Sex and 3D Prints
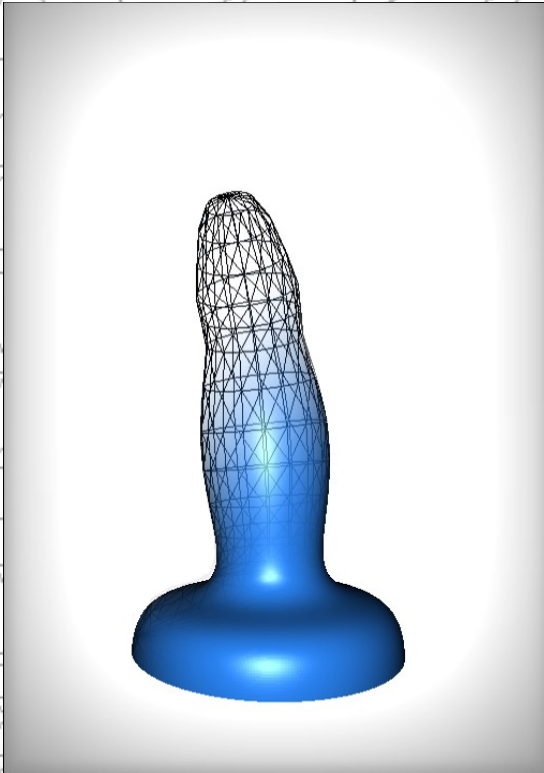
The making of a custom dildo

(My) Aim

- Do some 3D fun stuff
- Should be something 'useful' *
- Learn to use WebGL
- Result should be something I can print

* no more dust catchers in the cup board

WebGL & THREE.js

- WebGL

  Web Graphics **L**ibrary

  A standard programming interface by W3C to control 3D graphics with software (javascript)

- Not yet fully supported by all browsers (Chrome, Opera, Android, Blackberry;

  partial support for Firefox, IE, Safari)

- Three.js

  A free javascript library for 3D modelling (yes, inside your browser)

- Working with WebGL

How to use three.js

```html
<html>
    <head>
        <title>My first Three.js app</title>
        <style>canvas { width: 100%; height: 100% }</style>
    </head>
    <body>
        <script src="js/three.min.js"></script>
        <script>
            var scene = new THREE.Scene();
            var camera = new THREE.PerspectiveCamera(75, window.innerWidth/

            var renderer = new THREE.WebGLRenderer();
            renderer.setSize(window.innerWidth, window.innerHeight);
            document.body.appendChild(renderer.domElement);

            var geometry = new THREE.CubeGeometry(1,1,1);
            var material = new THREE.MeshBasicMaterial({color: 0x00ff00});
            var cube = new THREE.Mesh(geometry, material);
            scene.add(cube);

            camera.position.z = 5;

            var render = function () {
                    requestAnimationFrame(render);

                    cube.rotation.x += 0.1;
                    cube.rotation.y += 0.1;

                    renderer.render(scene, camera);
            };

            render();
        </script>
    </body>
</html>
```
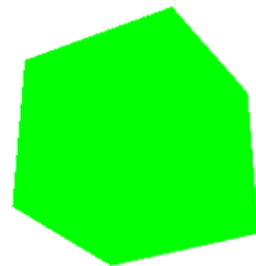
Adds the HTLM5 Canvas:
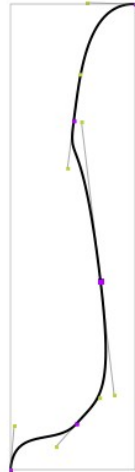
Example from the Web:

Create a scene object and add a rotating 3D cube

Source:

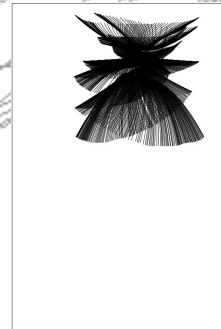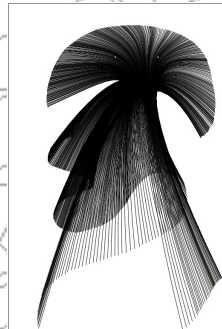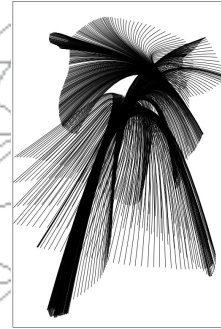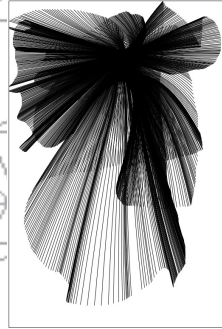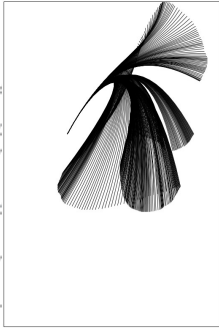http://threejs.org/docs/#Manual/Introduction/Creating_a_scene
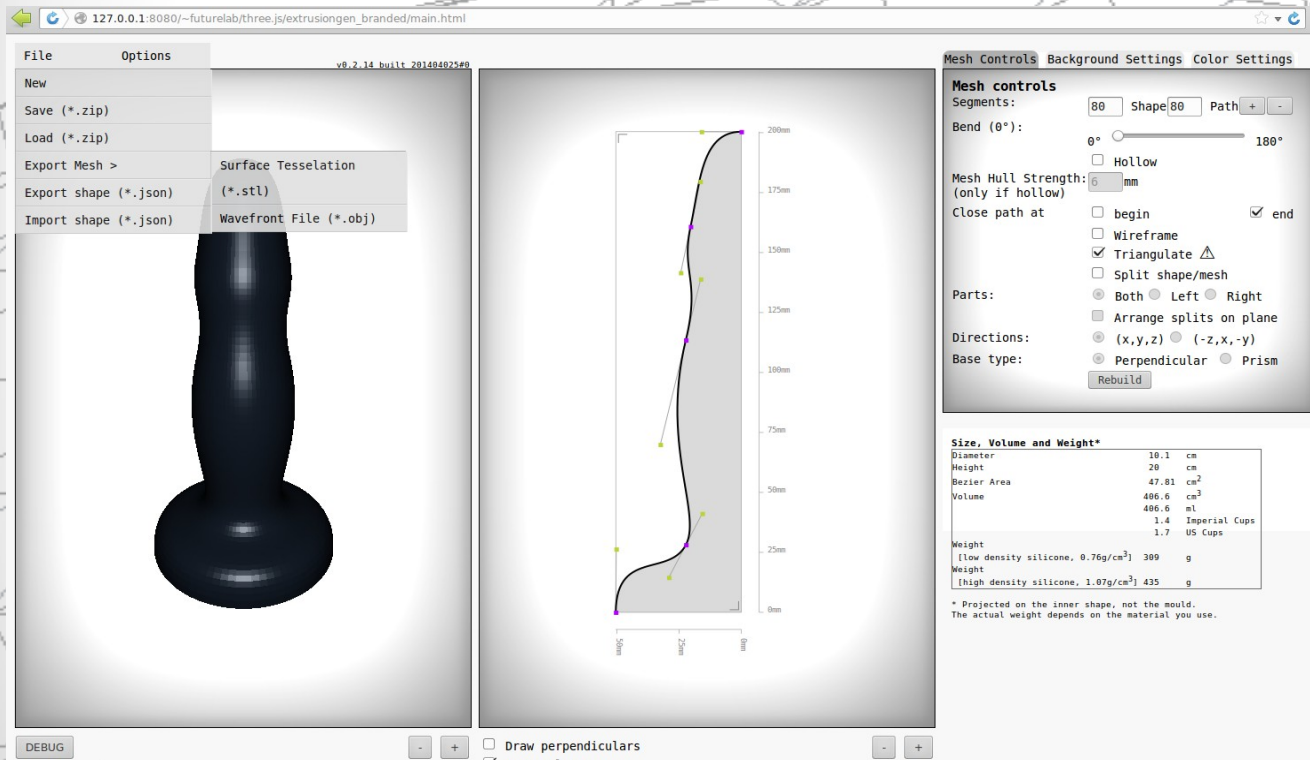
A Dildo Generator (I)

- ## Right canvas:

  A Bezier curve editor to specify the outline (made with a 2D context and plain javascript)

- ## Left canvas:

  The preview canvas (made with 3D context and three.js)

Bezier Bug: forgot to clear screen ^^

A Dildo Generator (II)

- Final View in the Browser

- Important: STL export

STL:

Surface Tesselation Language

~
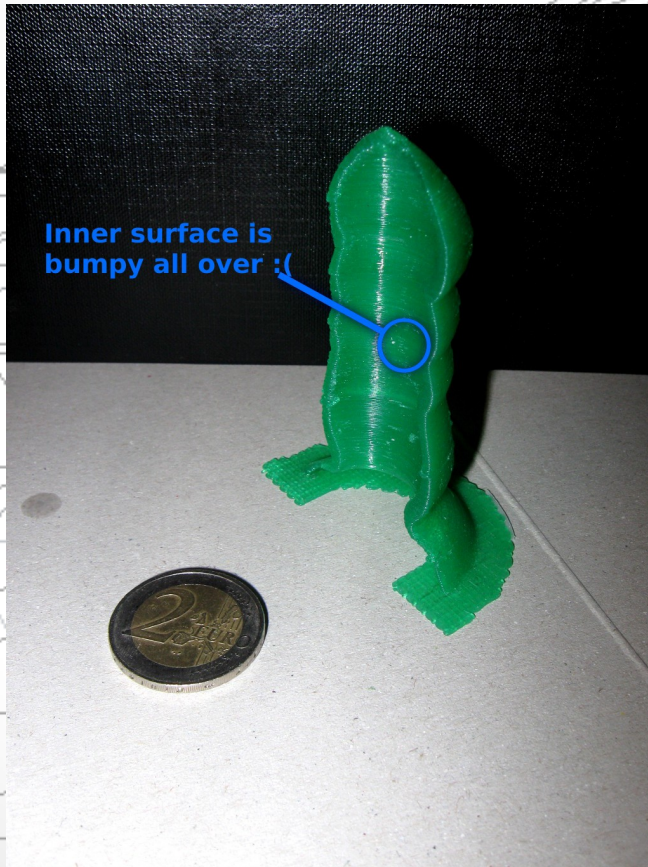
Standard Triangulation Language

~

Standard Tesselation Language

First Printing Results
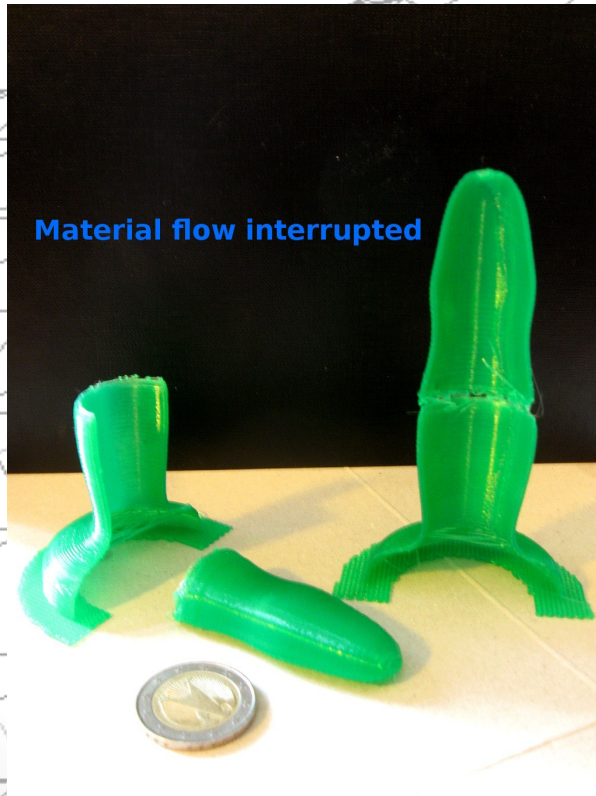

- The first printing test was a simple revolution solid with 6*10 mesh points (very pointy)

