

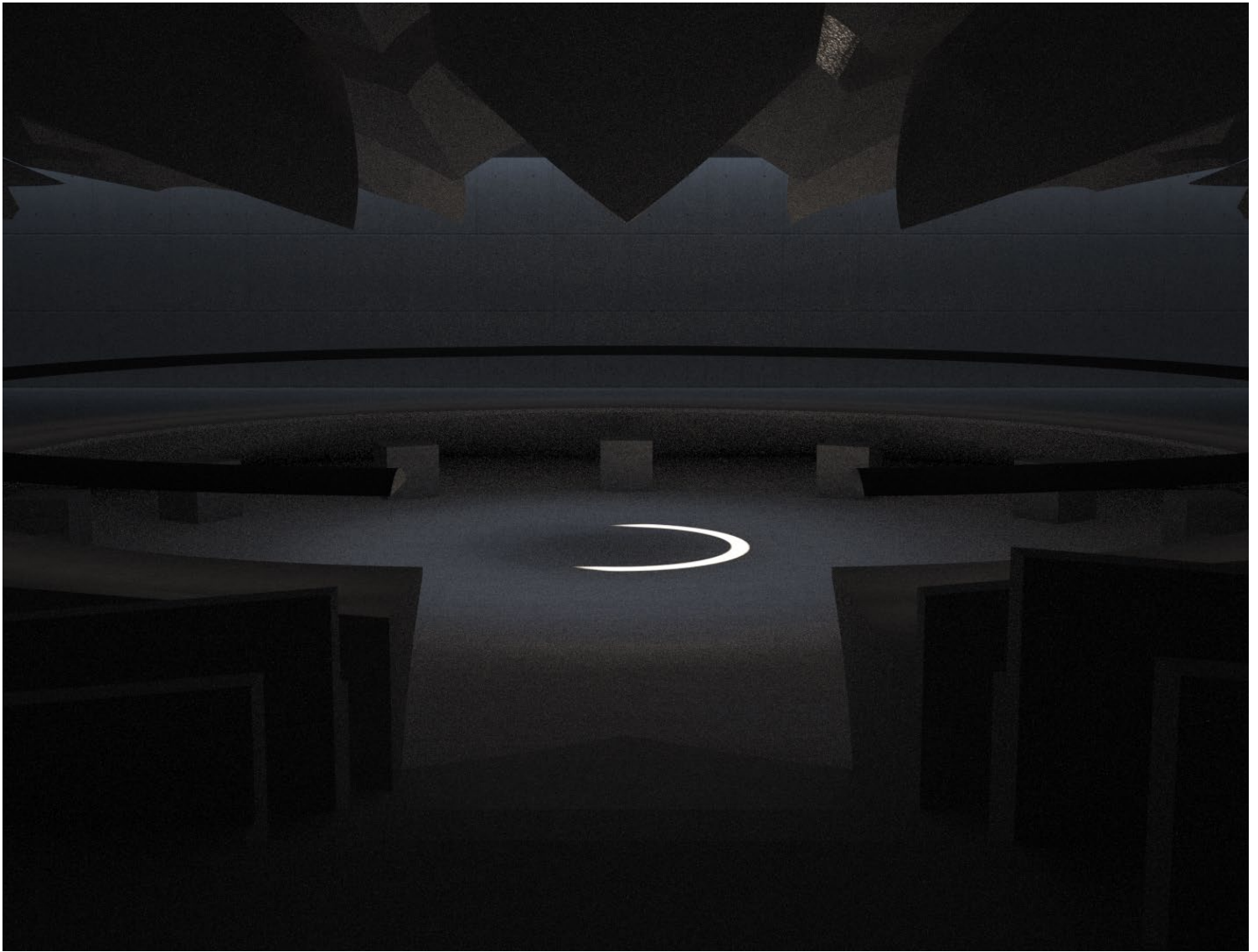




# Trygve Wastvedt

Portfolio

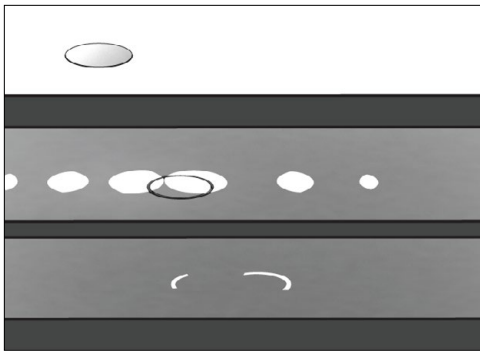




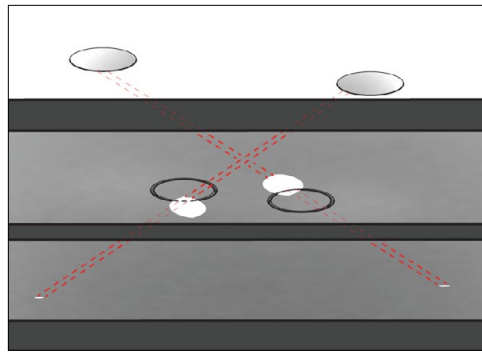
42° | 3/23 11:00s

### **Heliocentric Architecture** | MIT Master's Thesis (solo work)

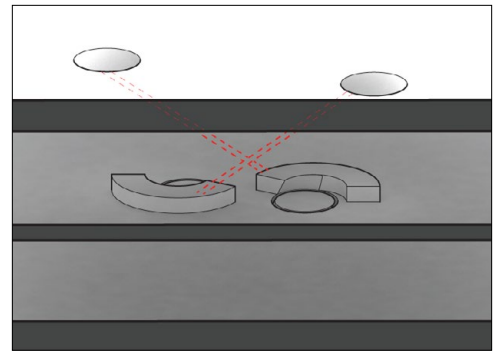
There is a long tradition of architecture creating atmospheric, awe-inspiring experiences by shaping and making visible natural light. Another similarly long-established approach to daylighting optimizes lighting conditions through the use of computational tools which provide precise numerical and geometric models of solar rhythms. This thesis applies the quantitative control of computational methods to the creation of atmospherically daylit architecture, making possible spaces whose forms, tuned to the rhythms of changing daylight, reveal latent celestial cycles. Visit [trygvewastvedt.com/heliocentric](http://trygvewastvedt.com/heliocentric) for video and virtual reality components.



