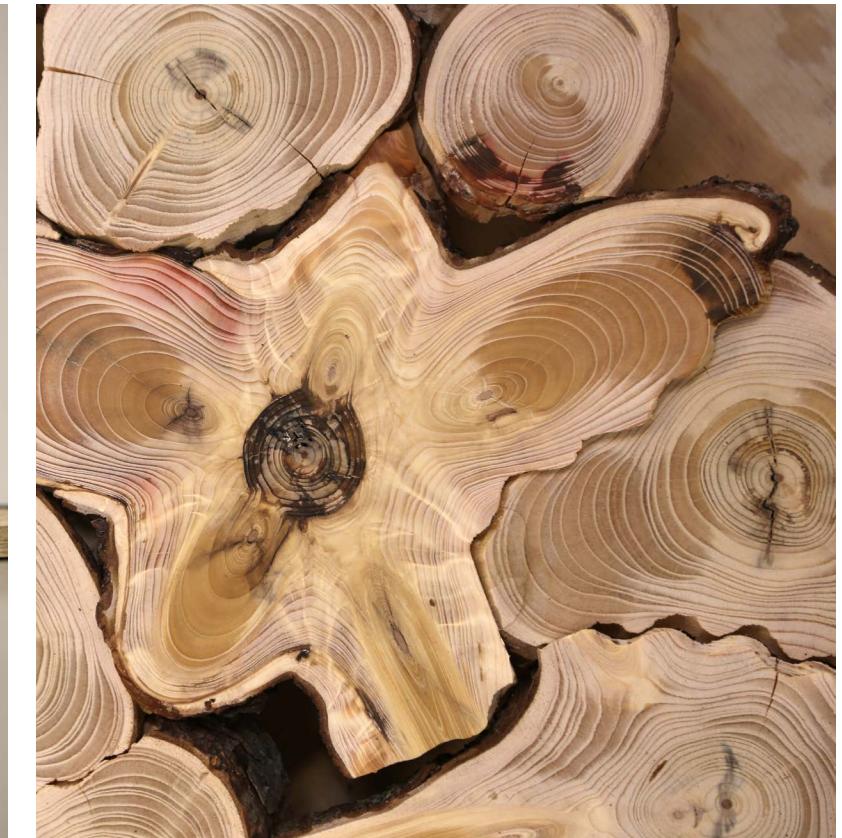
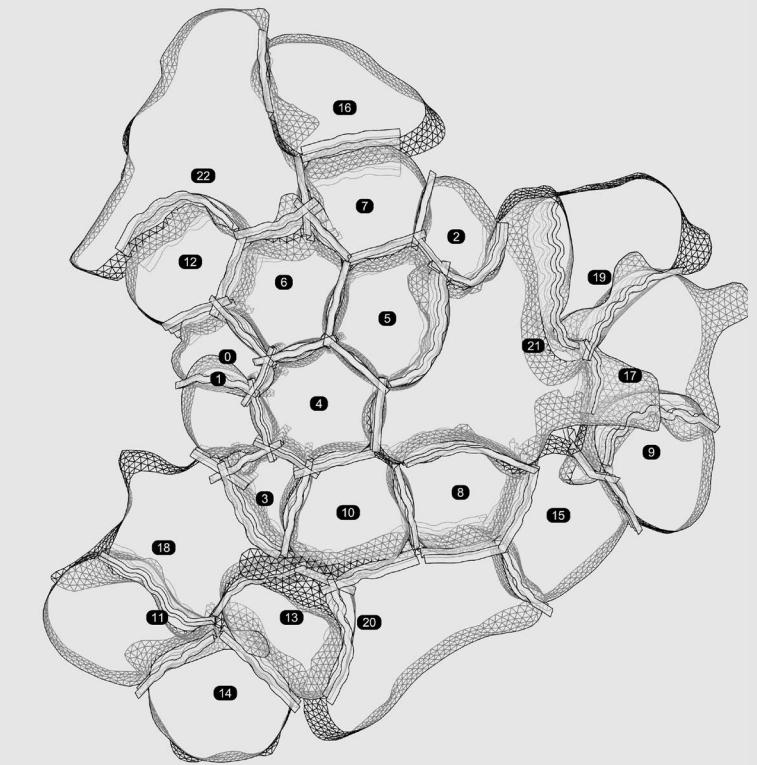