Hollow Approach

Inner surface is bumpy all over :(

- 📦The next step was to print hollow shapes

- 📦Idea: make molds that fit perfectly together
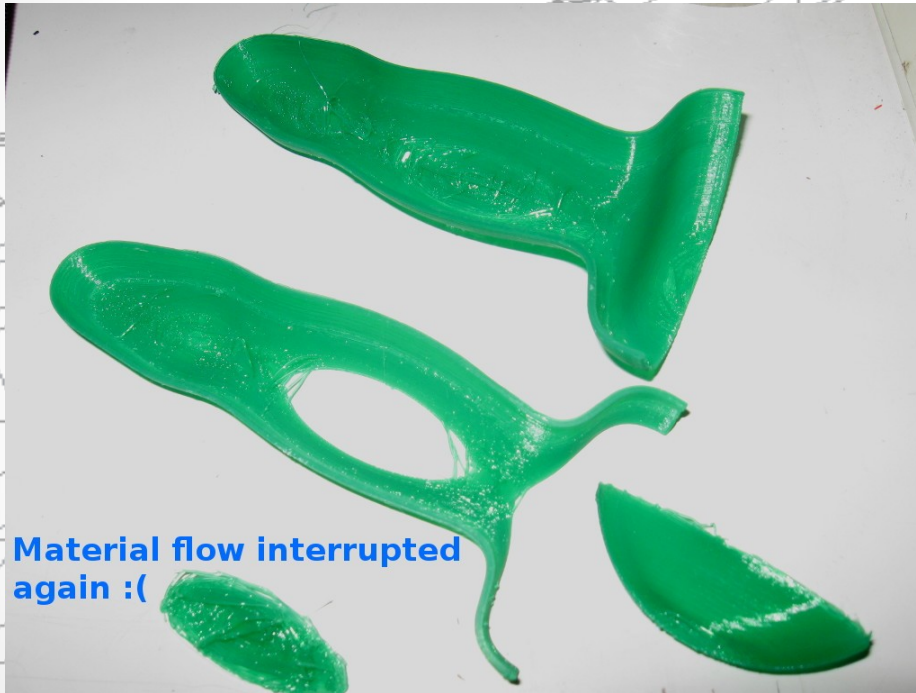
Try-and-Error

Material flow interrupted

- Printer Type
- RapMan v3.1
- Result is bumpy and edgy
- Printing process requires constant monitoring
- Problem: material flow interrupts randomly
- Material ABS (Acrylonitrile butadiene styrene) is very hard and kind of brittle

"Reizend"

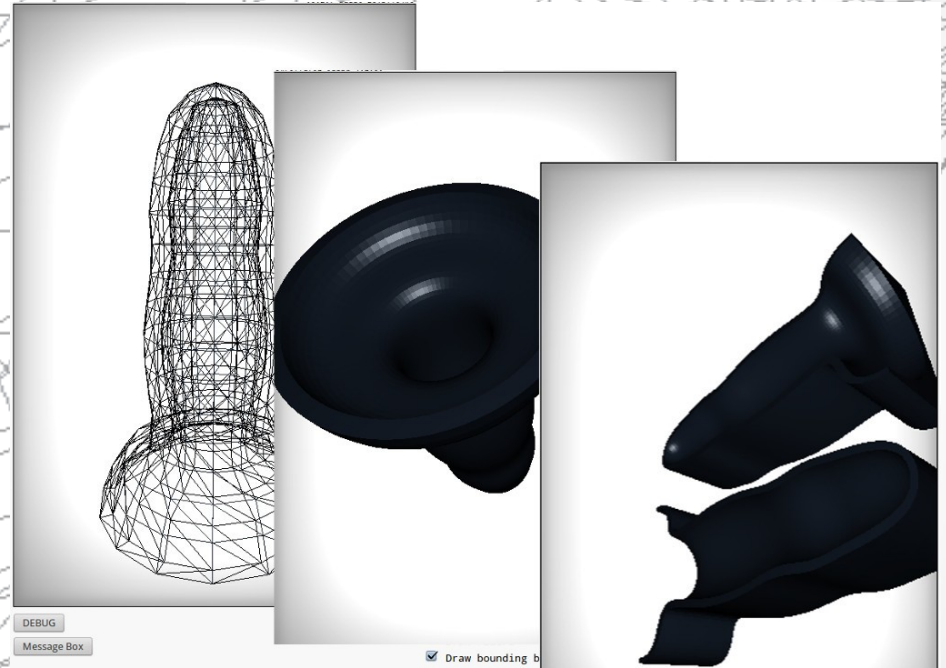# Try-and-Error (II)