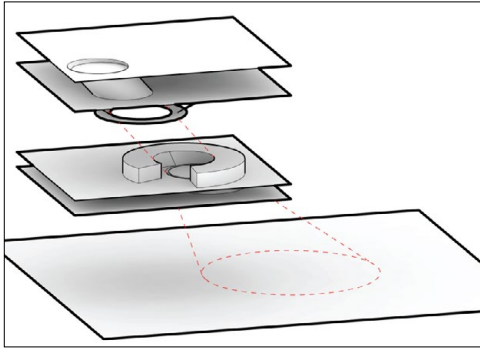
1 | Circular skylight and ring filter.



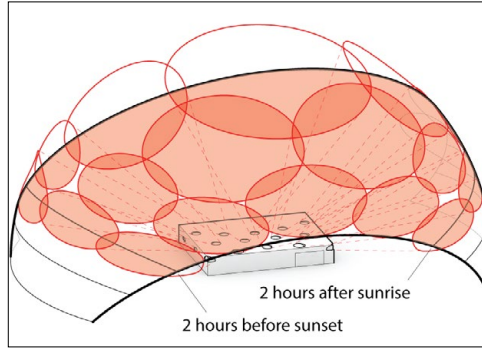
2 | Errant light paths



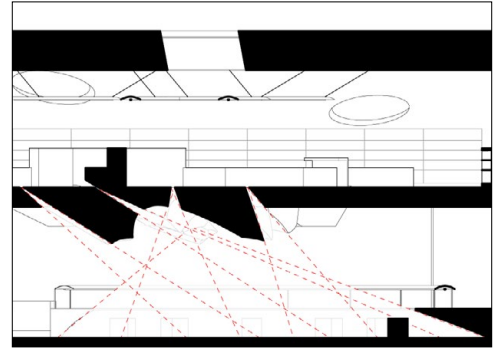
3 | Benches block errant light



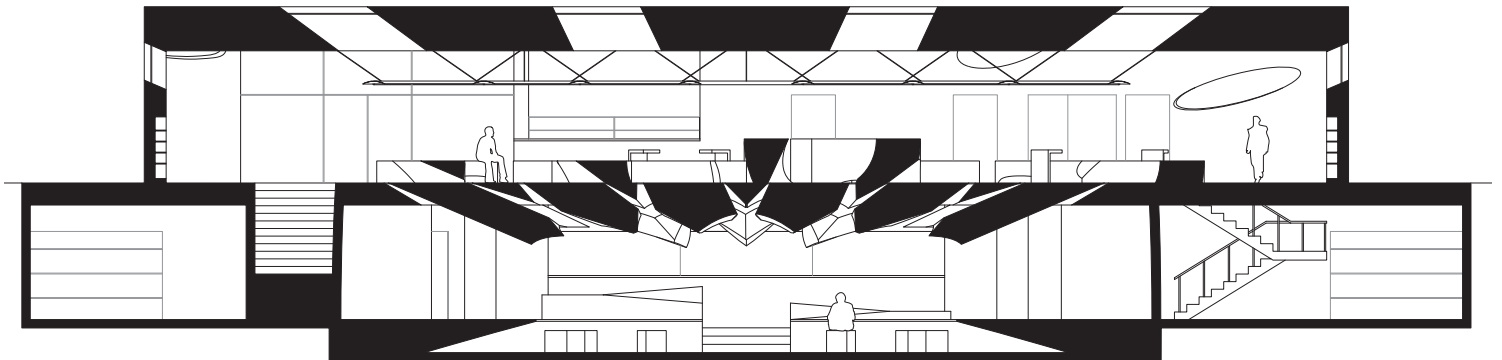
4 | Filter set



5 | Solar swath coverage



6 | Sunlight carves out the reading well

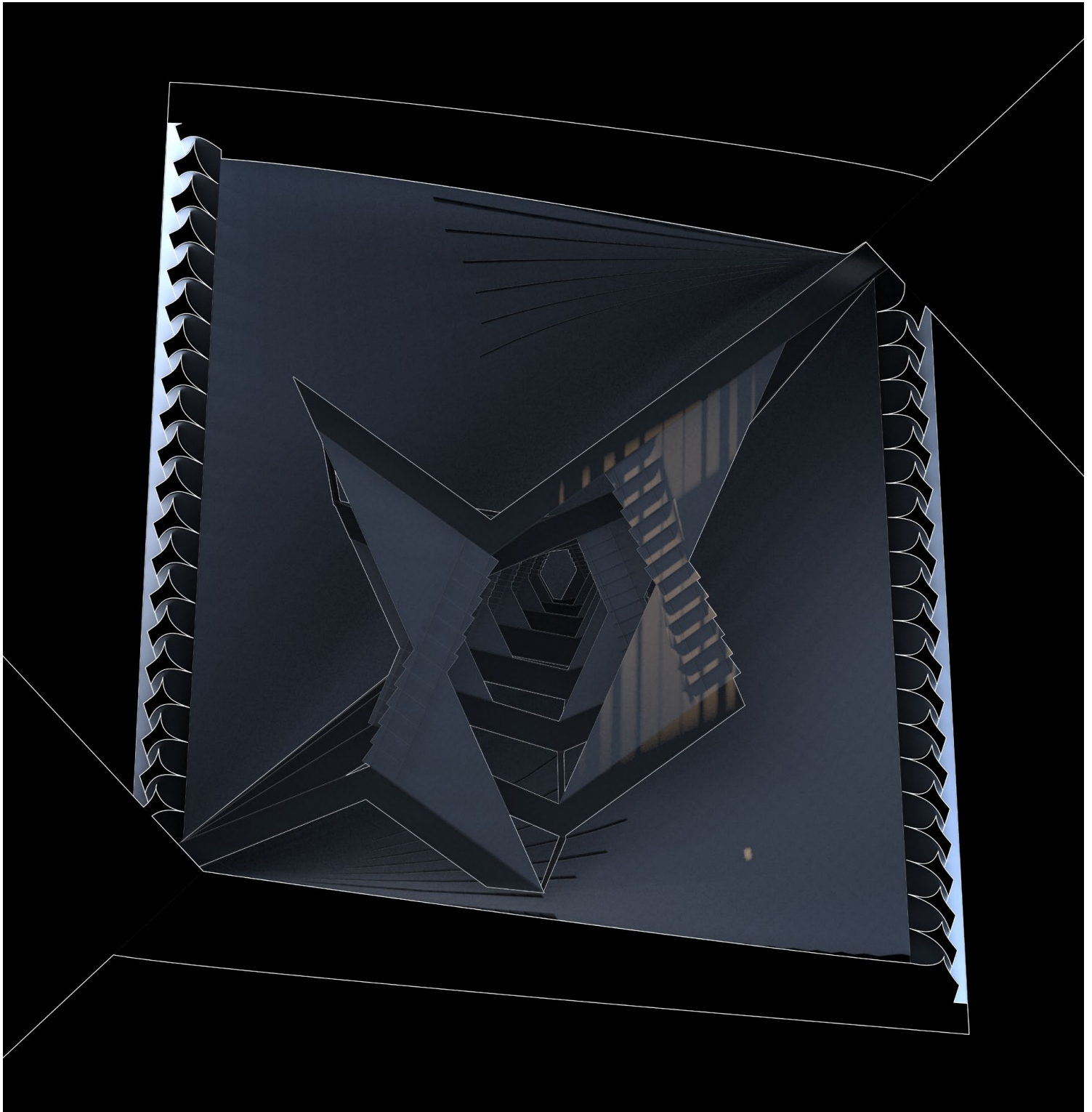


42° | Section

## 42° N

42° is designed as a rare books library which is tuned to allow in carefully controlled direct sunlight which never falls on surfaces which might hold a book. The books are housed in a subterranean space underneath the ground level of the library. The ceiling and floor of the ground level, as well as the furniture, act as filters which control when and where sunlight can shine into the reading room. In the reading room a series of arcs of light traverse across the floor, creating a different pattern each day of the year.





