COMPUTATIONAL FABRICATION

☰

April 4, 2022   yieshengchen   Student Work

Final Project Proposal – yieshengchen

Description of my project

For my final project, I want to explore tiling further. One deliverable is a water clock where between the upper vessel and low vessel the water flows through tiles. It's inspired by the reading assignment blog post from Kate Compton, "So You Want to Build A Generator", and my process of doing LA3 and SA4. According Kate Compton's post and also in the "generative design approaches" lecture, I think so far I mostly used distribution method to create things and I want to see if I can explore how things can pass between tiles.

Deliverables and milestones

Week 13, April 26:
1. a 3d tiling of a surface that can conduct water
2. a working water clock mechanism (rack, pinion, a small floating vessel)

Week 14, May 3:
assembled water clock and the water flow by 3d tiling.

Week 15, May 10:
variation of the water clock and water flow: some ideas are listed as followed and I will evaluate and pick one to implement based on prototyping results and time constraints:
1. different tiling of the water flow tiles.
2. a chess variant based on tiles
3. flow of ball bearings across the tiles to drive different kind of mechanical elements for a dynamic solar system model

Pieces of related work:

The first piece is Prof Oh's PaperMech project (http://www.papermech.net/publications/) that includes a series of papers and a website documenting different paper mechatronics. PaperMech will provide precise graphics of different mechanical elements and how they can be utilized for my final project.
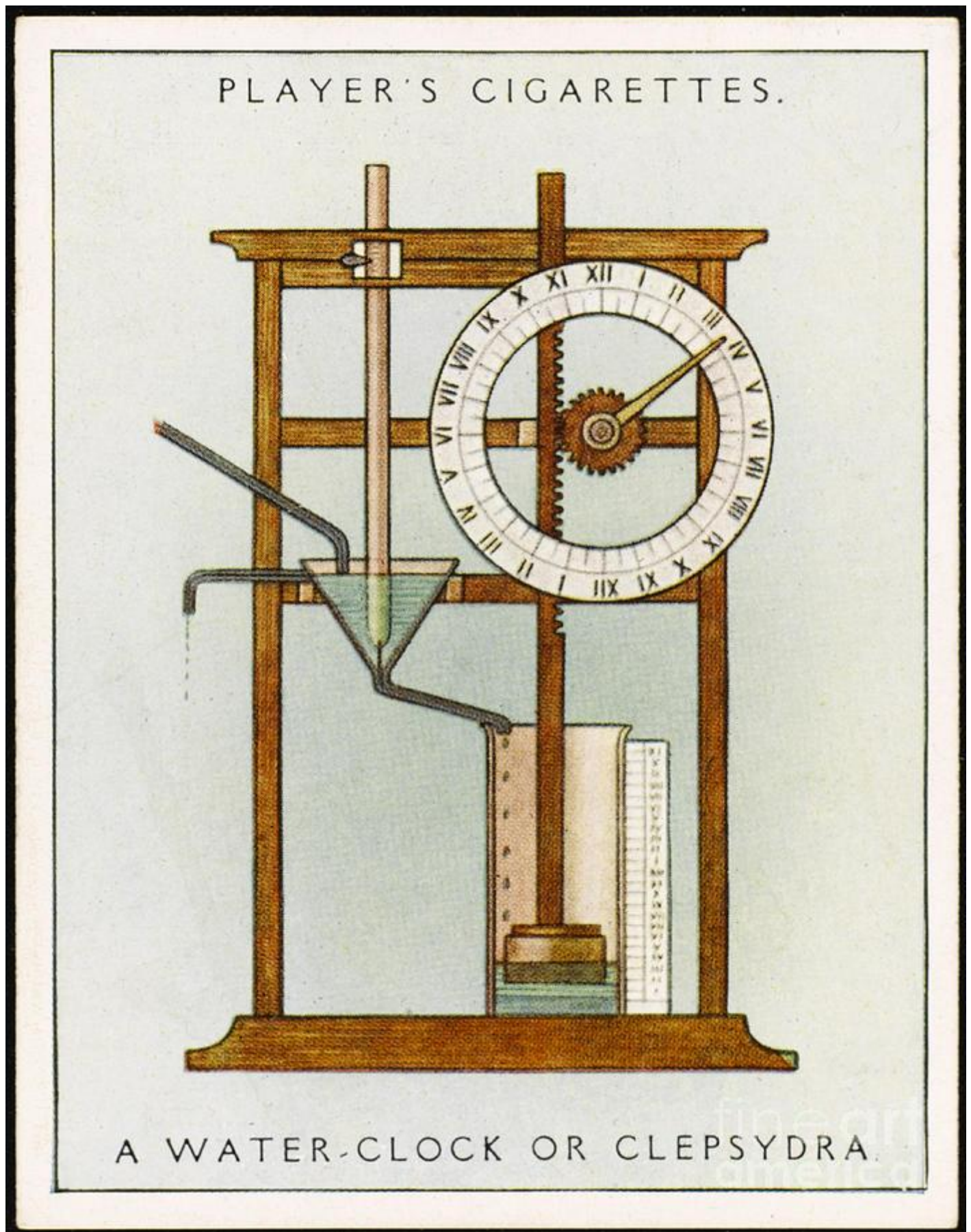

