

Reina Magica 3d printed shoe



Aim: to make a custom pair of moulded shoes made out of plastic, inspired by these cool shoes



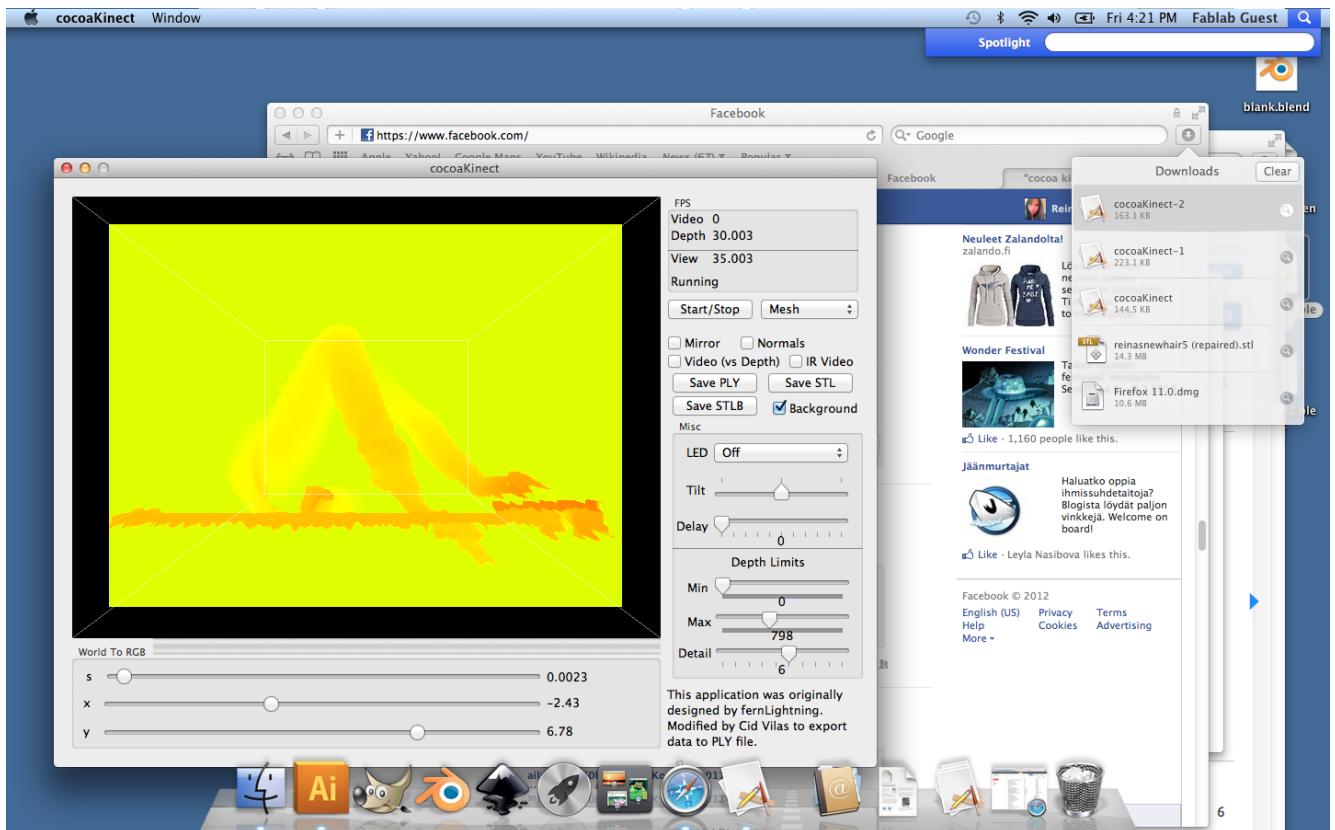
I saw designed by United Nude.

Concept: The idea is that the shoes would be comfortable, because it is made to fit the soles of my feet smoothly. Especially important that it is comfortable is because high heels usually are the most uncomfortable things in the world besides wedgies. My aim is to make a nice looking and hopefully ergonomically good shoes that will also look nice.