4° | 6/22 6:30 s (frame from animation)

#### 4° N

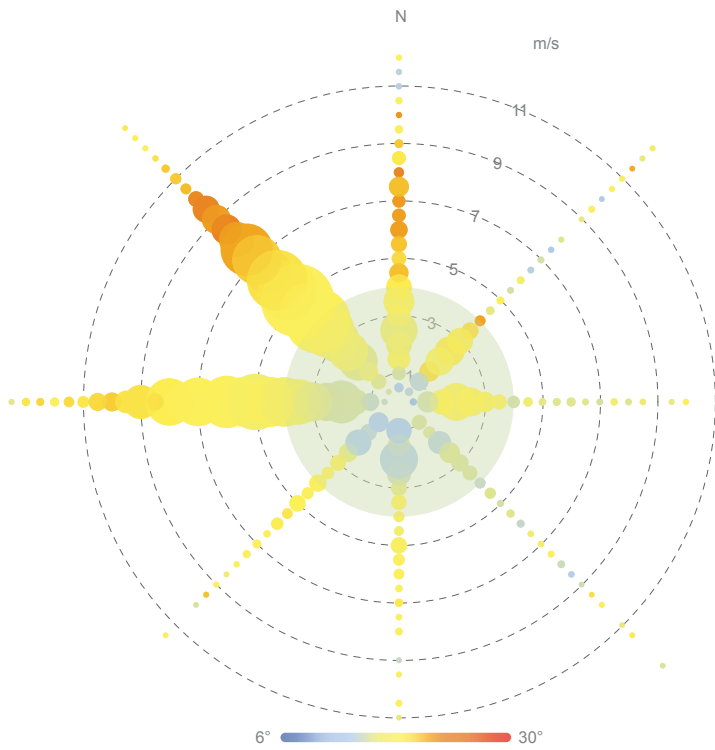
4° is an interstitial atrium linking two high-rise buildings. A spiral stair rises through the center and connects the floors of each building with each other. The stair planes and the walls are aligned so that direct sunlight in the building follows a similar path each day, illuminating the same series of surfaces. On the stair planes the sunlight dramatically occupies the same surface as the people, elongating the shadows cast by occupants. The raking angle of the light also causes the patches of sunlight to move rapidly over the stairs, making the movement of the sun nearly perceptible to occupants.



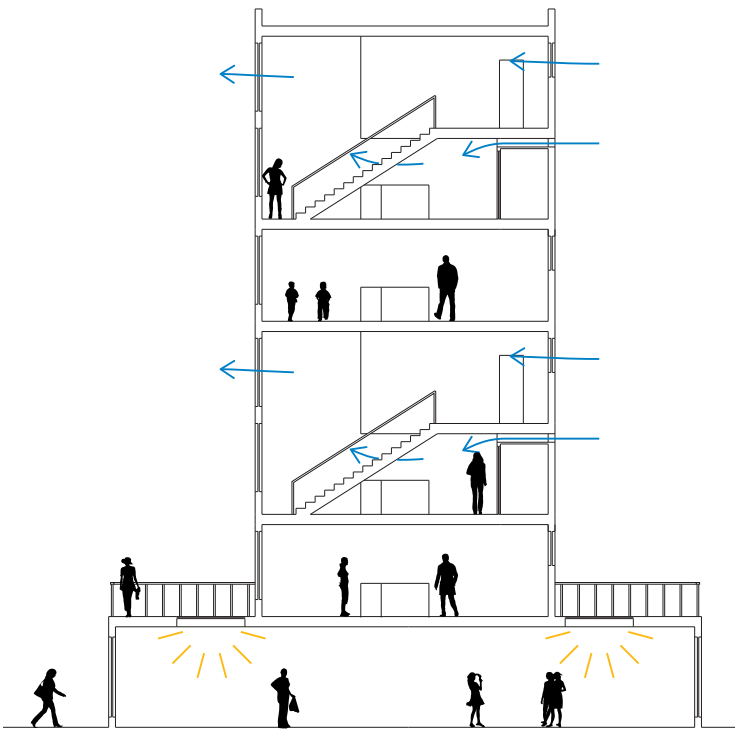
78° | 6/22 7:55s (frame from animation)

