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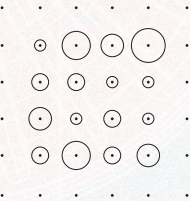
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2024 / Fall

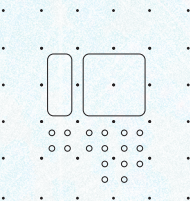
Archiving the Invisible

Advisor : Prof. Leslie Gill, Khoi Nguyen
Course : Advanced Studio V
Individual Project

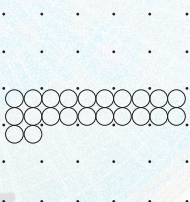
“Archiving the Invisible” is a multi step architectural project that reflects on the impact of global warming on Arctic ecosystems through the study and preservation of dormant bacteria released from melting permafrost. The project is divided into three interrelated components:



The Field Station
A modular, mobile system for the sampling of permafrost cores throughout the Arctic landscape



The HUB
A research and medical facility based near local Arctic communities, with forms filleted for durability in the arctic environment and thermal efficiency



The Archive
Located in Iqaluit, which couples sleek, expandable metal research pods with locally inspired wooden public spaces.

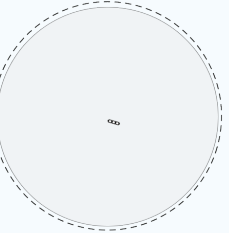
Together, they form a network for sampling, studying, and archiving invisible bacterial ecosystems, the basis of a global scientific network and raising public awareness about Arctic ecology’s challenges and opportunities.



Dormant Bacterias Sampling Concept

Mapping the Bacteria

The system spans the Canadian Arctic, beginning with the Field Station, which samples permafrost cores across remote landscapes. Samples are sent to The HUB in Arctic towns for research, storage, and emergency response. Select data is archived in The Archive in Iqaluit, where scientific research meets public engagement.



Field Station



The HUB

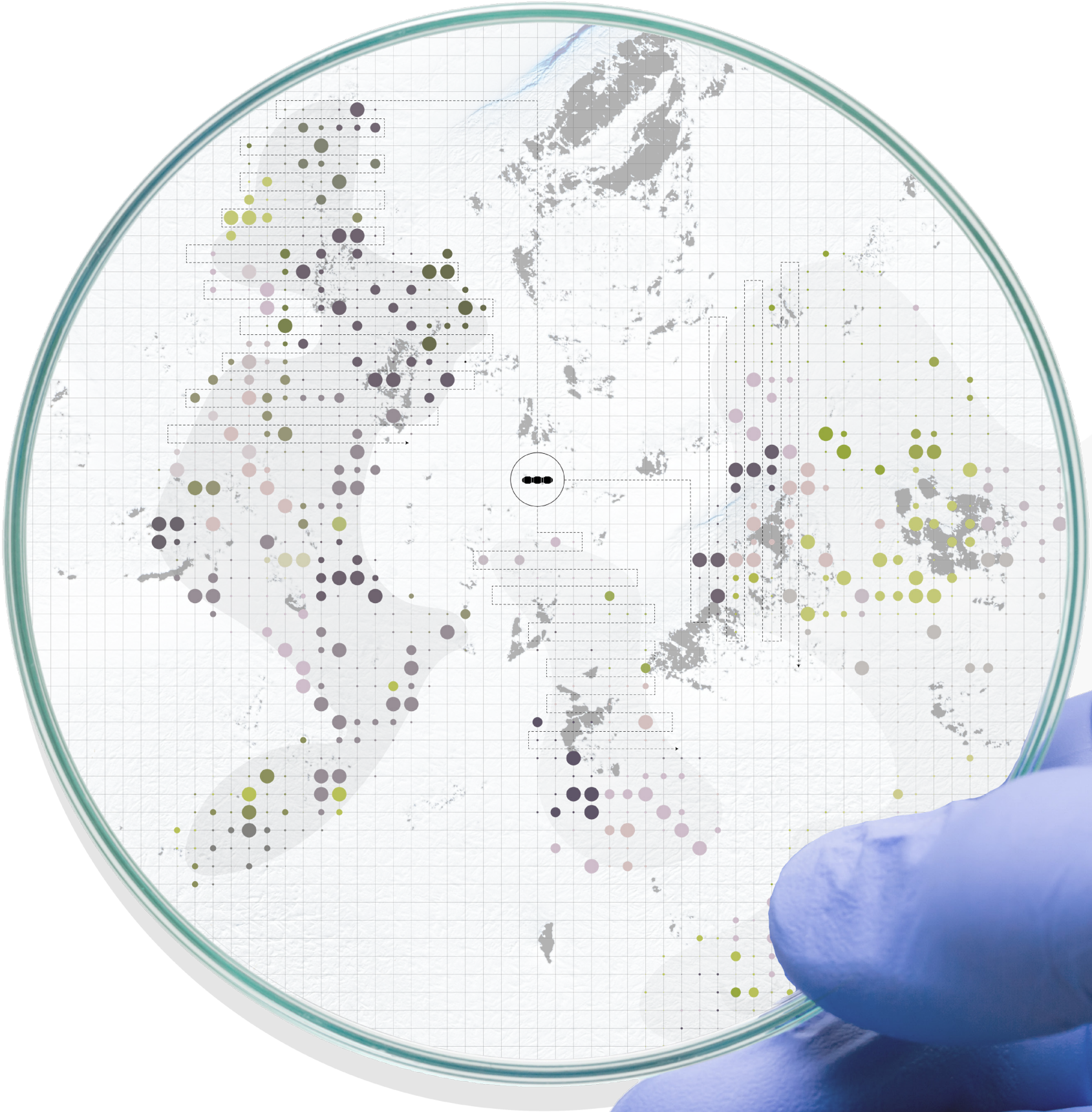
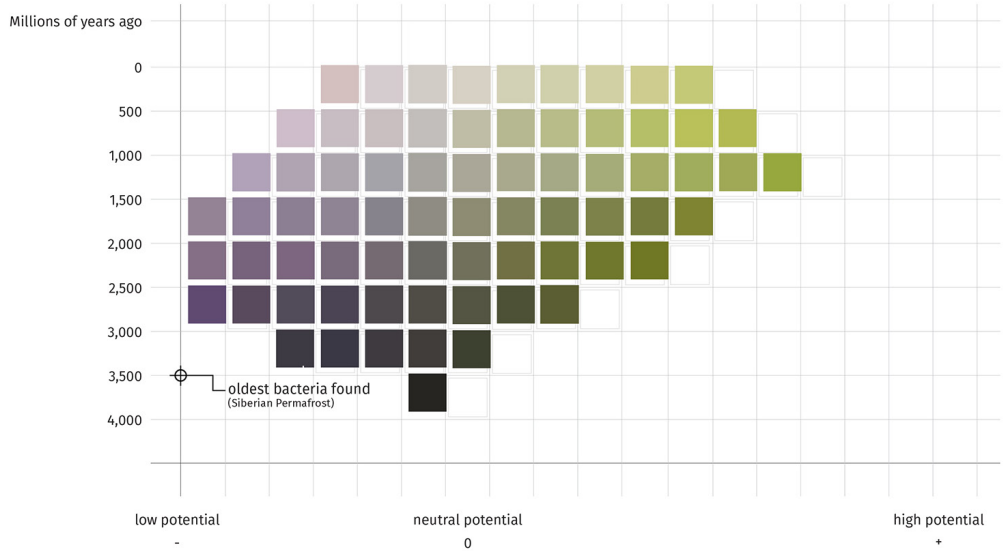


The Archive

Ice Core Sampling strategy

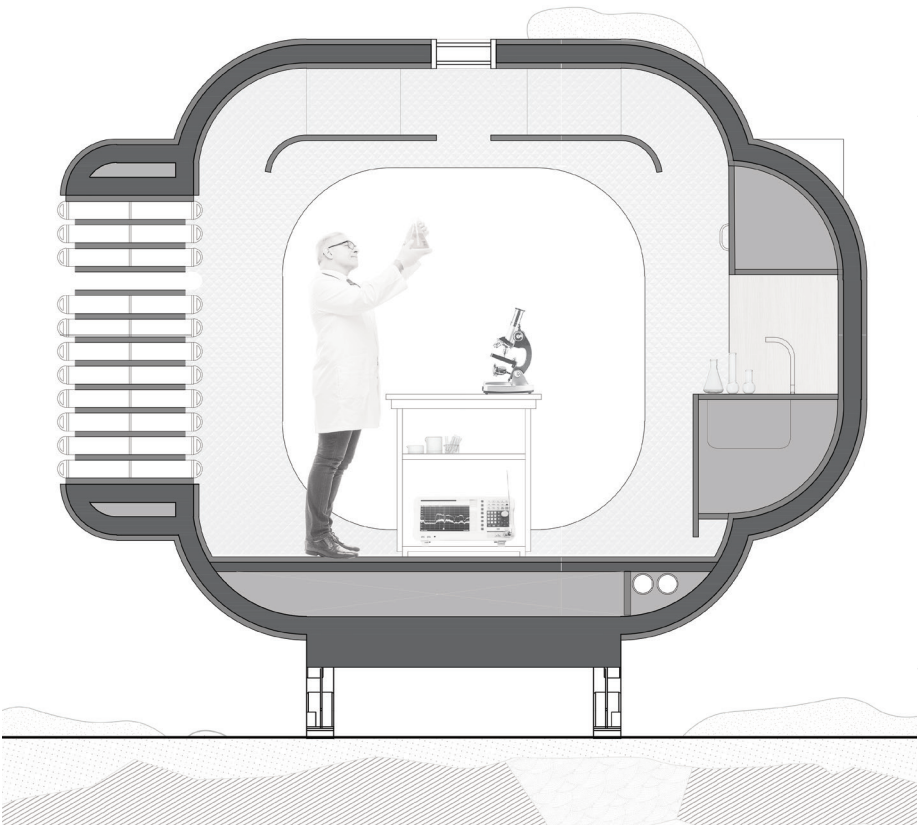
Each 10m x 10m grid of the Arctic landscape is systematically analyzed, and the data is visualized using natural dyes, creating a color-coded map of bacterial distribution.

The X axis of the color code indicated ecological colonization, the potential for successful colonization in modern environments after thawing. If its Green, it means the bacteria has high potential in surviving and adapt to the modern environment and Purple is low potential of survival. The Y axis is the average bacteria age of the sample. The darker it is, it is more old.

