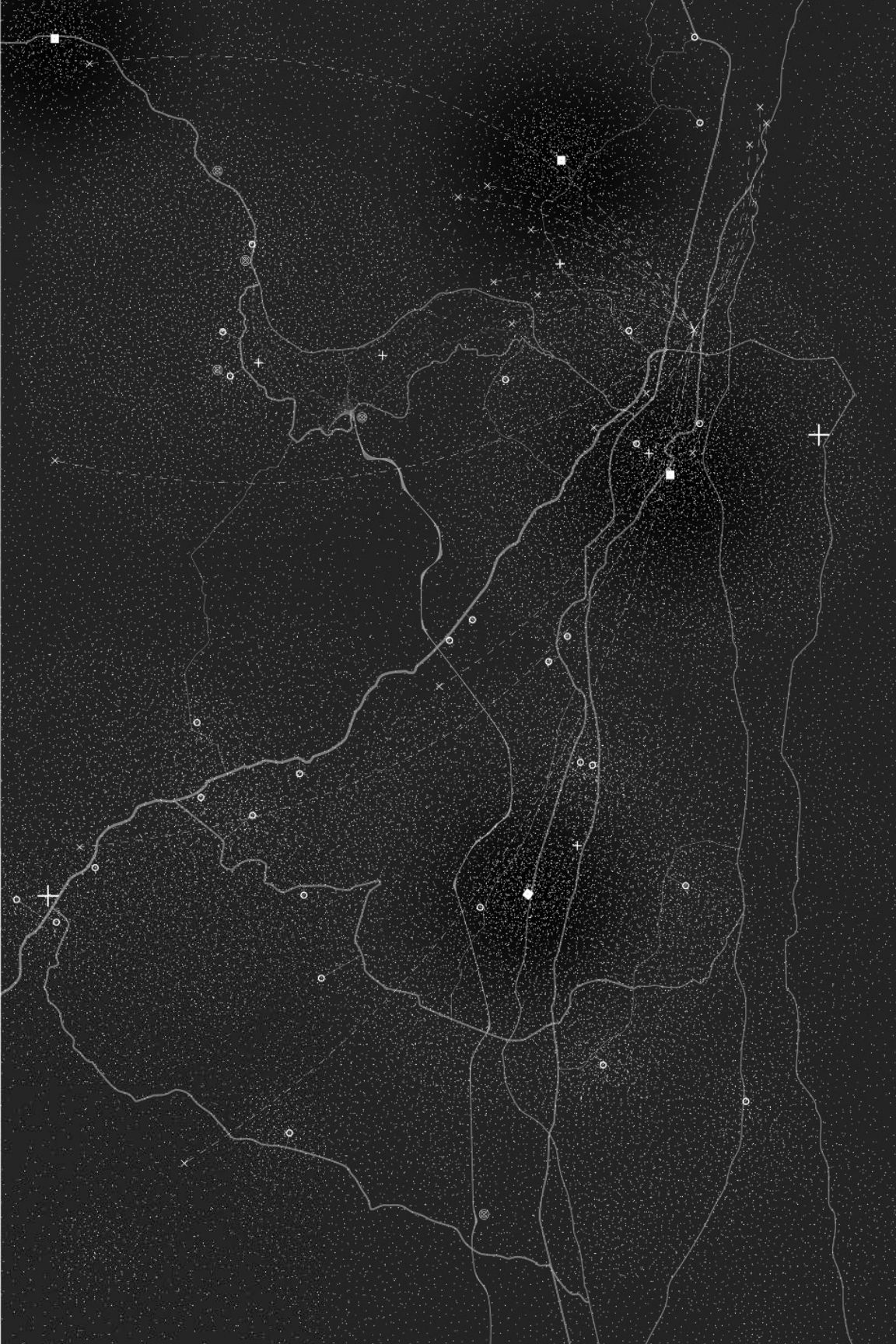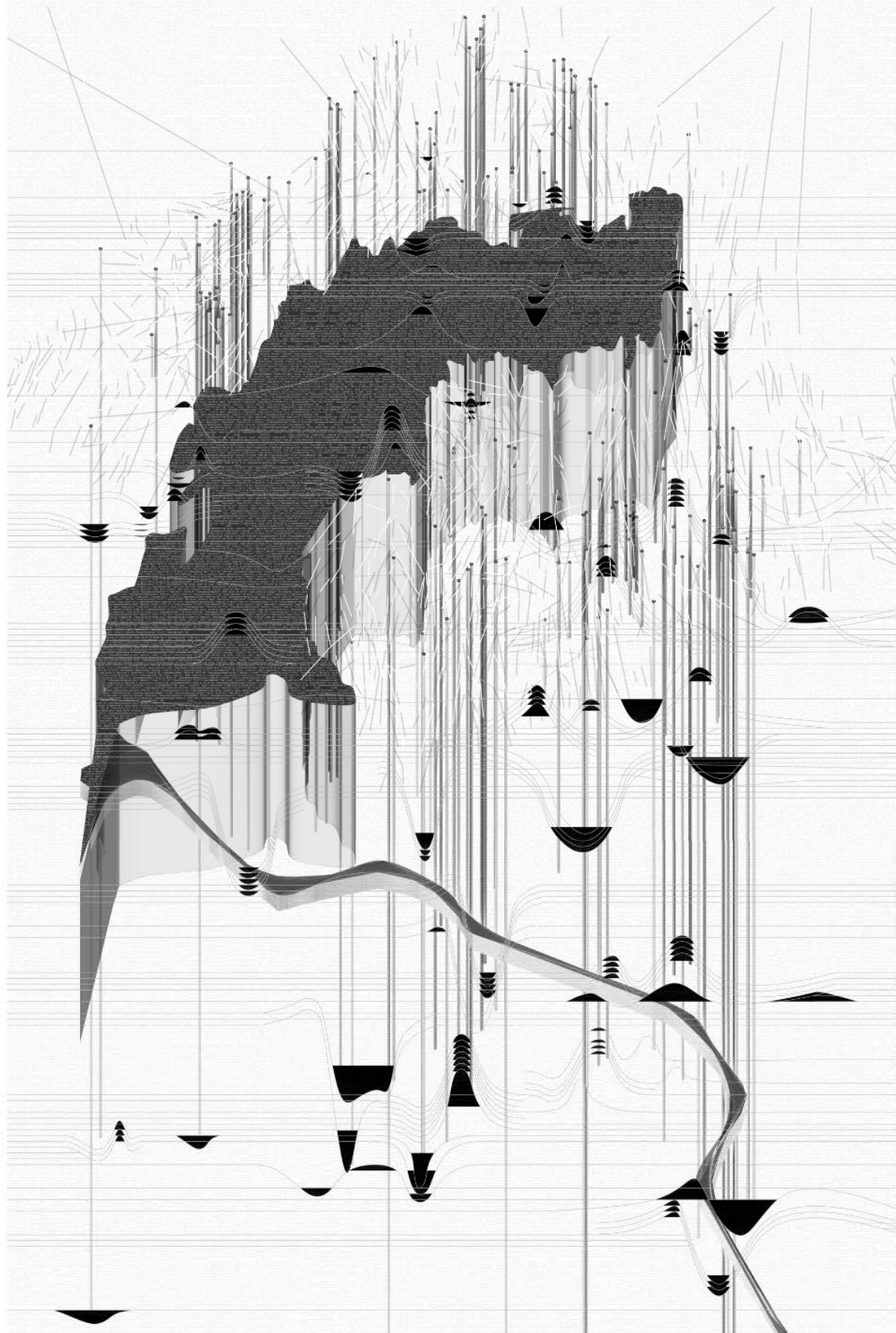
What could another reality look like devoid of land dispossession, historial dilution, and forced displacement?
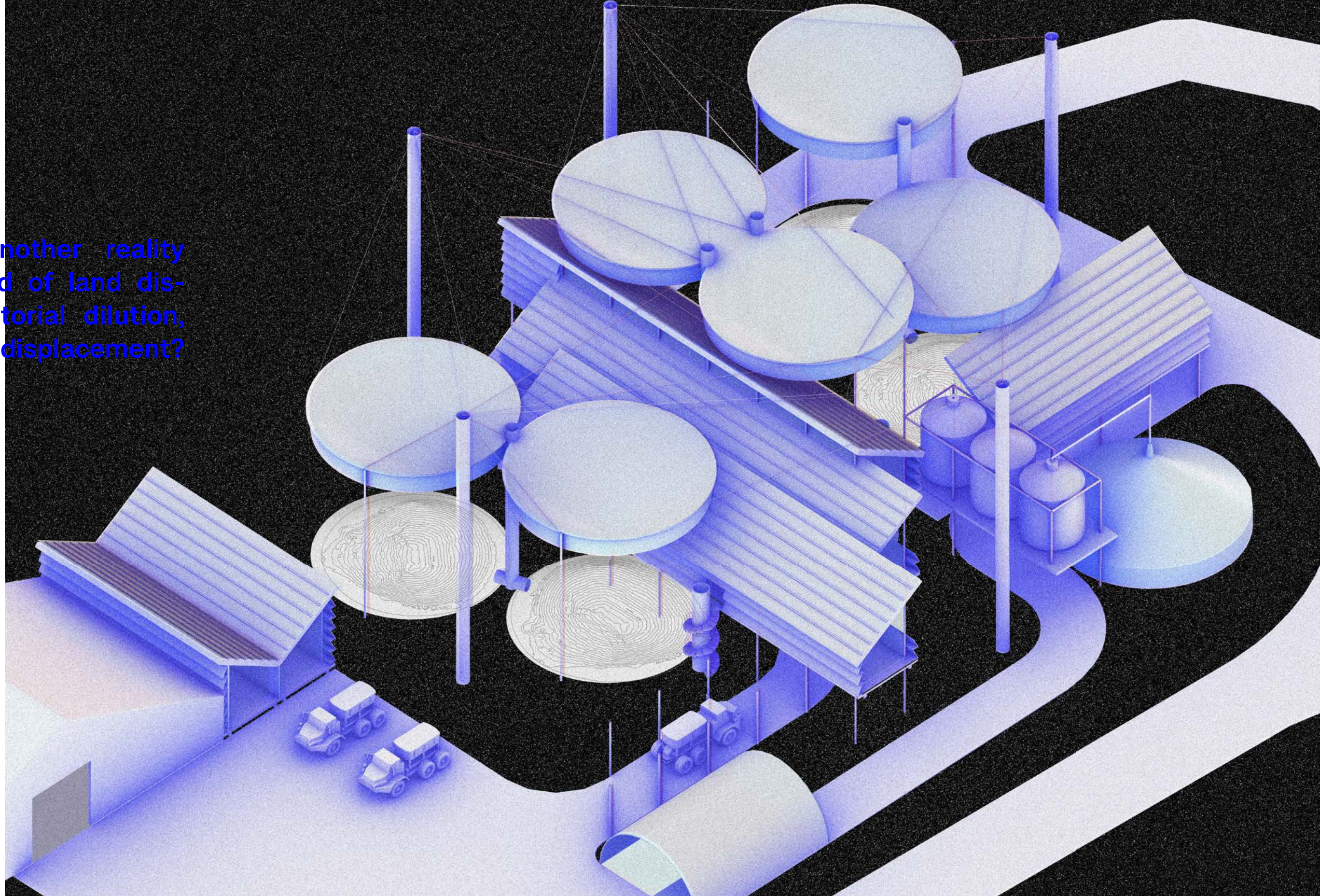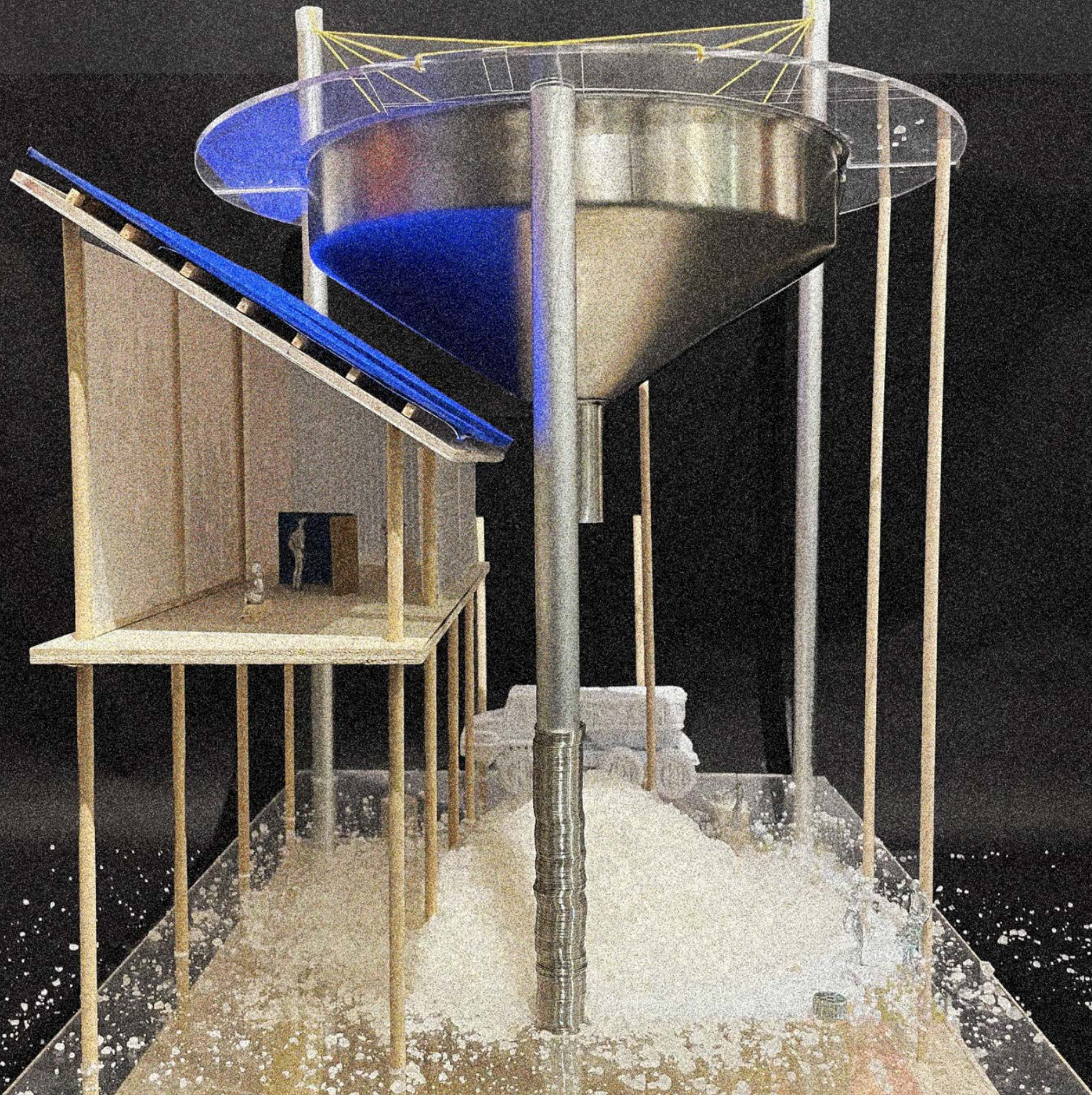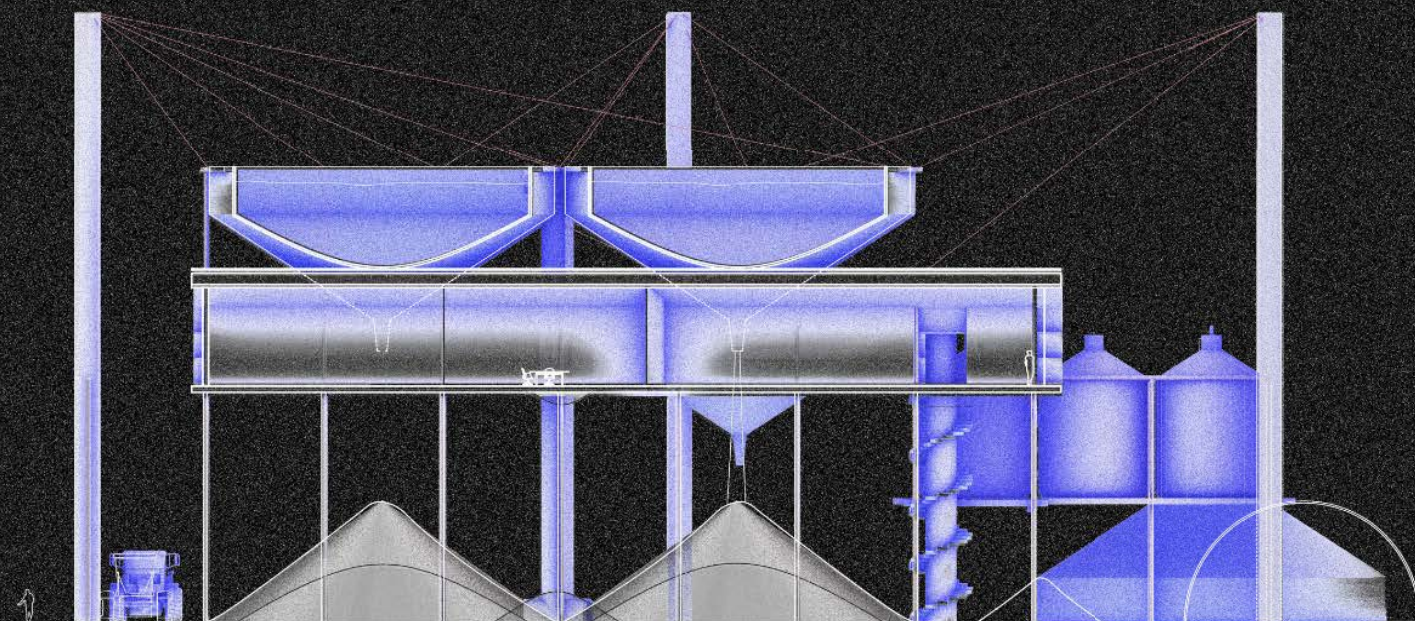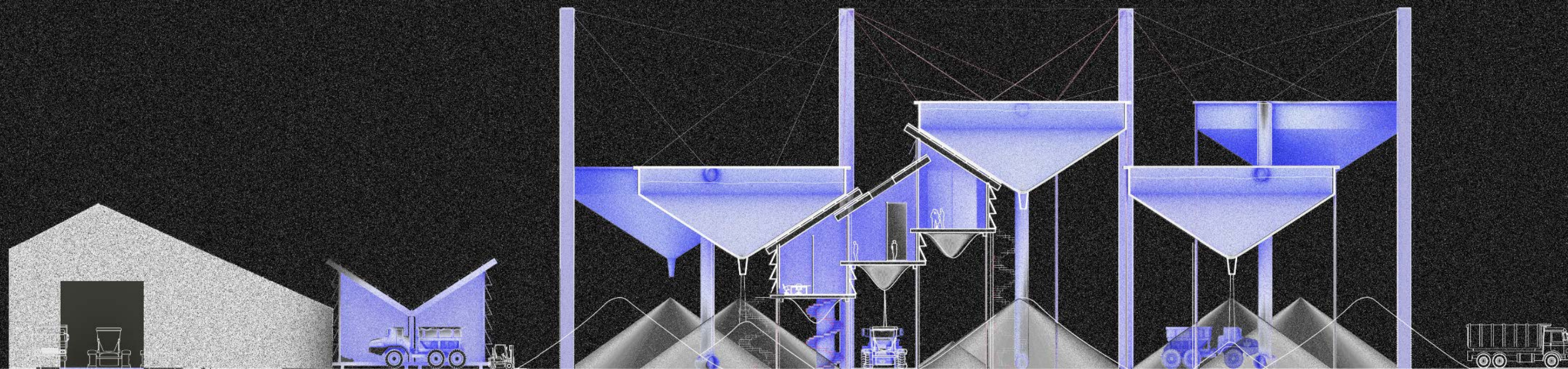
living
interface

Core III studio
Gary Bates
Collaboration with Deniz Mahir Dagtekin
Harlem, NY
Fall 2023

VNS matrix, ALL NEW GEN (1992)

As we exist in a hybrid world between digital and physical space, questions of social connectivity are ever more present. Fundamentally, our project aims to interrogate and spatialize conditions for both the potential of hyper connected and the zero connected. We acknowledge that living embodies a spectrum of connectivity. Connectivity can be read in three main ways: digital, social, and urban and these three threads have guided the development of our investigation. Harlem is underserved in broadband, leading to disparities in access to information and digital equity. While critical of the Big Tech's optimism that access to better broadband or 'smart' systems in housing can fix social problems, our project instead focuses on increasing equitable access to technology to house data self-sufficiency and foster tech literacy among the Harlem community.