## 78° N

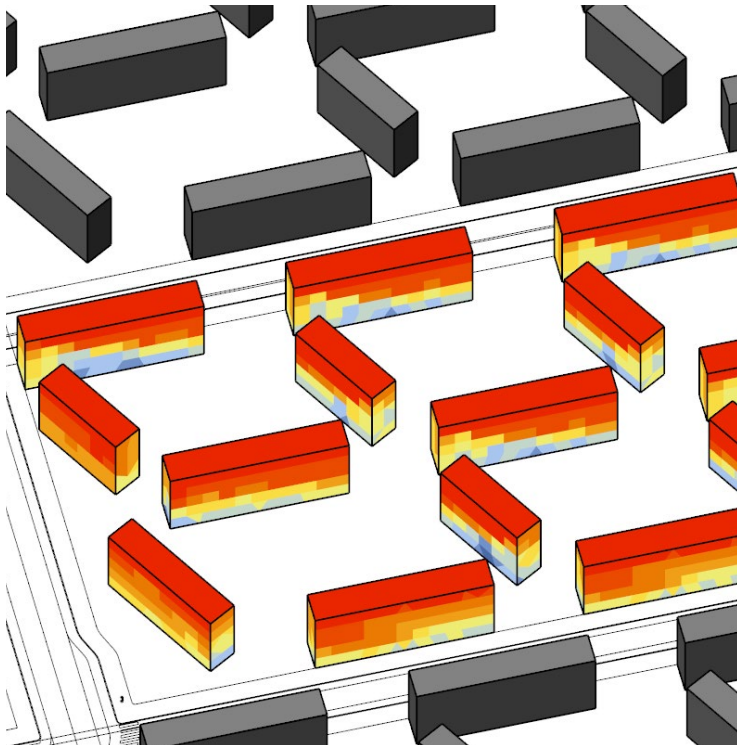
78° is a variant of Boullée's cenotaph which employs a similar monumentality to tell a different story about light. Here sunlight becomes visible as an entity inhabiting the space. The movement of the sun forms the building into a monument which exhibits solar rhythms. The space takes the form of a hemisphere with a single linear skylight cut into the flat roof. The line of light cast by the skylight occupies a stair which encircles the space, allowing visitors to follow the light through its diurnal cycle.



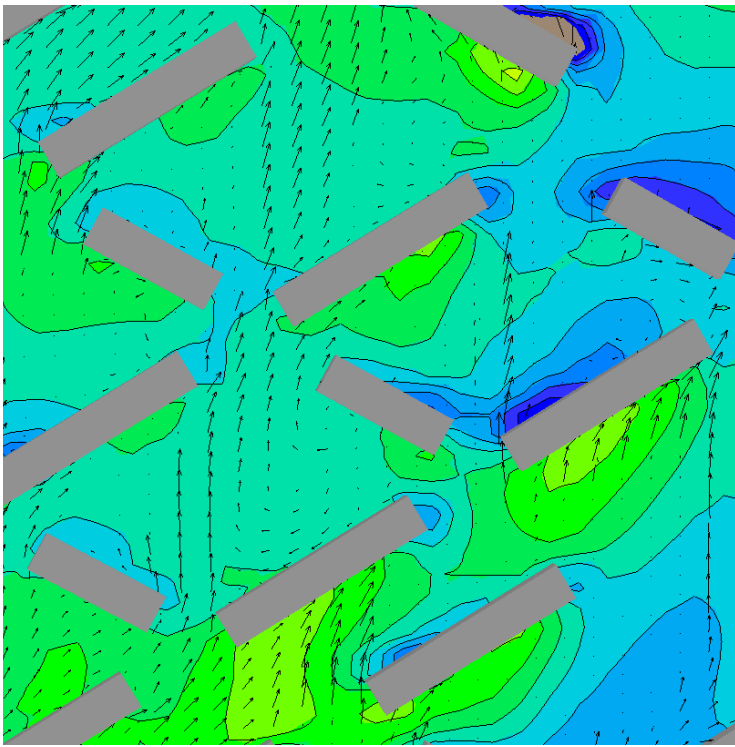
Wind study: frequency, direction, speed, and air temperature.



Daylighting and natural ventilation strategies.



