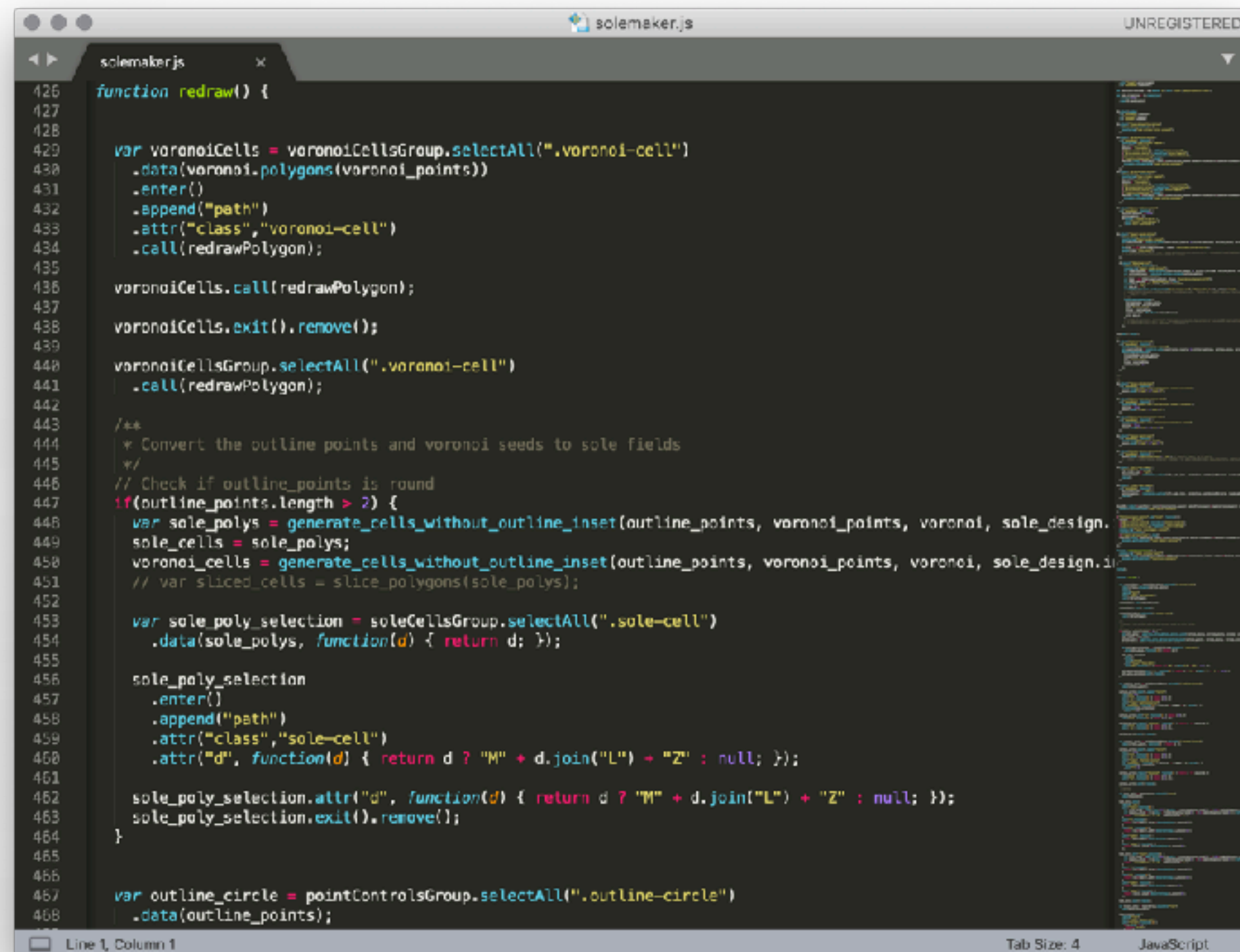


Data as a Material?