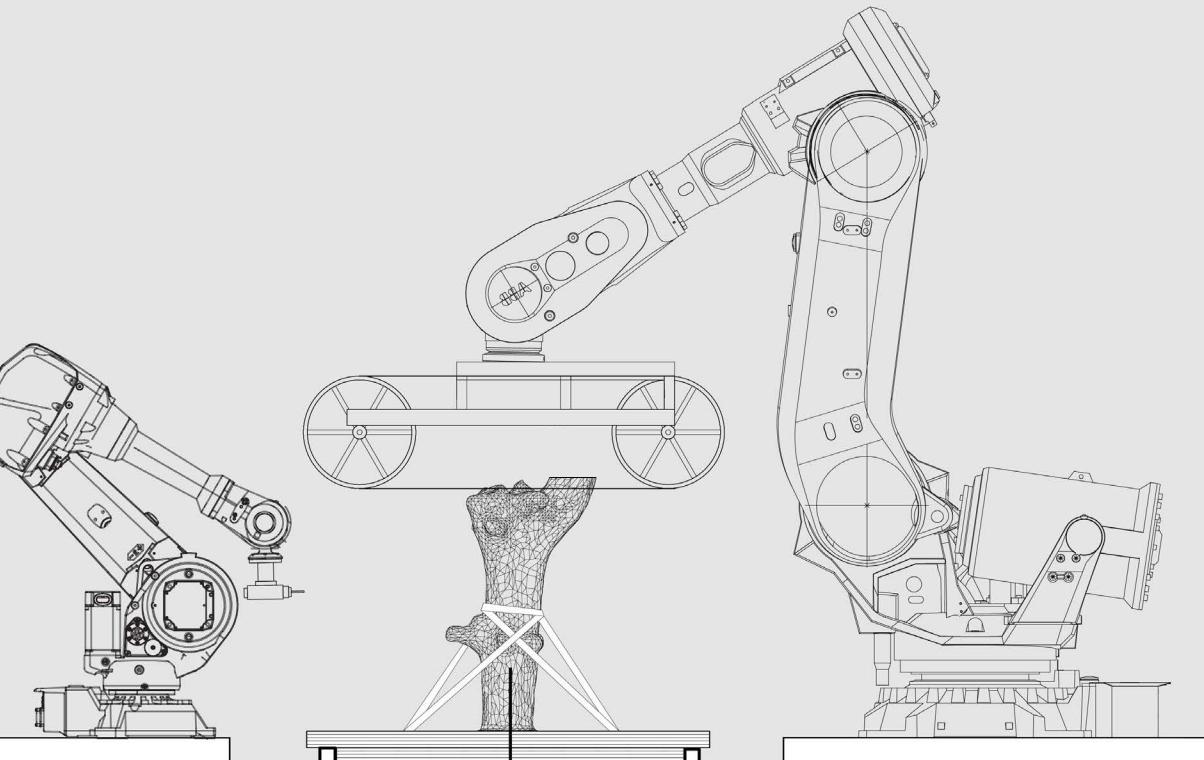
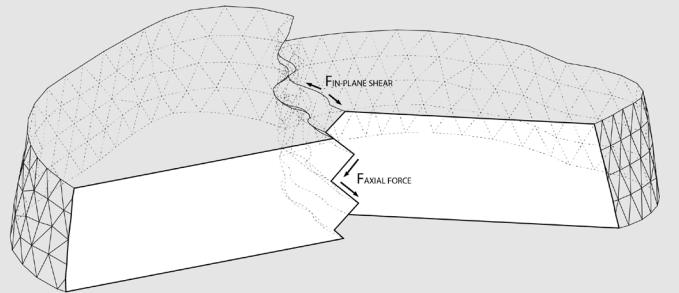