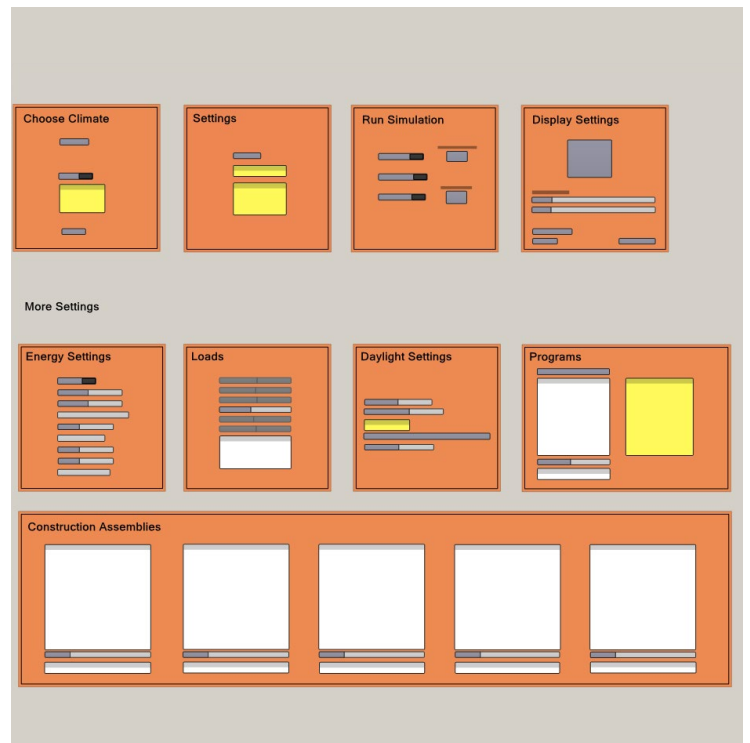
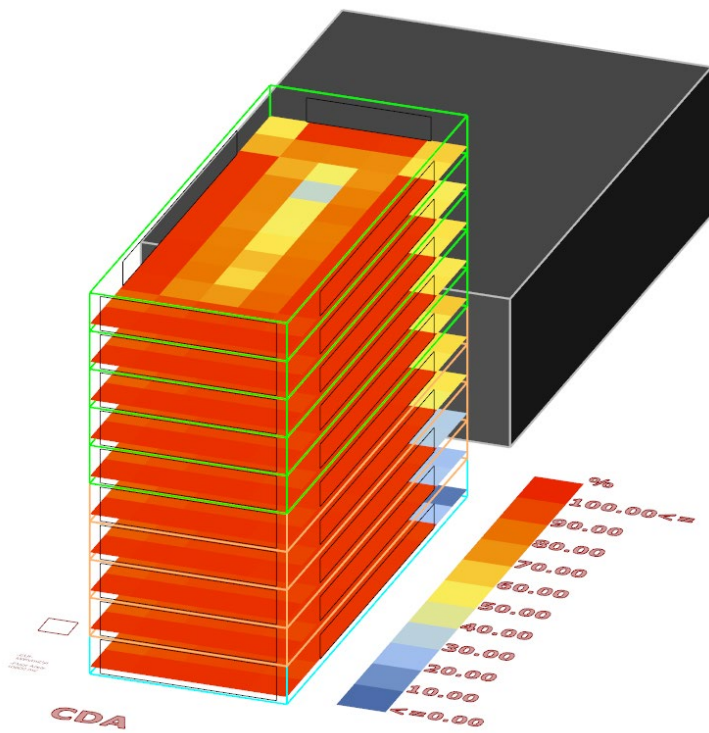
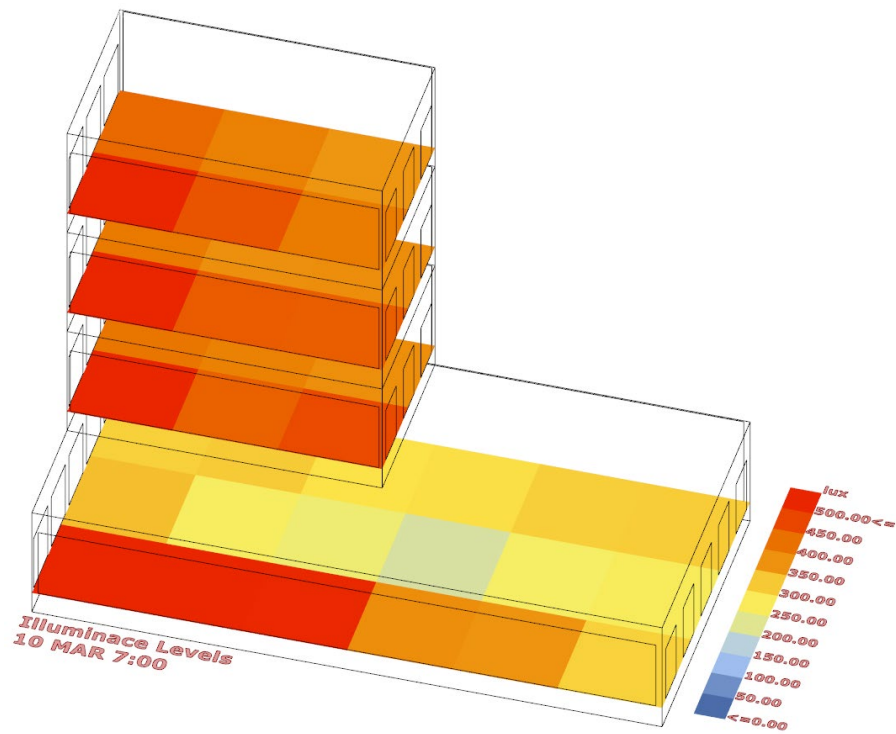
Useful solar radiation.



CFD analysis for natural ventilation.

**San Francisco - Alternative Zero** | MIT (four-person team)  
 Instead of balancing heating, cooling, and lighting costs with renewable energy, we attempted to eliminate those costs altogether with passive strategies such as natural ventilation, skylights, and night flushing. We used a variety of tools to inform and optimize the design including Ladybug, DIVA, umi, and DesignBuilder.



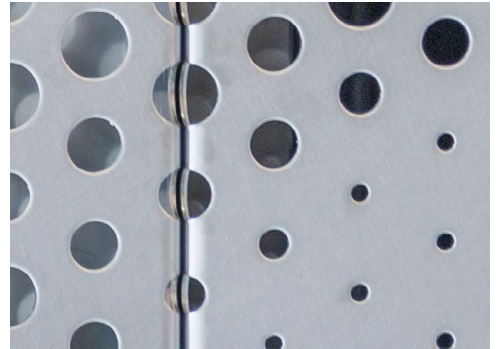
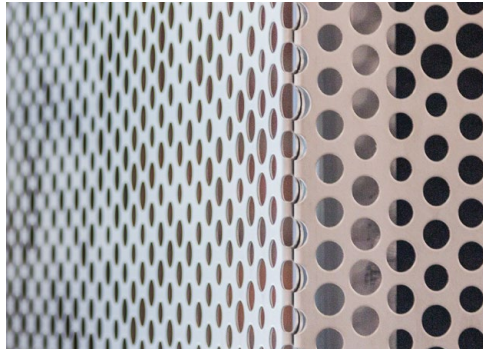
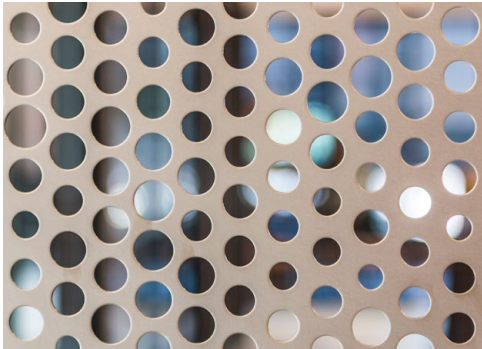


Translate layers into building programs, automatically place windows,

## Energy Modeling Tools | Perkins+Will

A set of Grasshopper workflows that automate a Ladybug/Honeybee environmental analysis. Translates layers into building programs, automatically places windows, and simplifies configuration of an energy and daylighting simulation.