From tech neck to digital isolation, we need to reassess our current interaction with technology to promote healthier living conditions
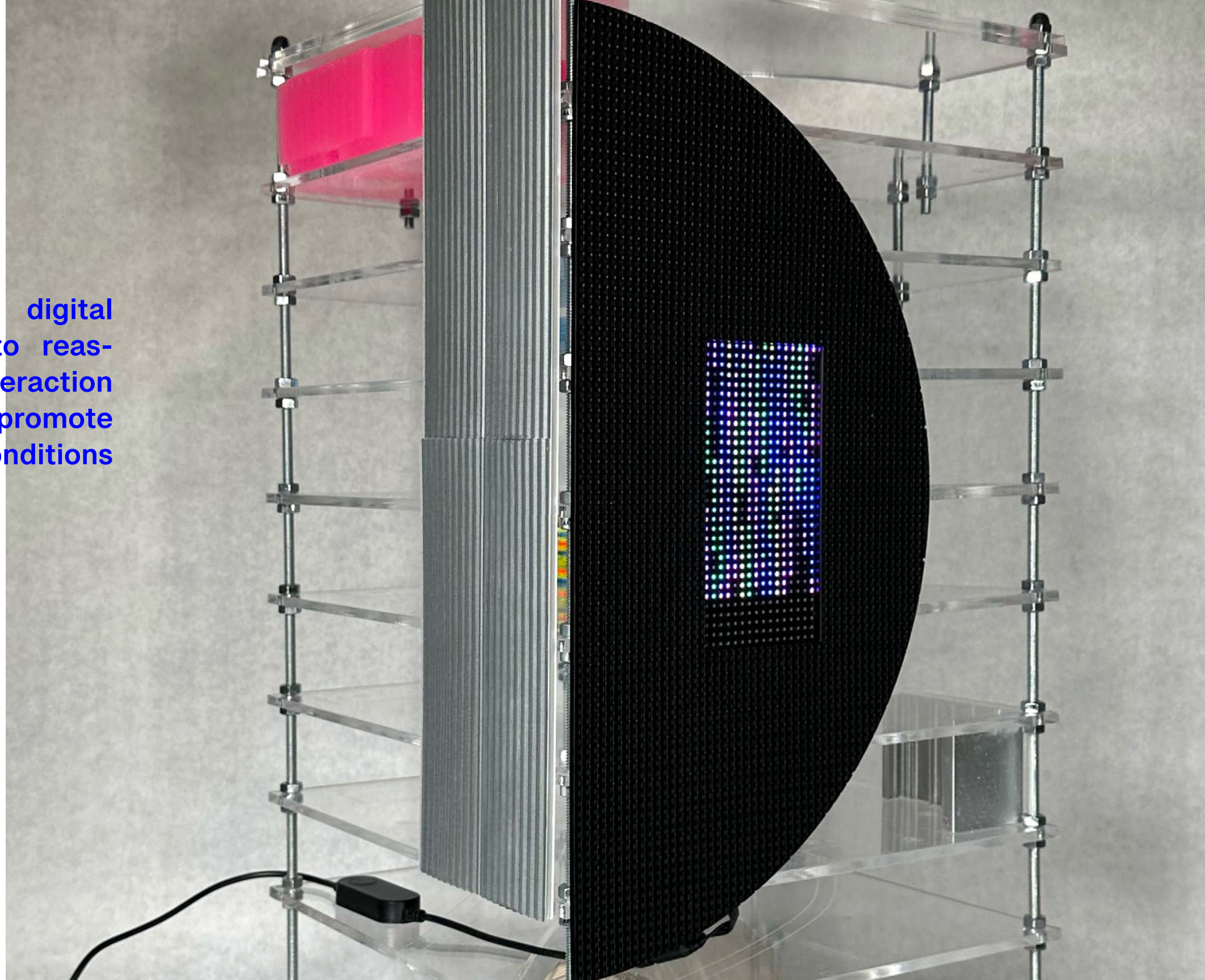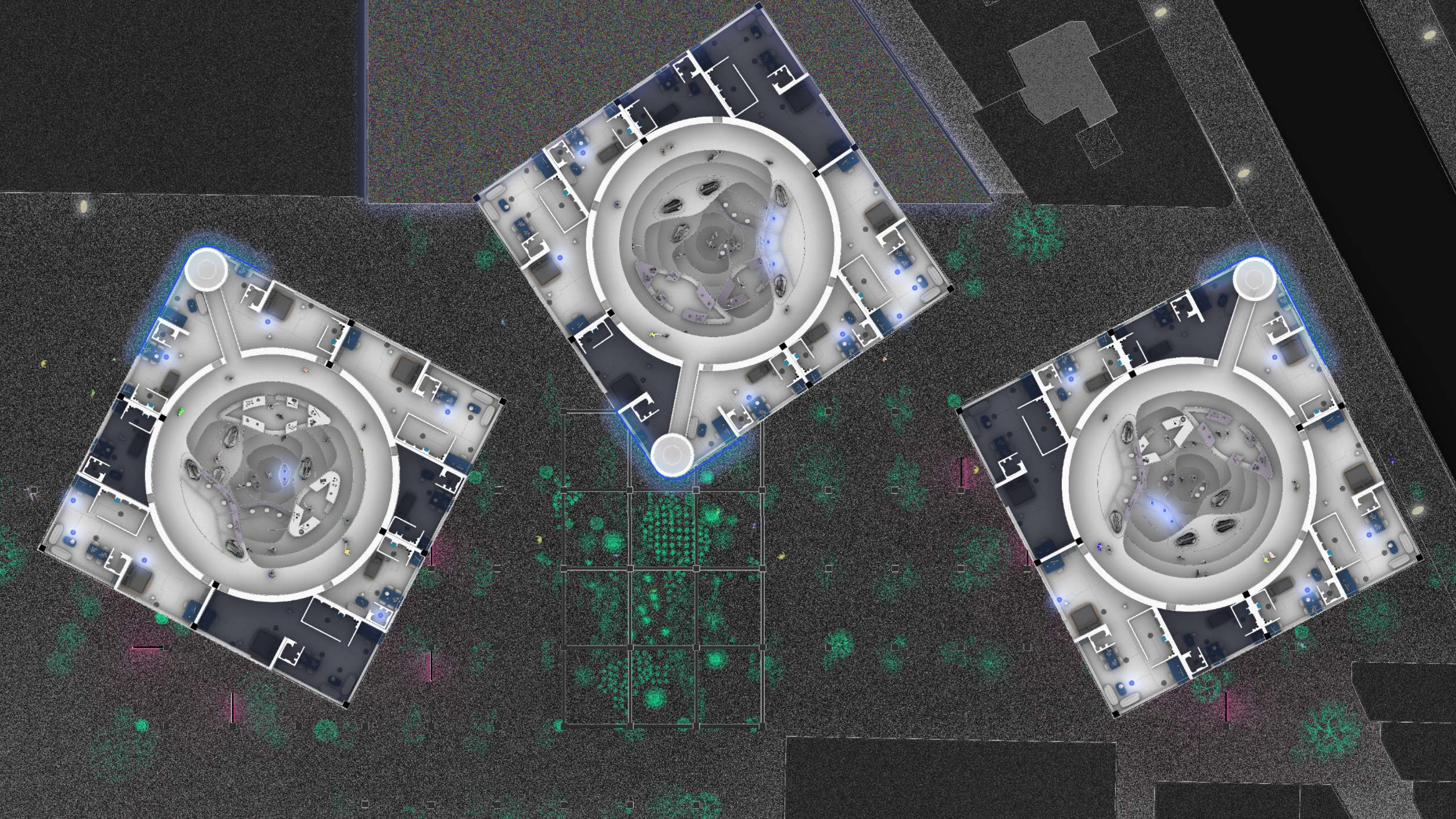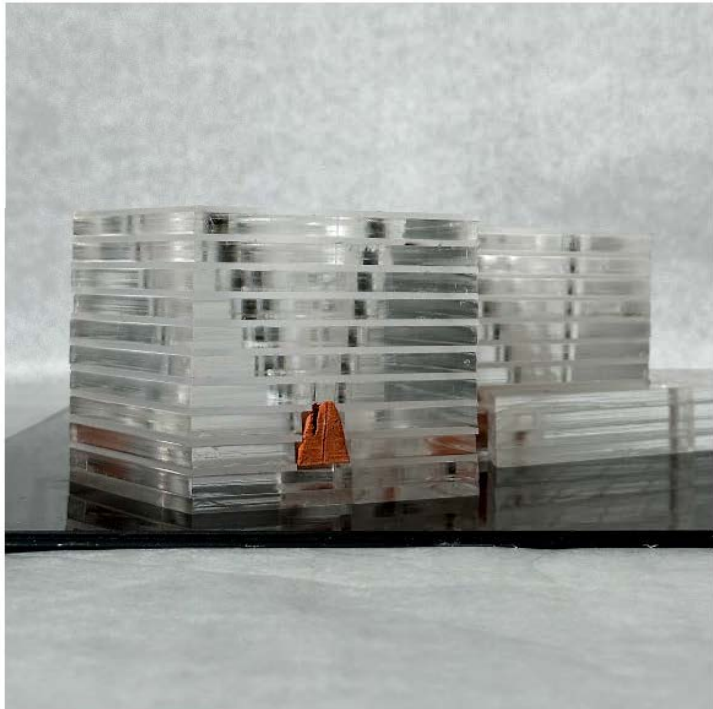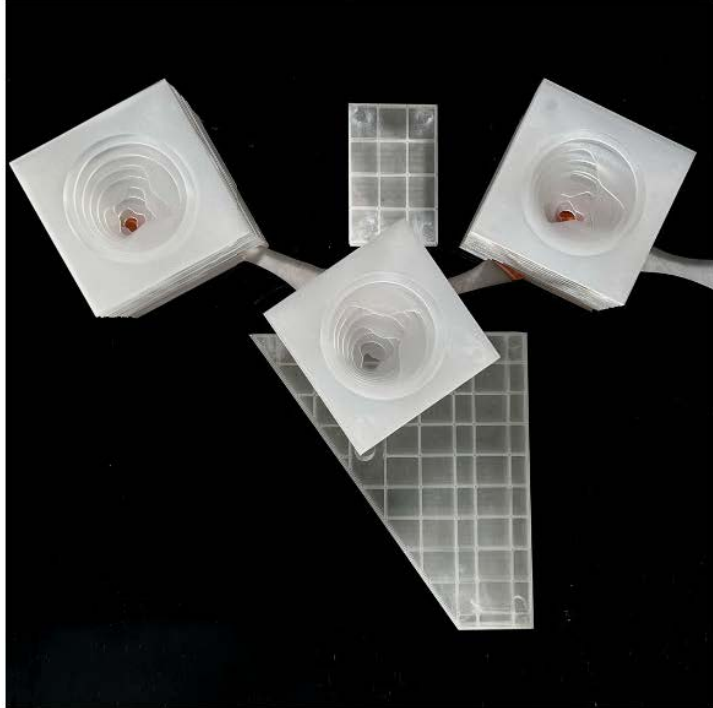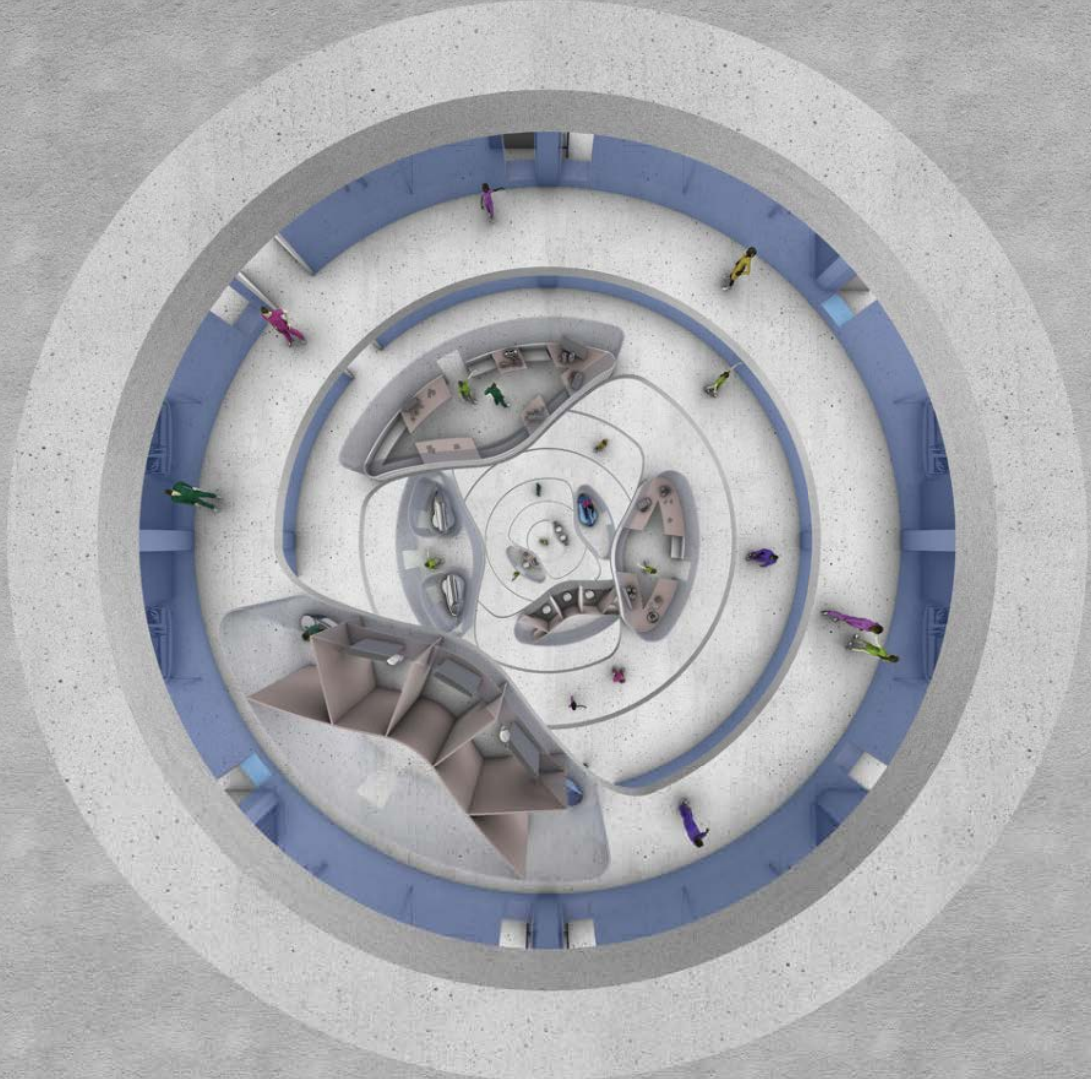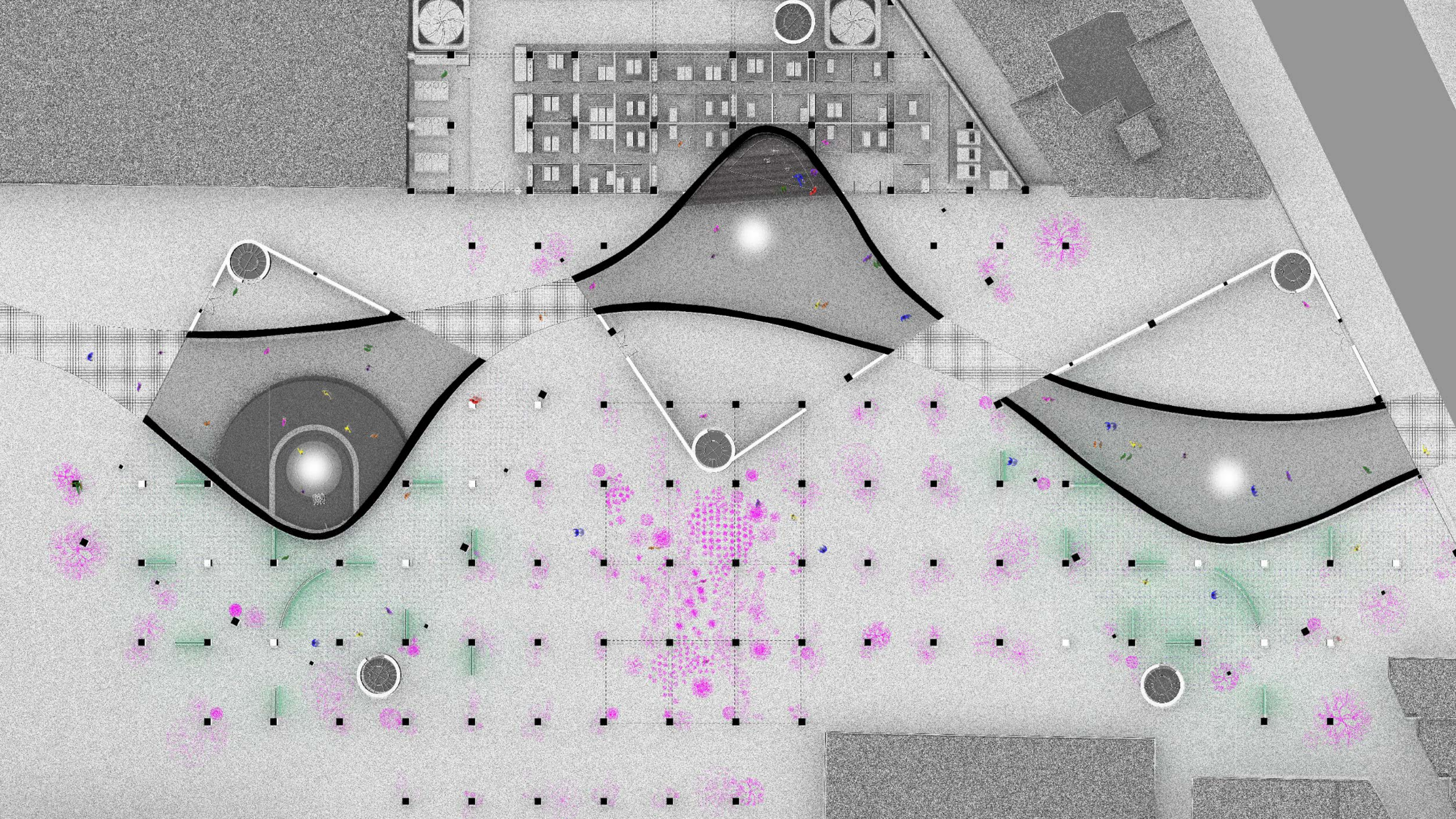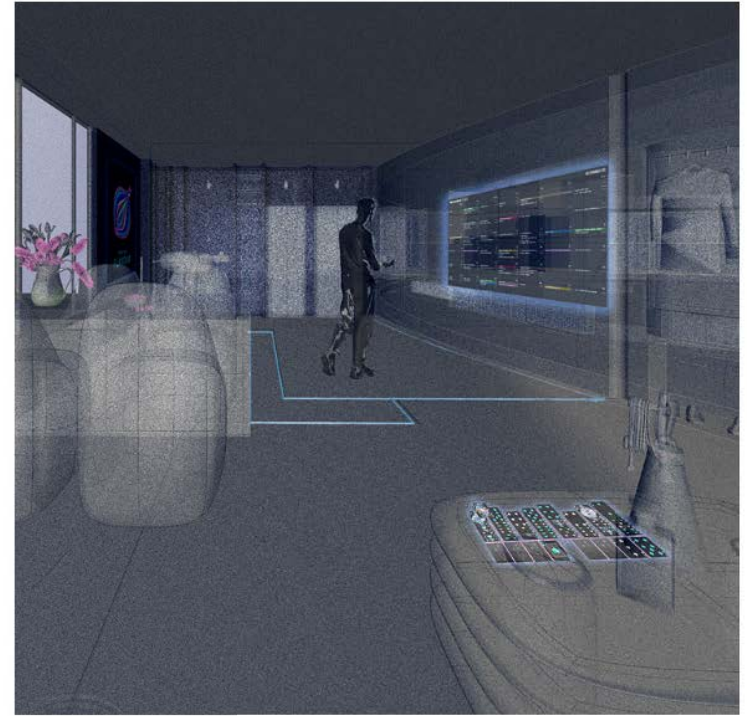
f a c e
v a l u e