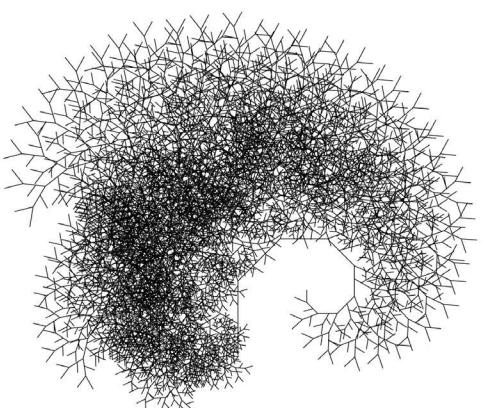
Jack M Otto
Design Portfolio



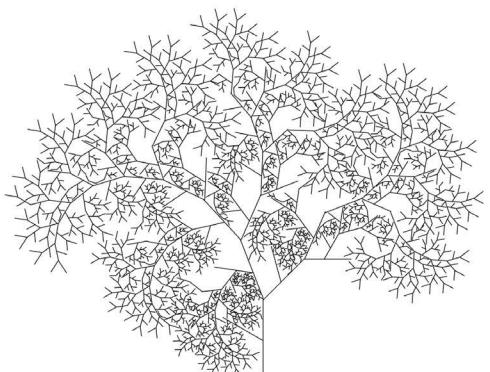
Cookie Cutter

celebrates the cross sections of discarded timber. Virtual cookies were sliced from a scanned log and puzzled together with a custom iterative packing algorithm. Two robots were used in alternation to mill “knuckle joints” and cut slices from the log. The 22 cookies fit together without any glue or fasteners into a small compressional dome capable of supporting over 100 pounds without buckling.