Image of one paper mechatronics from "papermech.net"
(http://www.papermech.net/2016/08/11/flower-garden-workshop/)

The second piece is a paper about 3d tiling: "Fabricable dihedral Escher tessellations" by Xiaokang Liu et al. This paper (https://www.cs.bgu.ac.il/~asharf/DihedralTessellation.pdf) discussed and explored 3d tiling techniques and printability requirements which are essential to my project.
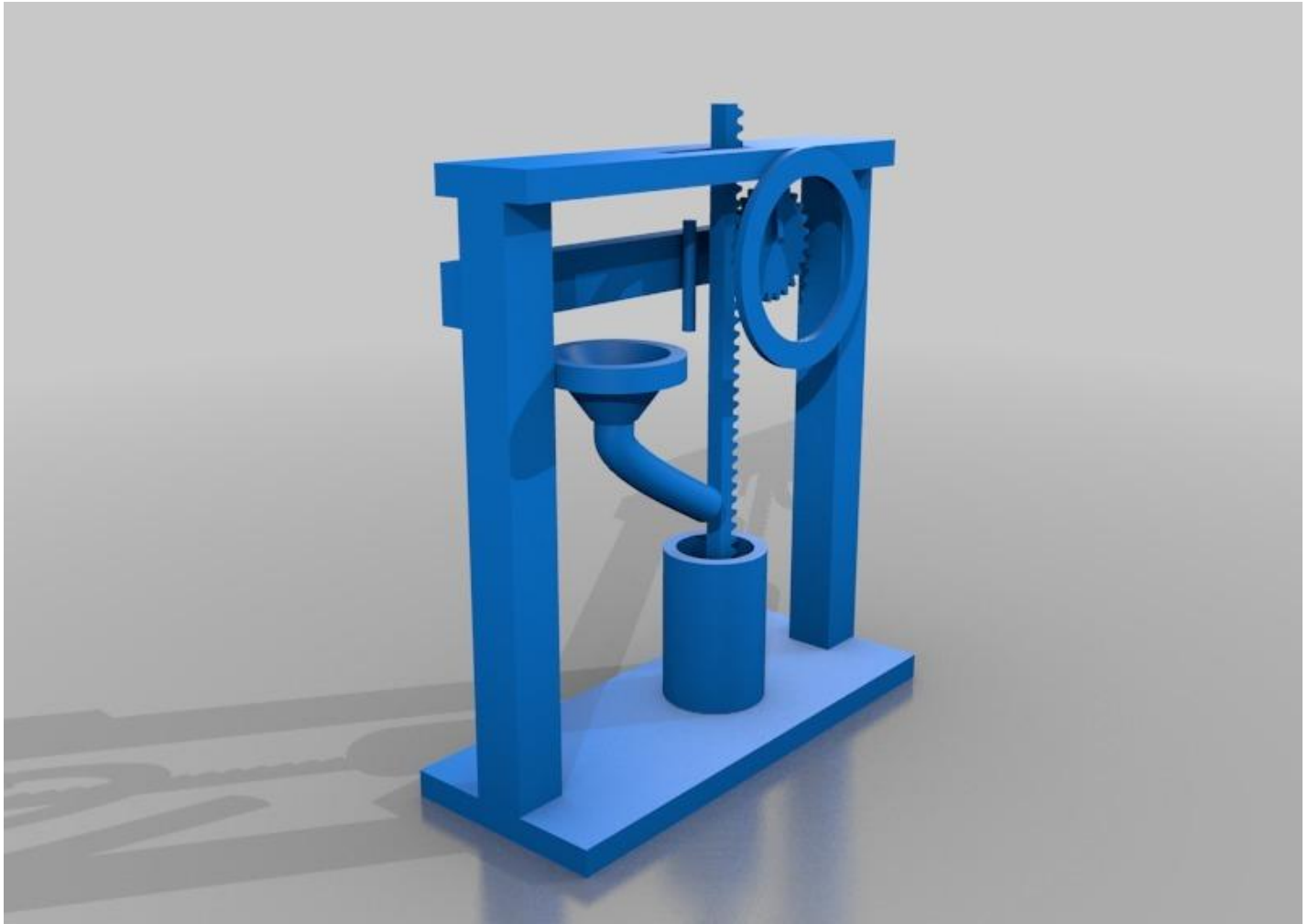
A image from the "Fabricable dihedral Escher tessellations" paper by Xiaokang Liu et al. of 3D printed models textured by our dual-shape tiling.