Physical Natives

Hfg Karlsruhe, 26 May 2021



```
solemaker.js
UNREGISTERED

function redraw() {
  var voronoiCells = voronoiCellsGroup.selectAll(".voronoi-cell")
  .data(voronoi.polygons(voronoi_points))
  .enter()
  .append("path")
  .attr("class", "voronoi-cell")
  .call(redrawPolygon);

  voronoiCells.call(redrawPolygon);
  voronoiCells.exit().remove();

  voronoiCellsGroup.selectAll(".voronoi-cell")
  .call(redrawPolygon);

  /**
   * Convert the outline points and voronoi seeds to sole fields
   */
  // Check if outline_points is round
  if (outline_points.length > 2) {
    var sole_polys = generate_cells_without_outline_inset(outline_points, voronoi_points, voronoi, sole_design);
    sole_cells = sole_polys;
    voronoi_cells = generate_cells_without_outline_inset(outline_points, voronoi_points, voronoi, sole_design);
    // var sliced_cells = slice_polygons(sole_polys);

    var sole_poly_selection = soleCellsGroup.selectAll(".sole-cell")
    .data(sole_polys, function(d) { return d; });

    sole_poly_selection
    .enter()
    .append("path")
    .attr("class", "sole-cell")
    .attr("d", function(d) { return d ? "M" + d.join("L") + "Z" : null; });

    sole_poly_selection.attr("d", function(d) { return d ? "M" + d.join("L") + "Z" : null; });
    sole_poly_selection.exit().remove();
  }

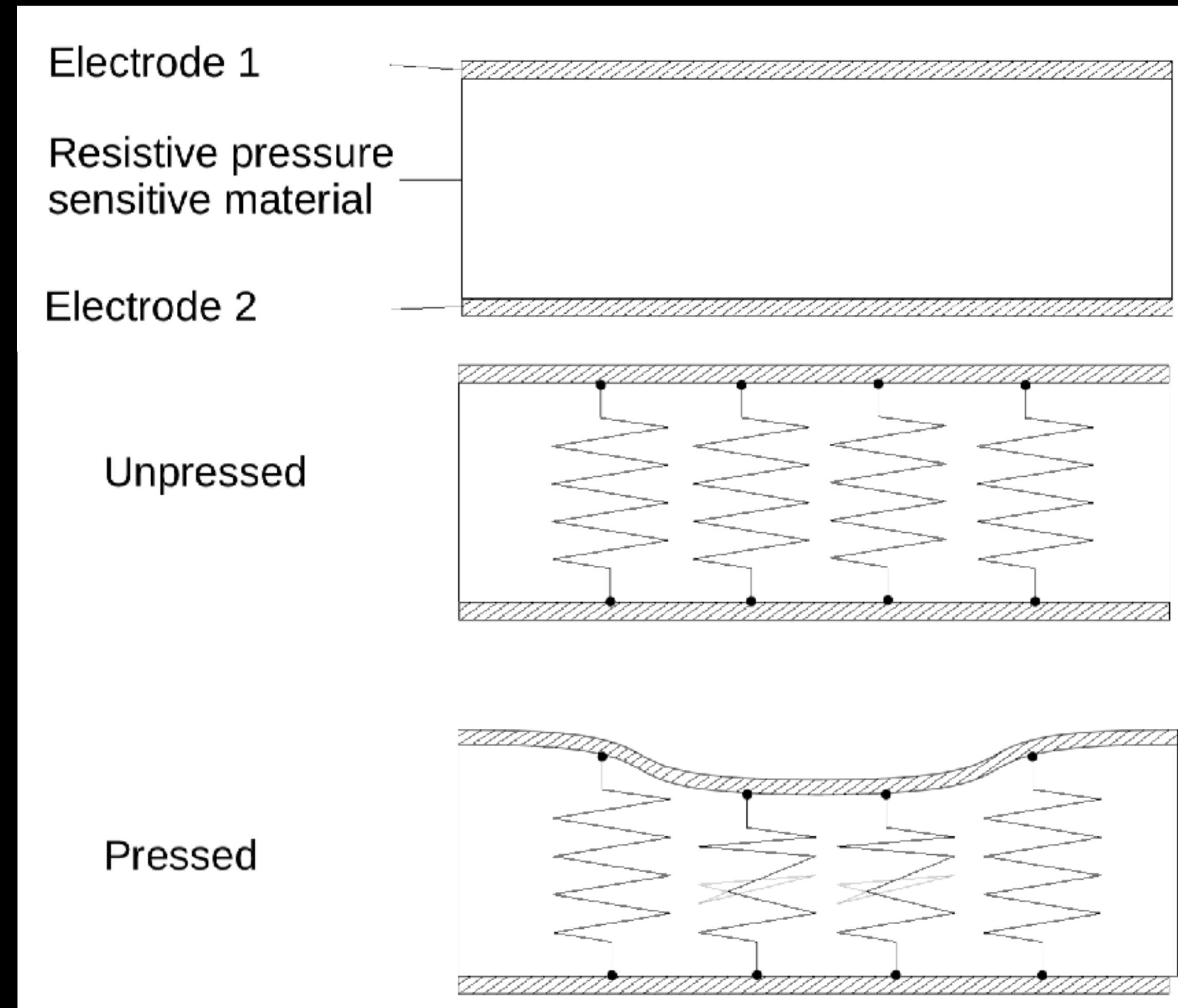
  var outline_circle = pointControlsGroup.selectAll(".outline-circle")
  .data(outline_points);
}
```