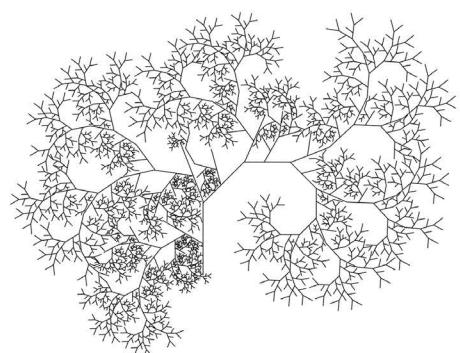




No Collision Test

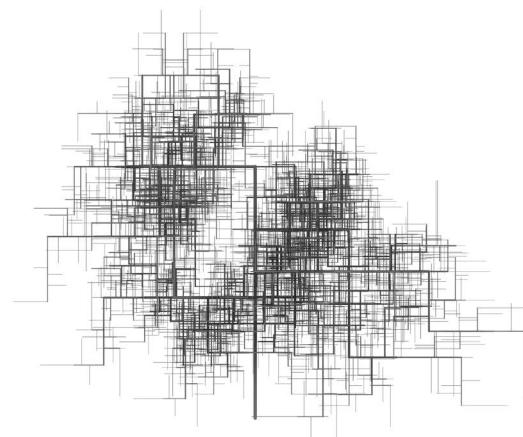
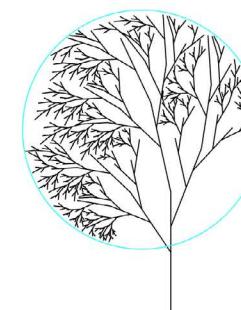
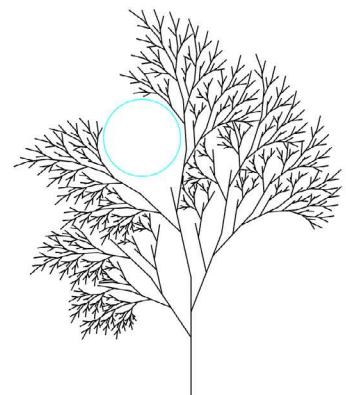
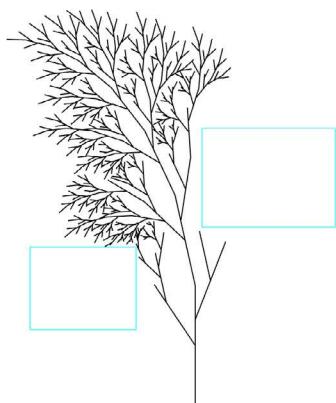
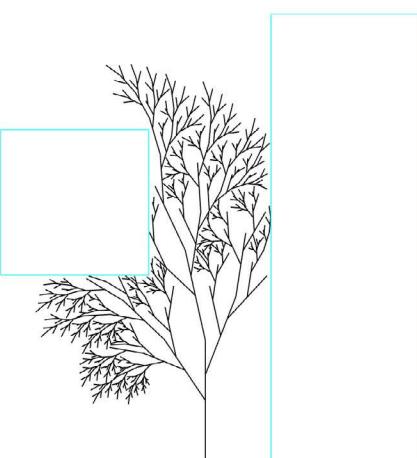


Draw Order: C L R

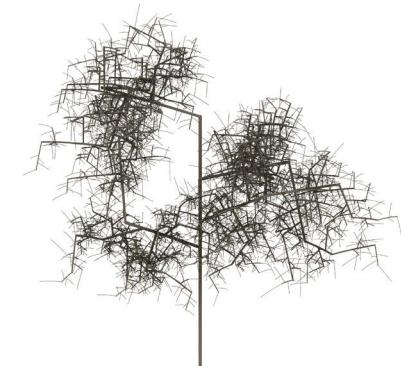


Draw Order R C L

Biomimetic Fractal Geometry:
The branching patterns of plants can be described mathematically with recursive Lindenmayer systems. Plants also grow in response to their environment. These explorations extend conventional fractal algorithms by integrating environmental factors such as collision testing with external objects, branch crowding, solar attraction, and gravity. These natural factors enable structures ranging from rigid and architectural to highly organic.