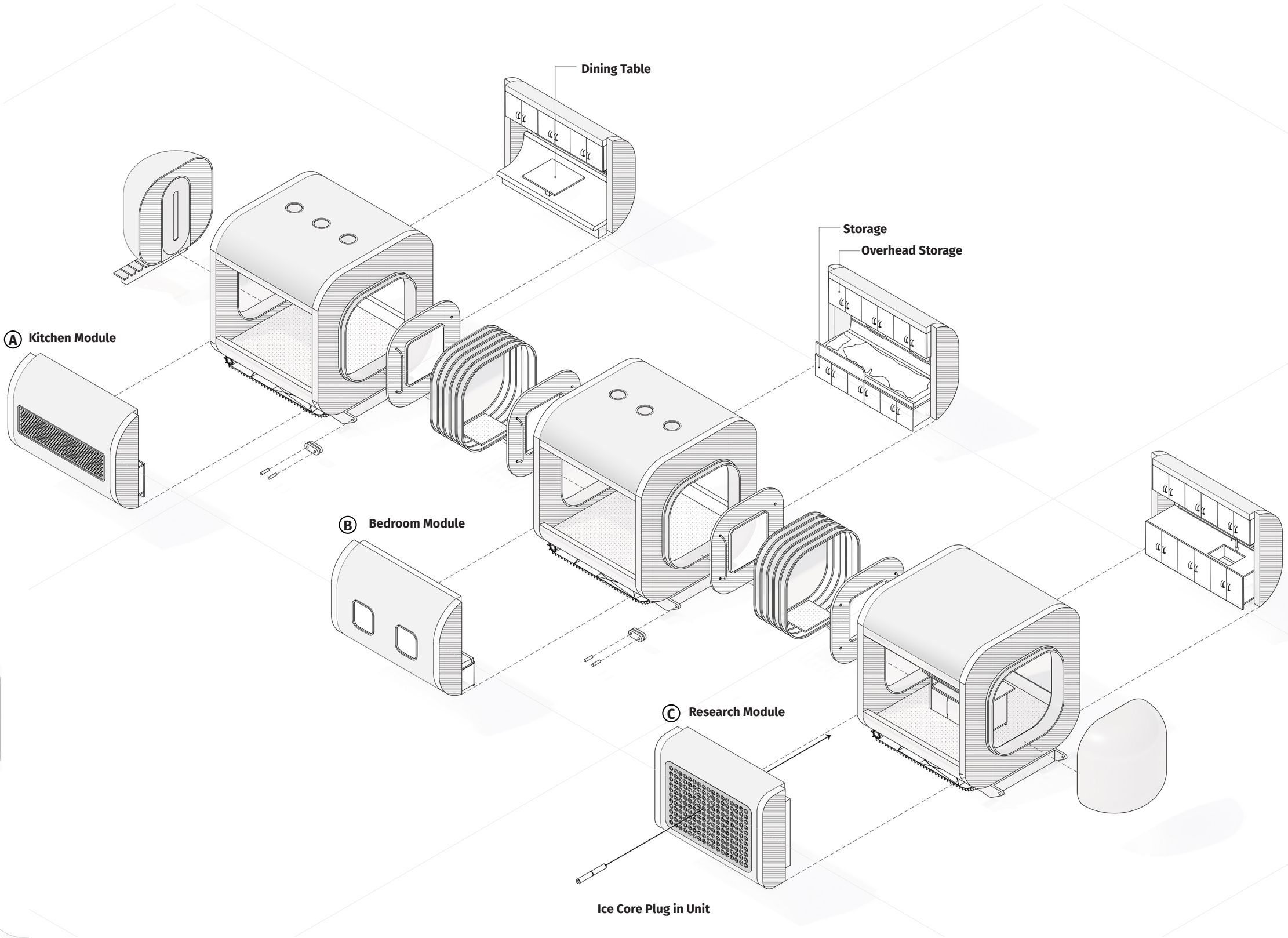


Field Station

The Field Station is a mobile, on-site module designed to traverse Arctic locations to collect ice cores. The module acts as a bedroom, bath, and kitchen, alongside a compact research facility and a primary bacteria collection dome. Researchers, working in teams of 2-3, conduct core sampling, with each collection taking approximately 10 minutes. Inside the station, ice cores are carefully scraped with sterile scalpels to preserve archival samples.



Field Station Module Section

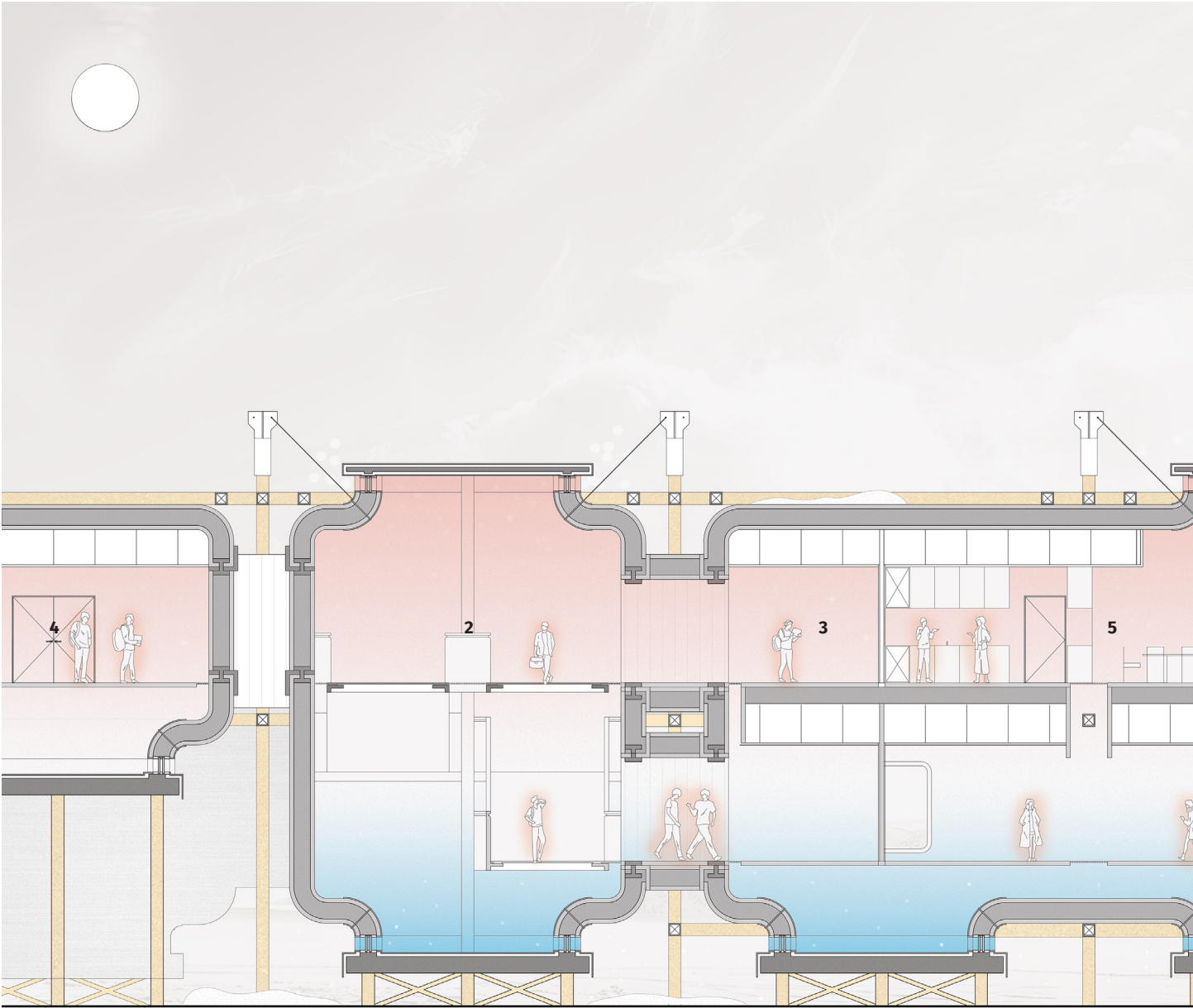
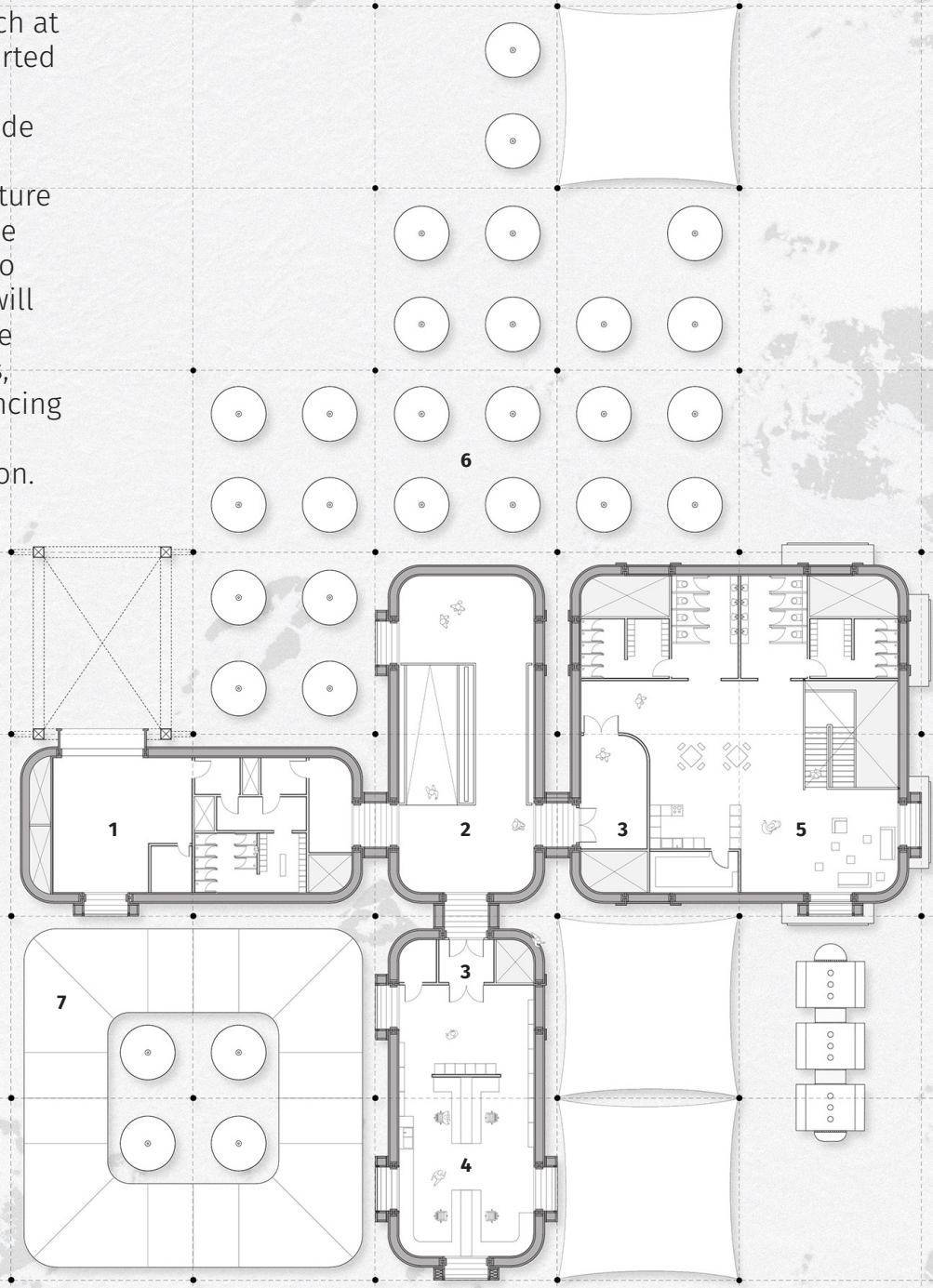


Field Station Exploded Diagram

The HUB

The Hub serves as a central facility for collecting, mapping, and storing archival data on colonized bacteria and permafrost cores. These cores will undergo intensive research at the Hub before being transported to the main archive center in Iqaluit, where they will be made accessible to the public. Each Hub, a semi-permanent structure located in key cities across the Canadian Arctic, is designed to be a hub of collaboration. It will support researchers and serve the surrounding communities, playing a crucial role in advancing Arctic bacterial research and fostering regional collaboration.