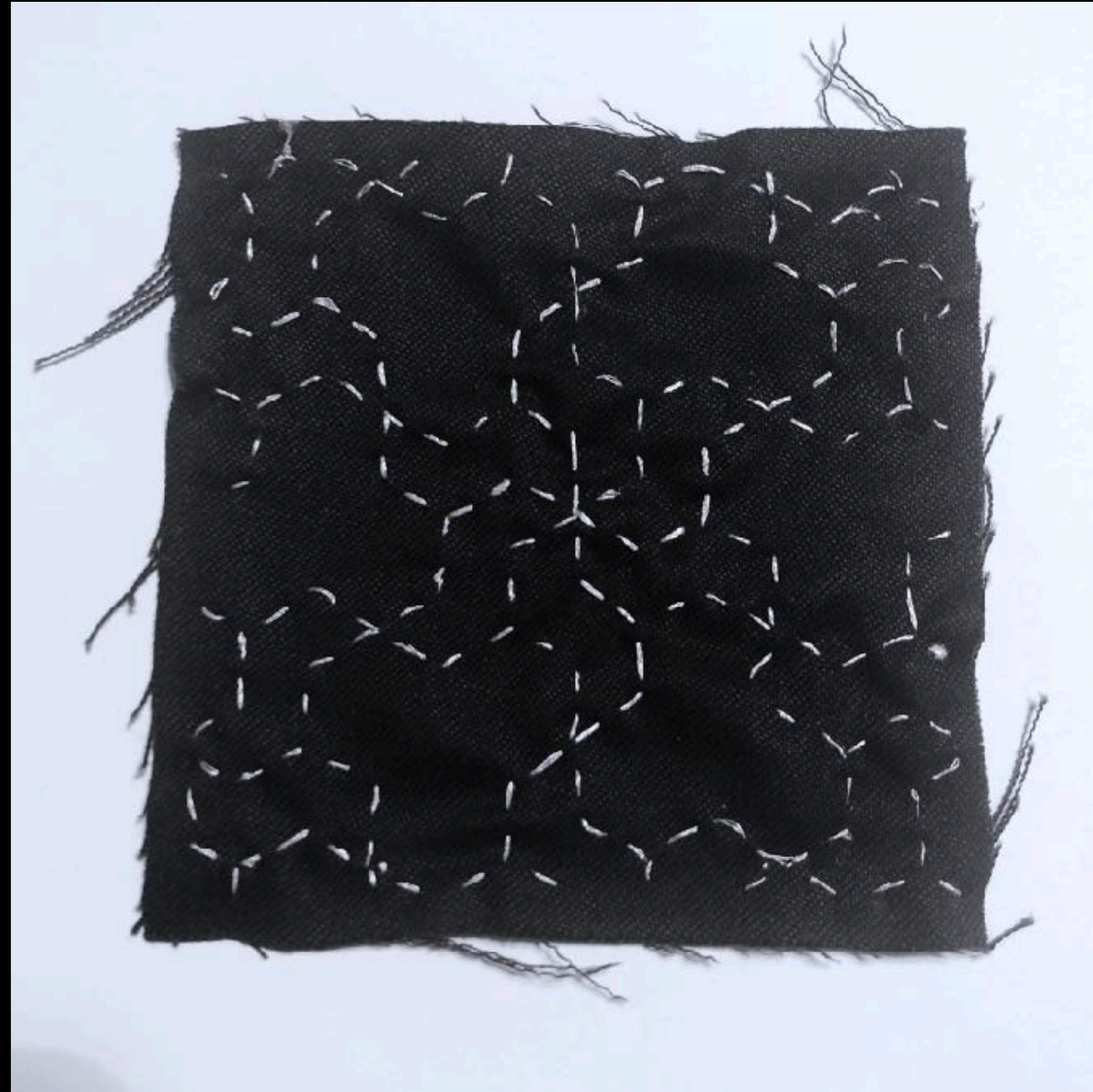
Physical Natives



Sandwich Sensor



**The Sensor area needs to around
the size of the object touching it**



Make a Pillow/Pocket (Conductive Stuffing)



A Big Sandwich

- Stack the materials
- Velostat
Eeontex
Velostat
Eeontex
Velostat

Pressure sensitive material: Velostat

Velostat / Linqstat

image: aura-comms.com

- PE film
- Impregnated with carbon based material
- Typically about 0.2 mm thick
- Slightly compressible



Different types of Velostat:

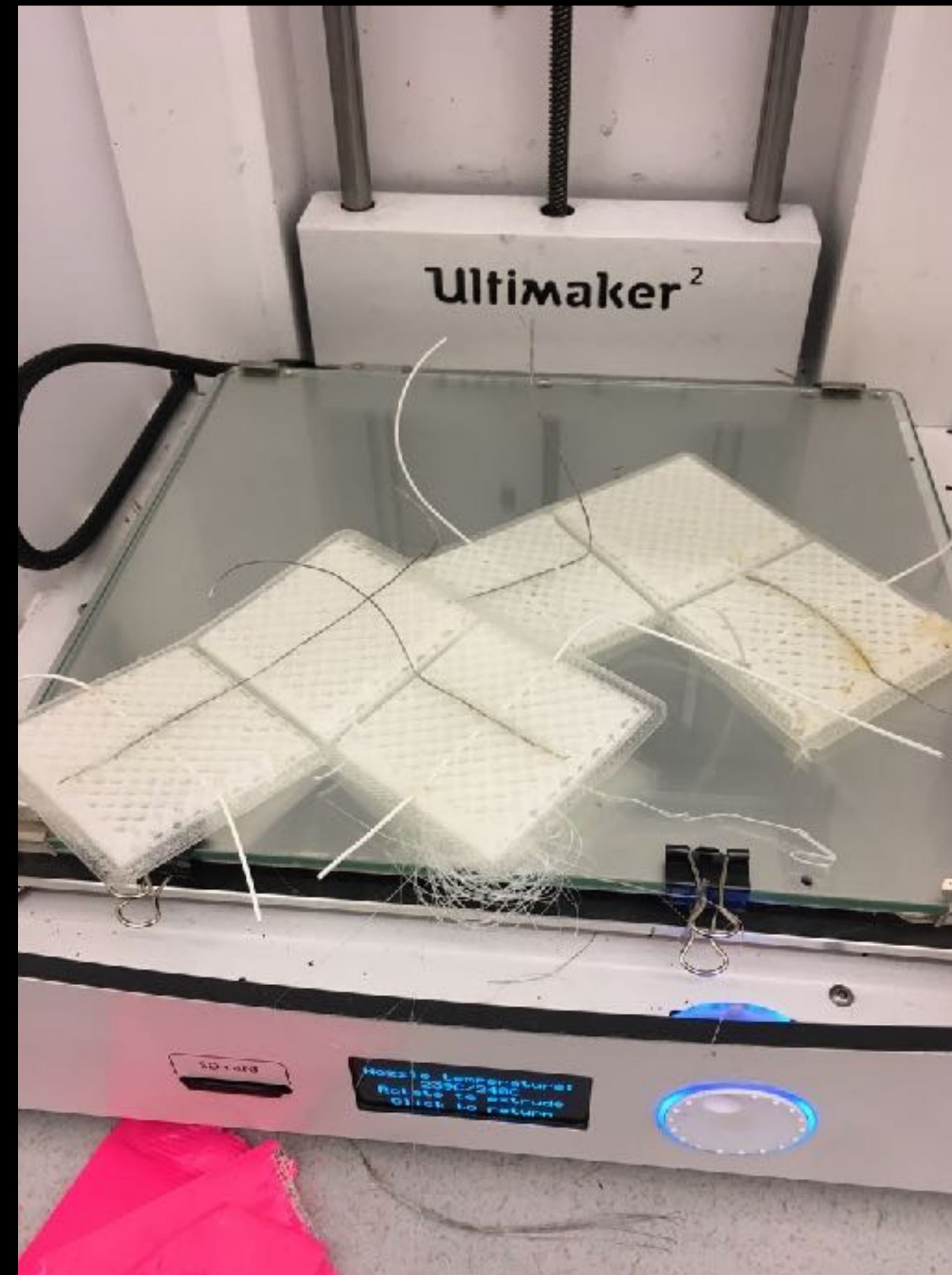
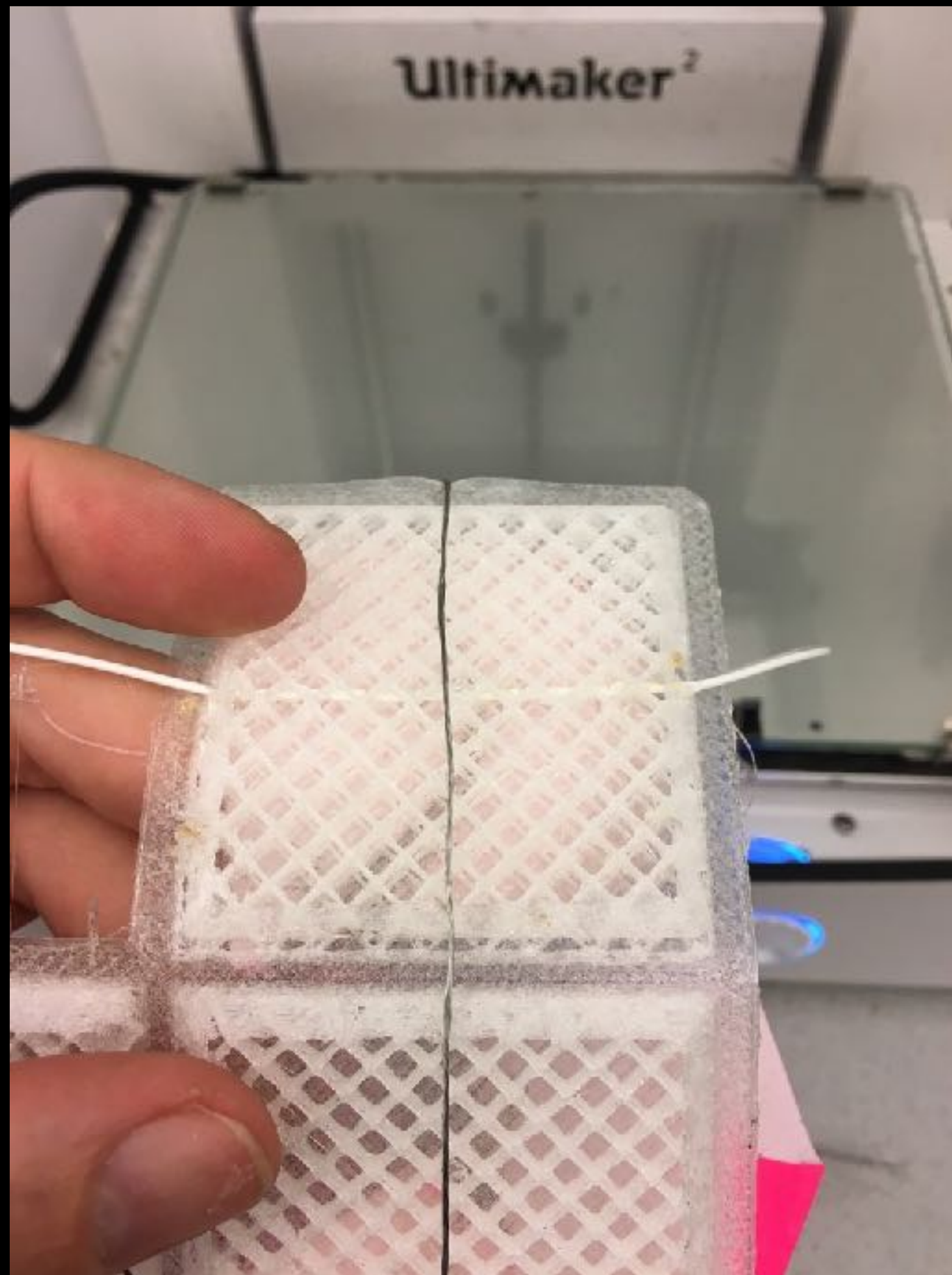
- High resistivity (50 kOhm/sq – 200 kOhm/sq)
- Medium resistivity (1 kOhm/sq – 50 kOhm/sq)
 - Useful for large pressure sensors
- Low resistivity (< 1 kOhm/sq)
 - Useful for pressure sensors