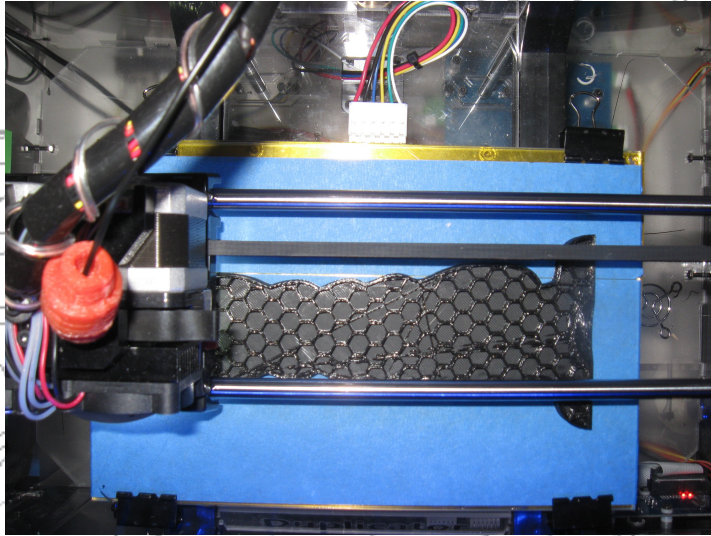
Material flow interrupted again :(

- Interruptions in the material flow were a mayor problem with the RapMan model

- The surface structure was way too fuzzy

- Not suitable to cast a solid with silicone

Align Molds on Plane

- Solution: Don't print the molds in upright position

- Instead: align both parts vertically on plane

- This avoids the molten material to drop down (hopefully)

Printing the Mold

- Printing a custom mold with a FakerBot

- Material: PLA

Optimized the Mesh (I)

- The first usable mold
- Printed with PLA (polylactic acid)
- Massive socket added
- Printing time: 5h

Casting in the Silicone (Attempt I)

- Pouring in the Silicone is easy
- Two-Component Silicone (1:1) sets within one hour
- Polymerizes at room temperature
- Silicone is harmless to human body (don't eat, anyway)
- Heat resistant

Smoothen the Mold (I)

- Structure of printed filament was <u>very</u> detailed on the silicone's surface

- Idea: smoothen the inside of the mold's surface with molten paraffin (candle wax)

- Is harmless to human body

- Available at local store

- Melting point near 45°C (boiler plate and metal pot work)

- The first smoothened result seemed OK but still wasn't perfect (bigger lumps from the wax)
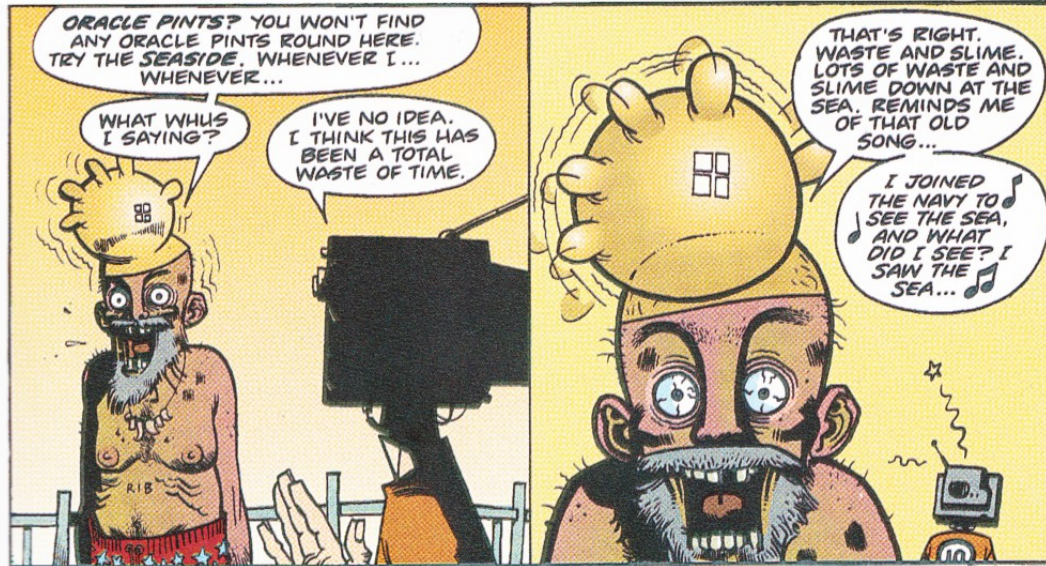
Smoothen the Mold (II)

- 🧊 Problem: ugly bumps emerge when applying the molten wax

- 🧊 Solution: smoothen the bumps with a heating fan

- 🧊 Remove expandable wax

Actual Results

- Further smoothening with a hot air fan (to remove the bumps from the wax)

- The current solution works so far

- There are still minor surface issues

- Problem: some paraffines prevent the silicone from polymerizing complety (stays someway sticky)

And now for something completely different

📦 Questions?

📦 Please send bug reports to
ikaros@polygon-berlin.de

📦 https://github.com/IkarosKappler/extrusiongen
📦 http://www.dildo-generator.com/
📦 http://www.polygon-berlin.de/dildogenerator
📦 https://re-publica.de/session/cast-your-own-silicone-dildo