Another 2 pieces of related work, examples of water clock:

PLAYER'S CIGARETTES.

A WATER-CLOCK OR CLEPSYDRA.

https://fineartamerica.com/featured/2-water – clock-mary-evans.html

https://www.stlfinder.com/model/roman-water-clock-DRXZpI36/2268179/

Current prototypes

In the process of my LA3, I failed to create a 3d tiling made of tubes which is essential to my final project ideas described above. Thanks to Prof Leah's generous help and inspiration from Ruby's LA3, I am able to do the following prototyping and found that this final project idea is feasible:

Placing my Rhino view port next to the lecture slide (as the following image), the difference between hexagon and triangle becomes clear: So I changed the "U" input to "Surface Morph" from 1/num_tiles to 1/num_tilesU, where num_tilesU = num_tiles * (1 + size/(size + cosR*2)) because I think I need to consider the bounding box instead of the hexagon and the extra length of my hexagon tiling is "size" (the input from slider) whereas the side of the bounding box is size **(1 + cos(60**) * 2)
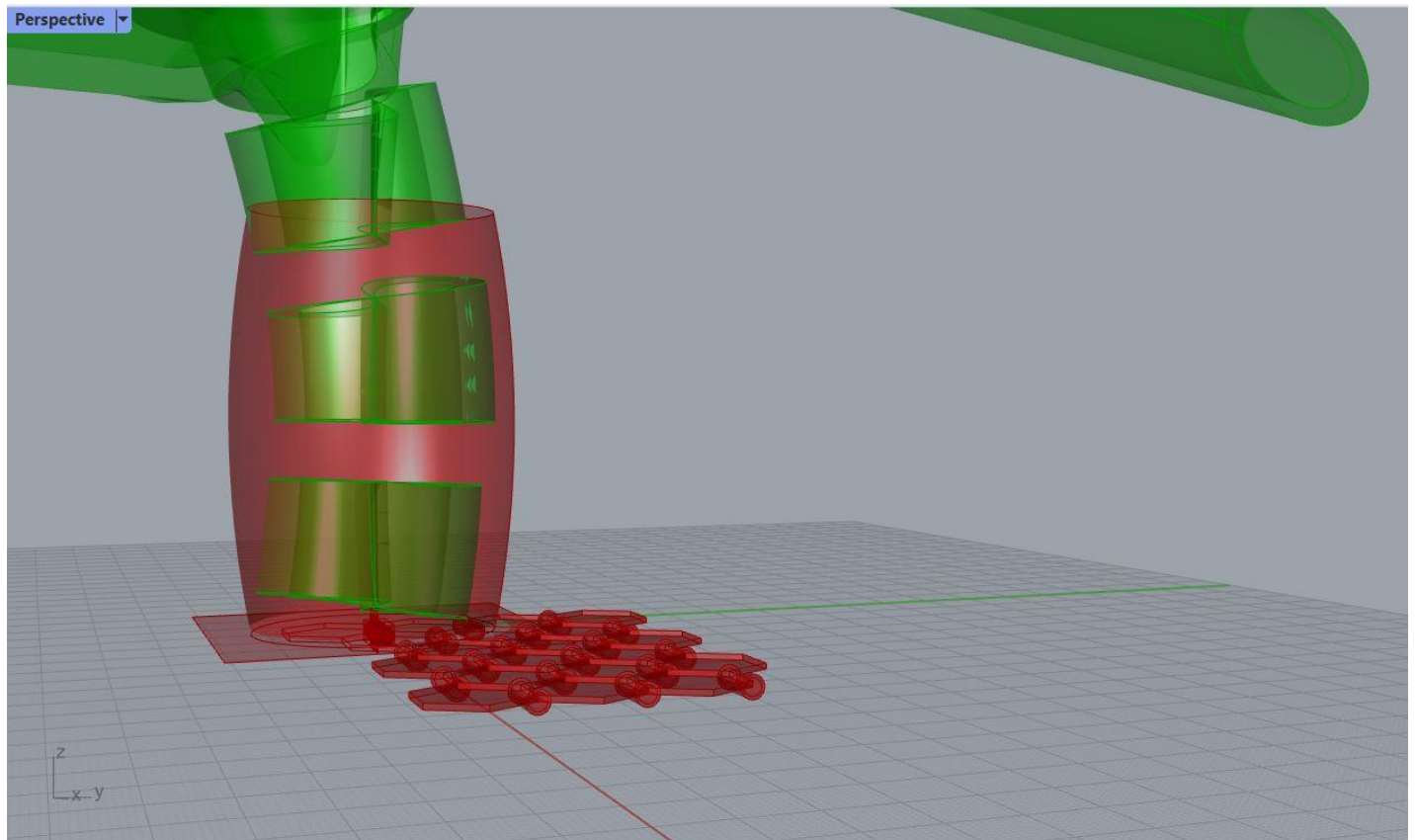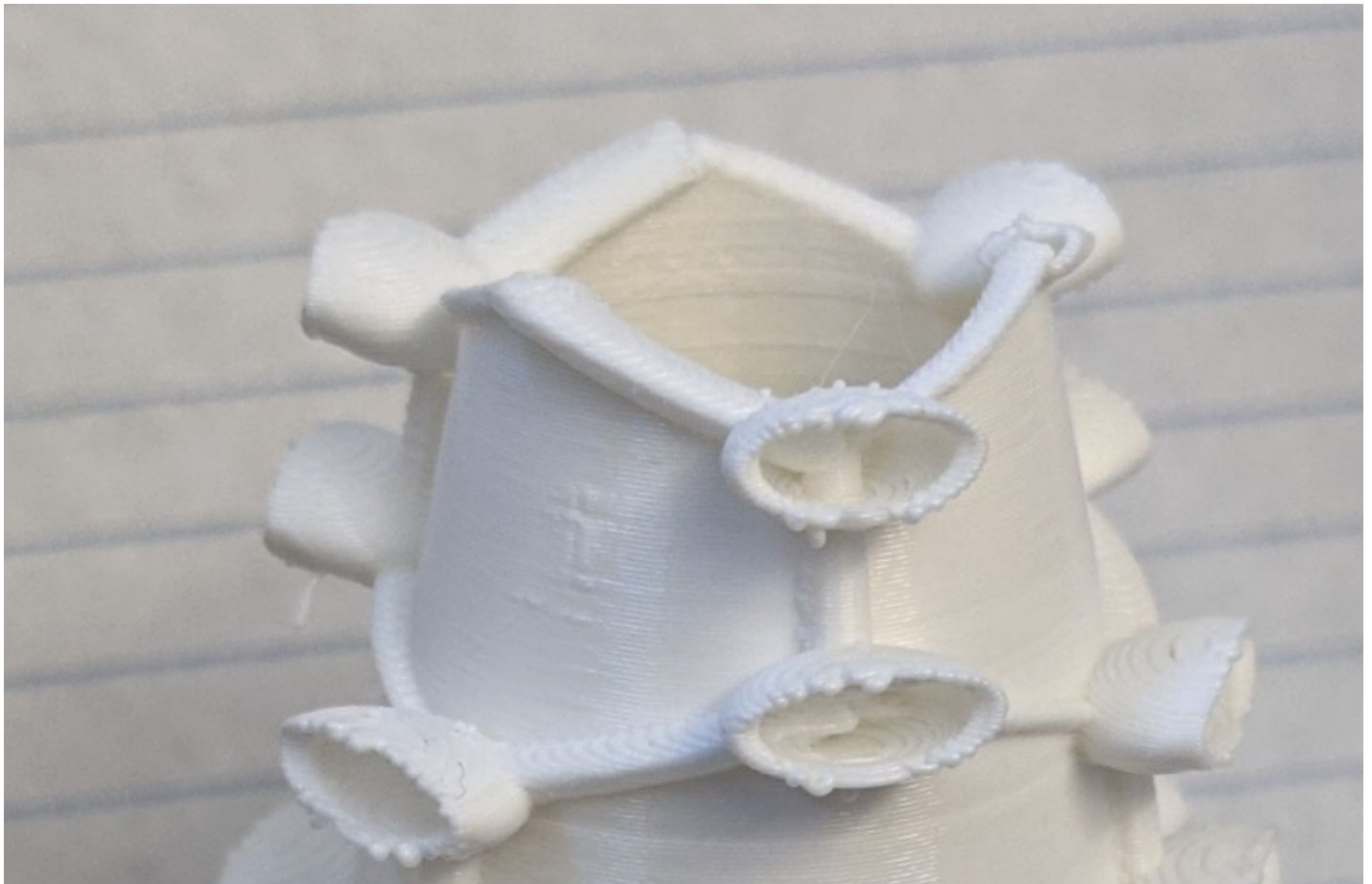
tiling with tubes before fixing how I calculated the U,V,Z values
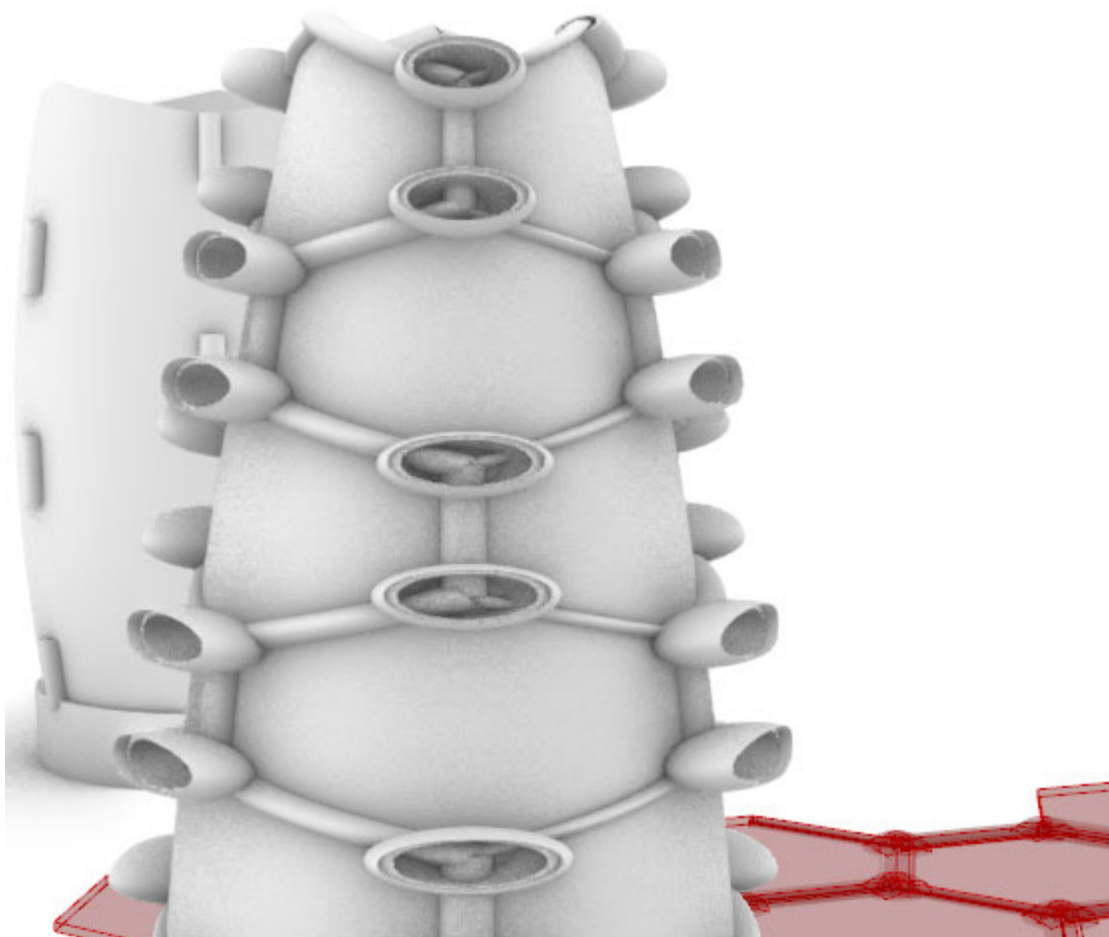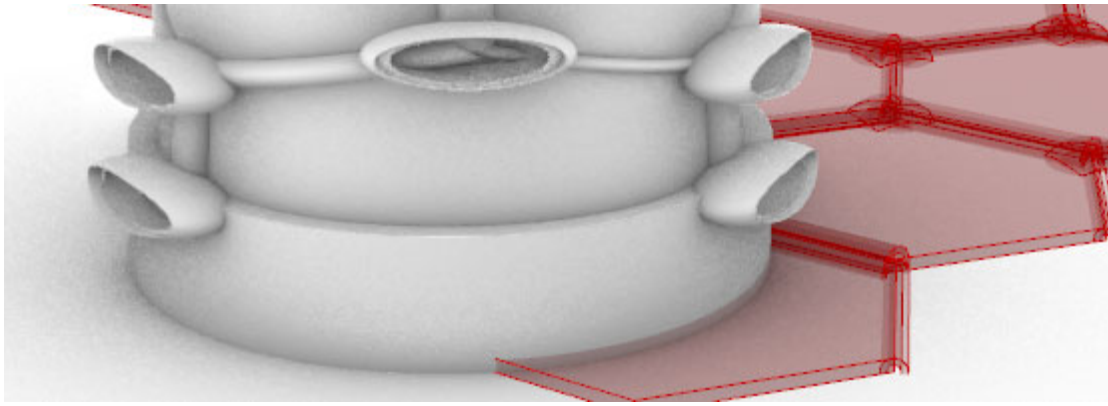
after I fixed the U value