- 1 Research Module Plug-in Station
- 2 Circulation Unit
- 3 Airlock
- 4 Research Lab Unit
- 5 Living Unit
- 6 Ice-core Storage
- 7 Underground Lab with Ice core storage

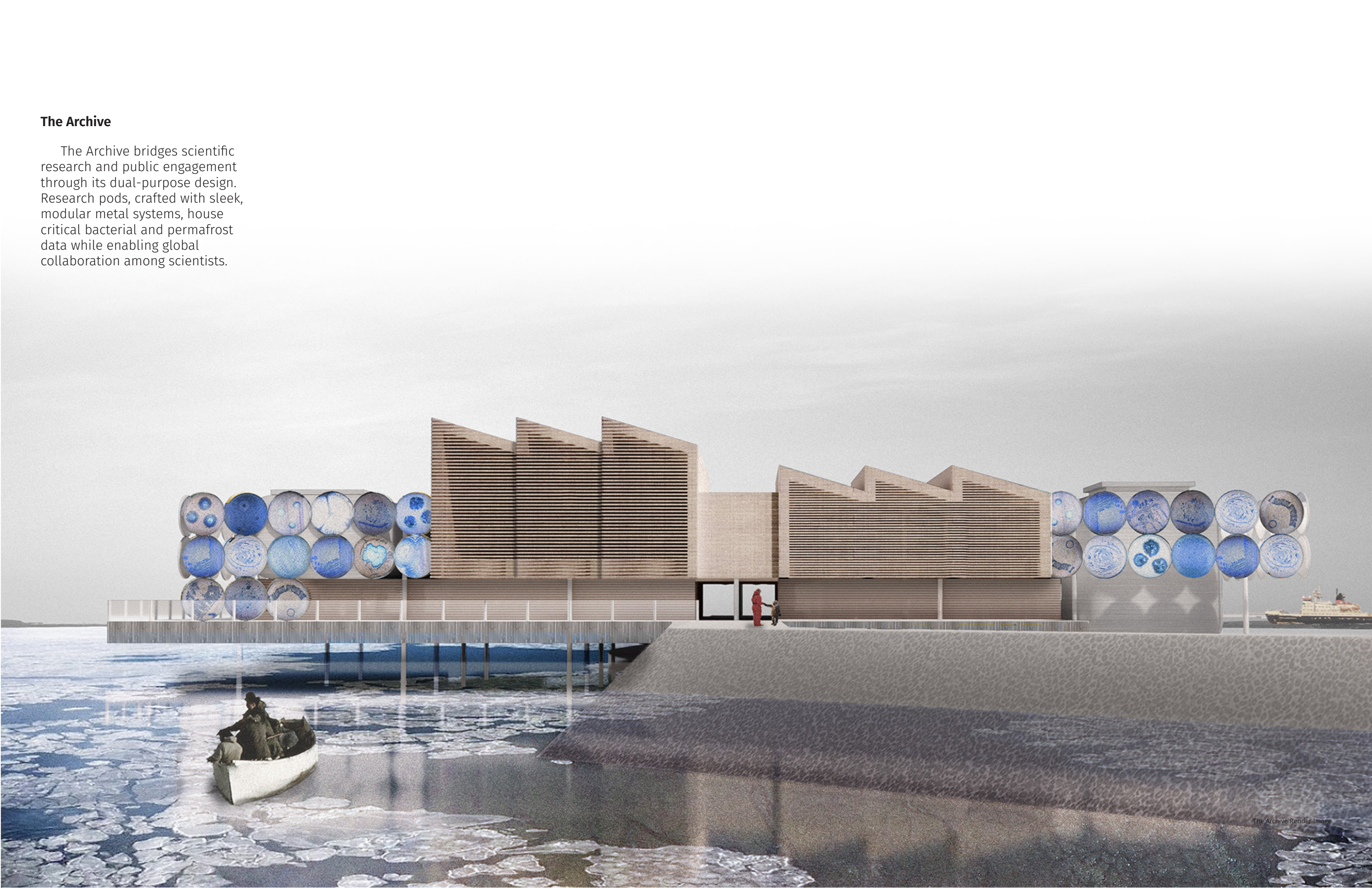


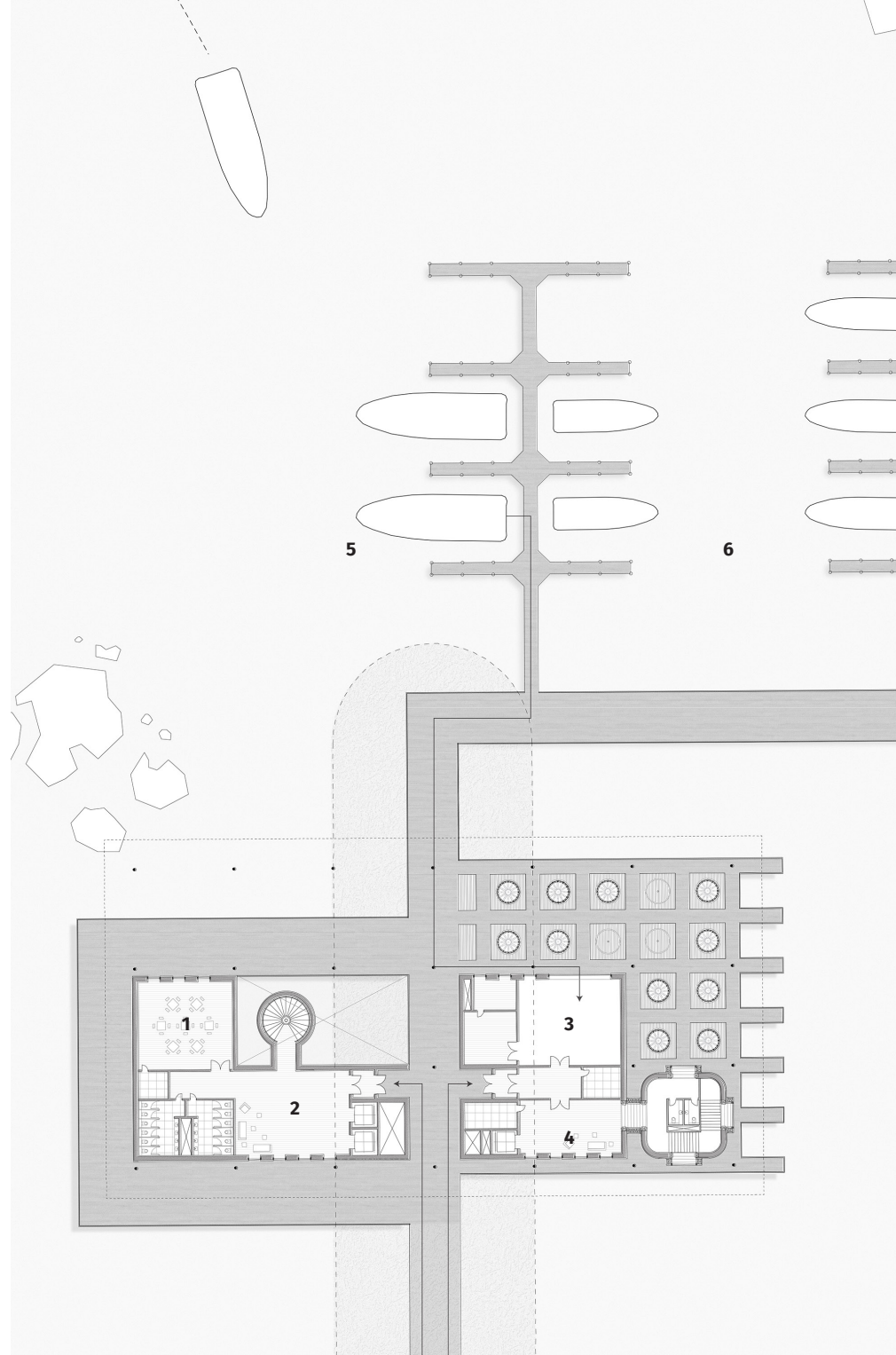
Thermal Control in Space

In the HUB, the layout is carefully designed to prioritize safety and efficiency. Safe and neutral bacterial samples are stored in elevated modules, where the circulation of warmer air naturally maintains optimal conditions. Meanwhile, dangerous bacterial samples are researched and stored at ground level or underground. This takes advantage of the Arctic's naturally lower temperatures, adding an extra layer of safety.

The Archive

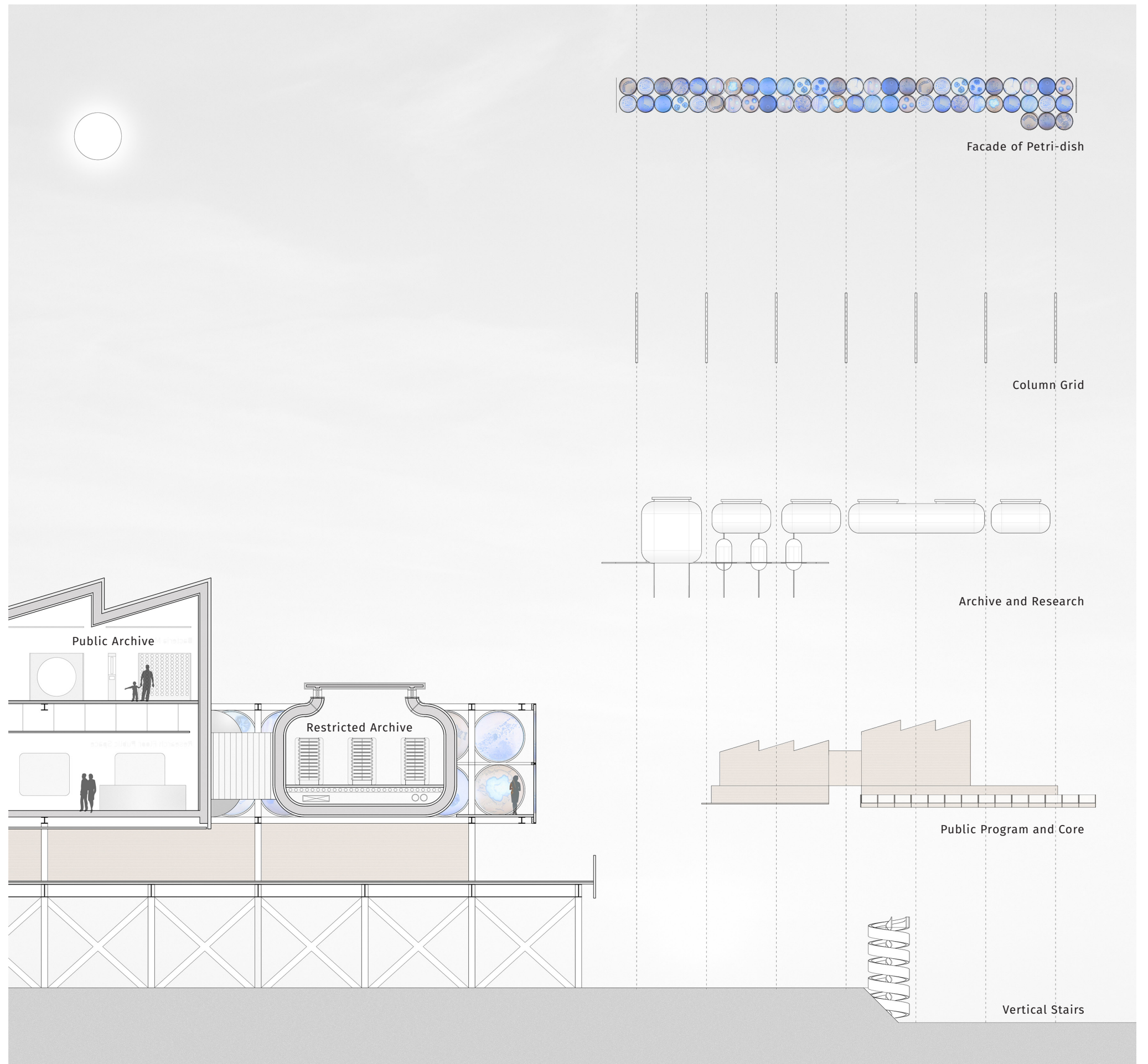
The Archive bridges scientific research and public engagement through its dual-purpose design. Research pods, crafted with sleek, modular metal systems, house critical bacterial and permafrost data while enabling global collaboration among scientists.





In contrast, public programs, constructed with locally inspired wooden materials, create warm, accessible spaces for education and community gatherings. This interplay of precision and familiarity symbolizes the Archive's mission: to make the invisible world of Arctic bacteria both understood and accessible.