← DO NOT USE THIS

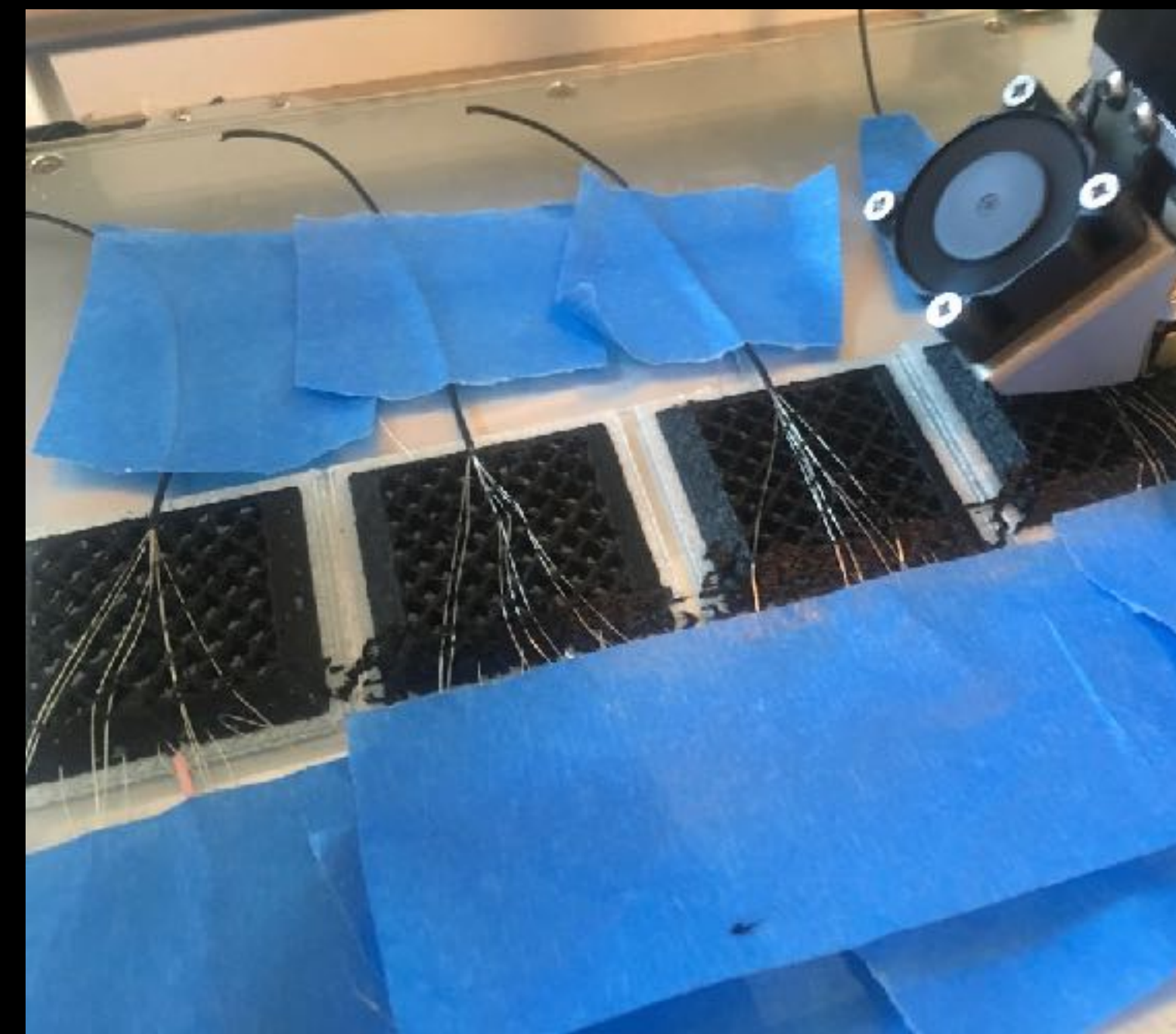
← USE THIS