Gravity = 0
Solar = 0



Gravity = -1.5
Solar = 1



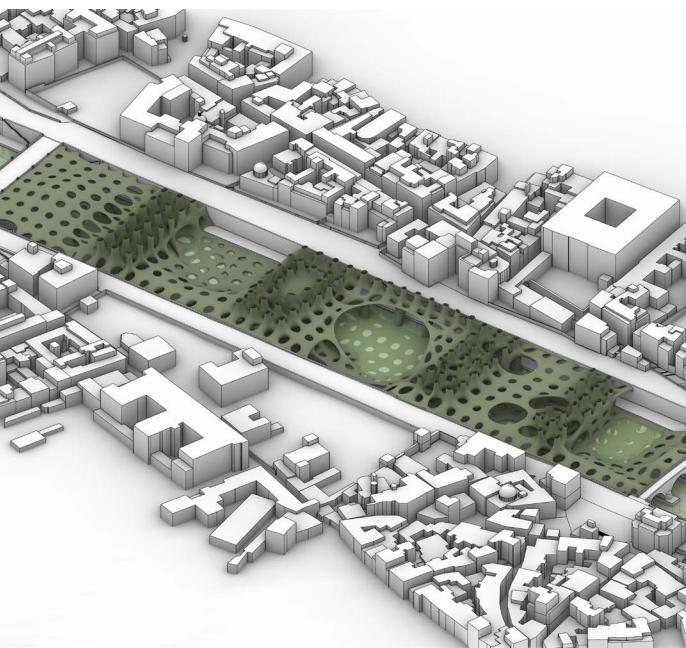
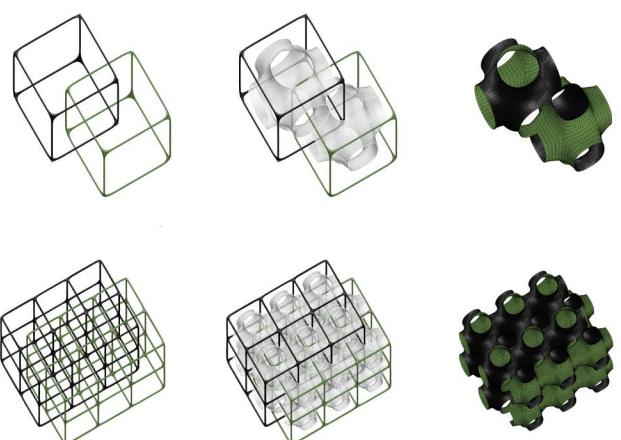
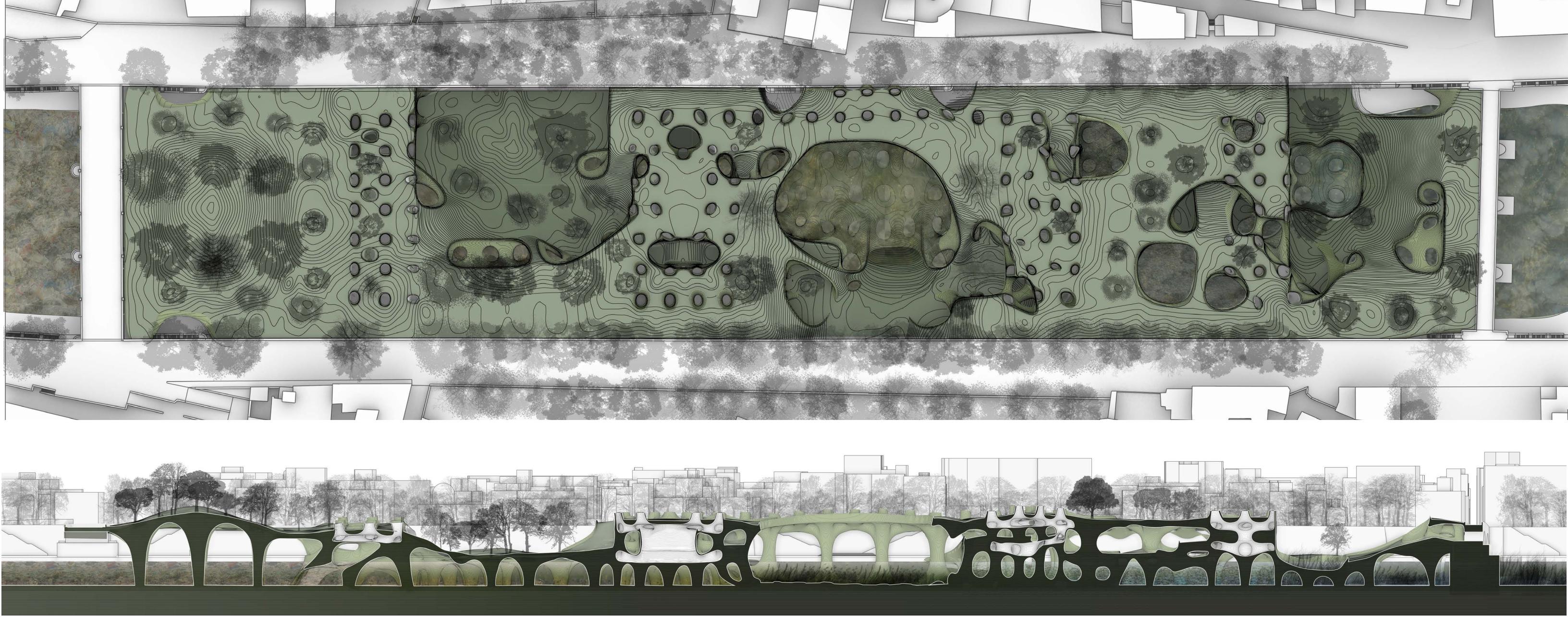
Gravity = -3
Solar = 2