- 1 Seminar Room
- 2 Guest Lobby
- 3 Ice Core Garage
- 4 Researcher Lobby
- 5 Ice Core Shipping
- 6 Public Dock

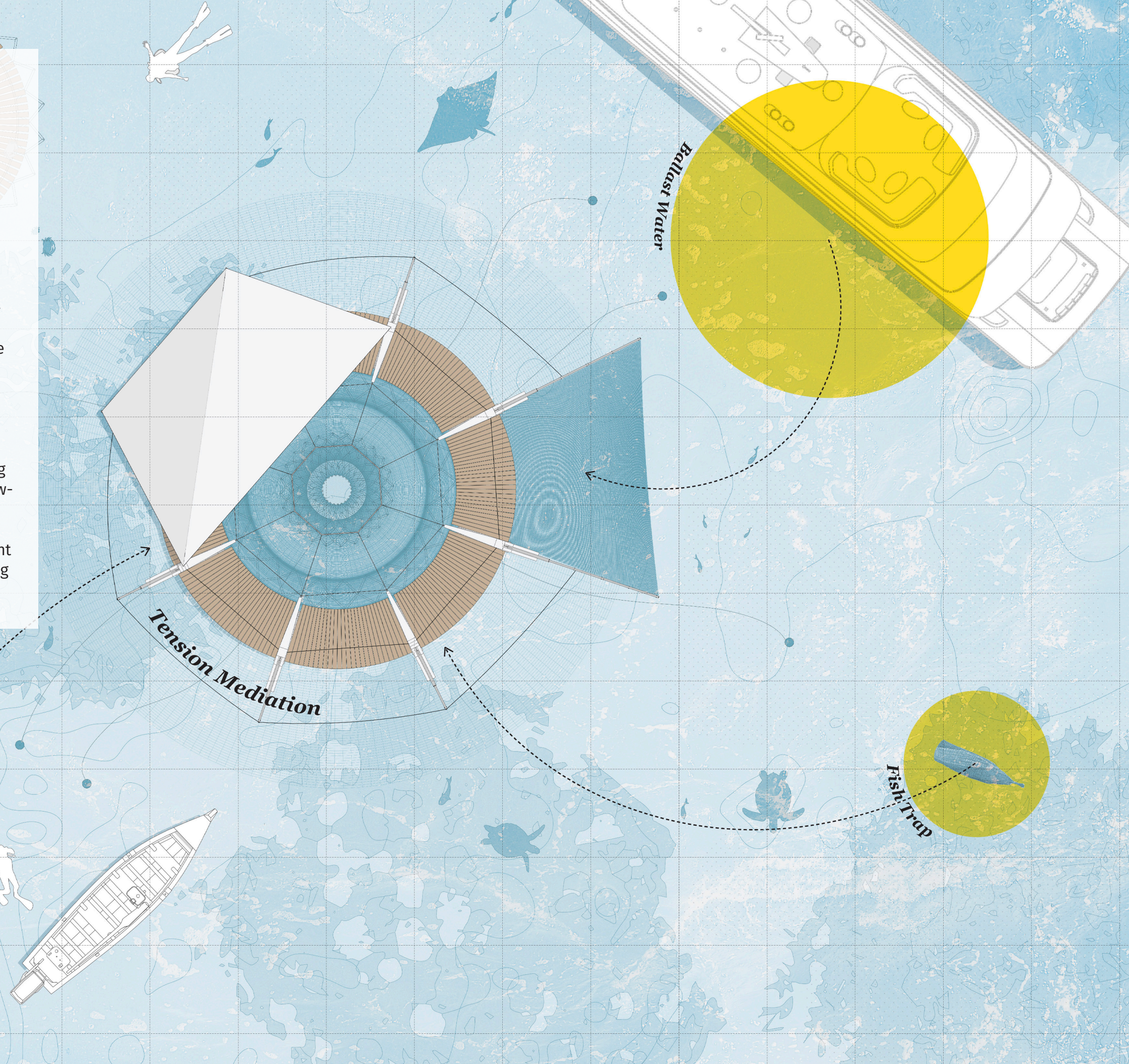


2025/Spring Studio

The Mediators

Advisor : Prof. Mireia Luzárraga
Course Advanced Studio V
Individual Project

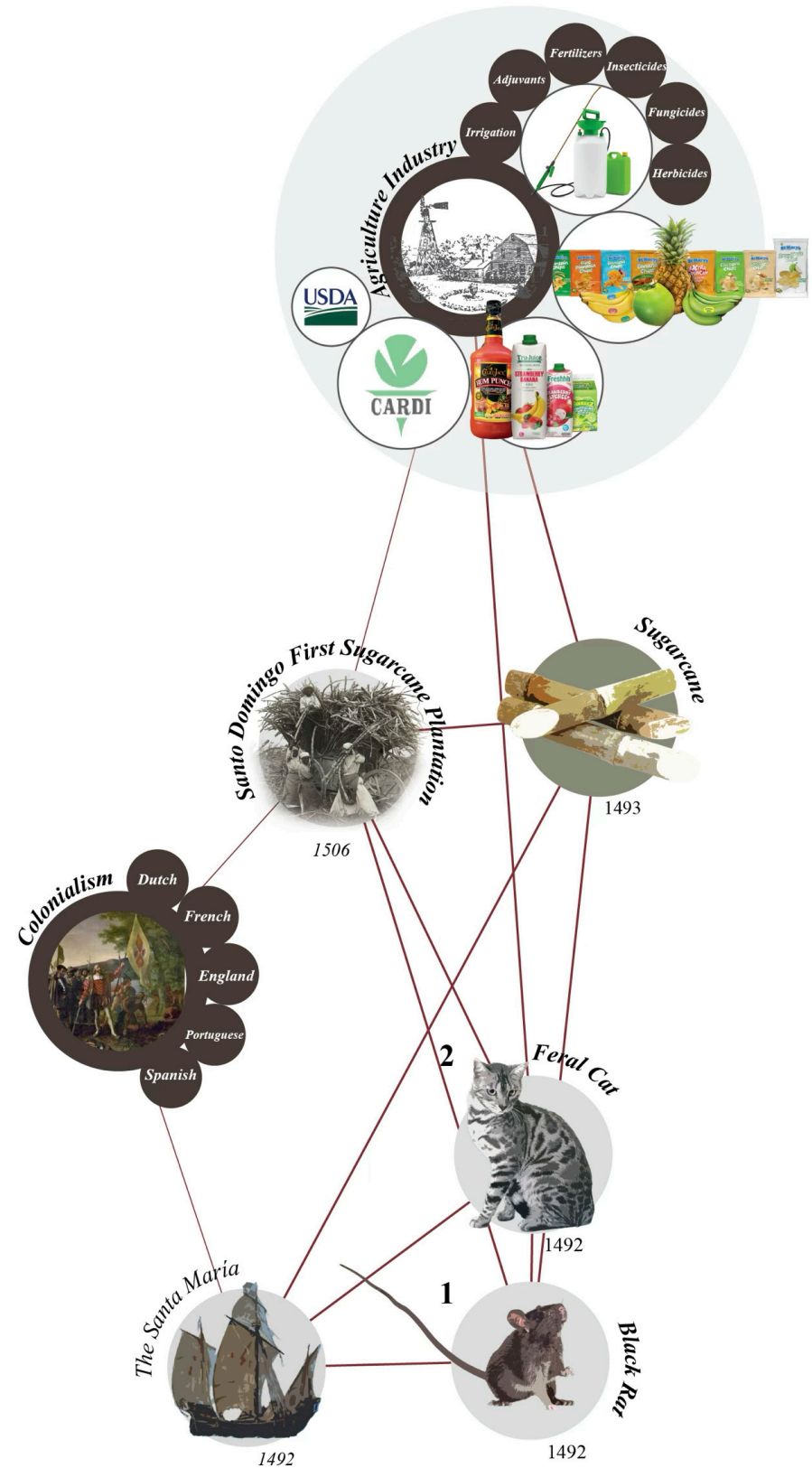
This project proposes a mobile, water-based architectural device designed to mediate the ecological tension between native and newly introduced species in the Caribbean, particularly in the seagrass ecosystems of Martinique. Rather than aiming for containment or eradication, The Mediator fosters adaptive interaction through flexible chambers, biodegradable fishnets, and modular components that respond to shifting ecological dynamics. At its core, a reimagined Hoberman ring regulates the degree of interspecies contact, allowing researchers to observe, incubate, and record the evolution of new relationships within the disrupted ecosystem. The device challenges dominant narratives of “invasion,” advocating for a reframing of belonging in the Anthropocene.

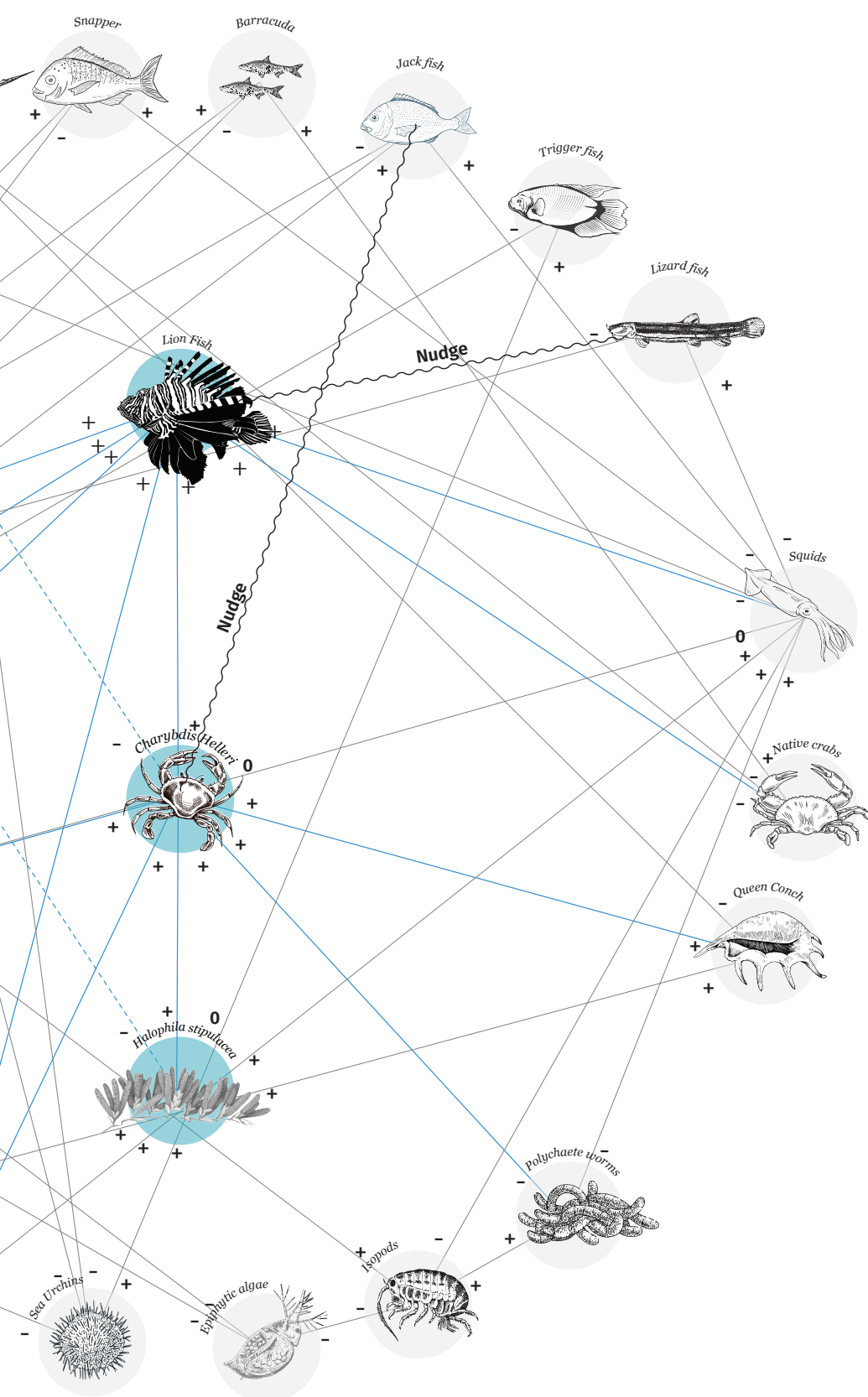




Cosmogram of Newly Introduced Caribbean

Cosmogram maps the entangled relationships between newly introduced species and the pre-ecological state of the Caribbean. Drawing on historical trajectories, industrial practices, and geographic data, the diagram reveals how colonial trade routes, ballast water discharges, and globalized industries have altered native ecosystems. By visualizing the flow and accumulation of biological and economic forces over time, the cosmogram reframes “invasion” as a spatial and temporal process rather than a fixed ecological event. It serves as both an analytical tool and a narrative device, supporting the broader architectural proposal to mediate, rather than reverse, ecological tension.