← OR USE THIS

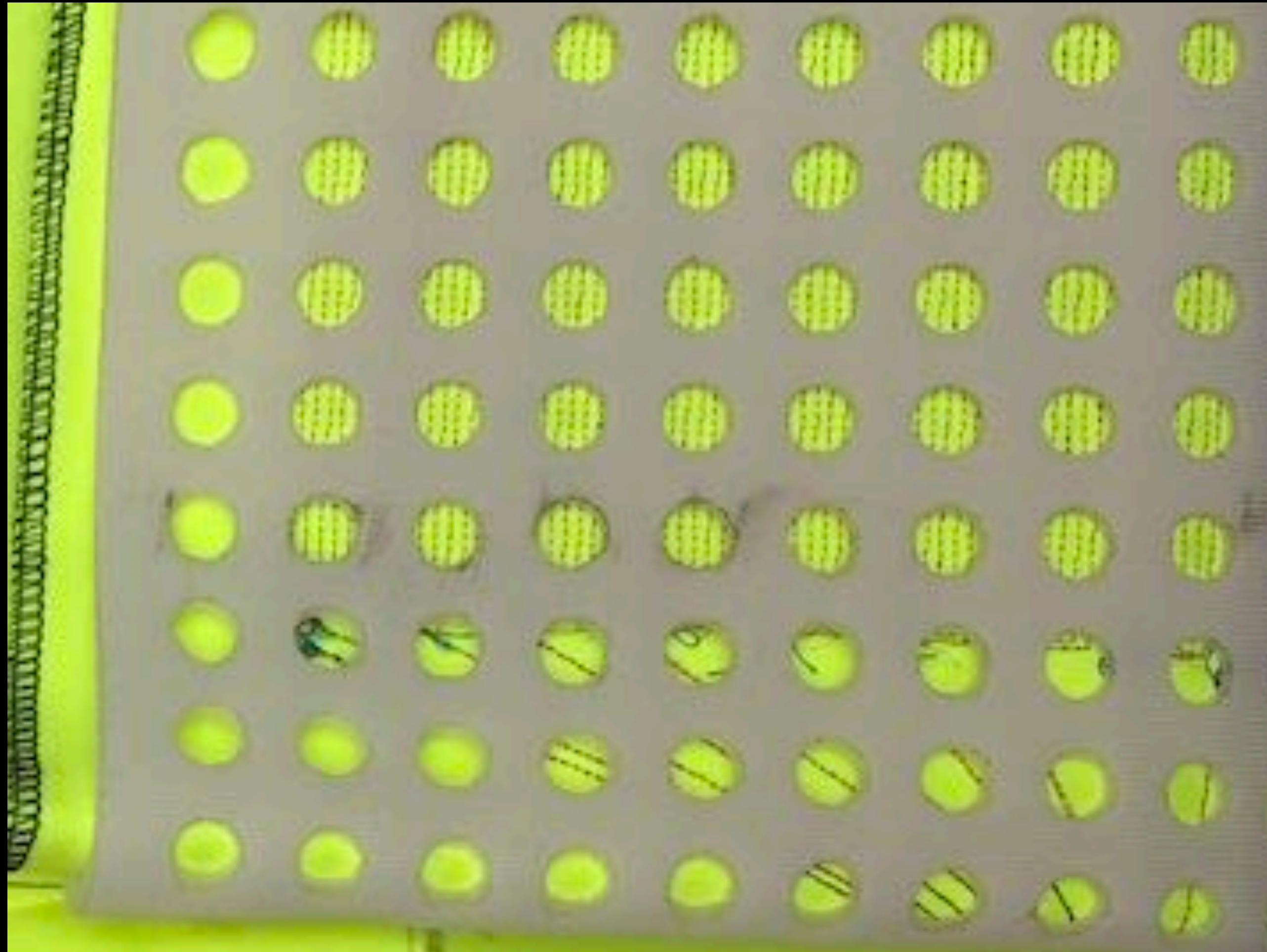
3D Printing