however the tubes are flattened

the tubes are not flattened so much if I use a slender as the surface to morph onto. (I didn't finish
this 3d print so it does not looked slender.

another prototype to see if tubes can be printed and to conduct water.

by adjusting the box's position, its bottom can be supported by the tube. And this prototype is to make sure a tube can extend from on hexagon into another.
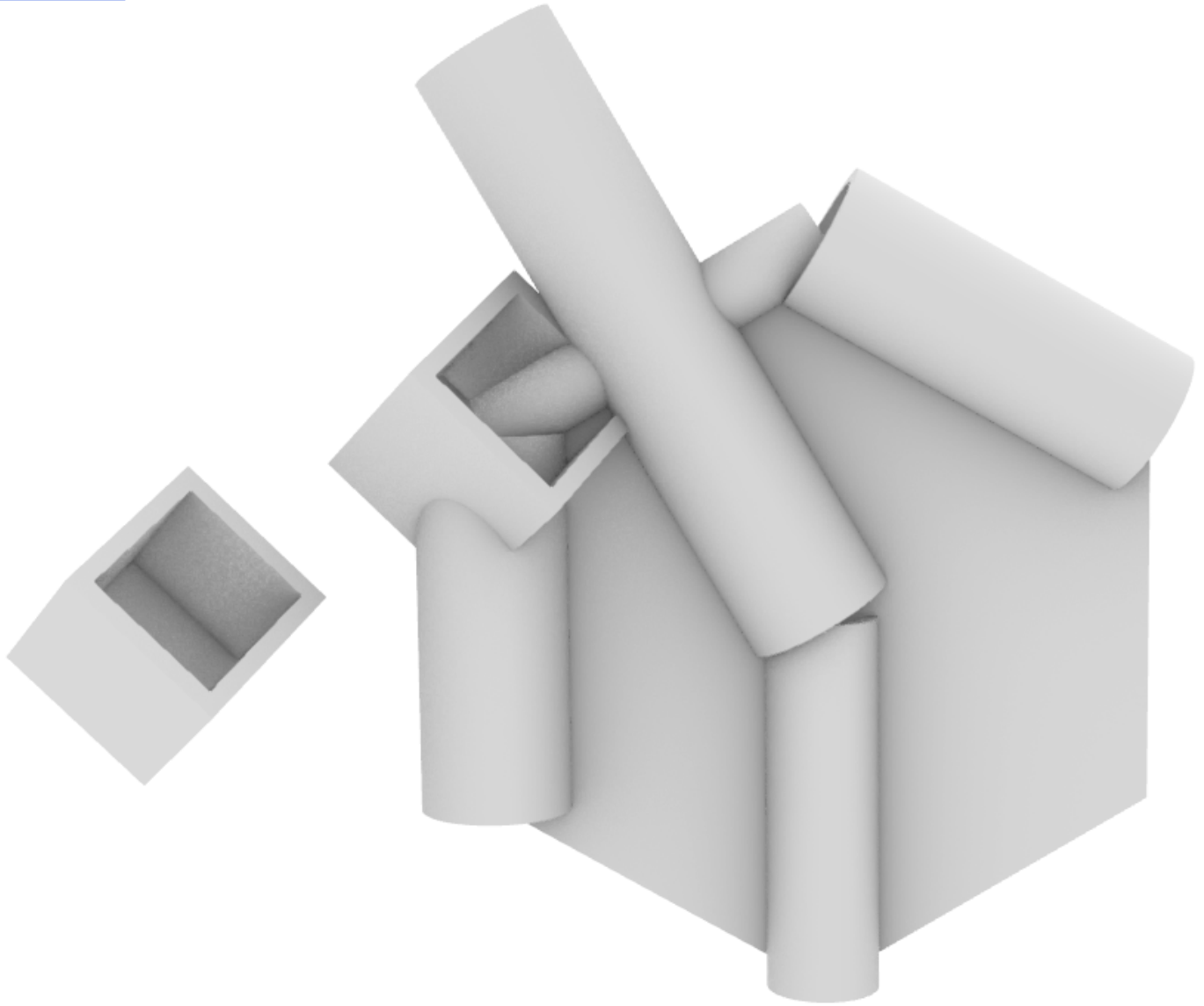
another image of my most recent prototype

closeup of my most recent prototype

Perspective ▼

render of a tile of my most recent prototype

Edit

6 thoughts on "Final Project Proposal – yieshengchen"

amytraylor says:

April 6, 2022 at 7:08 pm   Edit

I just love your 3D work! Are you sure you weren't meant to be an artist?

Reply

yieshengchen says:

April 7, 2022 at 6:50 am   Edit

Hi Amy, I think being computer scientist is also fun! And staring at the cylinder for ideas to continue, I think it will be nice if I can try something similar to "the monolith" by Gustav Vigeland.
I saw a website (http://www.allscandinavia.com/sculptingthehumancondition.htm) describe Gustav Vigeland's work as "interpreting the pathos that is the human condition". I googled pathos and read from the wikipedia page that pathos means "complaints of the soul".
I began to wonder is pathos a good thing?
Does it mean the emotional difficulties?
If so, I think maybe it would be nice to understand, see through and overcome pathos?

Reply

JorgeLoredo says:

April 6, 2022 at 8:53 pm   Edit

Wow, I literally cannot wait to see your final work. I agree with Amy, perhaps you are realizing now you were meant to be an artist.

Reply

yieshengchen says:

April 7, 2022 at 6:56 am   Edit

Hi Jorge, hmmm, it would be nice if I can be an artist, have fun and .. safely retire. But I think it's also fun to be computer scientists, sometimes. Maybe when I finally under

something, instead of getting stuck, can't find a bug, etc. But from this view point, artist can get stuck too?

Reply

Ben Liu says:

April 7, 2022 at 2:18 am   Edit

Making a water clock is a really cool idea, printing out the mechanical and moving parts seems like a fun challenge!

Reply

yieshengchen says:

April 7, 2022 at 6:58 am   Edit

Hi Ben, thanks! And I hope this can be a fun challenge too! "hope for the best prepare for the worst"?

Reply

Leave a Reply

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2022