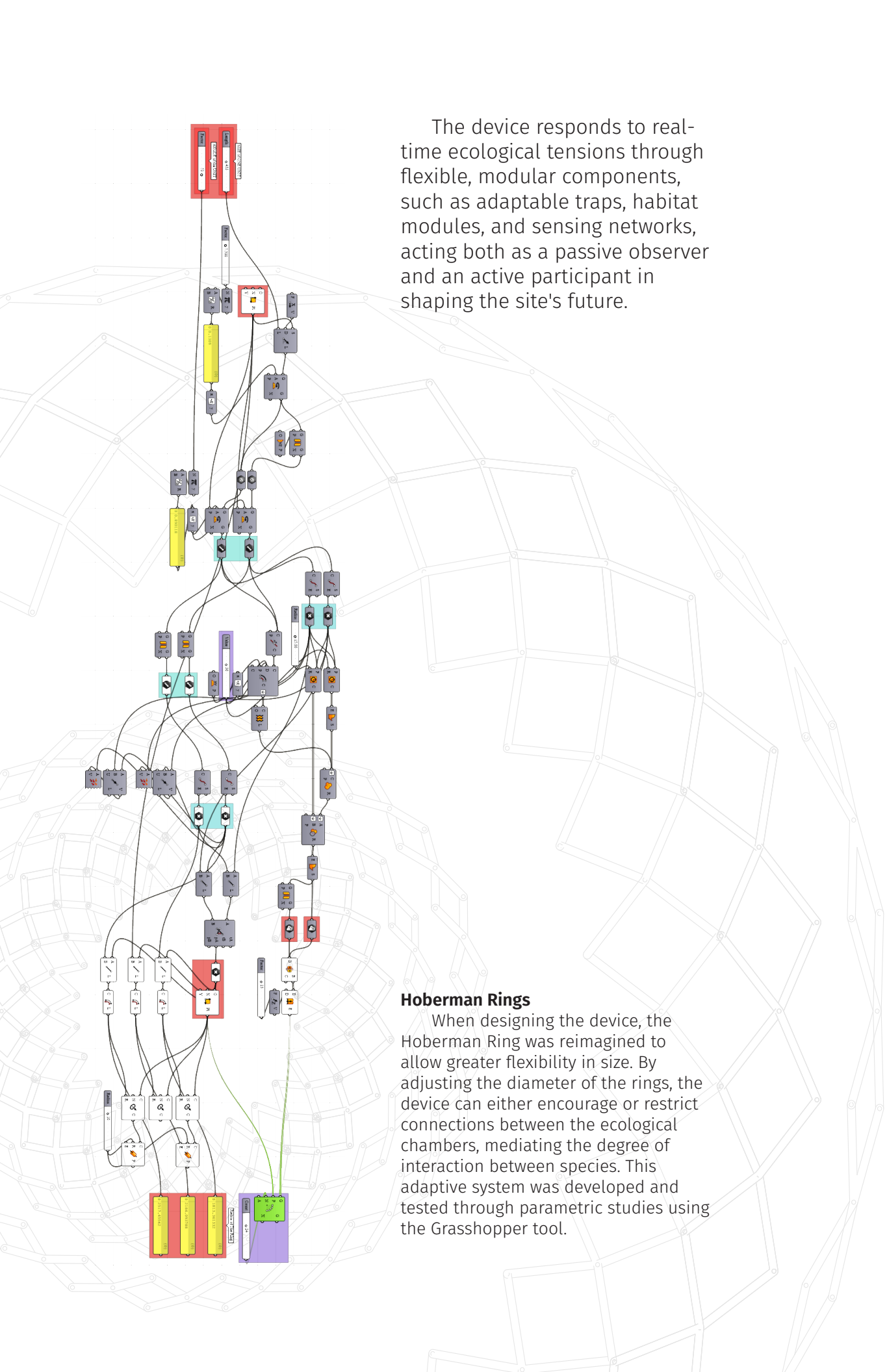


The Mediator is an architectural mediator between two different ecological forces that are new to each other. It monitors environmental conditions, incubates vulnerable species, and *nudges* interactions between pre-existing and newly introduced organisms. Rather than restoring a pre-existing ecological balance, the device encourages dynamic adaptation and coexistence, recording shifts in species behavior and supporting the emergence of a new, negotiated equilibrium.

- Newly Introduced
- Pre-Ecology Species



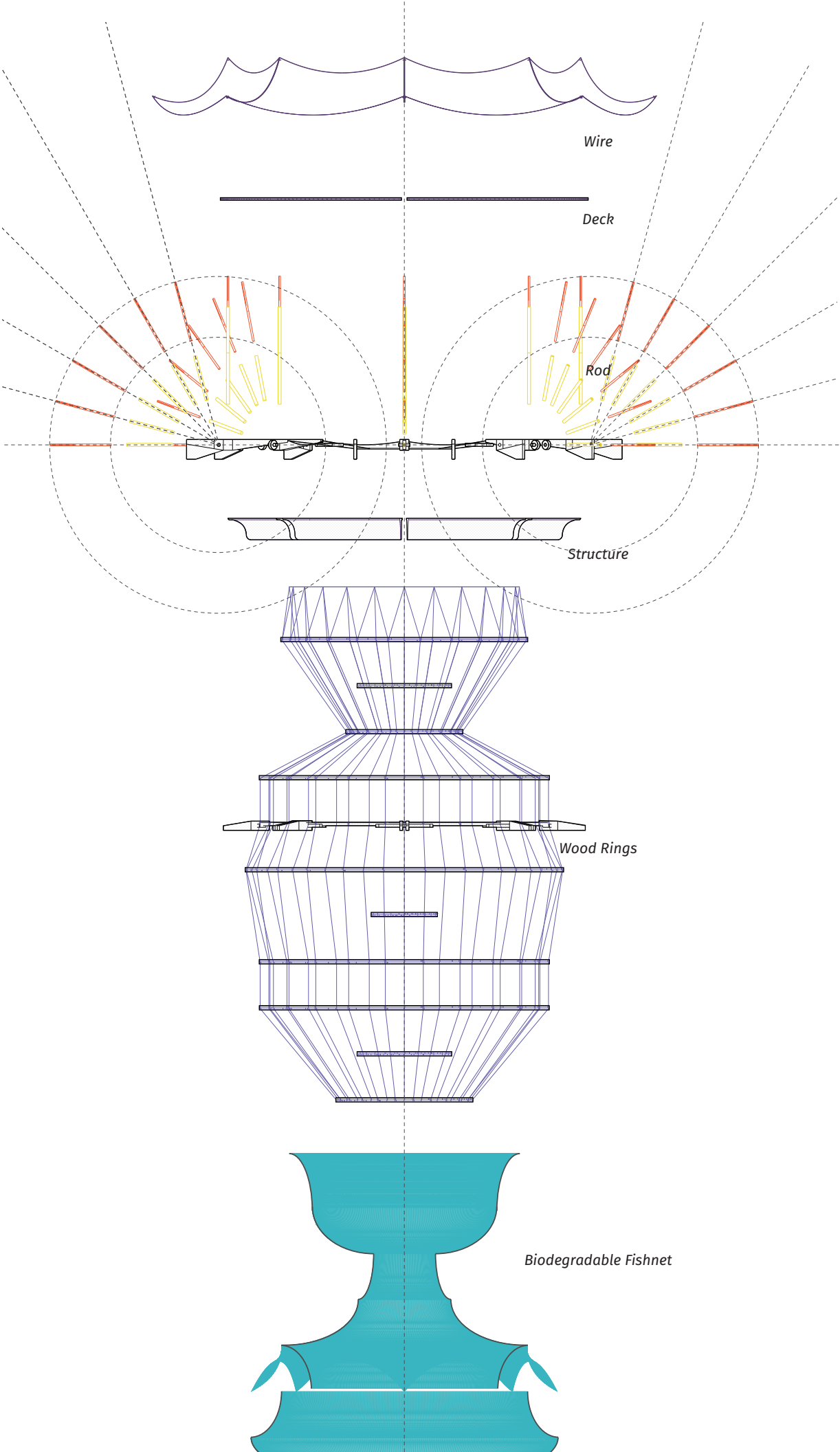
Isometric Section of The Mediator



The device responds to real-time ecological tensions through flexible, modular components, such as adaptable traps, habitat modules, and sensing networks, acting both as a passive observer and an active participant in shaping the site's future.

Hoberman Rings

When designing the device, the Hoberman Ring was reimagined to allow greater flexibility in size. By adjusting the diameter of the rings, the device can either encourage or restrict connections between the ecological chambers, mediating the degree of interaction between species. This adaptive system was developed and tested through parametric studies using the Grasshopper tool.



Rods and Deck

Above water, the device incorporates a lightweight structure designed to support either a tarp, providing shelter for researchers, or fishnets used to collect ballast water from small passing ships. The rods connecting the structure to the floating deck can be rotated to different angles, allowing the device to flexibly adapt to various operational needs.

Designed for simplicity and efficiency, the device can be easily installed, uninstalled, and transported. When disassembled, it compacts into a small, lightweight form, making redeployment across different sites fast and minimally invasive.

Fish Net Ecology

The device is designed with flexible-sized chambers constructed from biodegradable fishnets. Rather than fully enclosing the environment and isolating it from its surroundings, the chambers allow a porous exchange of water, organisms, and nutrients with the surrounding context. This openness supports a more dynamic, responsive relationship between the device and the local ecology, encouraging gradual adaptation rather than rigid containment.