Core II studio
Mustafa Faruki
Upper West Side, NY
Spring 2023
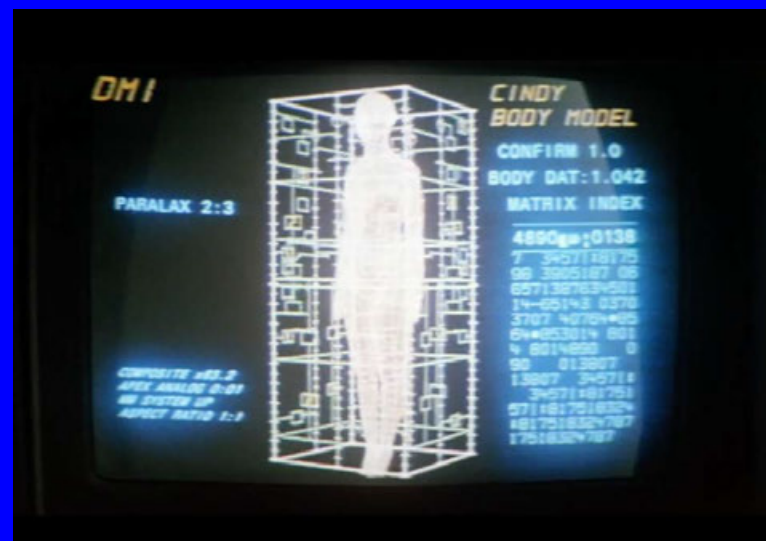
Still from "Looker" (1981)

The project investigated the social and spatial implications of Facial Recognition Technology, focusing on specific sites in New York where data is collected without consent, to raise questions about our own "face value" in the context of personality collection. The recent utilization of Facial Recognition Technology (FRT) by private institutions as an unconsented method of tracking, monitoring, and selling personal data needs direct attention. As a person moves through the city, gets scanned, and enters more pavilions, they cumulatively collect individual pieces to eventually complete a physical profile of themselves. Once this profile has been completed in full, they are able to sell their own personal metadata that is embedded into this object to a pawn broker, and retain agency over the hidden process of data brokering and regain back a sense of self.

VI   V   IV   III   II   I

millimeter wave emmiter
body signals
P{mv}

condensation detector
palm perspiration
P{pp}

digital camera
facial movement
P{ey}

molecular detector
heart rate
P{br}

iodinizing radiation
hidden hormonal device

insulating sound monitor
breathing pattern
P{br}
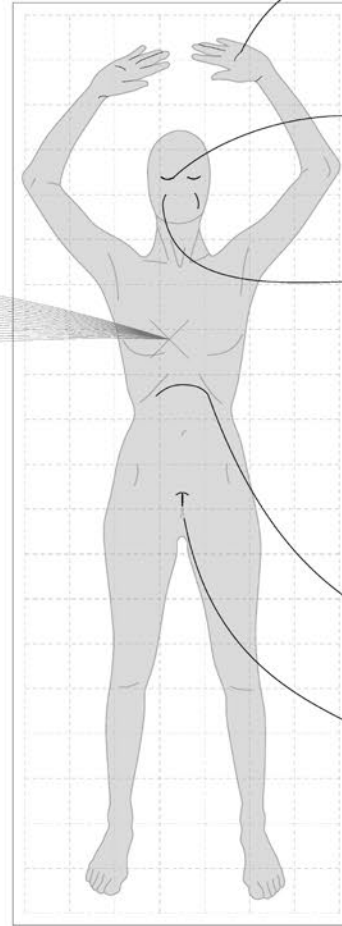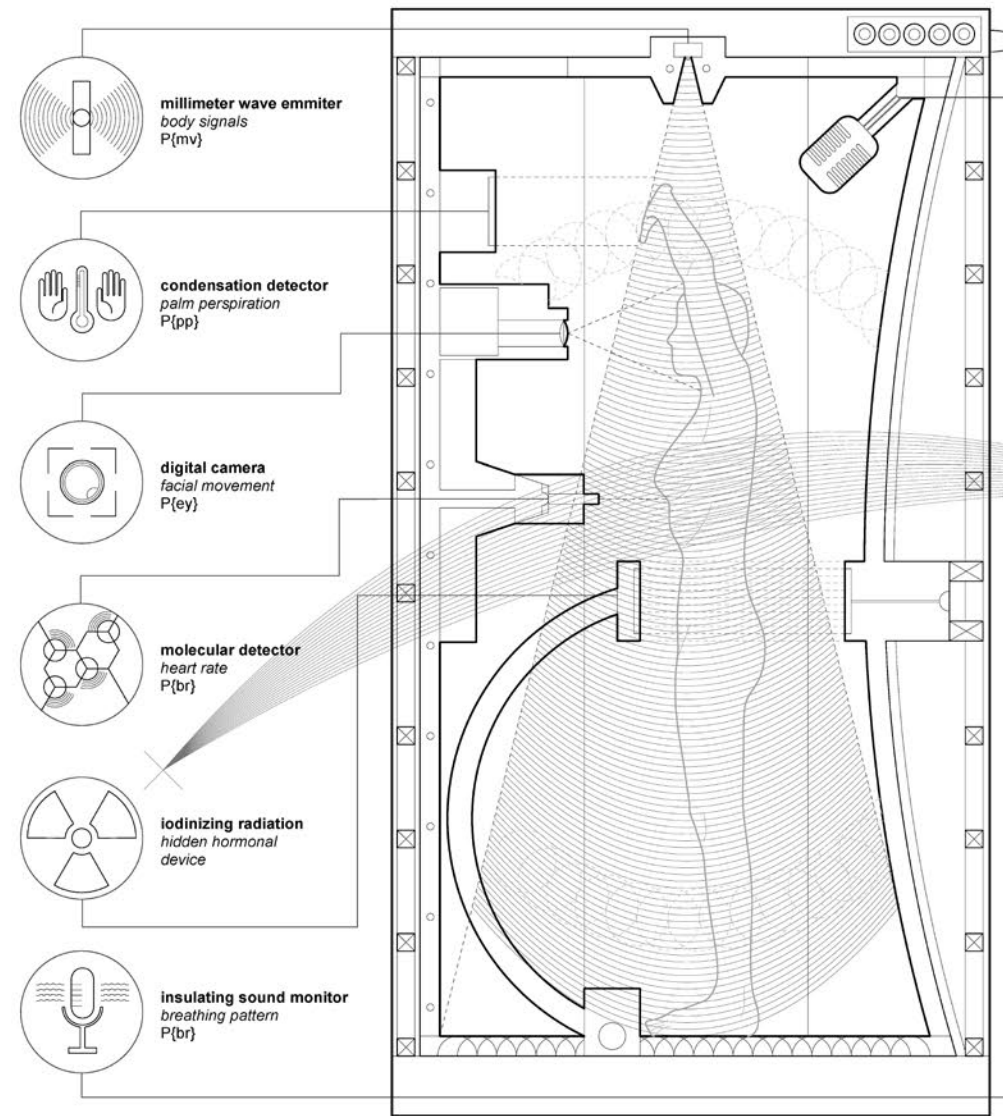
a picture for the collector
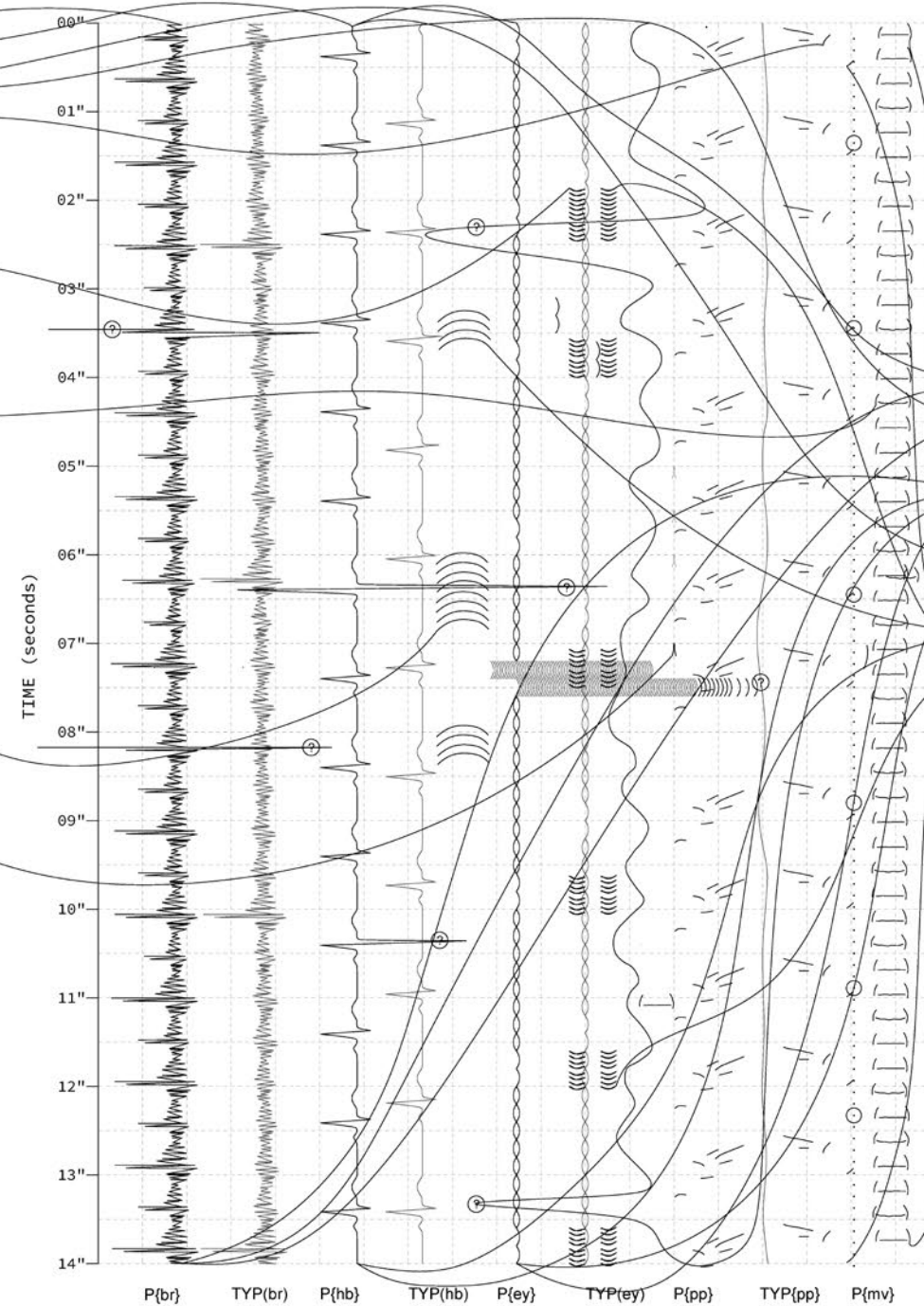
surname: BAKER
given names: HOLLY YASMIN
nationality: UNITED STATES OF AMERICA
date of birth: 13 May 1998
place of birth: NEW YORK, U.S.A.
sex: F

scan time = 15 seconds
beam frequency = 30 GHz
wave count = 0.035 mSv
x-ray radiation intake = 0.1 Sv
millimeter wave penetration = 10 mm

ANGER: DETECTED
DISGUST: DETECTED
ENJOYMENT: not detected
FEAR: DETECTED
SADNESS: not detected
SURPRISE: DETECTED
SMUGNESS: DETECTED
FRUSTRATION: DETECTED
ANXIETY: DETECTED

consumerist indulgence obvious.
defense mechanism probably active.
emotional baggage clear.
PMS symptoms most likely present.
discomfort evident.
anomaly count high.
sabottage likely?
alter ego at play?

the machine reads what Holly is thinking,
knowing, and concealing.
this reader of fictions knows more than
Holly could ever control, or care.