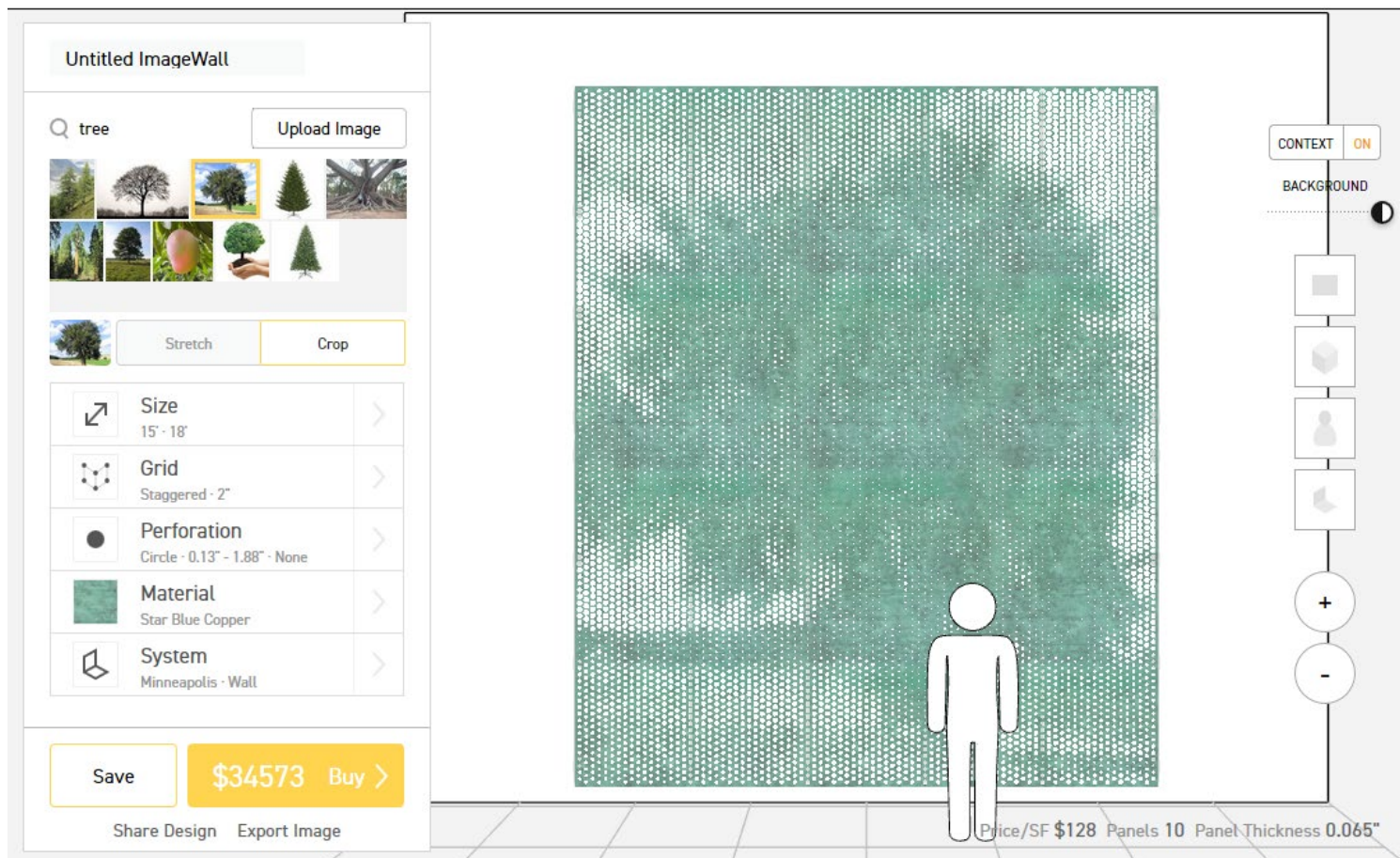


Holmes Murphy ImageWall. | Role: project manager, design engineer. Photos: Zahner

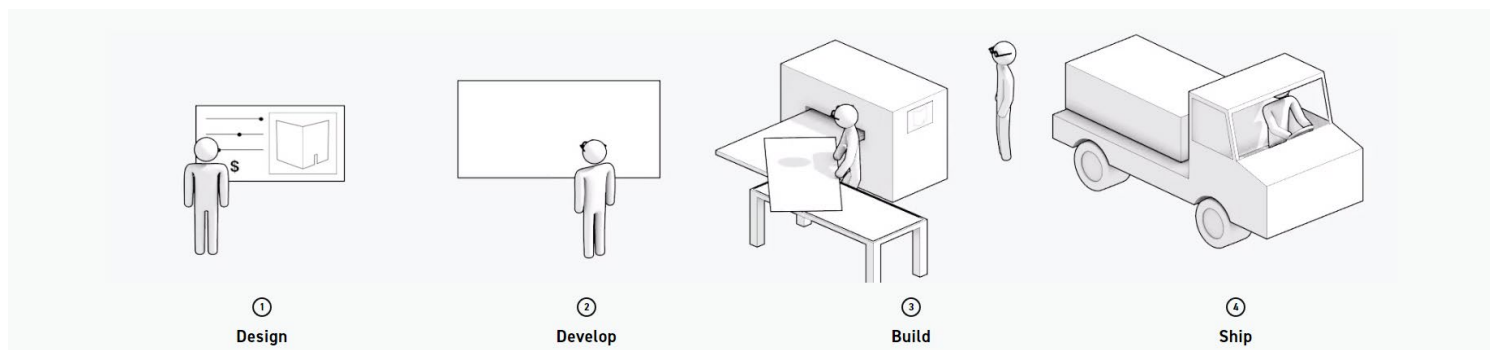
#### **ImageWall | Zahner (small team)**

At Zahner I worked with a small team to develop a Zahner manufacturing process, custom perforated metal imagery, into a stand-alone product line. I was involved in all aspects of the product, including branding, software development, business process development, detail design and engineering, manufacturing planning, project management, and installation management. The ImageWall team has designed and fabricated 50 projects around the country over the past three years.





Screenshot of the ImageWall 3D design app. See the app at [imagewall.com/design](https://imagewall.com/design). | Role: project manager, designed and wrote 3D and pricing engine.



Still from animation overview of ImageWall process. See the animation at [imagewall.com](https://imagewall.com). | Role: solo work.