Method: I started by looking for ways to scan my feet into 3d. I tried using pictures and 123d catch but the result was not good, as I could not keep my feet still in that position, it was a real mess. I heard a fellow student used kinect to scan his face, so I downloaded the same program OSX connect from (<http://www.thingiverse.com/thing:8262>).

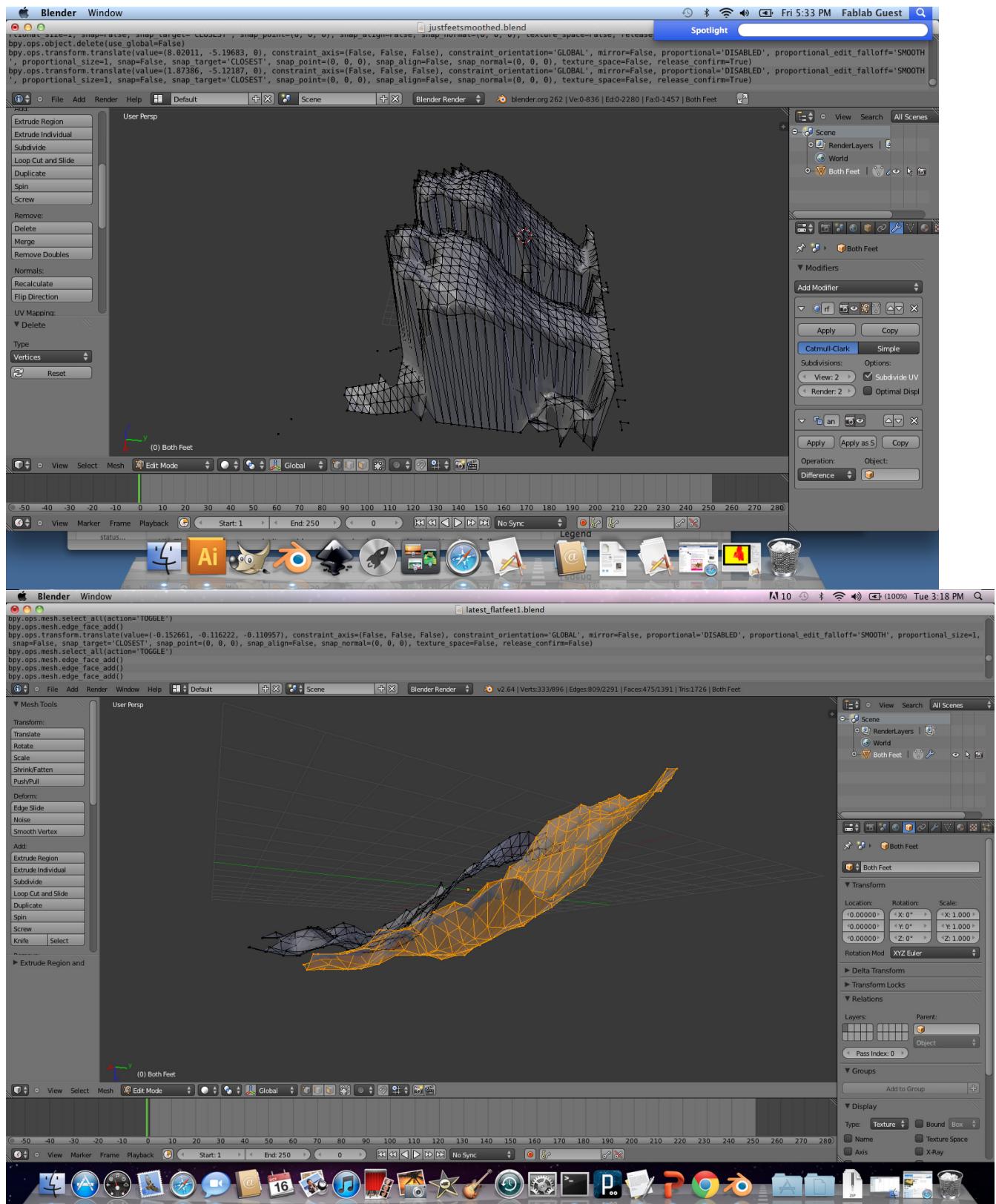
I set the kinect on the table, and because the distance was too close, I sat on the next table. Then I bought the laptop to where I was sitting and arranged myself and the depth settings on the program so I could get a shot of just my leg. Anyway, I wanted the curvature in my sole when I tiptoe, so I took some shots like that. But that wasn't getting the bottom of the foot, so I took some like that also.