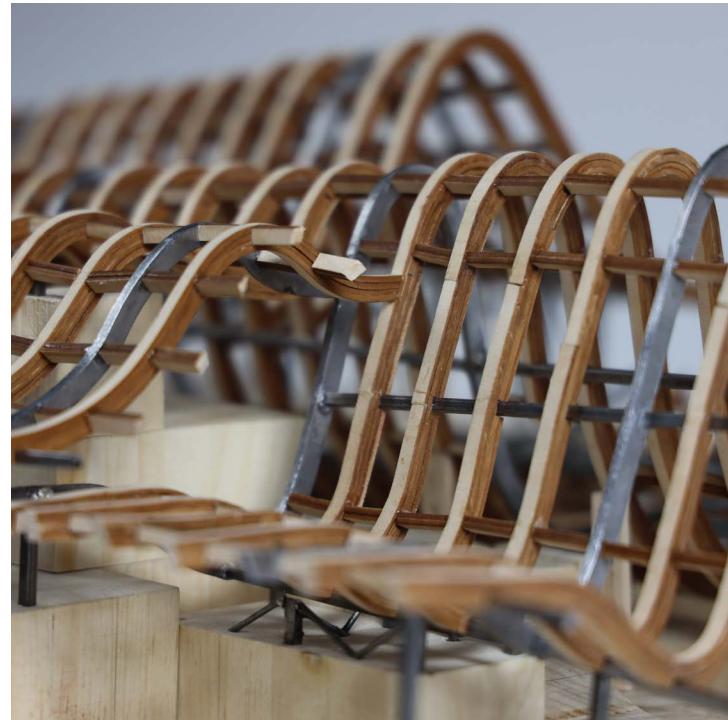
Gravity = -4.5
Solar = 3



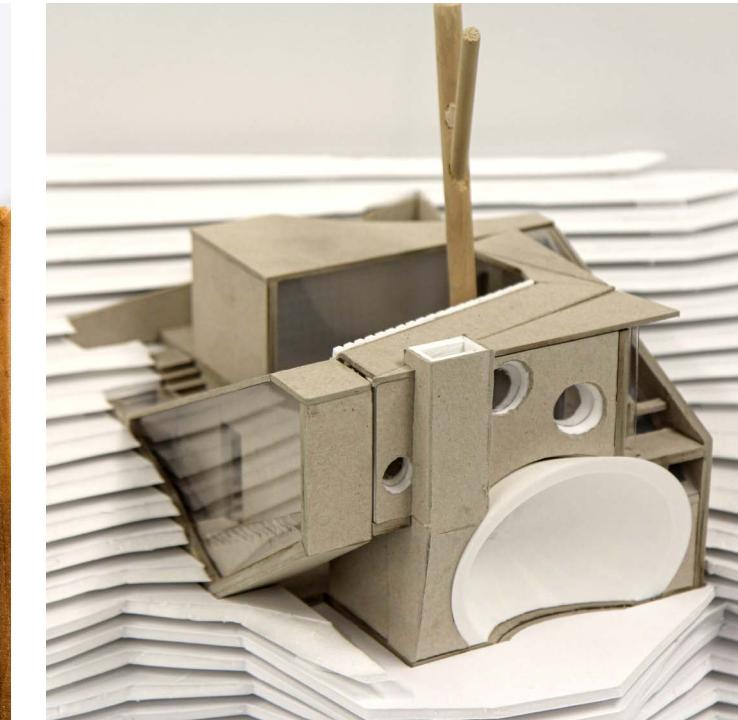
Gravity = -6
Solar = 4



Ponte Parco [Bridge Park] radically reconsiders the relationship between bridge and water. Drawing from the geometric principles of the triply periodic Schwartz P surface, a single 3d-printed concrete surface sprawls from Ponte Sisto to Ponte Giuseppe Mazzini along the Tiber River Canal. This surface restructures the canal to encourage sedimentation and plant biodiversity, which will naturally filter pollutants from the water. The multi-tier park features dynamic interior and exterior public spaces, reintegrating public circulation with green spaces.



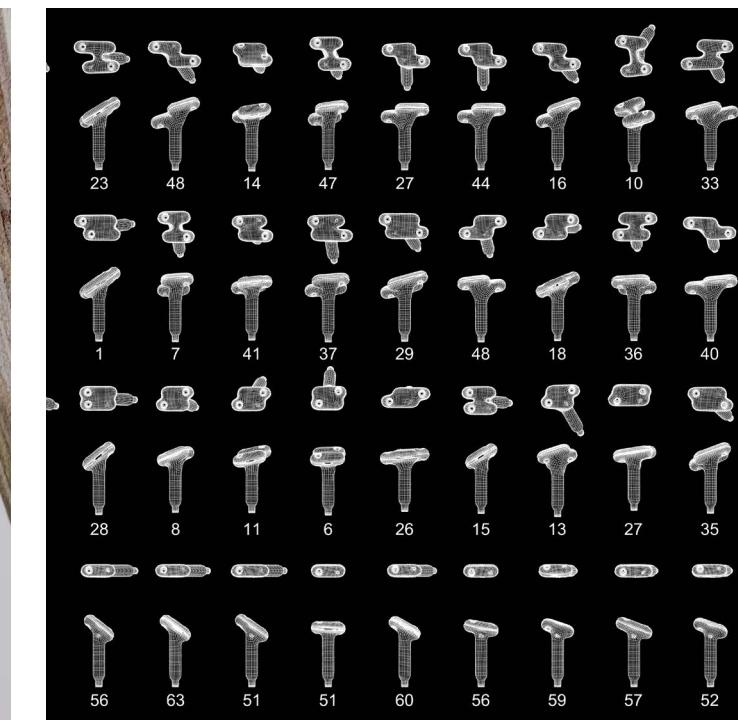
Structural Model | China Pavilion | Milan Expo 2015