**biometric data has been used
to make absurd assumptions.
now ready to be sold on to
whoever wants to make more.**

TIME (seconds)

00"
01"
02"
03"
04"
05"
06"
07"
08"
09"
10"
11"
12"
13"
14"

P{br}   TYP(br)   P{hb}   TYP(hb)   P{ey}   TYP(ey)   P{pp}   TYP{pp}   P{mv}

How do we give agency back to civilians who are scanned, processed and profiled on a day-to-day basis?
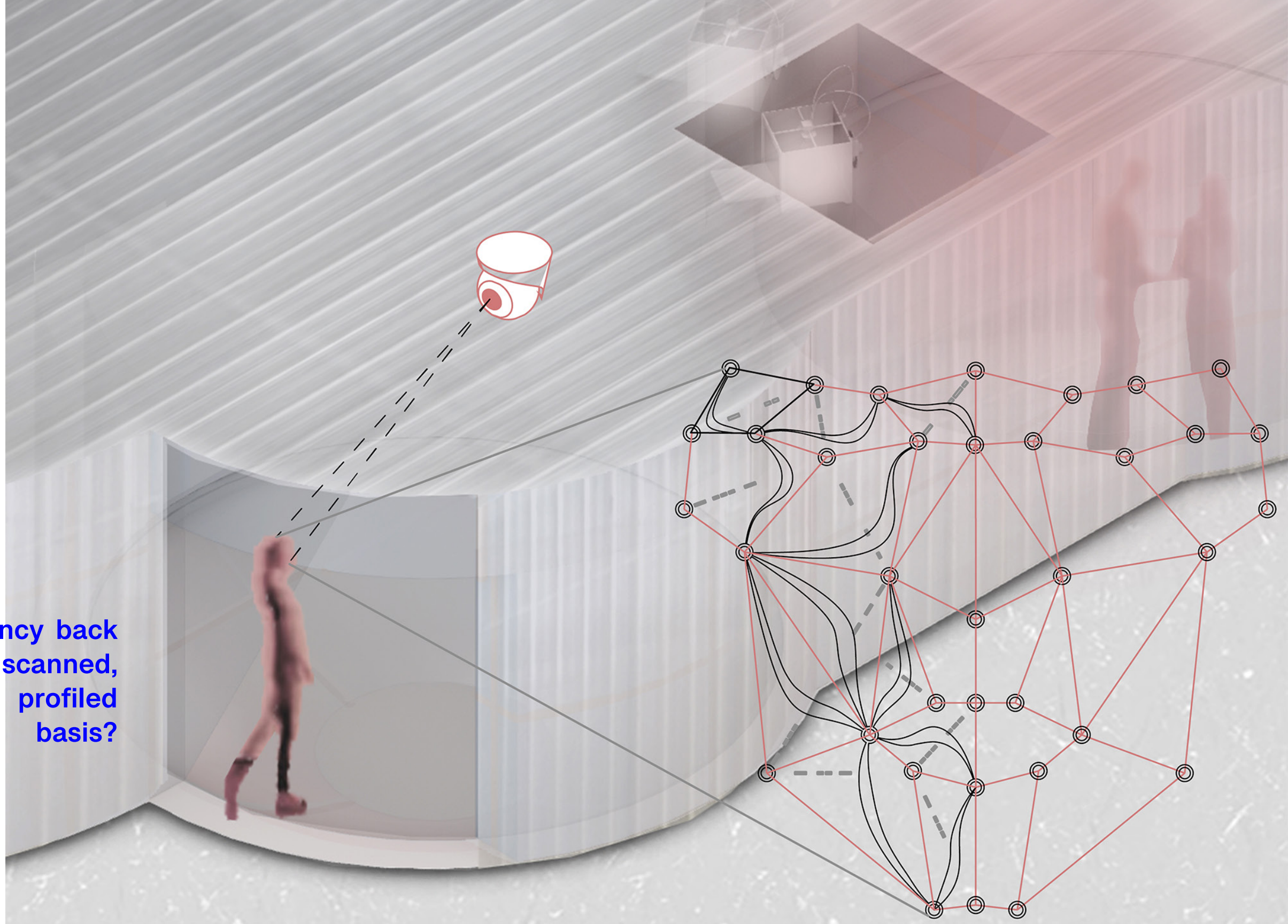
3   Fairway Market
74th Street & Broadway

Pavilion C

2   Radio City Music Hall
51st Street & 6th Avenue
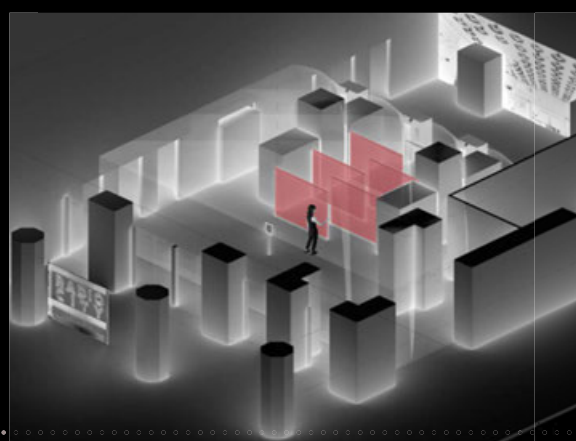
Pavilion B

1   Macy's Herald Sq
34th Street & 7th Ave
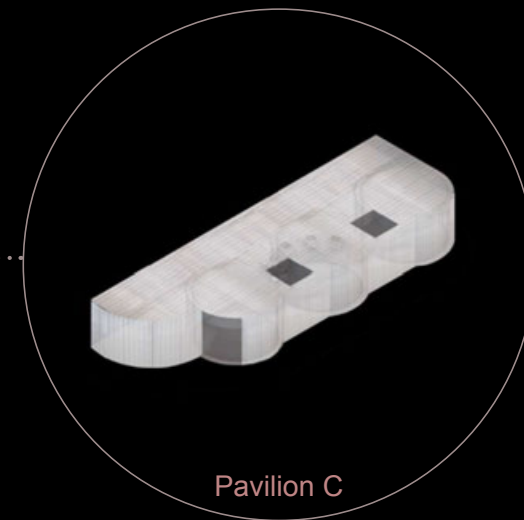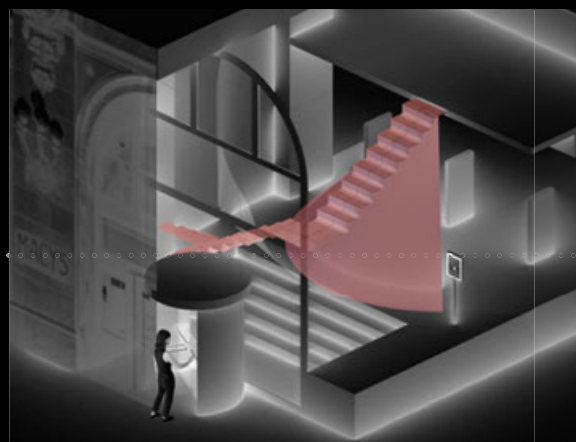
Pavilion A
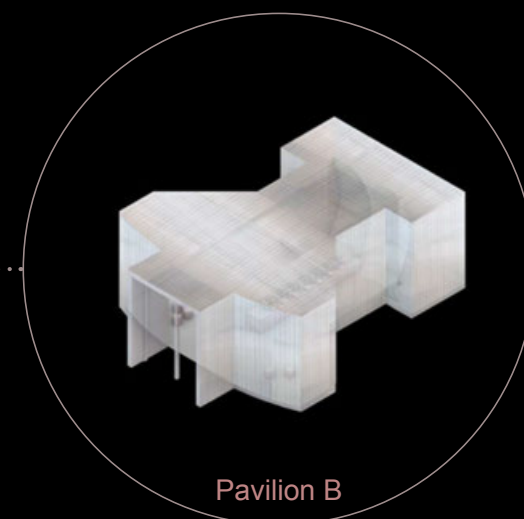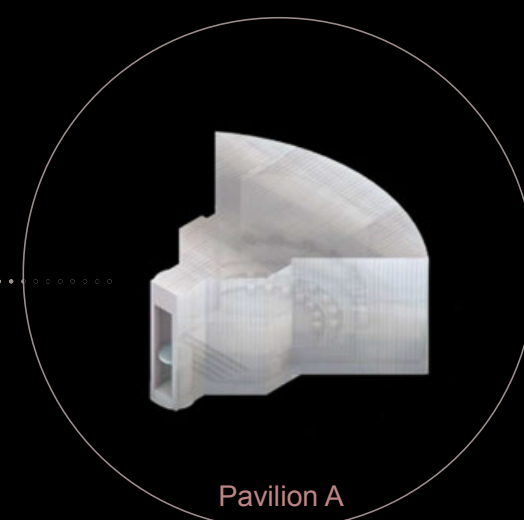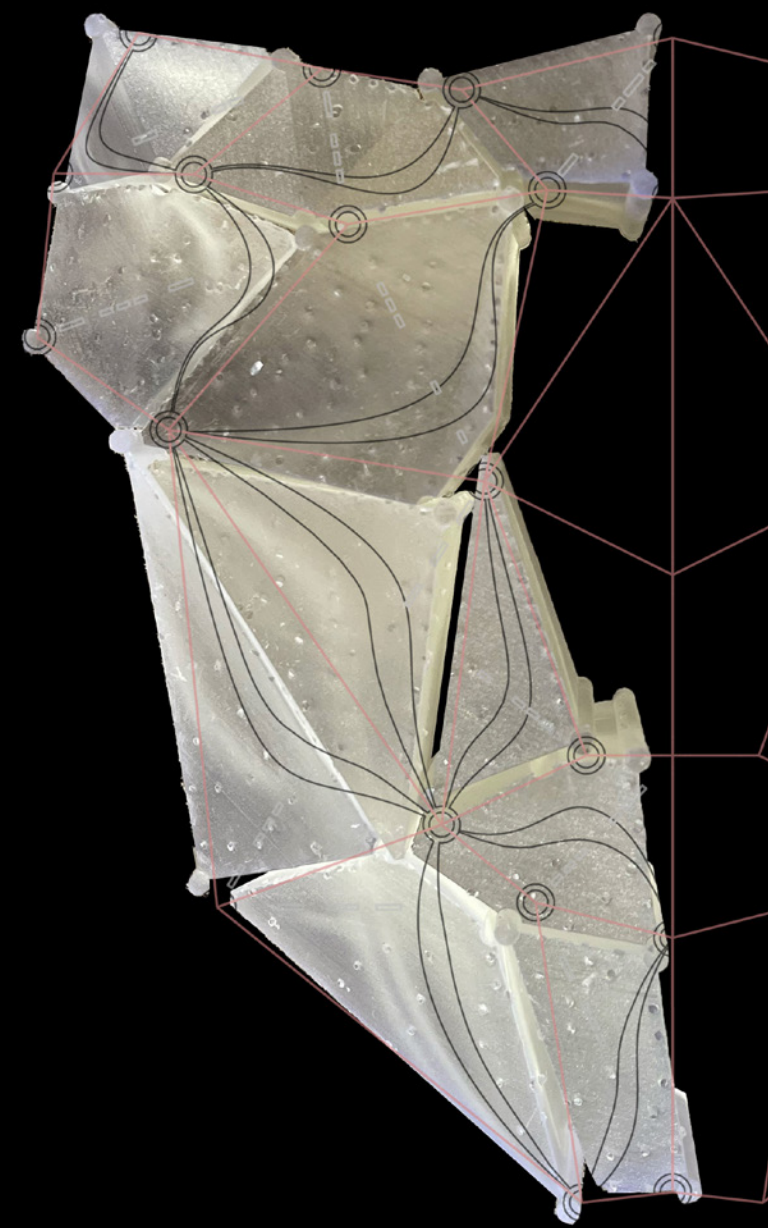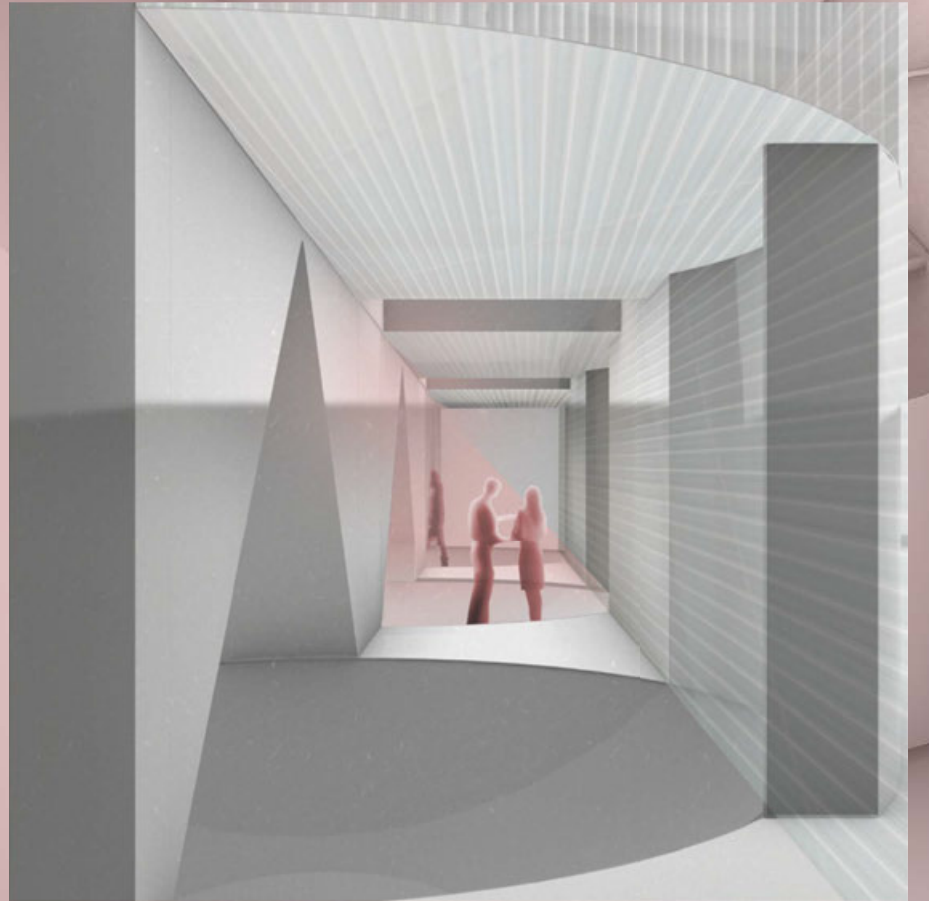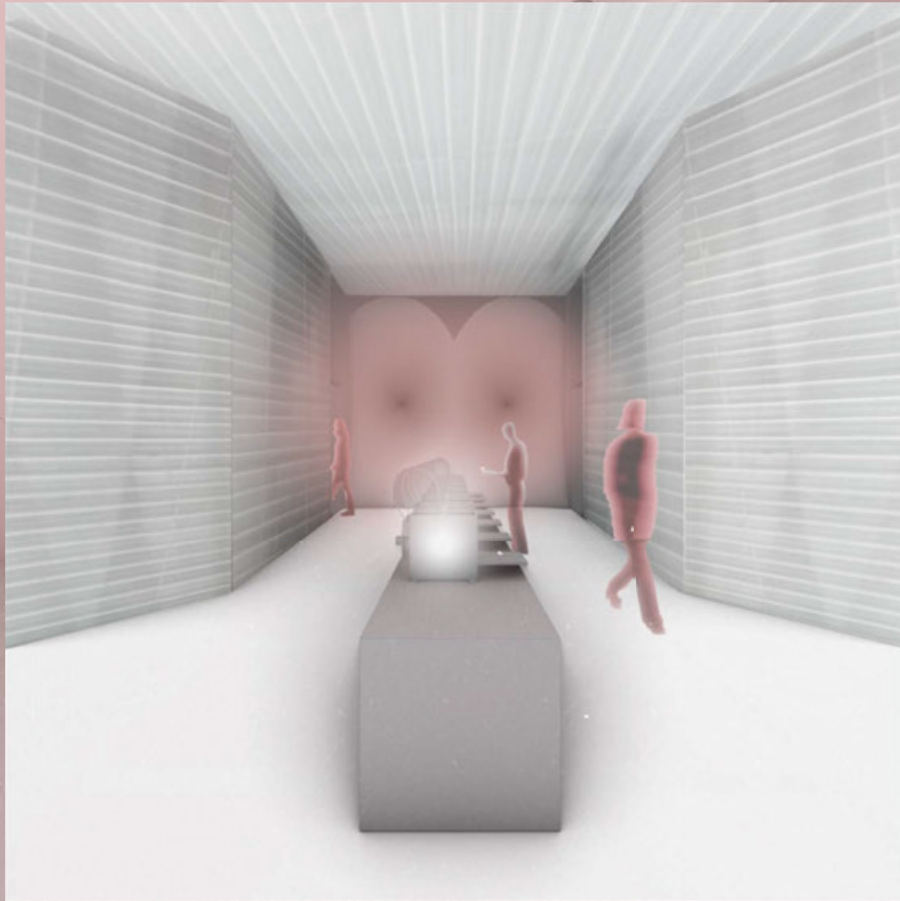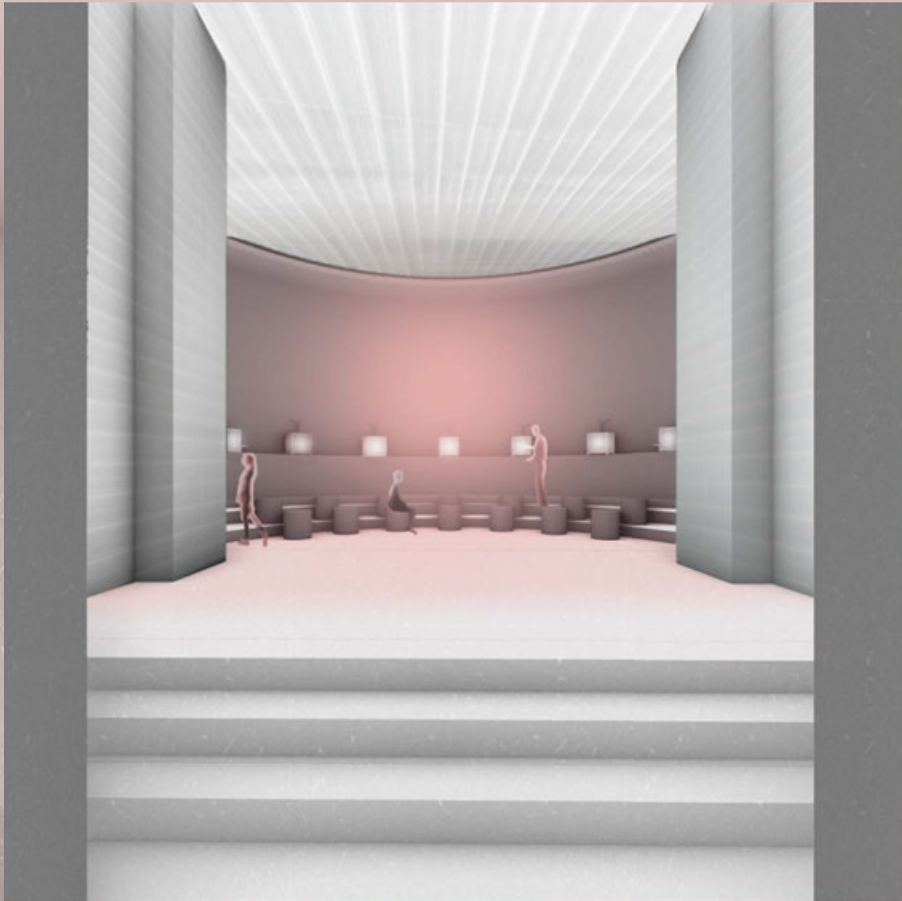
FAIRWAY
"Like No Other Market"

ciruclar laundry

"Wash day in New York", Tenement District (1925)

Hydraulic, thermal, and social histories define the urban extent of Maiden Lane. In the revival of a past waterway, a laundromat will provide a non-gendered, climatically immersive, energy-efficient, and productive space for gathering on a neighborhood scale. The riverbed lies above two subway lines; the energy produced through trains will heat the water to designated temperatures to run the laundromat as a productive machine encased only in materials found on site. The project aims to sustainably publicize a domestic labor to curate a common investment in material care.