Because the kinect detects depth pretty nicely, I ended up using the bottom sole shots for the model I will base my shoes on:



Journal: Tues Oct 16th

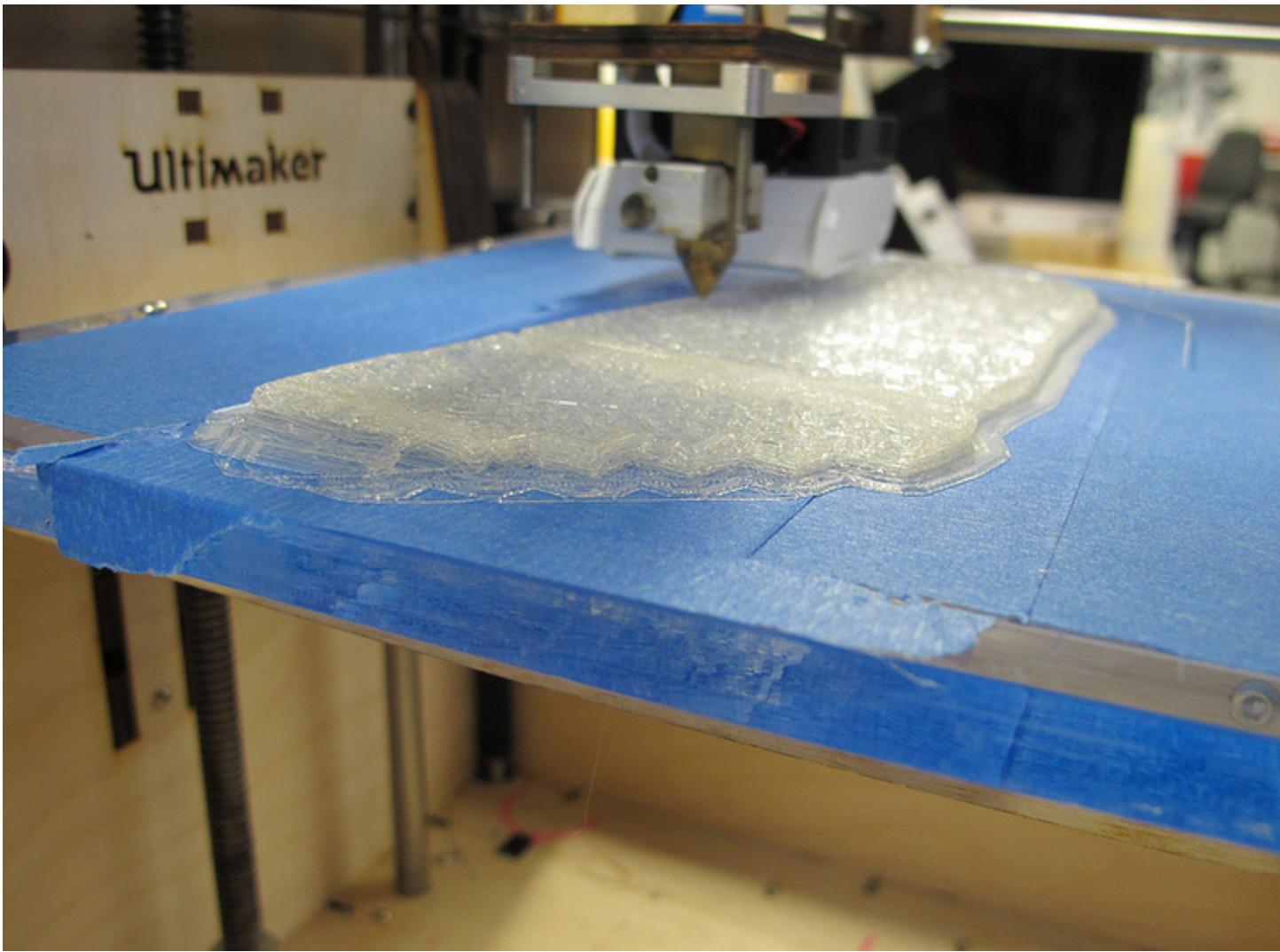
Spent time designing the shoe file. Extruded out of the faces of the foot scan, and then levelled the bottom with a boolean difference function with a box. All the faces were missing below the shoe somehow, and also aesthetically corrected some geometries and extra faces by moving vertexes. Corrected the toe area because it was on a slight bend upwards. Added some holes using boolean difference between cylinders and models because that's where I put in some ribbons to tie the shoes on.