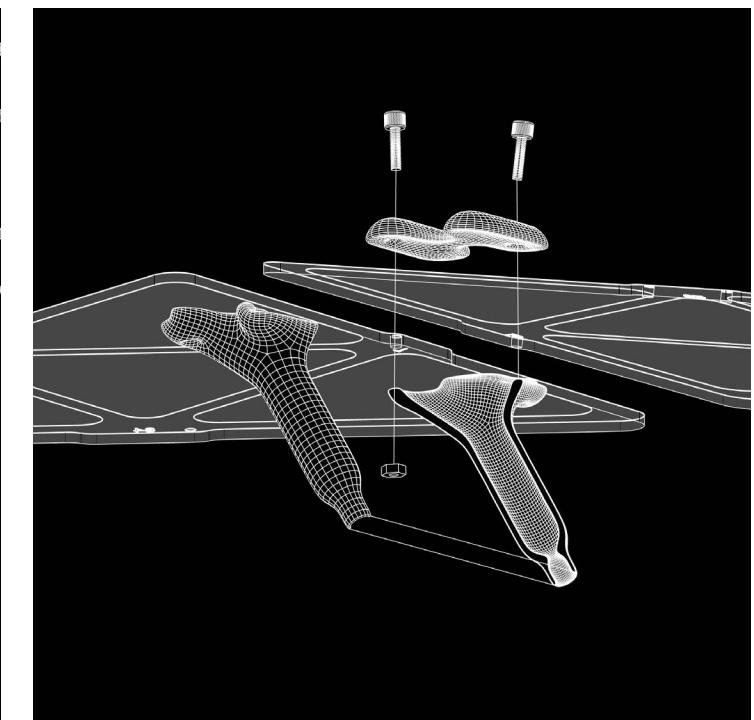
Light and Sound | A Sensory House



Woven Wood Screen System from Tesselating Parts



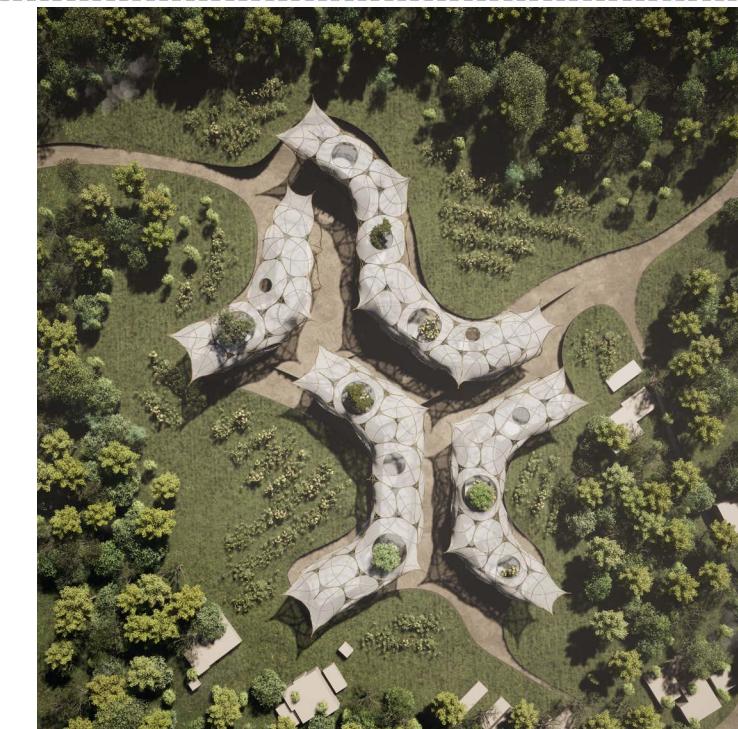
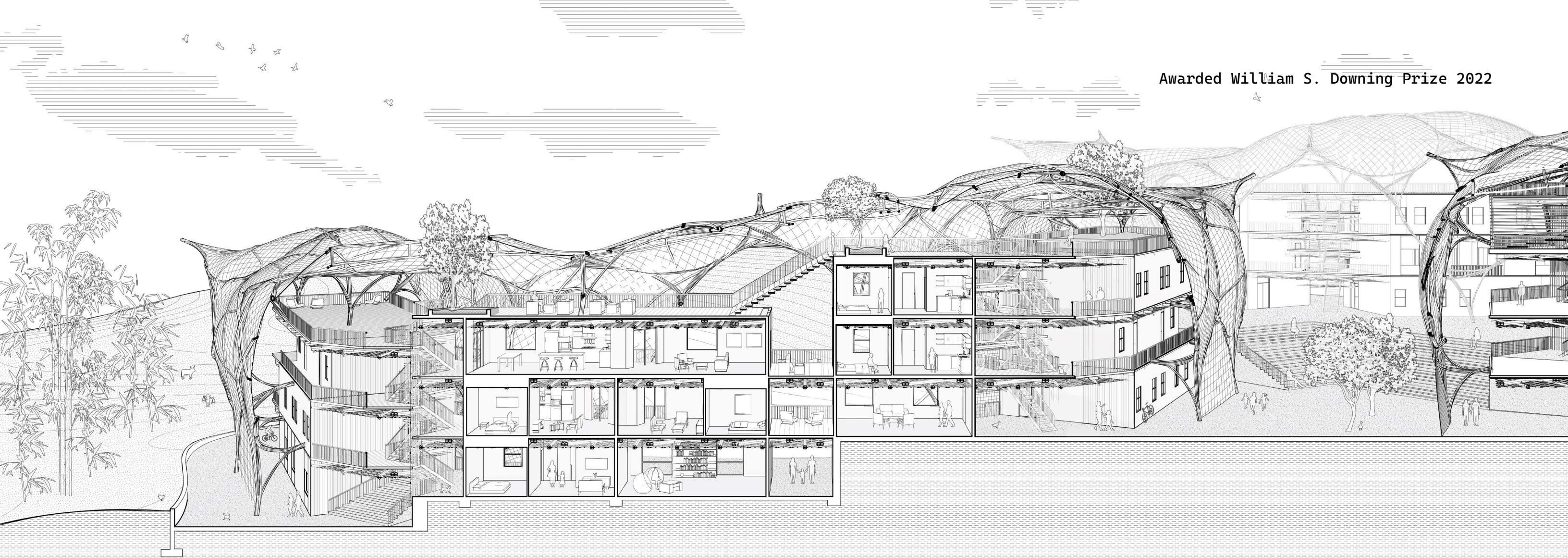
Bespoke Bracket Development | SSA | Sabin Research Lab





Dragon Day is a long-standing tradition for first-year architecture students at Cornell University. I was honored to be one of three heads for design and construction in 2019. Our dragon was built from hinged timber modules allowing the tail to whip side to side and the neck, supported by an internal counterweight, to arch back and roar to the clock tower.