2024 / Summer

Afterlife of Renewables

Advisor : Prof. Laura Gonzalez Fierro

Course : Advanced Studio IV
Individual Project

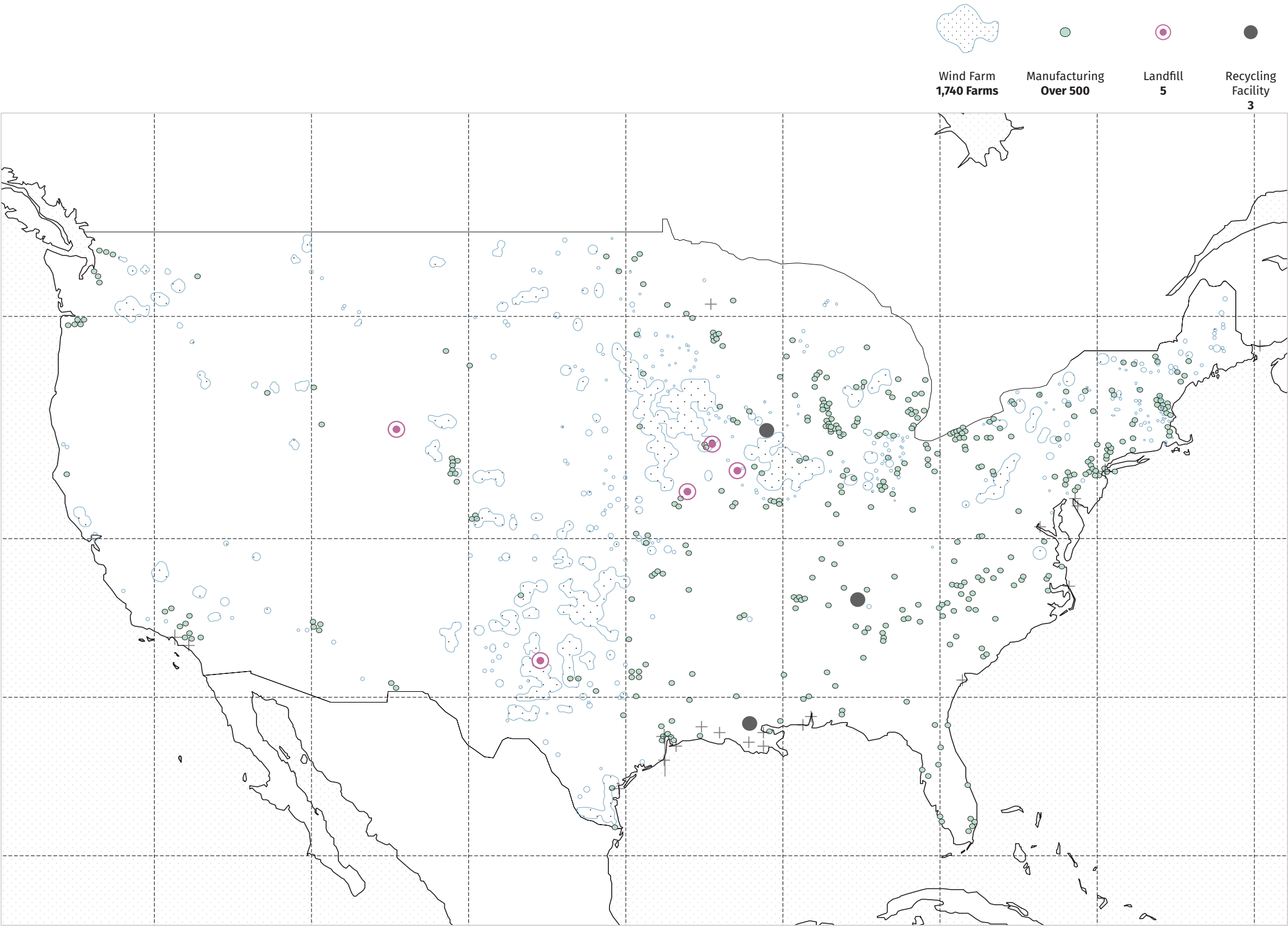
Wind turbines, now a significant source of green energy forms, used for centuries to harvest kinetic energy from the wind. Today, we utilize wind turbines to reduce our dependence on fossil fuels and address the global climate crisis. Wind turbines produce very low CO2 emissions compared to other energy sources. According to the United States Department of Energy, Wind energy is an inexhaustible renewable energy source that does not deplete our natural resources. The wind energy-generating process is clean and does not pollute water and air. However, renewable energy and all its components, from extraction to manufacturing to operation and decommissioning, are not issues of national scale but have world-scale implications.



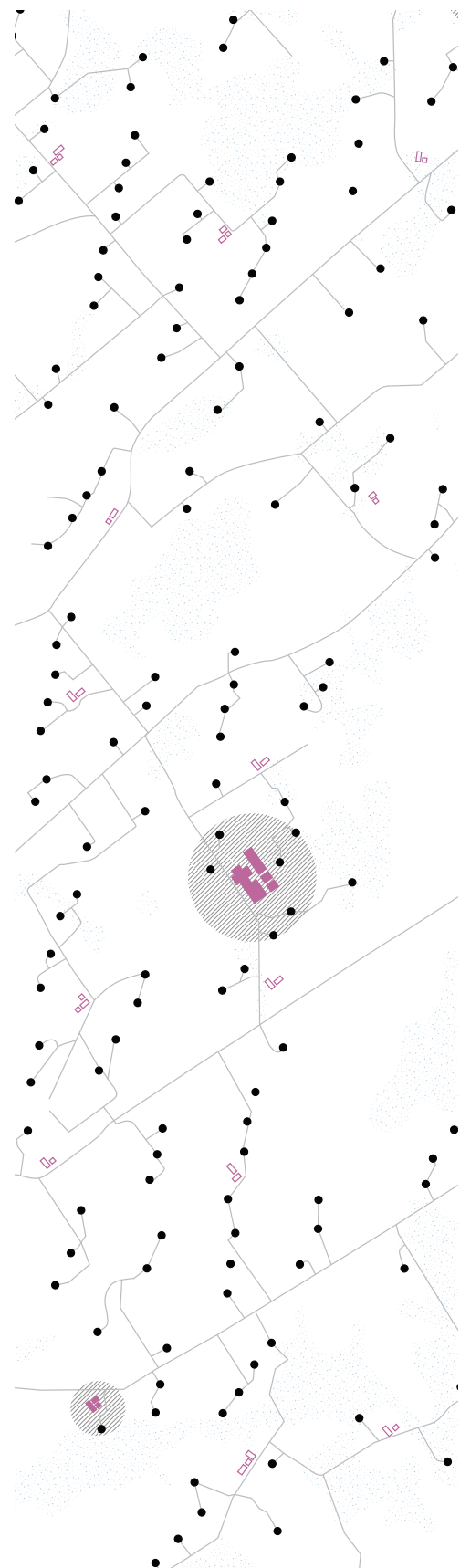
On a domestic scale, there are over 500 wind turbine-related manufacturing plants in the US and 1,740 wind farms. However, after a wind turbine is decommissioned, there are only five landfills and three wind turbine recycling facilities it can go to. Importing raw materials to the states, transporting them to manufacturing companies, and shipping them to wind farms requires much energy. After operating, they are decommissioned and moved a long distance in large heavy-duty trucks to landfills and recycling facilities.



Fragments of wind turbine blades await burial at the Casper Regional Landfill in Wyoming
Photographer: Benjamin Rasmussen for Bloomberg Green