Wednesday Oct 17th

Loaded .stl file of shoe into B2B and there were some issues. There were some extra vertices and fixed those in Blender. Fixed the next file in B2B as an .stl and built a b2b file to print. The estimate was 14 hours, actually the first with 40% fill was maybe 34 hours. Anyhow, I changed the plastic to White ABS, and while printing, it wasn't really sticking to the surface, as happened often with 3dtouch, it was cooling too quick, so when the Ultimaker was back, I switched machines. In the new preview of the Macpronteface software, we could see that the bottom of the shoe was not flat, so corrected that again in blender. The ultimaker was broken and needed recalibration, so now its the second/third attempt to print and looking alright. Also, the length was only 16.5 instead of 19.98 as stated in the b2b software, so the scaling function is inaccurate in B2B.





I switched to clear PLA because its already there and has a nice effect so you can see the meshes and inside the shoe.

Settings: Layer Height:0.4 Fill density: 0.2 Fill Pattern: Honeycomb top/bottom fill: rectilinear Infill every 1 layer solid infill every 0 layer fill angle 45 Solid infill threshold 70mm² Speed: 30mm/s on perimeters 60mm on infills and bridges 130 mm travel first layer at 30% skirt - 3loops, 6mm, 1 layer, 5mm width support material yes, overhang threshold 45, rectilinear, 4mm pattern spacing, pattern angle 0

21st Oct Printed one shoe for about 8hrs 45min.

22nd Oct

Today I set the outside perimeter speed to 60 from 30, because I met some About the seventh printing of the shoe. The Ultimaker, when moved, often loses it calibration of the platform, so you have to manually adjust it again with tools. Didn't know notice it was off calibration until later. Also the screw on the ultimaker at the back for fastening to the filament often loosens,

and that caused most problems for "layers of nothing". Sometimes there were layers of nothing when the filament had worn down from too tight feeding, but if its not tight enough, the screw comes loose. It was a real hassle using the Ultimaker for such a big piece. If I had a choice, some kind of industrial light based 3d maker would be a better option.

Infill at half speed and perimeter at half speed is much more stable Currently at:

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; layer_height = 0.4 ; perimeters = 2 ; solid_layers = 4 ; fill_density = 0.1 ; perimeter_speed = 60 < 30 is safer ; infill_speed = 60 < 30 safer ; travel_speed = 130 ; scale = 1 ; nozzle_diameter = 0.4 ; filament_diameter = 2.95 ; extrusion_multiplier = 1 ; single_wall_width = 0.42mm
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23rd Oct Tried to print 2nd (the right shoe) but the print failed during the first 1/5. Part way through printing the filament stopped. Tried to fix but it did not come out anymore and stopped the print.



The final shoe from 21st Oct had contained the missing filament errors and I filled it with a sealant glue which took 16 hours to dry.

24rd Oct Finished the shoe and presented.

Conclusion

Ultimaker technology is not the best for printing a shoe, better to use a commercial printing or a mould, but still, it can produce a stable shoe prototype with some effort.