VI   V   IV   III   II   I

Material masses

Daylighting a river on Maiden Lane

RUBBLE

648,000 ft³

SAND

200,770 ft³

1833 ft³

RUBBLE

BRICK

2444 ft³

36 panes of 8'x18' glass

320' x 90' roll of recycled fabric

3000 planks of timber

Typical 20lb washer

12,112 bars of soap

19th century 18" wash bowl

23kg of my own clothing

Occupancy of 500 people using 40 gallons/load = 20,000 gallons of water needed per day

Maximum load of 20 pounds with 500 users = 10,000 pounds of clothing can be washed per day

A standard dryer uses 3.3 kW hours per 45-minute cycle ∴ 1650 kW of electricity needs to be produced per day

Cashmere 37g — 3 items contain cashmere
Elastane — 14 items contain elastane
Acetate 286.15g — 3 items contain acetate
Polyurethane — 7 items contain polyurethane
Spandex 86.5g — 6 items contain spandex
Cotton 365.1g — 23 items contain cotton
Rayon
Polyamide — 1 items contain polyamide
Linen 657.65g — 4 items contain linen
Suede — 3 items contain suede
Nylon 413.5g — 21 items contain nylon
Silk 1907.68g — 14 items contain silk
Viscose 1959.17g — 9 items contain viscose
Leather 150g — 4 items contain leather
Wool 4610.44g — 22 items contain wool
Polyester 2485.12g — 24 items contain polyester

factories of information

Lithium mine in Chile, 2022

The project identified sites of material and immaterial extraction, including an-depth analysis of the Lingotto Factory in Turin, Italy, built in 1920 and converted by Renzo Piano Building Workshop in 2003. Tracking its material and labor extraction, embodied carbon, I created a proposal for a more sustainable alternative. This led to investigating the adaptive reuse of industrial building stock as data centers through a report to consider a future of alternative more sustainable server practices.

Lingotto Factory Conversion

Location: Turin, Italy

Original Engineer: Giacomo Mattè Trucco
Completed: 1923

Renovation Architect: Renzo Piano Building Workshop
Competition: 1983
Completed: 1991-2003

Designed for Fiat and completed in 1923, Lingotto was the first example of modular construction in reinforced concrete, based on the repetition of three elements: pillars, beams, and floors. Modelled on Taylorist notions of productive efficiency, the factory became a pinnacle of modern Italian architecture.

The building is microcosm for raw material transformation and labor extraction in itself for car production. Although these figures and locations are not exhaustive, they have tried to map with as much accuracy the origins of labor and material extraction for the creation of both the reinforced existing structure alongside the RPBW's gallery extension. Asterisks (*) are used to show approximate deductions when info wasn't available. For consistency and precise scope, the report focuses on the three materials listed below.

STEEL
Fe | Ca | C
iron ore, limestone, coke

GLASS
Si | Ca | Na

CONCRETE
Ca | Si | C

✕ SITE OF MATERIAL EXTRACTION
○ SITE OF MATERIAL PROCESSING
● ORIGIN OF LABOR FORCE
- - - Movement of Material: 1920
—— Movement of Material: 2000
····· Movement of People

* Locations indicated with an asterix are approximate deductions based on reports and general trends in extractive processes at the time. Used in cases where specific data could not be found.

Map labels:
iron ore mine — Sweden or Norway* — 1920 / 2000
Pilkington Glass — Ravenhead, UK — 1920 / 2000
coal mine — Cornwall, UK* — 1920
Thyssenkrupp Steel — Essen, Germany — 2000
coking coal — Western Poland* — 2000
water, river Po* — 1920 / 2000
limestone / silica quarries in Piedmont — 1920
migrant workers — South to North Italy — 1960 - onwards
migrant workers — Eastern Africa to Italy — 1960 - onwards

Diagram callouts:
1920s: raw material brought in via railway
concrete casting happened on-site due to the specifications of world's first modular RF concrete structure
manufacturing process moved up the building via a spiral ramp to end with finished product to test drive on top

A production chain from raw to race
500,000 workers for endless fiat cars

Center text blocks:
"The "Scrigno" was created as a small museum elevated above the city. The contents of this "shrine" were donated by Giovanni Agnelli, the grandson of the Fiat company founder. He bequeathed 25 works of art from his private collection to the city; and with this gallery, he created a striking monument to himself over the rooftops of Turin."

The Lingotto conversion creates an interesting power hierarchy between raw material coming in at the bottom, industrial labor existing throughout the building, and cultural "jewels" sitting on top of it all: Agnelli stores Fiat's capital gains from the exploitation of resources and workers at the very top through display of the art collection.

Exploded diagram labels:
ROOF STRUCTURE — STEEL — 6532.8 ft²
ROOF LOUVRES — GLASS — 3800.0 ft²
SKYLIGHT — GLASS — 330.5 ft²
EXTERIOR CLADDING — SHEET STEEL — 1165.3 ft²
INTERNAL WALLS — CONCRETE — 1800.0 ft²
PRIMARY STRUCTURE — STEEL — 590.0 ft²
GALLERY FLOOR — CONCRETE — 3453.6 ft²
SUPPORT STRUCTURE — STEEL SECTIONS — 250.8 ft²
EXISTING ELEMENTS — REINFORCED CONCRETE — 23678.5 ft²
EXISTING STRUCTURE — REINFORCED CONCRETE — 653.3 ft²
EXISTING GLAZING — GLASS — 42.4 ft²

Analysis & Proposal

RPBW's conversion of the Lingotto factory uses almost exclusively steel members in the primary and secondary structure. With galvanized steel cladding and steel members to support the suspended roof it acts as a thermal conductor. For a gallery space designed to minimise sun and heat exposure, my proposal incorporates timber structural elements for the roof to act as a true shading, low carbon shading device. The timber woud be sourced locally in the Piedmont region, known for Pine and Oak abundance.

A second proposal for the project would be greater transparency in where both the materials of the architecture come from but also the labor relations and historical ties. Given that the very roots of the factory design was a deterrent against mass worker strikes, as happened in the previous Fiat Factory plant in 1920, I propose that the Fiat family include these relations through the format of an exhibition in the gallery space itself.

Roof breakdown

Low carbon steel
mass = 3189057.8 lb
energy = 1.1e+10 kcal (94% total)
material carbon footprint = 7.8e+06 lb (94.7%)
manufacturing carbon footprint = 1e+09 lb (64.5%)
transport carbon footprint = 2.4e+05 lb (84.5%)

Soda-Lime glass
mass = 585008.5 lb
energy = 6.4e+08 kcal (5.7% total)
material carbon footprint = 4.1e+05 lb (5.3%)
manufacturing carbon footprint = 4e+05 lb (37%)
transport carbon footprint = 4.4e+04 lb (15.5%)

Roof *alternative* proposal

Timber roof structure
mass = 212227.6 lb
energy = 8.8e+08 kcal (57.3%)
material carbon footprint = 4e+05 lb (49.1%)

> Timber provides a much lower carbon footprint than steel members in the roof

Overall *alternative* proposal

> Proposal to use a hardwood for the roof shading structure

GRADIENT OF EMBODIED CARBON
LIGHT RED = LOWEST
DARK RED = HIGHEST

> Proposal to use double glazing for existing building from a local manufacturer

Existing structure VS. New structure

Reinforced concrete
mass = 585008.5 lb
energy = 4.2e+04 kcal (51.7% total)
material carbon footprint = 3.2e+05 lb (54.2%)
transport carbon footprint = 1.4e+05 lb (96.3%)

Steel rebar
mass = 115580.0 lb
energy = 1.2e+05 kcal (48.3% total)
material carbon footprint = 2.7e+05 lb (45.8%)
transport carbon footprint = 4.9e+03 lb (3.3%)

Steel section
mass = 288034.2 lb
material carbon footprint = 6.7e+05 lb
manufacturing carbon footprint = 6.2e+04 lb
transport carbon footprint = 7e+03 lb

> new lightweight low carbon steel frame has a lower carbon footprint than the original structure's solid reinforced concrete

The sale of Lingotto factory to Reply, a tech giant is an apt example of the shift from industrial to digital productive services. The timeline shows Turin's position in industrial production and its downfall in the 1970s to a reemergence as a cultural center.

Timeline axis: 1920 1930 1940 1950 1960 1970 1990 2000 2010 2020

Timeline events:
Construction ends / Production begins. Fiat patiently redistributed their skilled workforce to build the factory.
Workers occupy Fiat factory at April 1920 in mass general strike.
Mussolini invades Ethiopia in 1938, Britain cuts off coal supply to Italy.
Lingotto factory bombed during Second World War, reconstructed soon after.
Production officially stops as factory moves into being a post-industrial era.
Lingotto factory falls into disrepair. Competition to renovate announced by city of Turin.
Construction completed. Lingotto opens as cultural & business center to public with the "Scrigno" gallery to house 25 works from Giovanni Agnelli, the grandson of the Fiat founder.
Fiat's parent company Stellantis sold the building to Reply, an Italian company specializing in digital services.

Key sources:
Christian Schittich (Ed.), Detail magazine, Building in Existing Fabric (2003)
Renzo Piano, Progetti e Architetture, 1984-1996.
Carlo Olmo, Michele Cerutto, Marcella Bernado di Prakome. "La metafora e il cantiere : Lingotto 1982-2003"
Marco Pranicki, "Progetto Lingotto, Torino", DOMUS 20, September 1986)
ANSYS Granta EduPack 2022 : Built Environment - Eco-Audits
www.rpbw.com/project/lingotto-factory-conversion
Matteo Licata, Medium magazine medium.com/road-star-life/a-test-track-in-the-sky-the-story-of-fiats-lingotto-factory-80fee6983664
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www.eea.europa.eu/data-and-maps/figures/elevation-map-of-europe

The map shows the ten largest data centers, by square footage, in the United States clustering around the country's largest major cities, as of 2022. As these cities house the country's highest real-estate prices, this is not the location one would typically expect for industrial buildings of this scale. Consuming vast amounts of electricity in their day-to-day operations, it seems illogical that the centers are positioned in areas that would compete with residents and the general workings of these major cities. Furthermore, the image of a data center as a huge, low-rise and sprawling black box–with constantly whirring servers that emit light and heat 24/7–would seem more appropriately located within the context of an open expanse, with little to no immediate neighbors, rather than in quite literally the densest cities in the US: New York, San Francisco, Boston, Chicago, and Miami.

Data centers should stay within our cities and cultural environments yet we need to find better ways to assimilate them into context. What is so present and strong about the "Grow your Own" initiative, in line with Shannon Mattern's notion of "digital bleed", is that it finds an alternative interface between the digital and physical realm. Opening up the black-boxes of new and daunting socio-technical networks is fundamental to finding formations that are more bottom-up, inclusive and equitable as Big Data shapes our futures.

Microsoft
Quincy, WA.
570,000 sq ft

Meta Platforms
Prineville, Oregon
4,600,000 sq ft

Google
Manhattan
2,900,000 sq ft

Digital Realty Trust
Chicago
1,133,739 sq ft

Markley Group
Boston
800,000 sq ft

CoreSite
Los Angeles
600,000 sq ft

Infomart
Dallas
1,600,000 sq ft

QTS Realty Trust
Sanston, VA.
1,500,000 sq ft

QTS Realty Trust
Atlanta
970,000 sq ft

Verizon
Miami
970,000 sq ft

Seattle · San Francisco · Los Angeles · Phoenix · New Orleans · Dallas · Atlanta · Chicago · New York · Philadelphia · Boston

ALBERS EQUAL AREA PROJECTION
MOSAIC OF FIFTEEN AVHRR IMAGES
24 MAY, 1984 - 14 MAY, 1986

nuclear ecology

History / Theory elective
Conflict Urbanism
Laura Kurgan
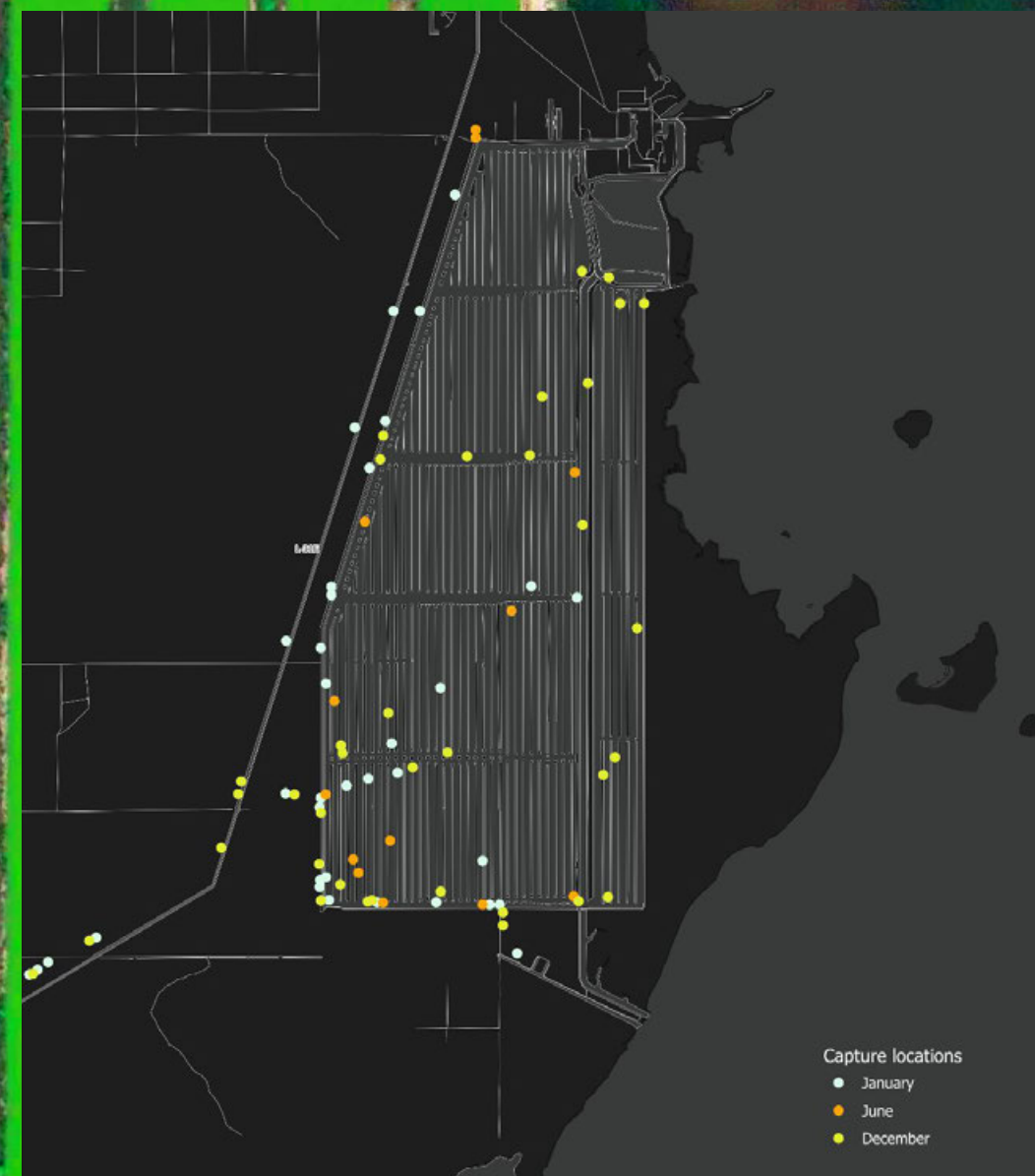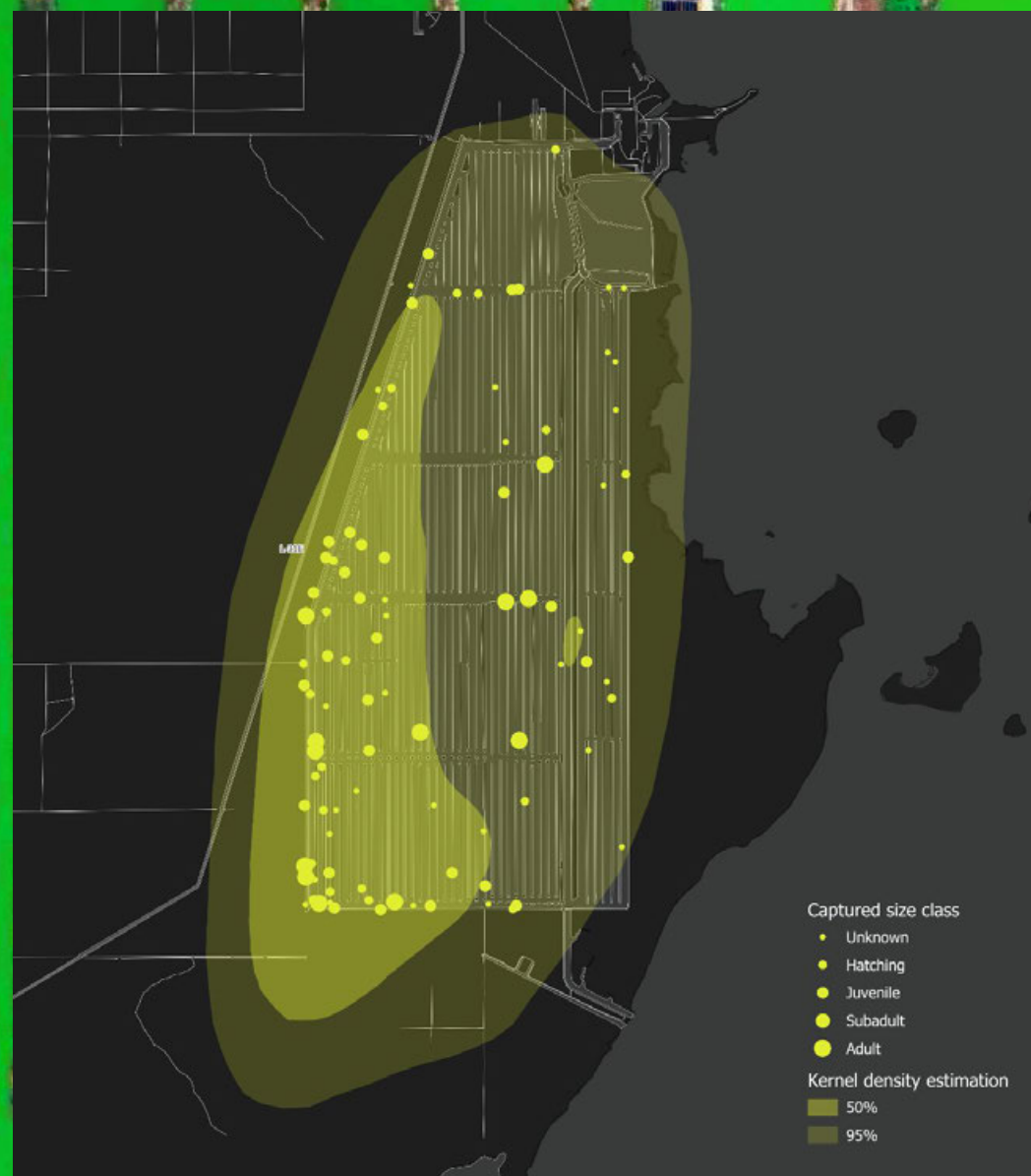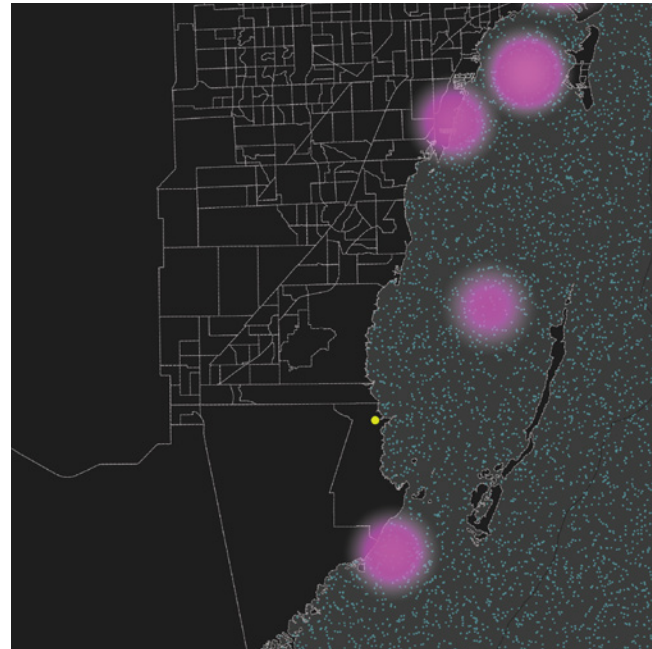**Collaboration with Trella Lopez + Minhan Lin**
Spring 2025

