

Isometric  
looking North East

Isometric  
looking North West

Context Plan



# The Gradient Tower

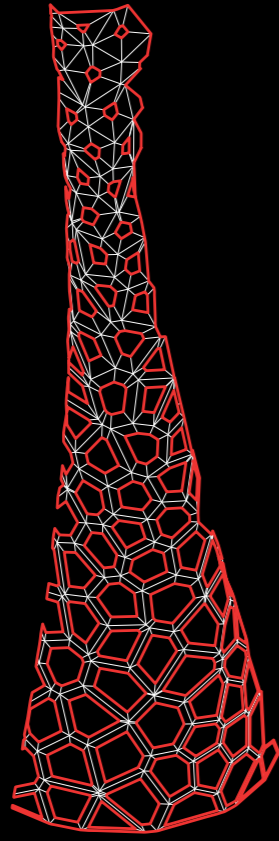
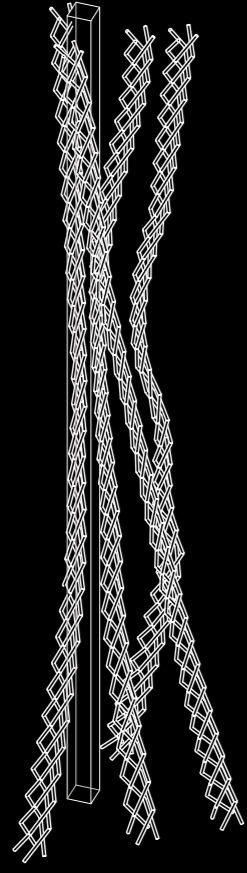
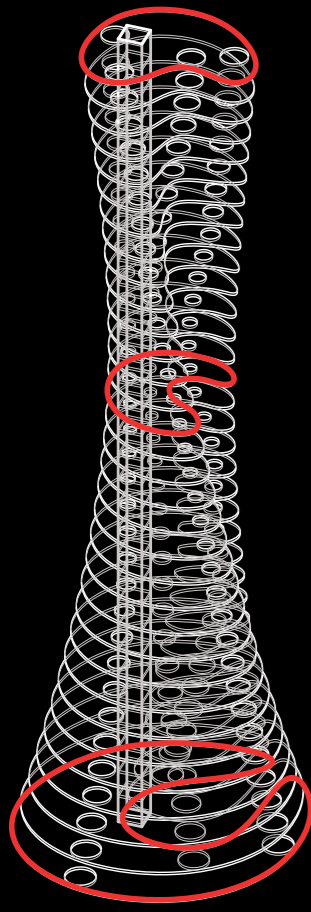
Hanyong Xu

Academic Work | 2019  
School | University of Toronto  
Professor | Nicholas Steven Hoban  
Location | Empty Plot on the South of 475 Front St E, Toronto  
Area | 6637 m<sup>2</sup>  
Levels | 32 Floors

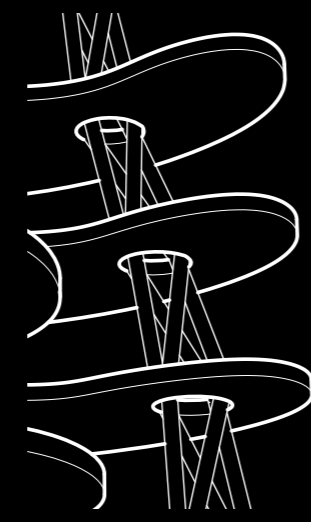
In this project, I explored with the parametric designs and the fabrication of multiple gradients: the gradient of the size of the Voronoi openings of the facade, the gradient of the twisting form of the tower, and the gradient rotation of the void-structures. I mainly used Grasshopper for the generation of these gradients. Furthermore, I explored with multiple fabrications methods including laser cutting and 3D printing, as well as various materials such as corrugated cardboard, plywood, and paper.

The central concept is about controlling the amount of light that reaches the usable space. I started with the horseshoe-shaped floor plates to create an ambiguity between what is inside and what is outside. I also used hollow structures to allow more sunlight to go through the tower. In addition, the gradient of the facade also considers the variation of the amount of sunlight on each level.