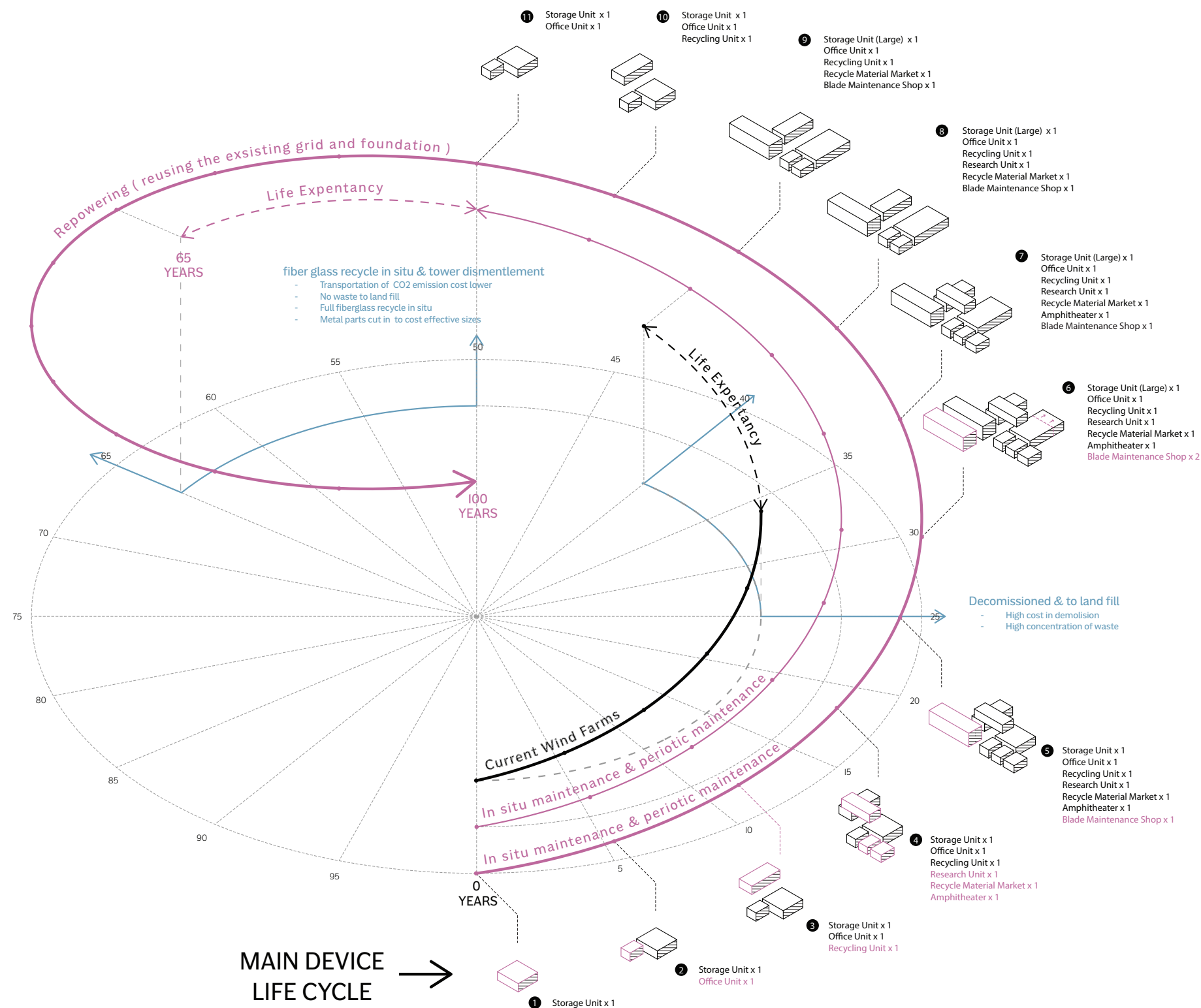


Domestic Map of Windturbine Industry



In-Situ Maintenance Facility

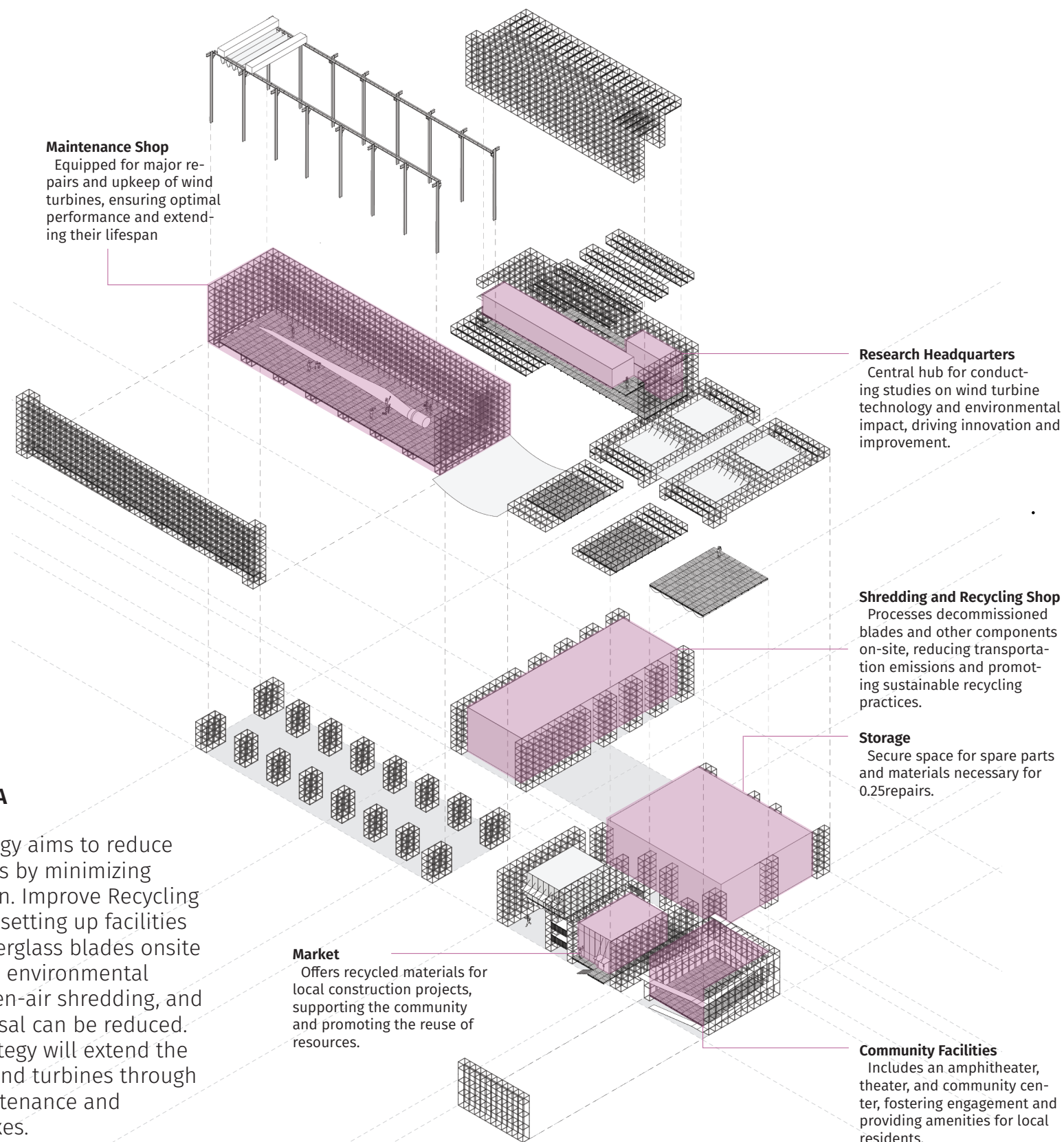
In situ maintenance and fiberglass recycling facility revolutionizes wind farm operations by drastically reducing CO2 emissions, extending turbine lifespan, and promoting sustainable practices. Enhance efficiency and environmental stewardship by eliminating the need for long-distance transportation of turbine components. This project integrates advanced maintenance technology, on-site recycling, and comprehensive wildlife research, ensuring that as wind energy capacity grows, it harmonizes with ecological conservation and community engagement. This strategic approach sets a new standard for sustainable wind farm management, aligning with the nation's renewable energy expansion and environmental protection goals.



- wind turbine
- Operating Devices
- Planned location of Devices

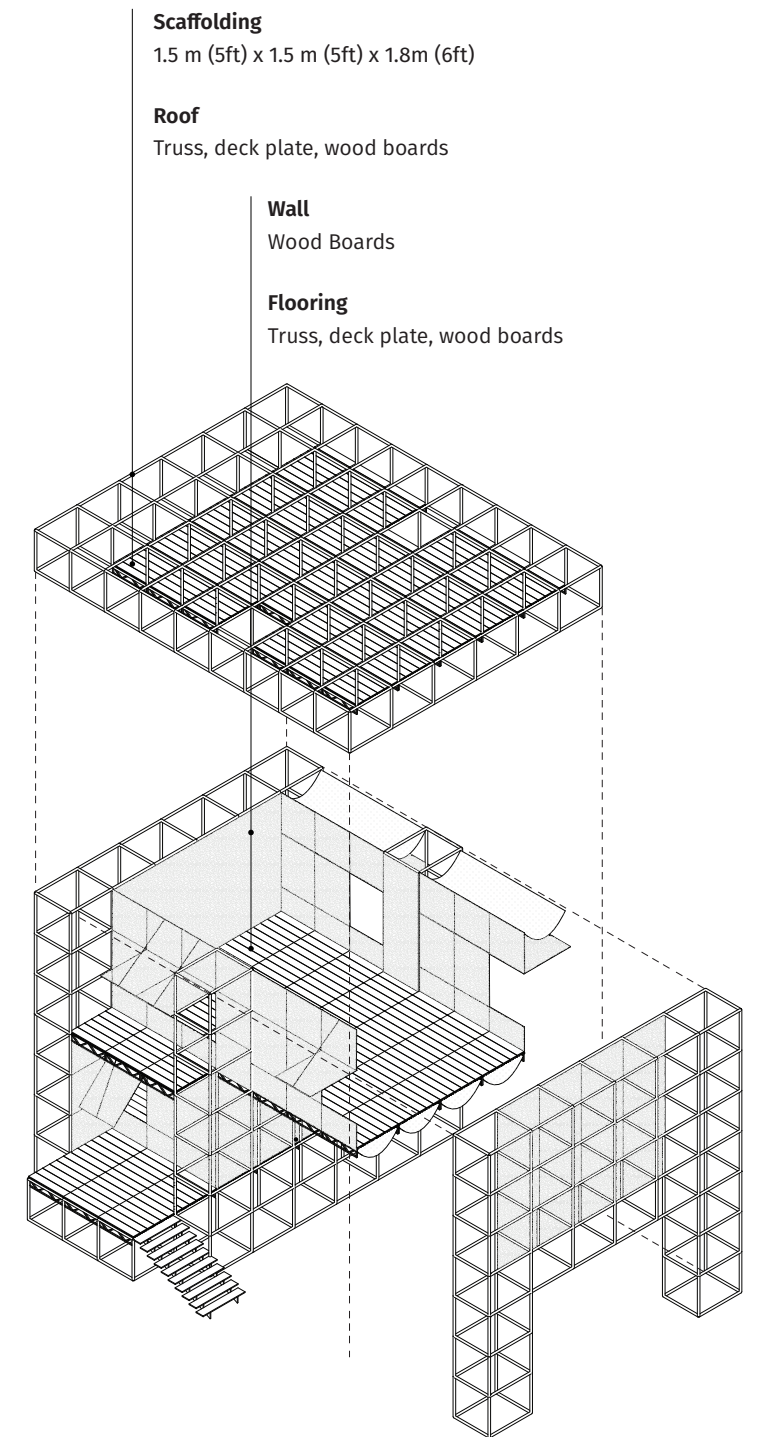
Main Device A

The strategy aims to reduce CO2 Emissions by minimizing transportation. Improve Recycling Processes by setting up facilities to handle fiberglass blades onsite to reduce the environmental impact of open-air shredding, and landfill disposal can be reduced. Also, the strategy will extend the lifespan of wind turbines through periodic maintenance and immediate fixes.



Extention Device B, C, D

These extension units are specialized mobile maintenance structures for different levels of severity of wind turbine maintenance. Scaffolding, wires, wood boards, and recycled fiberglass membranes as constituents make the units easy to install, uninstall, and move around a wind farm. Their modular nature helps reduce CO2 emissions from transportation and increases efficiency in maintenance.





Wind Energy

Wind turbines are a significant source of green energy worldwide. Originated from windmills and other mechanical forms, Wind energy is harvested and used for centuries.

Birds and Bats

Wind turbines poses a significant risk to birds and bats, often resulting in high mortality rates. Studies have shown that thousands of birds and bats are killed annually due to collisions with the wind turbine blades

2024/Fall

No Loitering!

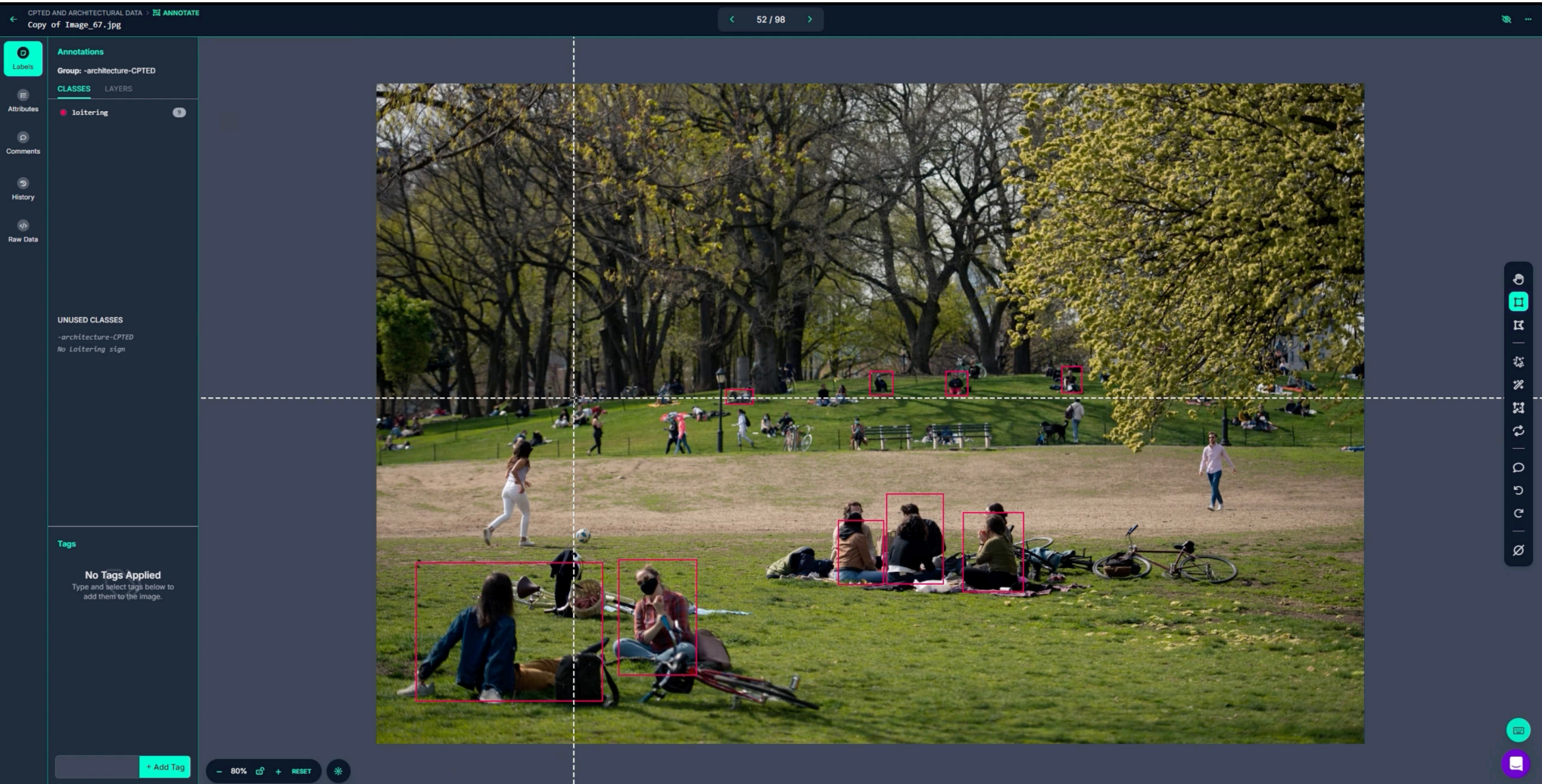
Advisor : Prof. Catherine Griffiths
Course : Seeing with Algorithms
Group Project; Hyunsoo Cho, Yujeong Rhee

Can an AI algorithm define a human’s gesture, and in what range should we allow it? Imagine someone on the street doing nothing, standing still. He might be waiting for his friend, searching on the Google map about his next destination, or he might be loitering. ‘Loitering’ is the definition of standing or waiting around idly or without apparent purpose, followed by the definition from Oxford Language. We aim to measure how effectively AI can identify loitering and the categories that exist within it. We then investigate to determine whether they can articulate the intentions behind the loitering. With this critical thinking model, we expect to explore how algorithms influence our daily street life.