Hatchlings of American Crocodiles at Turkey Point Nuclear Power Plant. Image courtesy NRCgov, CC

The project explores the impact of Turkey Point Nuclear Generating Station on ecosystems – both natural and political – in Southern Florida. Tracing how nuclear infrastructure creates an artificial landscape, our project reveals a key tension: while Turkey Point's cooling canals have been long under scrutiny by environmental groups due to their proven leaking of salt water into local aquifers, this warm brackish water has surprisingly created an ideal habitat for American crocodiles. Set against a backdrop of concerns for the risk associated with nuclear generation, our research aims to bring to light the various data voids – or manipulated information – connected to Turkey Point. Amidst a contentious political landscape with scandals connected to Florida Power & Light, the owner of the plant, the project focuses on mapping available information and the array of actors, from Senators to crocodiles, to point to gaps in Turkey Point's narrative. The research aims to expose a series of complex relationships between ecology and political motivations and, ultimately, contribute a nuanced perspective to discourse on impact of nuclear infrastructure.
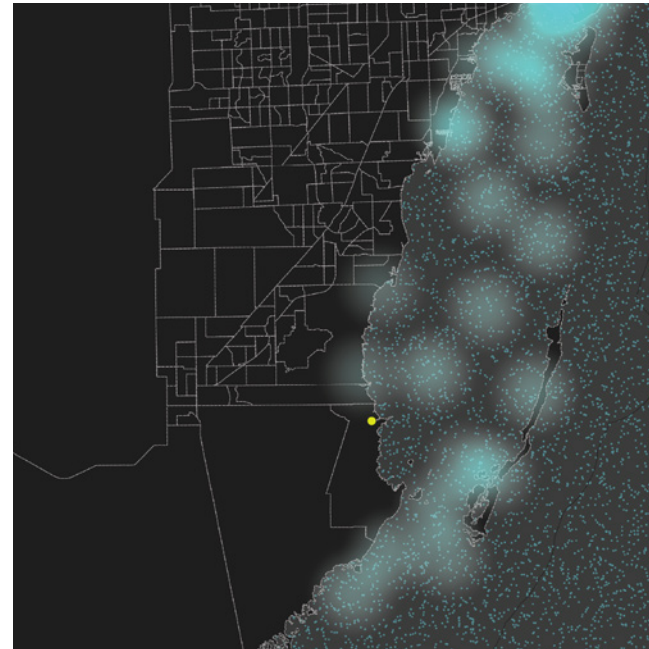
https://centerforspatialresearch.github.io/
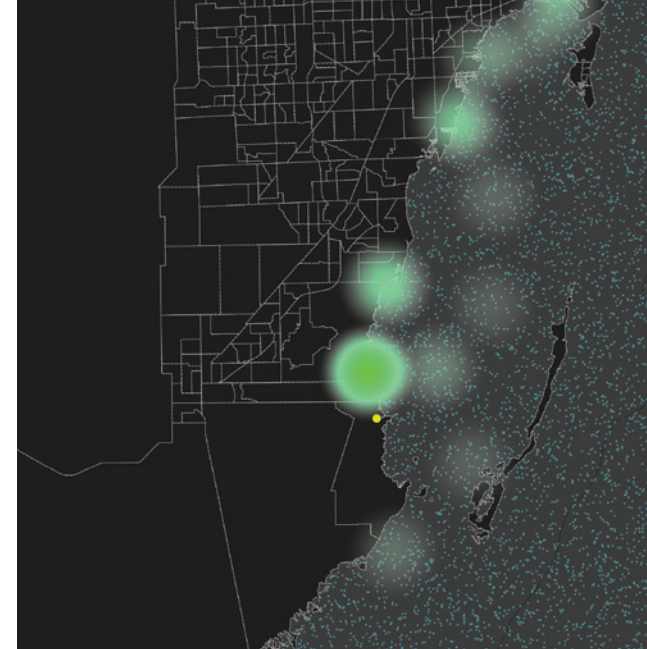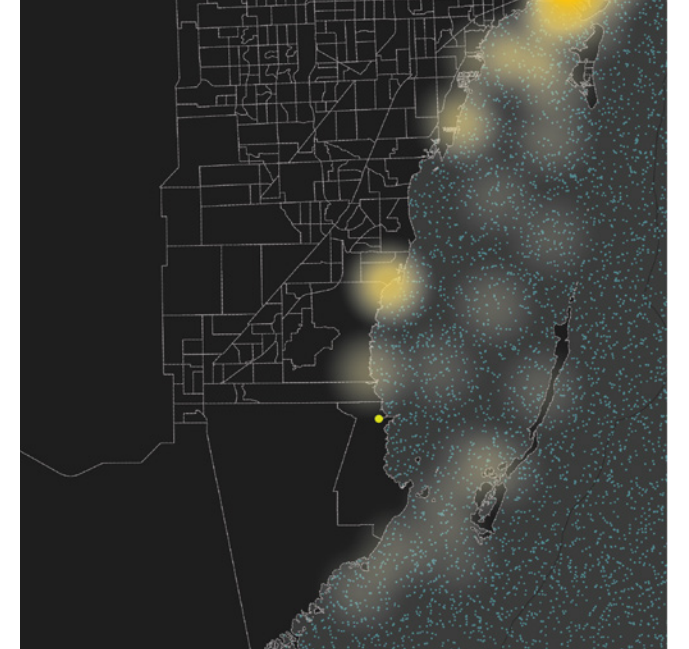conflict_urbanism_sp2025/2025/03/25/
Lopez.html

vi   v   iv   iii   ii   i

Captured size class
· Unknown
· Hatching
· Juvenile
· Subadult
· Adult

Kernel density estimation
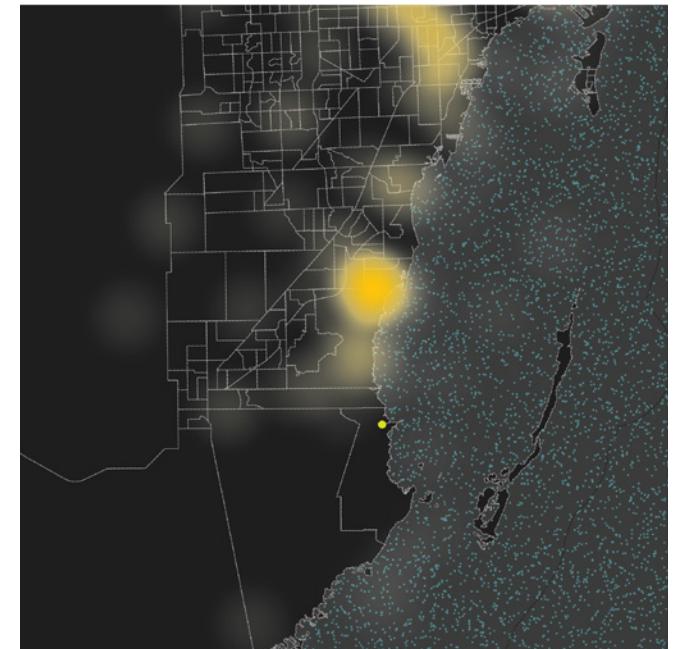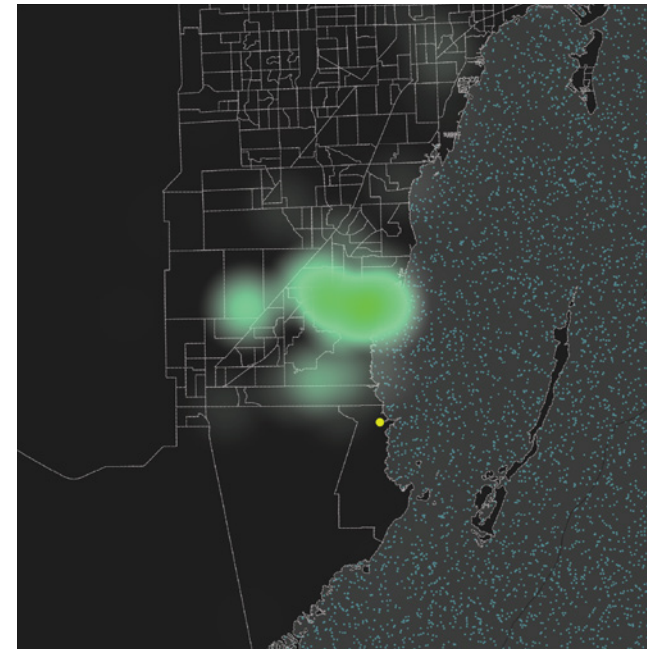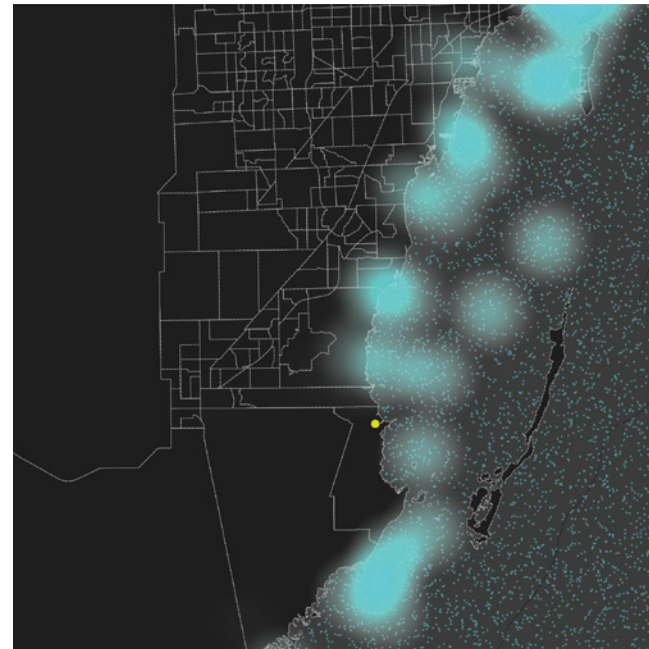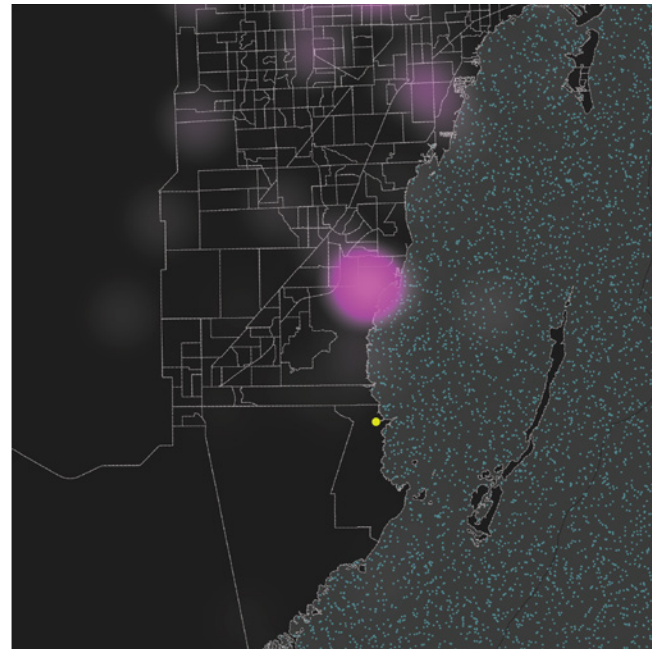50%
95%

Capture locations
· January
· June
· December

|	ammonium	salinity	nitrogen oxide	phosphorus
1980				
2024				

In 2018, Florida Power & Light became the first nuclear operator to seek to extend its operating license to a total of 80 years, which was met with backlash from environmental activists. In 2019, the NRC granted license extensions without a comprehensive environmental impact assessment, leading to a lawsuit from environmental groups. In 2022, the NRC reversed its prior decision and mandated a full environmental review, and by 2024 reinstated the license extensions, allowing Units 3 and 4 to operate until 2052 and 2053. An analysis of Florida's census tract changes from 1990 to 2020 revealed an intriguing insight: while most tracts subdivided and increased as a clear result of urban development around Miami, Turkey Point was uniquely assigned its own census tract in 2020. The map shows that the line was deliberately drawn to enclose the facility. This tract is not connected to any urban development, raising questions on the reasoning behind the decision.

FPL used outdated census data from 1990 in their license renewal application published in 2018. The report cited continuity from its renewal filing in 2000 and for consistency in available environmental data, yet a lower population works in their favour to and gives an advantage to reduce opposition. FPL's interest in census outcomes is evident, though the political and regulatory implications are complex. Although there is no direct evidence, a newly drawn tract around Turkey Point in 2020 raises speculation as to whether FPL had any influence in the redistricting process – to position the facility as an isolated entity, with lower population in the vicinity, offering significant regulatory and strategic advantages.