Awarded William S. Downing Prize 2022



Bamboo Bending features a reconfigurable modular system that leverages the active-bending property of bamboo. The kit-of-parts consists of linear, triangular, and tetrahedral bundled modules that can be assembled on the ground and lofted into complex spatial structures. A custom Mixed-Reality design environment with integrated material physics simulations was developed to address the difficulties of designing with a non-standard and structurally-dynamic material. A secondary system stabilizes the module configuration and hosts the semi-porous envelope creating dynamic interstitial spaces which respond to the humid climate of rural Hangzhou, China.

Linear, Triangular and Tetrahedral Modules



Reconfigurable Model



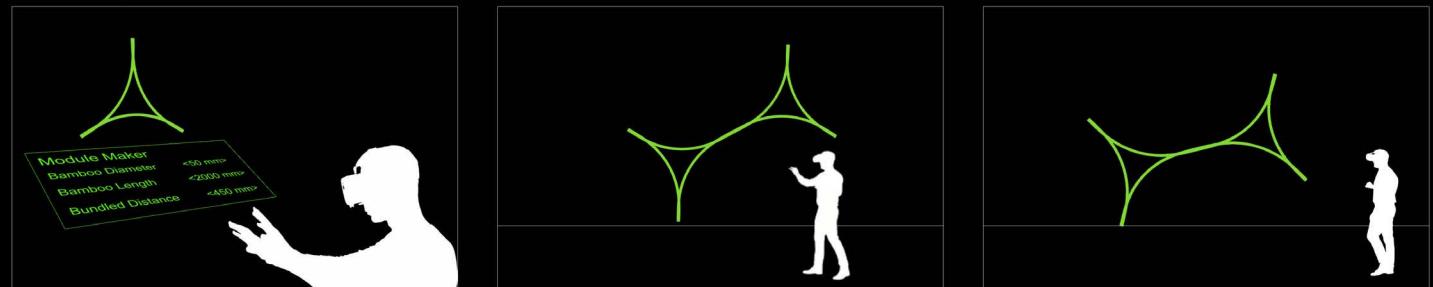
Mid-Scale Prototype



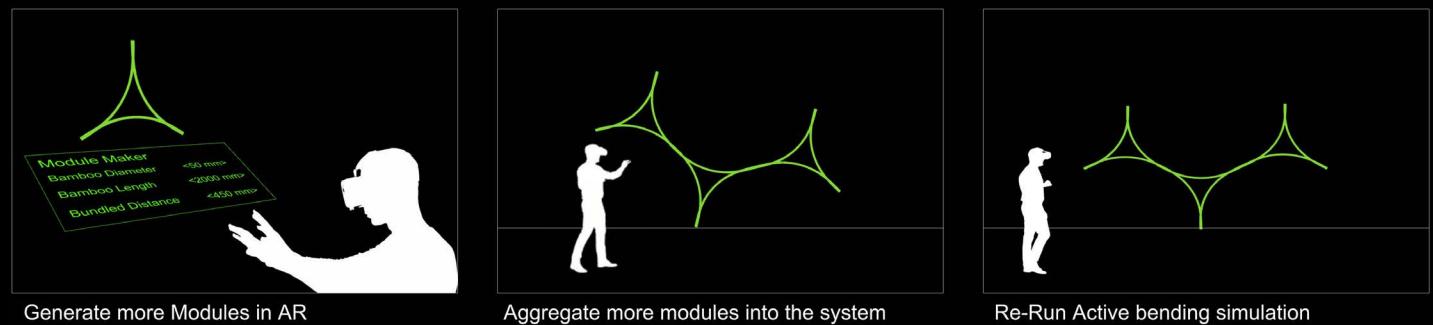
Jack Otto | Design Portfolio | Bamboo Bending | Partner Project

Mixed-Reality Design Environment

Initial Setup



Repeat Step 1-3 until desired geometry



Large-Scale Prototype



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