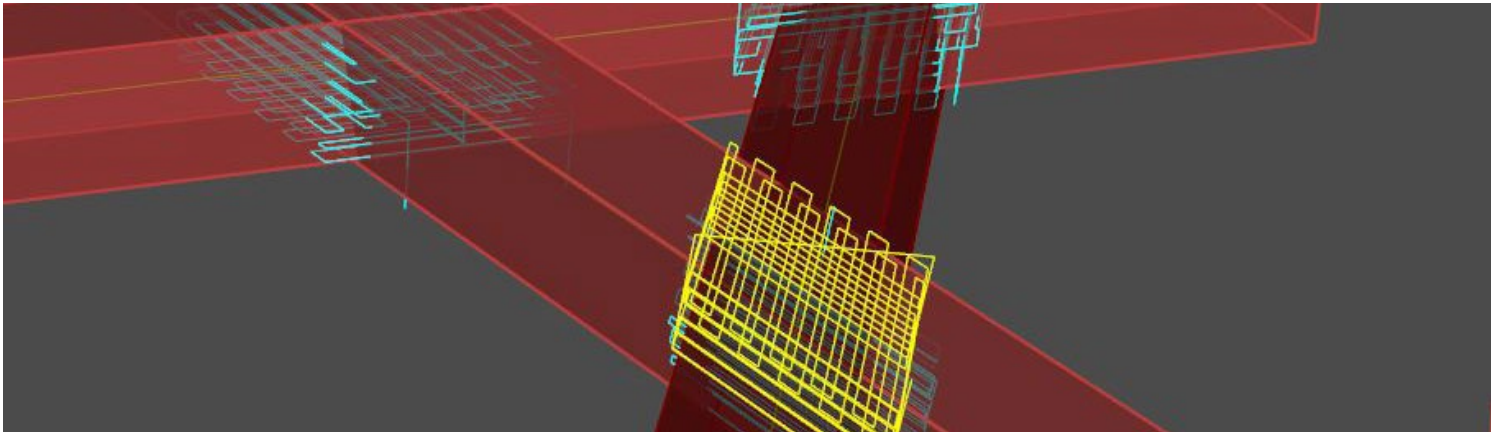




**Framework** | MIT Independent Study (four-person team)

Within the Framework project we explored many themes that have current disciplinary significance to architects, including the rationalization and construction of complex forms, the automation of design to manufacturing processes, new methods to describe construction sequences, mass customization, and reciprocal structures that can span large distances with small components. This pavilion is just one of many forms that can be built using the tools we developed. We also used this construction system as the basis for a workshop we led at the FAB11 conference (Boston, August 2015) where we built another small pavillion.





Grasshopper and Python scripts generate posts and G-code from design surface.

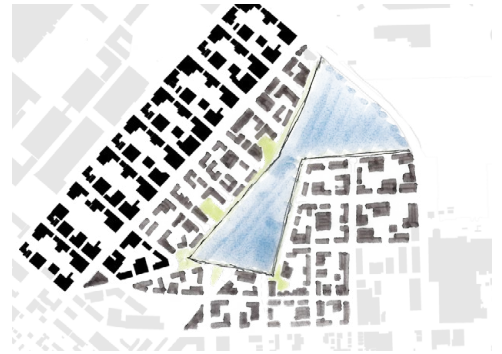
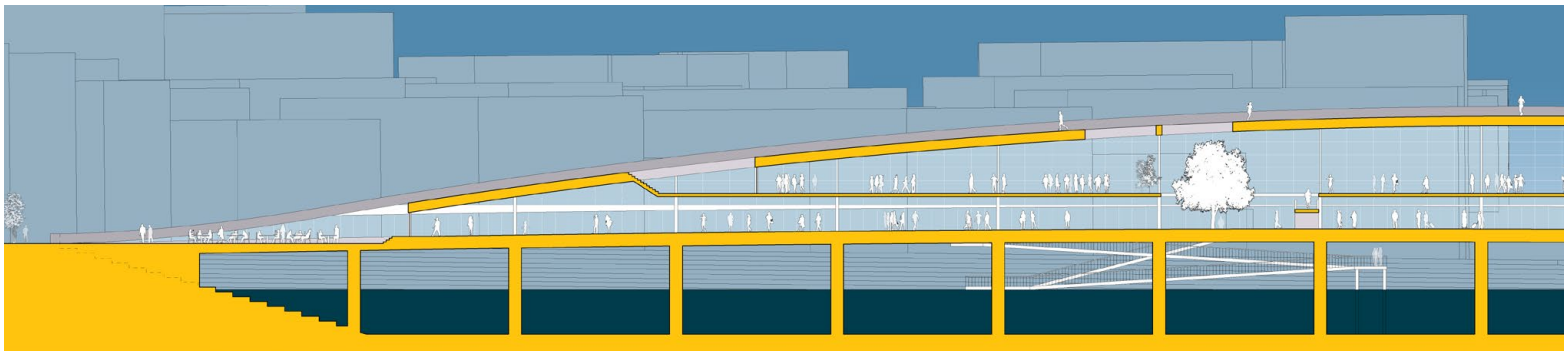


4-axis mill cuts joint pockets.



Part labels eschew assembly drawings.





Urban form studies.

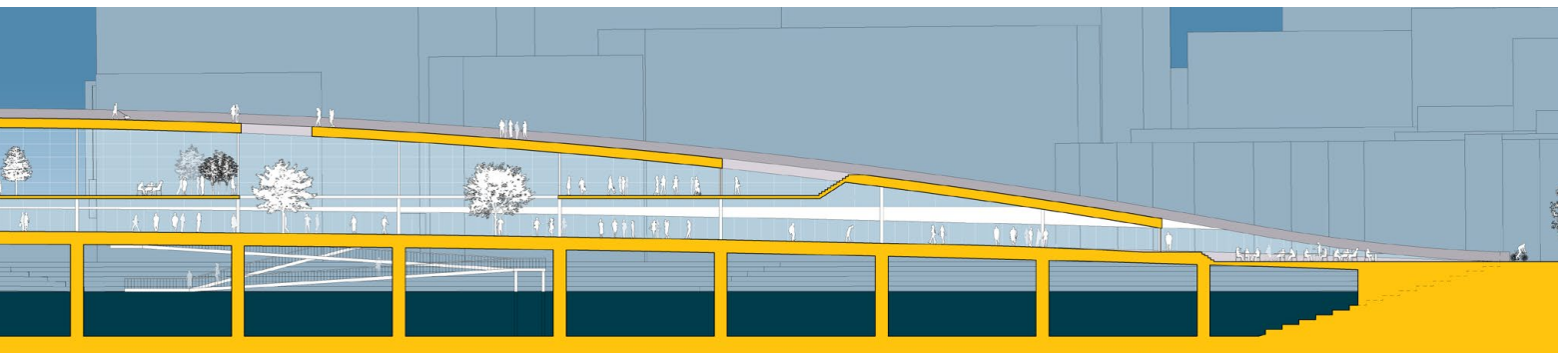


Internal streets and increased views of and across the water draw traffic into the site.