1990

2000

2010

2020
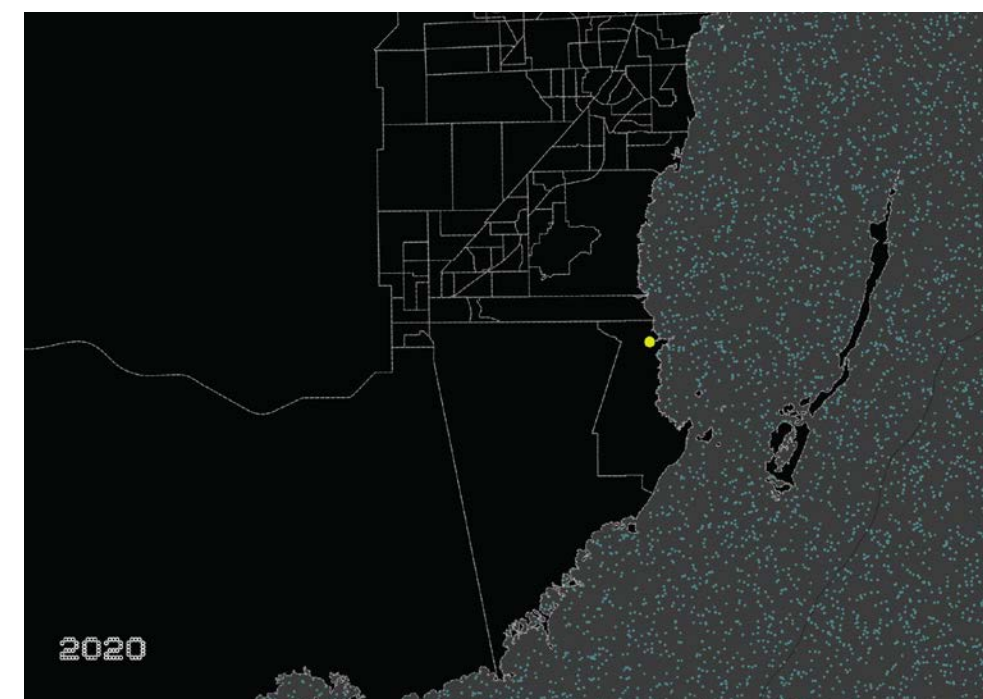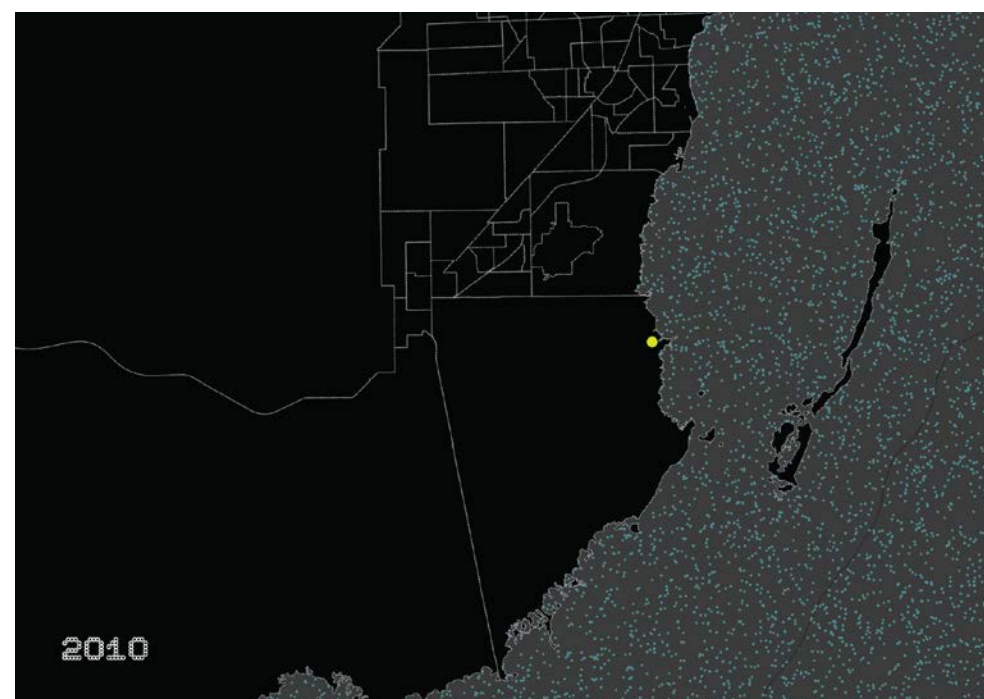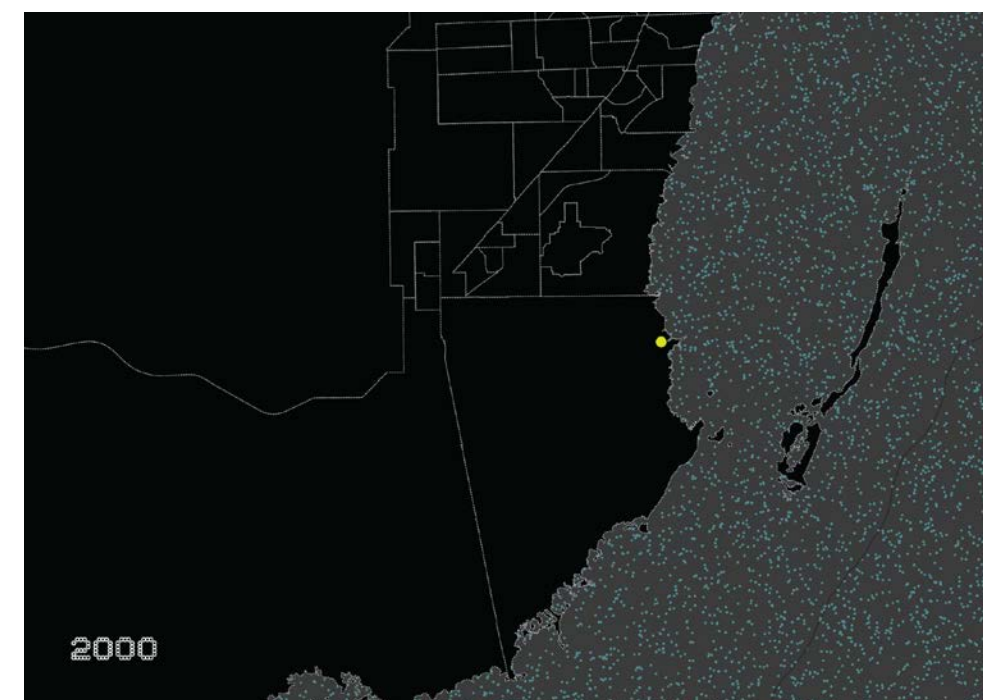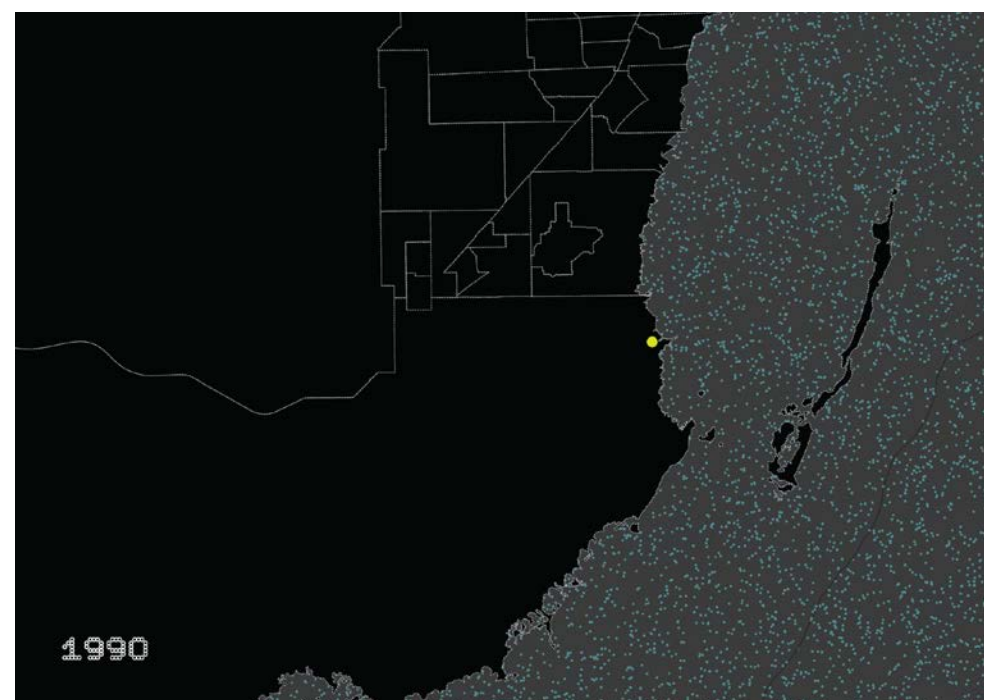
laboratory for design correlation

History / Theory
Felicity Scott
Questions in Architectural History II
Spring 2023

Documentation of the Mobile Home Library, 1937

The paper investigates the pedagogical work of Frederick Kiesler in the "Laboratory of Design Correlation", a multidisciplinary research lab he set up at Columbia University School of Architecture from 1937-41. The paper argues that Kiesler's theory of Biotechnics was employed in his teaching practice by combining a scientific rule-based framework with more idiosyncratic, organic notions of design. The paper questions to what extent Kiesler's theory of Biotechnics acted as a deviation from the School of Architecture's pedagogical direction under Dean Arnaud, and determine Kiesler's position beyond the modernist canon and with other institutions across the US through a study of the Mobile Home LIbrary.

"No tool exists in isolation" Frederick Kiesler's t r a n s d i s c i p l i n a r y pedagogical practice in the Laboratory of Design Correlation at Columbia University School of Architecture

The Mobile-Home-Library was a project developed by Frederick Kiesler (1890-1965) with students at the Laboratory of Design Correlation (LDC), a multidisciplinary research laboratory active at Columbia University School of Architecture in New York between 1937-1941. The design resulted from an investigative survey on domestic book storage completed by students David Tukey, Alden Thompson, and Ronald Kaufmann in the second year of the LDC's operation. "A summary of all the design principles currently employed in bookcases led to one conclusion: they place the preponderance of strain upon the user, not the tool:" the design was, therefore, resolved "biotechnically" in six major areas: capacity, flexibility, construction, dust control, content grouping, and fatigue reduction. As an optimized means for storing a collection of books, the product was designed with careful effort to both reduce strain for the body and create a content categorization system, inviting a multitude of possibilities for both ergonomic movement and interaction with the book as a form of media.

Kiesler's summary provides us an insight into three major strands of his own research inquiry that persisted throughout much of his career: 1) an intensive study of the limitations of the human body, 2) a focus on the body's natural, technological, and cultural environment, and 3) the correlation between the body and these very types of environments through design. The very fact that Kiesler chose to link three words to form one is highly telling of his intent to correlate and fuse these three elements; Mobile presenting representing the movement of the human body, Home representing its environment and context, and Library indicating information categorization through the subject of the book. Oscillating between the individual and institution, this paper will utilize the three themes stated above as the basis of its structure to extrapolate the context of Kiesler's pedagogical practice.

This paper argues that Kiesler's constructed theories were closely aligned with his pedagogical tools, in fact they were often one and the same. This stemmed from his early education, his criticality of the Bauhaus, and the assimilation of pedagogical practices similar to American philosopher John Dewey's famous notion "learning by doing." Tracking Kiesler as a networked figure in both the early European avant-garde and later in US modernism, I aim to determine the complex position Kiesler held between scientific research methods and fantastical imaginations and assess how this tension played out in Columbia's educational setting.

Through further analysis of Columbia's history of teaching, this paper seeks to claim that the LDC proved a critical turning point for the School of Architecture's research practices. Although it is widely acknowledged

that transdisciplinary research only initiated in certain institutions in the late 1960s, Kiesler pioneered transdisciplinary research methods over thirty years earlier in his fusion of correlative disciplines in design. I argue that the Mobile-Home-Library was an early form of information technology and embodied apparatus for the intent, pedagogy, and structure of the research laboratory to converge.

In 1941, after the closure of the LDC, Kiesler began to work on a manuscript: a treatise on Correalism. Although he worked on the project for several years, the manuscript remains unfinished and unpublished. Perhaps this did not matter to Kiesler, as correalism did not need a conclusion. It was a methodology to codify and ultimately try to form a basis for connection between humans and the world around them. "No tool exists in isolation. Every technological device is co-real: its existence is conditioned by the flux of man's struggle, hence by its relation to his total environment." Thus, all technological development was "conditioned" by the "flux" of humans in cultural evolution, totally aligned to the endless continual nature of learning and growing. In a 1937 article for Columbia University Quarterly, Arnaud states that Columbia University will always be in a process of development: architecturally and pedagogically.
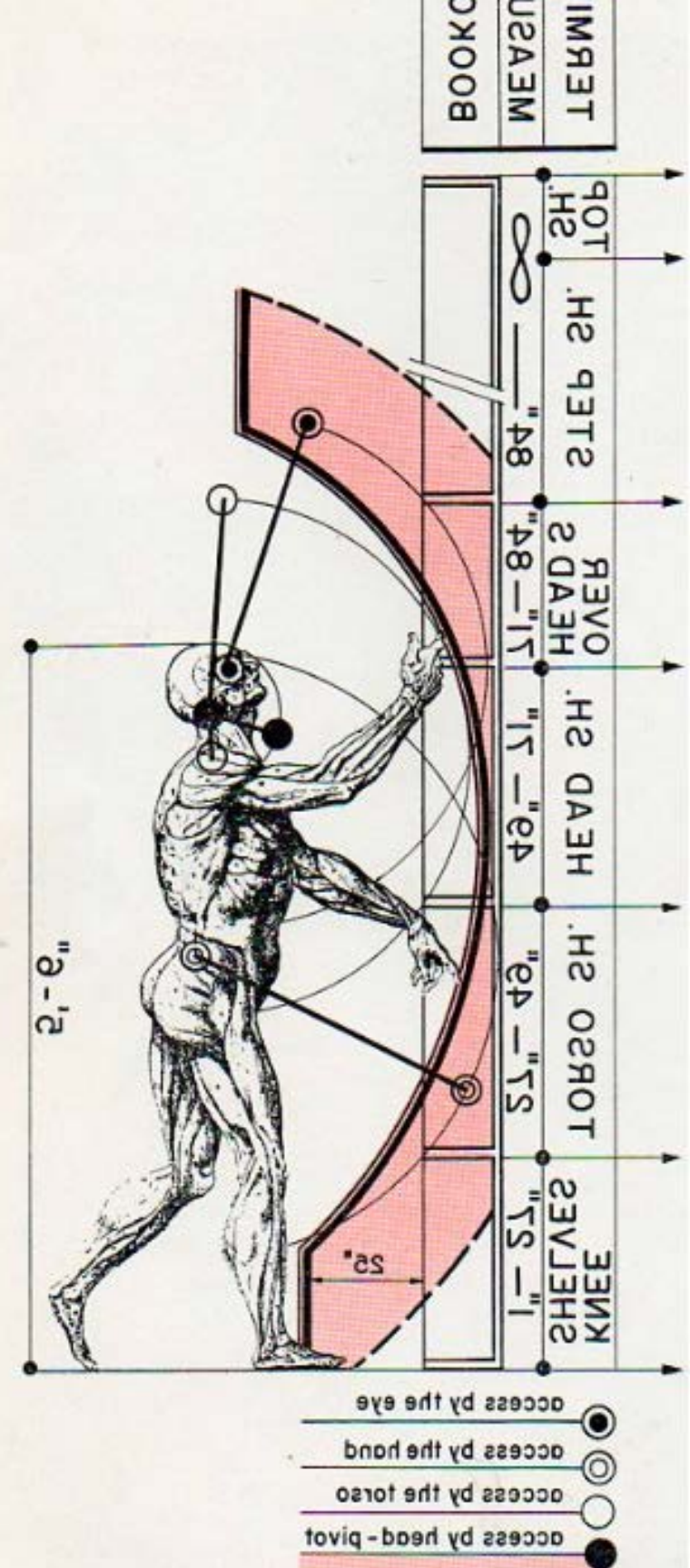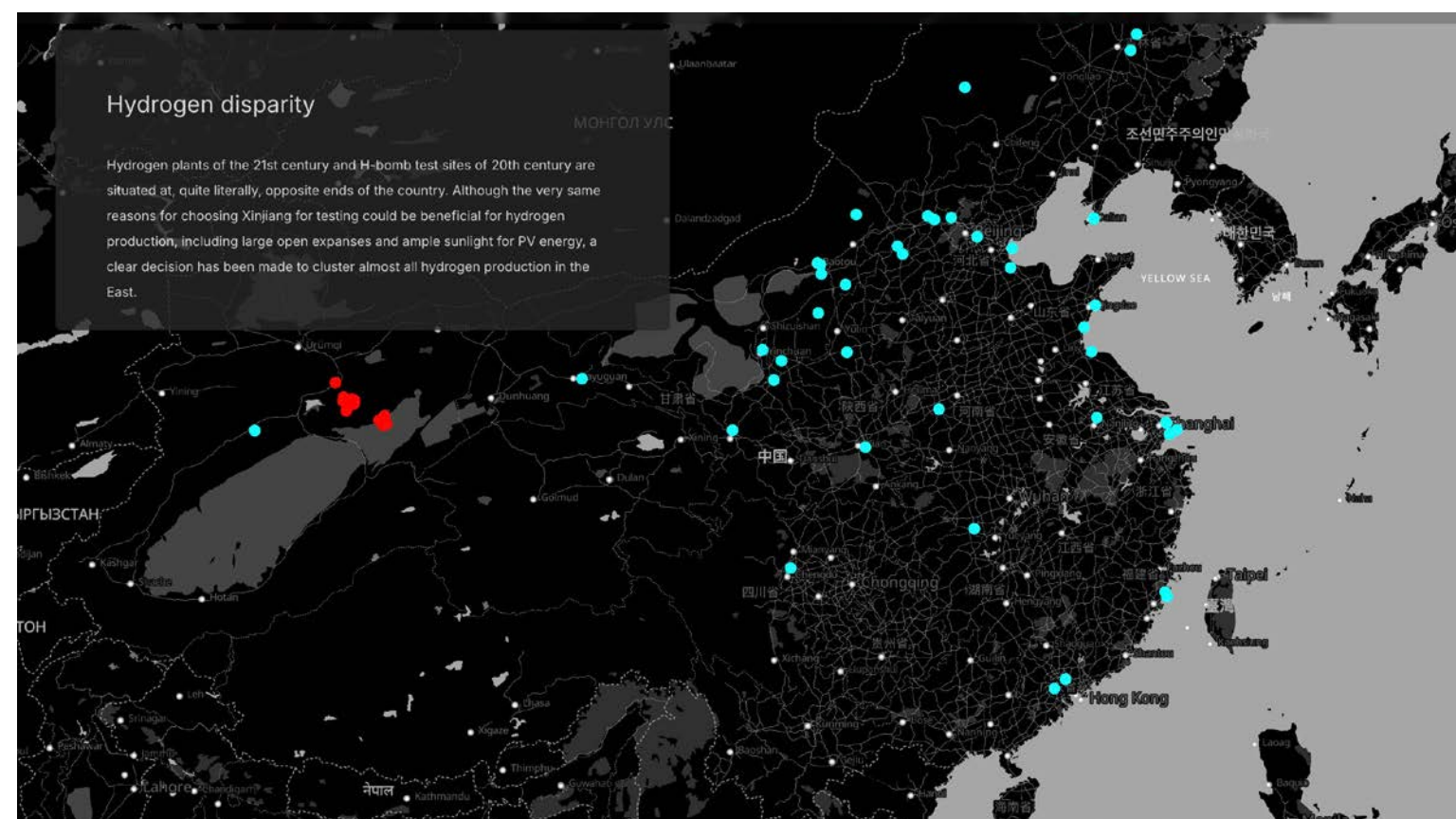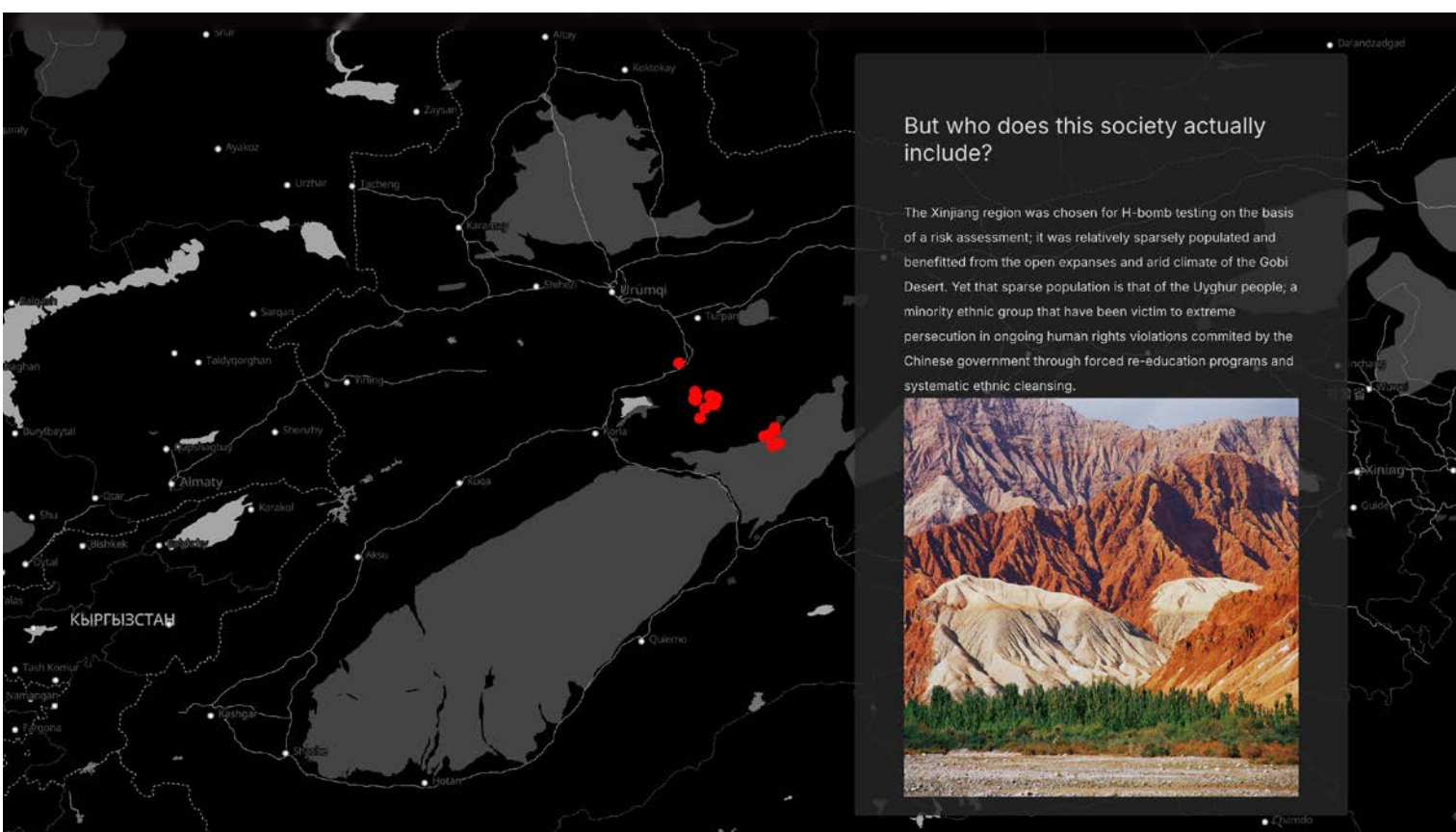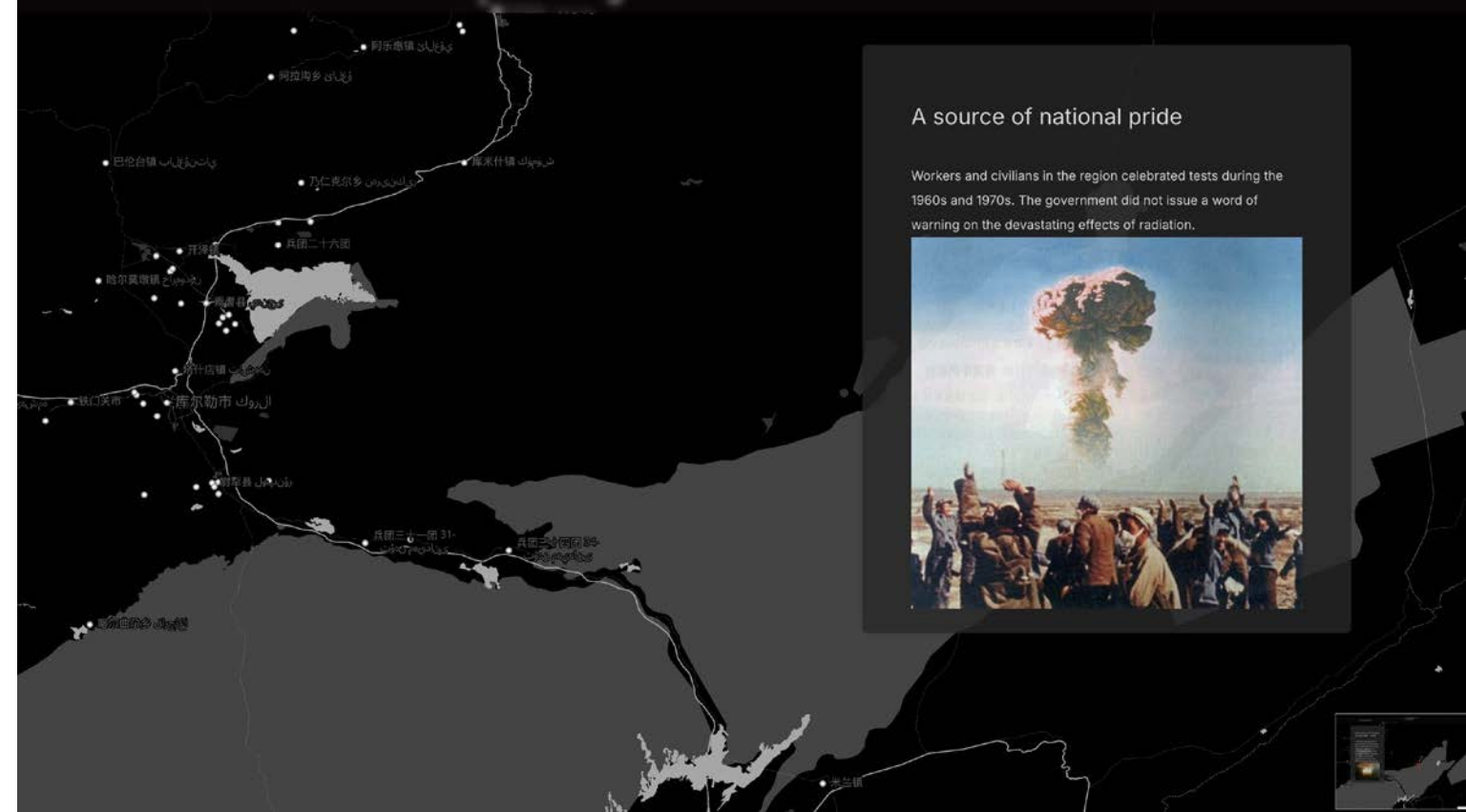