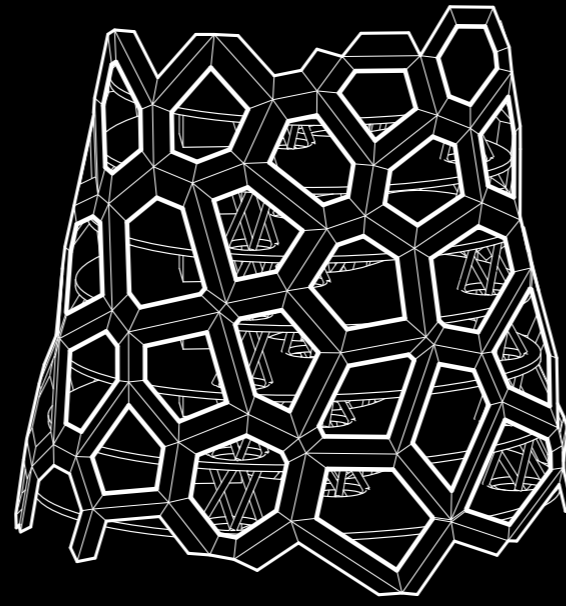
Exploded Axometric  
of  
form generation /  
structure generation /  
facade generation



Structural Details



Facade Details

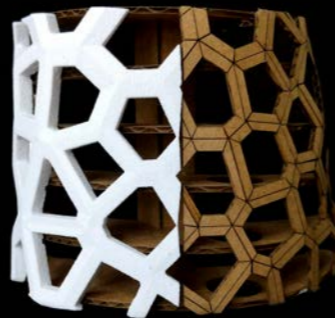


Sectional Model  
exploration of the  
fabrication methods

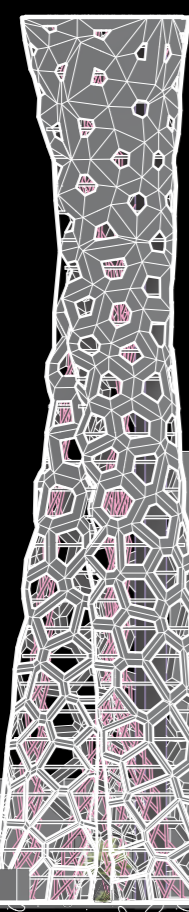


starch-based  
3D printing

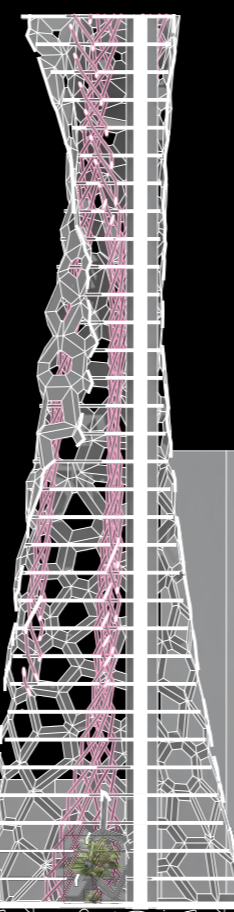
laser cutting  
cardboard +  
folding



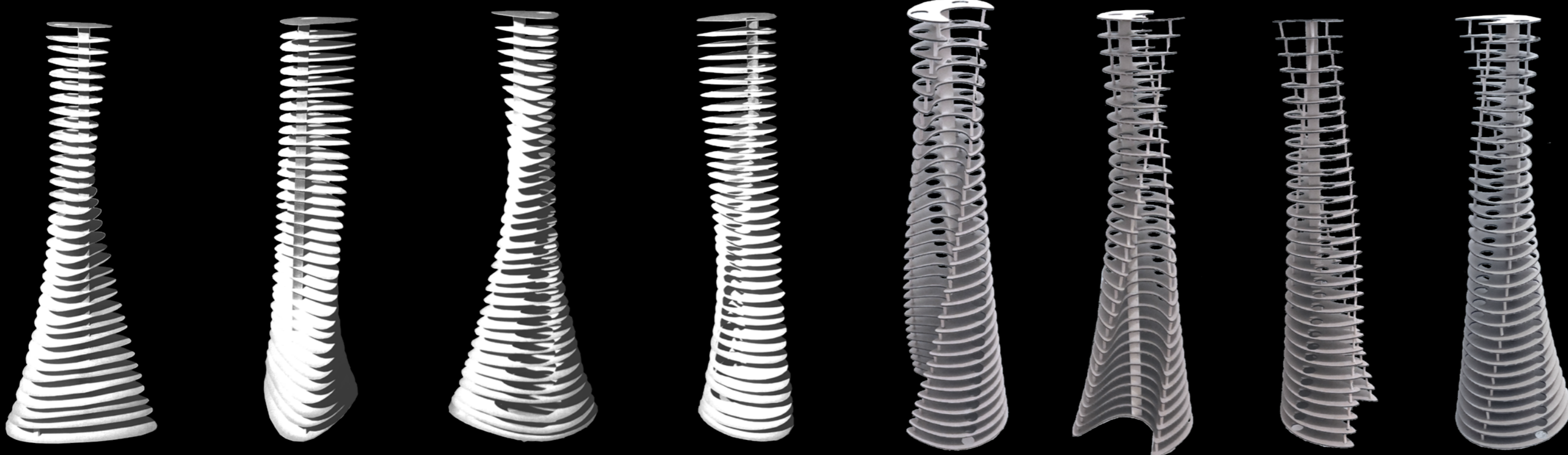
Elevation



Section



Physical Models  
form finding / structure exploration



Physical Models  
final model