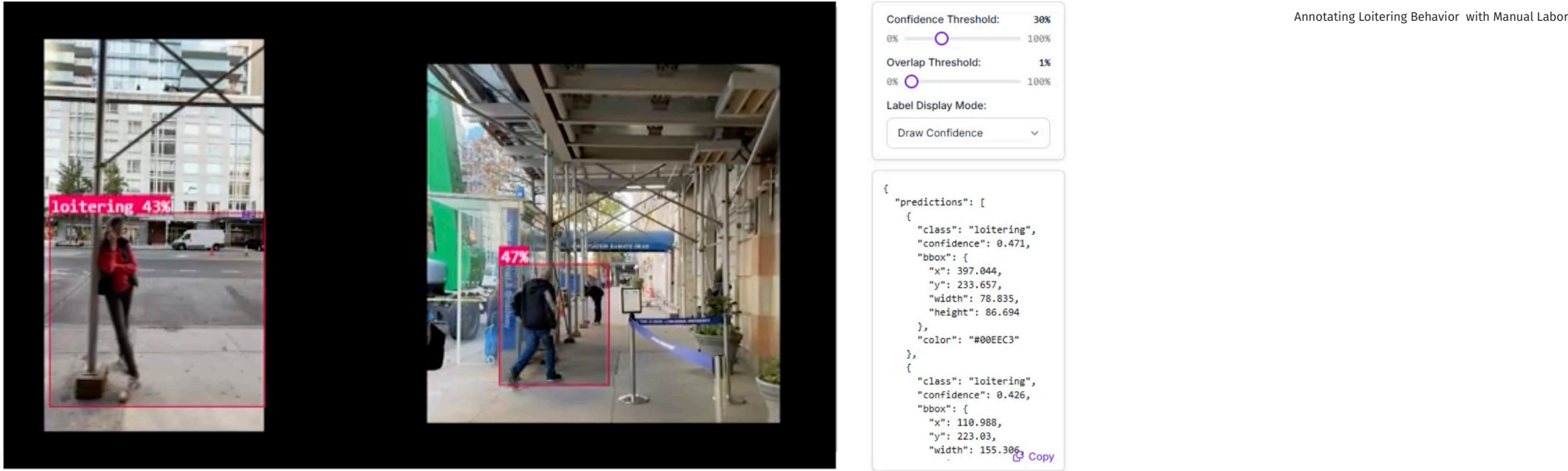
This project investigates how artificial intelligence interprets human presence in public space, specifically the ambiguous act of “loitering” by combining street-level video documentation with AI driven image analysis. Filming was conducted along a square route from 108th to 110th Street and between Amsterdam Avenue and Broadway in New York City, a zone shaped by commercial activity and the presence of Columbia University. A chest-mounted GoPro stabilized the footage to mimic a neutral, first-person observer.

Following data scraping techniques learned in the “Seeing with Algorithm” seminar, over 300 images from U.S. and U.K. sources were collected via Bing. These were filtered and annotated using Roboflow, a computer vision tool. Irrelevant or AI-generated content was removed, and actions observed in the images were labeled manually.



While the results revealed patterns in how AI perceives behavior, the process illuminated significant limitations. Inconsistencies between still image datasets and real-time video underscored gaps in model accuracy. Furthermore, the repetitive act of labeling revealed a deeper critique: the human labor behind AI, reminiscent of digital tagging jobs often reduces complex behaviors to simplistic categories. This reduction raises ethical and philosophical concerns.

The project concludes by questioning the very premise of machine judgment: Can AI truly understand intention? Can it distinguish between waiting and loitering without context? And ultimately, can AI grasp the philosophical dimensions of human behavior? In seeking to teach machines how to see, we confront what remains inherently human and perhaps, forever untranslatable.



Used Roboflow to train the AI to recognize and interpret instances of loitering.

2025/Summer

(), fluid borders

Advisor : Prof. Michael Wang
: Metabolic Materialities
Team : Hyunsoo Cho, Cheng Chien
Material : agar-agar, natural dye, petri dishes

(), fluid borders investigate the overlooked entanglements of layers between labor, materiality, and industries through the lens of agar-agar, a gelatinous material made from red seaweed. The team researched history, geopolitics, gender politics, and materiality itself to untangle the transcalar layers of agar.

Although agar-agar is often associated with the sterilized, standardized biotech industry, the raw material itself originated in the traditional, manual harvesting practices of Southeast Asia. The project traces the geopolitical and economic disjunction between where the material is sourced and where it is capitalized.





The geopolitical and material flows behind agar-agar focus on Indonesia's red seaweed industry. Indonesia is one of the world's largest producers of red seaweed, with labor-intensive, small-scale farming methods using low-tech tools such as ropes, wooden stakes, and manual harvesting in coastal waters and brackish ponds. While the material is dried and minimally processed locally, most high-value extraction and refinement into agar-agar occurs elsewhere, linking Indonesian labor to global biotechnology, food, and pharmaceutical industries. Major biotech hubs in North America, Europe, and East Asia rely heavily on agar for culturing microbes, food stabilization, and pharmaceutical applications. Despite their critical role in supplying raw materials, Indonesian producers often remain at the bottom of the value chain. This research highlights the asymmetries between origin and end use and the hidden labor-sustaining standardized biotechnological processes worldwide.



Using industrially standardized agar jellies, those used in Petri dishes to culture life, we stain them back into their original red. As time passes, the red pigment bleeds outward, seeping across the transparent jellies, slowly overtaking the sterile clarity with the memory of its origin. This slow diffusion acts as both a metaphor and a method: a re-territorialization of biotech's sanitized, white-cube logic by the unruly, overlooked life-worlds of those who harvest the sea.



2025/Summer

Architecture and Photography

Advisor : Prof. Michael Vahrenwald
Course : Architectural Photography
Individual Project

The democratization of photography has contributed to an overwhelming saturation of visual content in contemporary life, where images and videos are produced, circulated, and consumed at an unprecedented scale.

Architecture, in particular, has emerged as a frequent subject within this visual culture. Owing to its formal richness and spatial complexity, the built environment readily lends itself to photographic representation. Architects, too, often engage with photography beyond casual documentation as a means of recording design processes, studying built works, and sharing ideas with broader audiences.

This portfolio reflects the product of sustained observation and inquiry into architecture as a formal object and the dynamic relationships between buildings, light, shadow, and human presence. Through this focused engagement, I sought to examine architecture as both a spatial construct and a visual artifact, exploring how photographic practice can sharpen our understanding of architectural experience. In doing so, the work presented here aspires to reclaim a space for thoughtful seeing within a culture of visual excess.





Assginment #2 Shadow and Architecture





2025 / Summer

On Possibilism

Advisor : Prof. Mario Gooden
Course : Advanced Studio VI



Kambui Olujimi

How he engaged with the site seamlessly and wove it into his work was so captivating. Specifically, his idea of space was striking regarding music, light, color, and art. He used words to describe sound, like swallow and whisper, so it can almost be considered an organic thing in space. The sound perspective for me is entirely new, something I never treated in such an organic manner while working as an architect. However, how sound interacts with the wall and material can be broadened in the specified room and the surrounding environment. I considered sound to be what must be contained in one particular space or prevent outside sound from entering the interior space. However, designing the organic characteristic of sound that roams throughout the space is what I have to acknowledge.

Additionally, material color and a certain simple-sounding yet deep-impacting narrative of the works add other dimensions to his practice. He poured blue sand into the center space of the gallery, where the liquidity of the sand and the color blue gave the feeling of a deep ocean yet added a fun playfulness to the space.

That week, I had two conversations with Kambui and Pinar Yolaçan. I noticed that their approach is relatively intuitive rather than rational; they create it because they want to create a simple yet challenging concept. As an architect, I am trained to be practical and sensible; data should justify and support any design decision. But in these conversations, I began to question whether every action needs a reason; sometimes, the desire to create is enough.

Olivia Erlanger

I was very fascinated by how Olivia Erlanger could present Freudian psychological theories through art symbolism. As someone who has been intrigued by Freud and Jung's psychological theories and psychological dream analysis, I was intrigued by the various elements in her work to be able to describe the unconscious stream of the human psyche so vividly in a very modern context, making the experience very immersive and allowing for the viewers to not only be intrigued by the colors and form of her artwork but make them think and question after what the artwork affects oneself. It was therapeutic in a way. What struck me even more was how she did not limit herself to psychological subjects but went on to discuss society, history, architecture, and culture—molding these into art in a manner that struck me deeply.

I have always been bewildered about how to bridge my background in psychology to architecture, not knowing how to merge the two, even though we know that the connection is inevitable and very apparent. However, this lecture by the artist clarified many of those issues. I am especially inspired by Erlanger's method of cultivating a single theme across various artistic media; sculpture, film, books instead of limiting it to one type of expression, and she experiments and deepens the depth of the subject by this. This way of thinking challenged my process, seeing that I am not restricted to architecture alone. Instead, I can explore and articulate my thoughts in the broader media range, opening up how I communicate and express myself.



Angela Co

Angela Co's speech provided an enlightening perspective of the human-nature relationship that resonates deeply with my personal experience and observation. Humans are prone to being desensitized to other beings, lost in our pursuit and drive for growth. It would be great if all creatures lived in sync in nature's web of survival. Still, humans have drastically grown their kingdom; manipulating landscapes, reaping resources, and annihilating lives for advancement.

Throughout her speech, Angela Co highlighted how our violent, artificial world and the way of life accompanying it can have ghastly effects on birds. She emphasized that every individual's actions, however small, are part of a movement toward change.



I've always enjoyed photography as a hobby, capturing the wildlife in New York. Although I interacted with and admired the animals I came in contact with, I never pondered their existence's interior realities or problems. After listening to this lecture, these experiences came back to mind, and I came to appreciate each creature's inalienable dignity. I mainly felt moved by the case of small birds that have maintained their existence in the world over centuries but now face risks from rapid human development. As an architect, I am increasingly aware that the gigantic structures we construct can encroach upon and violate nature's rights. This instigates me to seek ways to design in greater harmony with our environment.

While so much has already been lost and so many challenges remain, Angela Co's talk has inspired me to seek out concrete ways I can help restore balance, if only in small measures. Her words are a valuable reminder that nature conservation begins with us.

Sarah Oppenheimer

We may respect human autonomy and freedom through architectural manipulation, yet this also leads to a paradoxical dilemma: It can become a form of analysis and control. As architects, we constantly think about how individuals will move within a specific space, their purpose, why they are there, and their circulation patterns, and we often make assumptions. People move as intended with the architect's design intention, but an individual's purpose, conscious, unconscious, and motions are unpredictable.

The interesting thing about architecture is its infinite action and intention. Sarah Oppenheimer says it in simpler terms. Much like how we design door handles to train people, implicitly teaching them that turning the handle will open the door—this simple learning pattern, she analyzes behavior patterns through devices that people are not used to in an architectural space. What is particularly interesting is how this extends beyond the interaction between the installation and the audience, including the cleaning and maintenance routines in exhibition spaces. The device becomes a relationship between the artwork and the viewers and an extension involving the installation process, the space it occupies, and those responsible for it.

It is fascinating how architects strive to understand every individual who might use a space, yet this understanding is often achieved through popularization and generalization. Historically, architectural dimensions and spaces have been designed to suit male-centered standards or specific ages. As our society values diversity and individuality in different contexts, it is relevant to recalibrate architecture's numerical and conceptual frameworks to more openly reflect the diverse needs of the people it serves.

Sarah Oppenheimer's lecture has made me reconsider our role in creating and controlling spaces and how we intentionally manipulate people's behavior. I question how we approach the design process and contemplate the implications of our intentions in shaping environments.