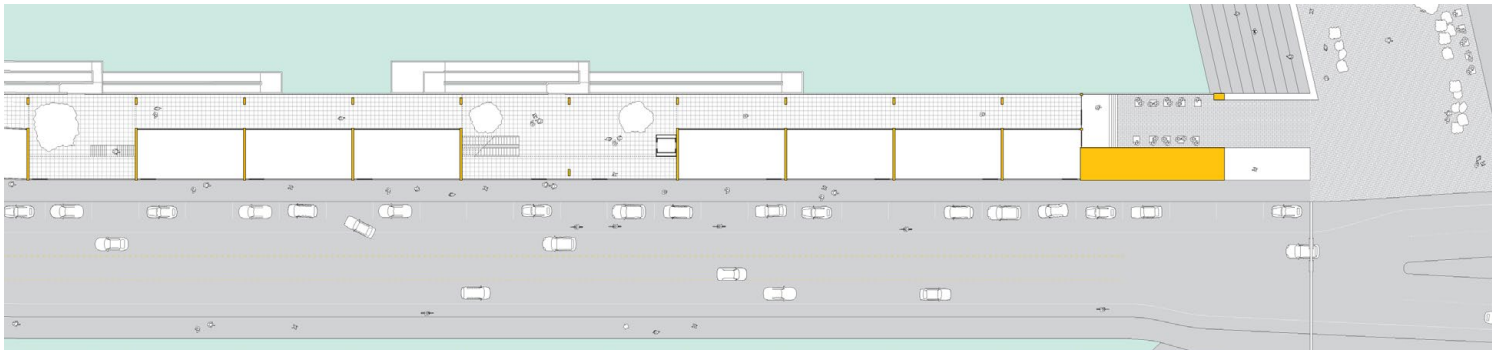
### An Icon for South Boston | MIT Studio - CLOSEPACKED (solo work)

The ancient Greek amphitheater is the inspiration for an iconic public inlet which serves as the catalyst for residential and commercial development in the area. At the edge of the water Boston's harbor walk is expanded into a multi-modal promenade along the bay which facilitates access to waterfront property while maintaining a continuous pedestrian-friendly urban fabric. On the fourth edge of the bay a building extends the length of the bridge completing the walking circle and turning the bay into a theater-in-the-round.

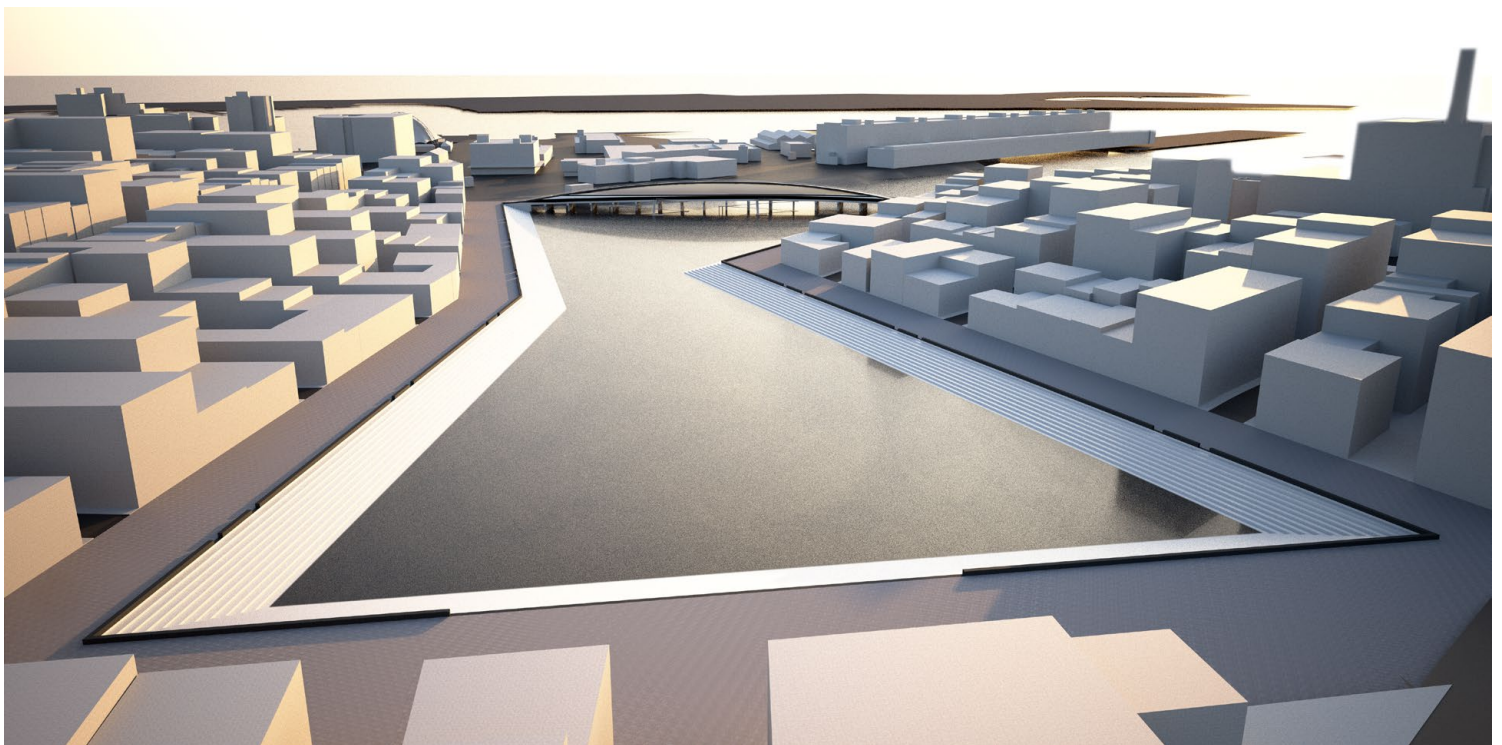




A promenade building encourages both congregation and ambulation.



Parking, bike lanes, and sidewalks reduce traffic speed, enhancing pedestrian experience.



Zoning codes restrict building heights close to the water, creating a pedestrian-scaled promenade.