Kiesler, Correlation, 1937

hydrogen society

Remnants of test sites at Lop Nur base, 2022

Hydrogen has played a defining role in both technological innovation and extreme devastation in China and across the globe. This atlas explores how both the weaponization and energization of hydrogen has shaped China's cultural landscape. In unpacking the nuances behind what hydrogen means to a rapidly changing society, this atlas serves to geolocate and acknowledge the continual effects of H-bomb testing on the Uyghur minority ethnic group in the Xinjiang Autonomous Prefecture. Eastern China is rapidly developing its hydrogen infrastructure with numerous planned plants to open in the near future. Utilizing the area of the country that is best connected, hydrogen is envisioned to transform transportation and pipeline networks. Planned proposals for hydrogen plants reiterate how hydrogen has been both weaponized against a vastly unacknowledged society, and energized towards a well connected society that will be able to reap the material's benefits.

hyb2106.github.io/astro-maplibre-template/scrollytelling/
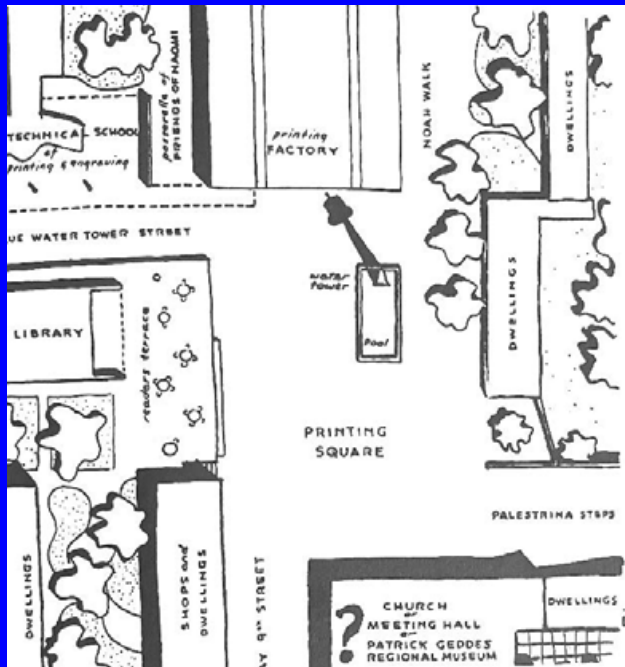
Mapping China's hydrogen society

Hydrogen has played a defining role in both technological innovation and extreme devastation in China and across the globe. This atlas explores how both the weaponization and energization of hydrogen has shaped China's cultural landscape. In unpacking the nuances behind what hydrogen means to a rapidly changing society, this atlas serves to geolocate and acknowledge the continual effects of H-bomb testing on the Uyghur minority ethnic group in the Xinjiang Autonomous Prefecture. Scroll to learn more about China's hydrogen society.

A source of national pride

Workers and civilians in the region celebrated tests during the 1960s and 1970s. The government did not issue a word of warning on the devastating effects of radiation.

But who does this society actually include?

The Xinjiang region was chosen for H-bomb testing on the basis of a risk assessment; it was relatively sparsely populated and benefitted from the open expanses and arid climate of the Gobi Desert. Yet that sparse population is that of the Uyghur people; a minority ethnic group that have been victim to extreme persecution in ongoing human rights violations commited by the Chinese government through forced re-education programs and systematic ethnic cleansing.

Hydrogen disparity

Hydrogen plants of the 21st century and H-bomb test sites of 20th century are situated at, quite literally, opposite ends of the country. Although the very same reasons for choosing Xinjiang for testing could be beneficial for hydrogen production, including large open expanses and ample sunlight for PV energy, a clear decision has been made to cluster almost all hydrogen production in the East.

situated smartness

Design seminar
Amale Andraos
49 Cities
Spring 2025

Percival Goodman, A new town square, 1947

Under the guise of technological progress, smart city frameworks render themselves increasingly inadequate in addressing communal needs as they so-often rely on extractive techniques of surveillance capitalism. Communitas: Means of Livelihood and Ways of Life (1947) by Percival and Paul Goodman offers a critique of consumerist society and proposes a form of visionary, techno-socialist planning principles. Juxtaposed with contemporary critiques of smart urbanism—particularly its emphasis on efficiency, data-driven governance, and technological optimization at the expense of public space—Communitas offers a valuable perspective on participatory planning. Smart systems have often emerged from the well-known Silicon Valley imaginary, where scalability, control, and productivity dominate. A critical-propositional framework is introduced and focuses on addressing two dimensions of future urbanism: energy infrastructure and public participation. The article cites Taiwanese digital governance as an example to synergize technological innovation and democratic planning in the development of more just urban futures.

Situated Smartness: Communitas as a Framework for Aligned, Civic, and Speculative Infrastructures

The contemporary image of the smart city is by now commonplace, and discourses over recent years have taken a routine script: critiques rightly center around ongoing concerns over surveillance and data extraction, yet the repetition has rendered them rarely surprising. While critics like Shannon Mattern (2021) propose nuanced theoretical alternatives to argue that a city is not a computer, tried-and-tested smart infrastructures that meaningfully center community participation are still few and far between. Digital technologies like computers, sensors, and servers are fleeting assemblages of extracted materials energized by electricity. Fostering a physical and material awareness that directly connects and resonates with energy levels of a city itself can open new possibilities for urban intelligence.

In an interview in Commentary magazine, Percival Goodman claimed that "the first purpose of architecture is not the building but the town square" (Goodman, as cited in Abrams, 1947). Expanding this definition of the town square to encompass both the physical city square and civic engagement more broadly, this article reconsiders Goodman's seminal text Communitas through the lens of community-driven technological infrastructures. Specifically, it aims to unpack the book's second urban proposal

"A New Commune" and compare this with contemporary notions of participatory digital governance in Taiwan, to eventually speculate on alternative infrastructures in the context of situated smartness in urban space.

'Smart city' as a term began to appear in urbanist literature in the 1990s, concretized by IBM's definition as "one of instrumentation, interconnectedness, and intelligence" (IBM, as cited in Salter, 2022). Many critics including Chris Salter (2022) have criticized smartness due to its lack of focus on the human. IBM actually trademarked the term "smarter cities" in 2011, which marked an era of fetishized fixation on data-driven design and decision making, catalyzing an exponential race to being "smarter", while giving an implicit hint that the city may be smarter than the resident itself (Salter, 2022). This smarter city quickly found itself being critiqued for being a site of surveillance, heightened commodity flows and information gathering facilities for the likes of Amazon and Alphabet.

What if a smart city aligned with the pace of the city itself? Imagine its learning systems —sensors, devices, and servers—powered entirely by energy harvested from the city's own byproducts and exhaust. Subway heat, solar gain, and waste converted through pyrolysis could all provide clean and latent energy to sustain a digital infrastructure. Both residents and policy-makers would receive real-time feedback: if it was a cloudy day, then data collection may slow, reflecting a temporary dip in available energy. If a city, for example, had very little sun but was proficient in processing waste, that could be the source of energy to power any smart infrastructure. This methodology evokes the metabolic

relations showcased through waste to fertilizer community organizing in "The New Commune". Each city has the opportunity to join a network like the Solar Protocol, where they contribute their greatest energy asset and host other city's data with any surplus energy they may have. Energy trade alliances and mutual relations are key in this context.

Drawing on Taiwan's 'Alignment Assemblies,' a new kind of town hall embraces decentralized public participation and invites diverse voices in the process of shaping shared futures. Virtual and physical round tables become the spaces where collective direction on smart urbanism is negotiated. An infrastructure that remains flexible and relational—responsive to people and place—are key to this model and adapting to changing conditions. This provides opportunity for the emergence of digital acts that honor reciprocity and ongoing feedback loops for mutual care. This town hall would serve as a prototype for other cities to learn from; all code used for networking participation platforms is open source and accessible.
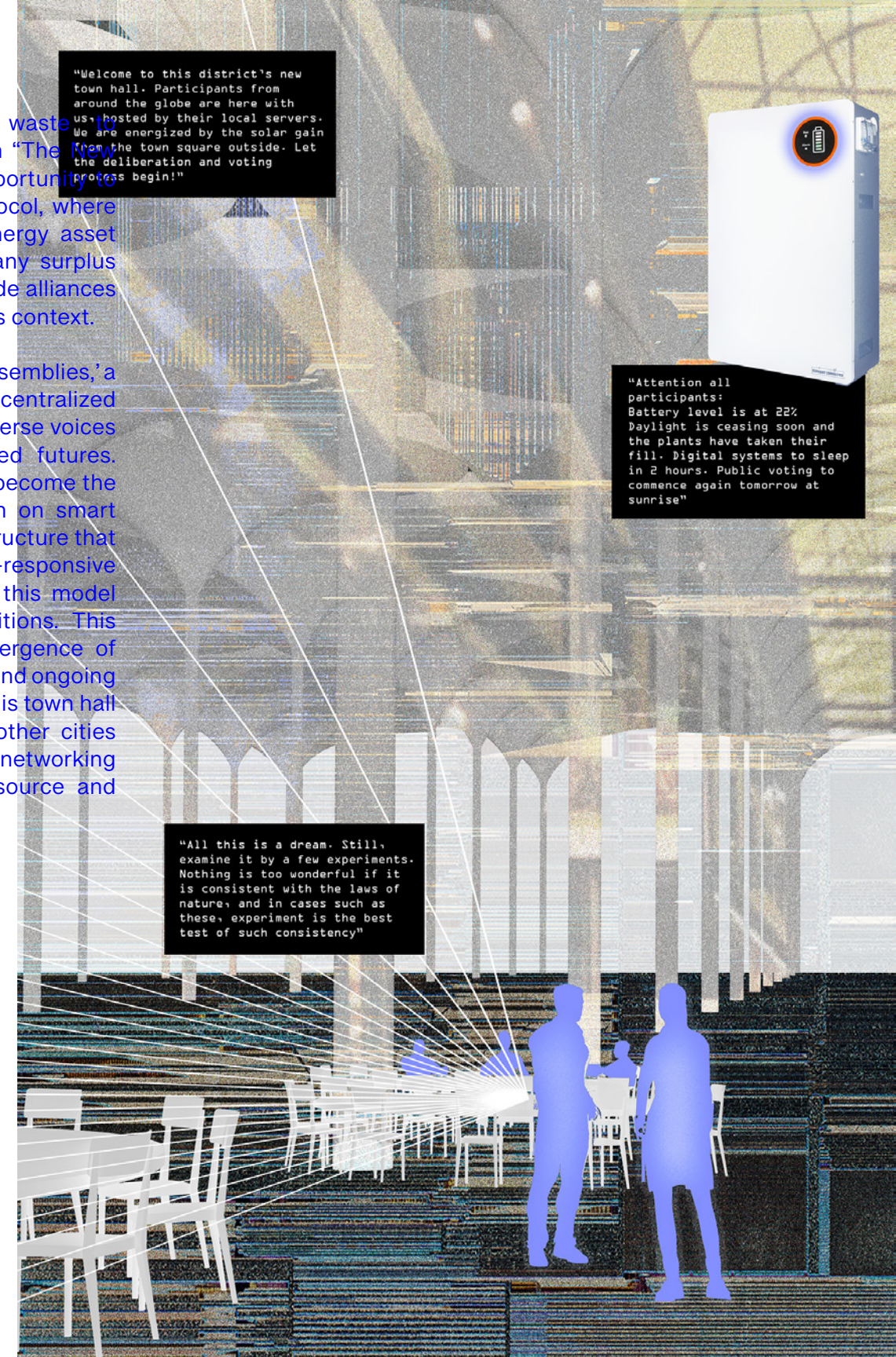
dark
metabolisms

Building Science & Technology elective
Metabolic Materialities
Michael Wang
Collaboration with Arissara Reed
Spring 2025

Etching of the "Pig Wars", Central Park, c. 1860

The land today known as Central Park was once the periphery of New York City; an unwanted edge occupied by stinky, sticky and prolific industries that metabolized the city's waste. On the western side, between what is now 66th and 75th street, was a district known as Stink Town, home to piggeries, bone boiling plants and bone charring facilities. These "nuisance" industries absorbed the offal and bones from butcheries and restaurants, and sold the grease, fat, and char byproducts to soap-making, candle-making and sugar distilleries across the city. These industries were crucial to the day-to-day functioning of New York, especially in keeping downtown Manhattan clean. However, amidst the rapid northward expansion of the city, a plan for a park to drive uptown real estate value emerged by the mid-nineteenth century. The existing occupants were labelled as disease-ridden and morally filthy. Used as an early form of zoning, "nuisance" laws were created specifically to displace these industries run by immigrant communities that sat within a rocky and hilly terrain. In order to realize the plans for Central Park, communities were violently displaced and the ground was dynamited to form a new flat, vast and sanitized datum.