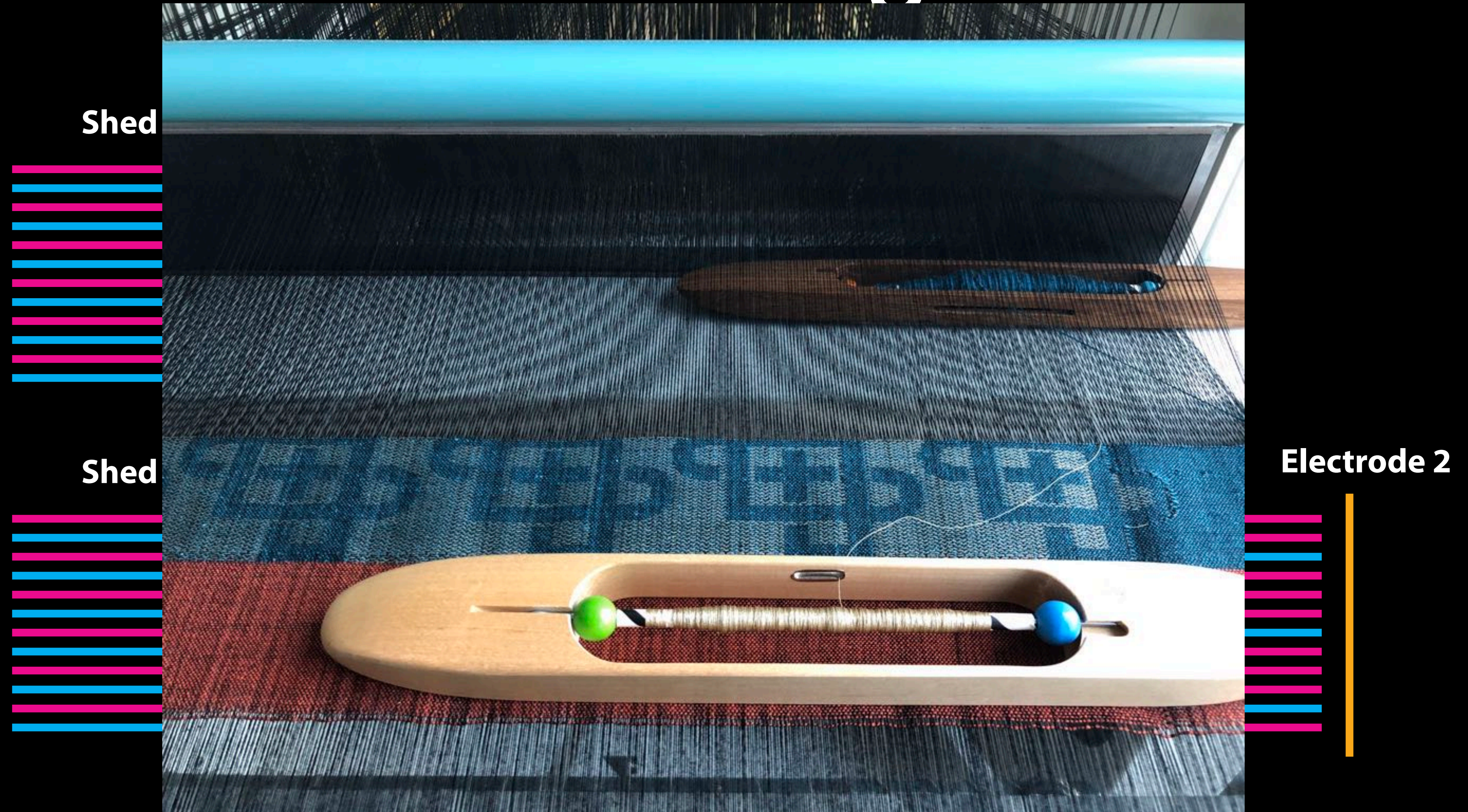
Making it on a 3D Printer



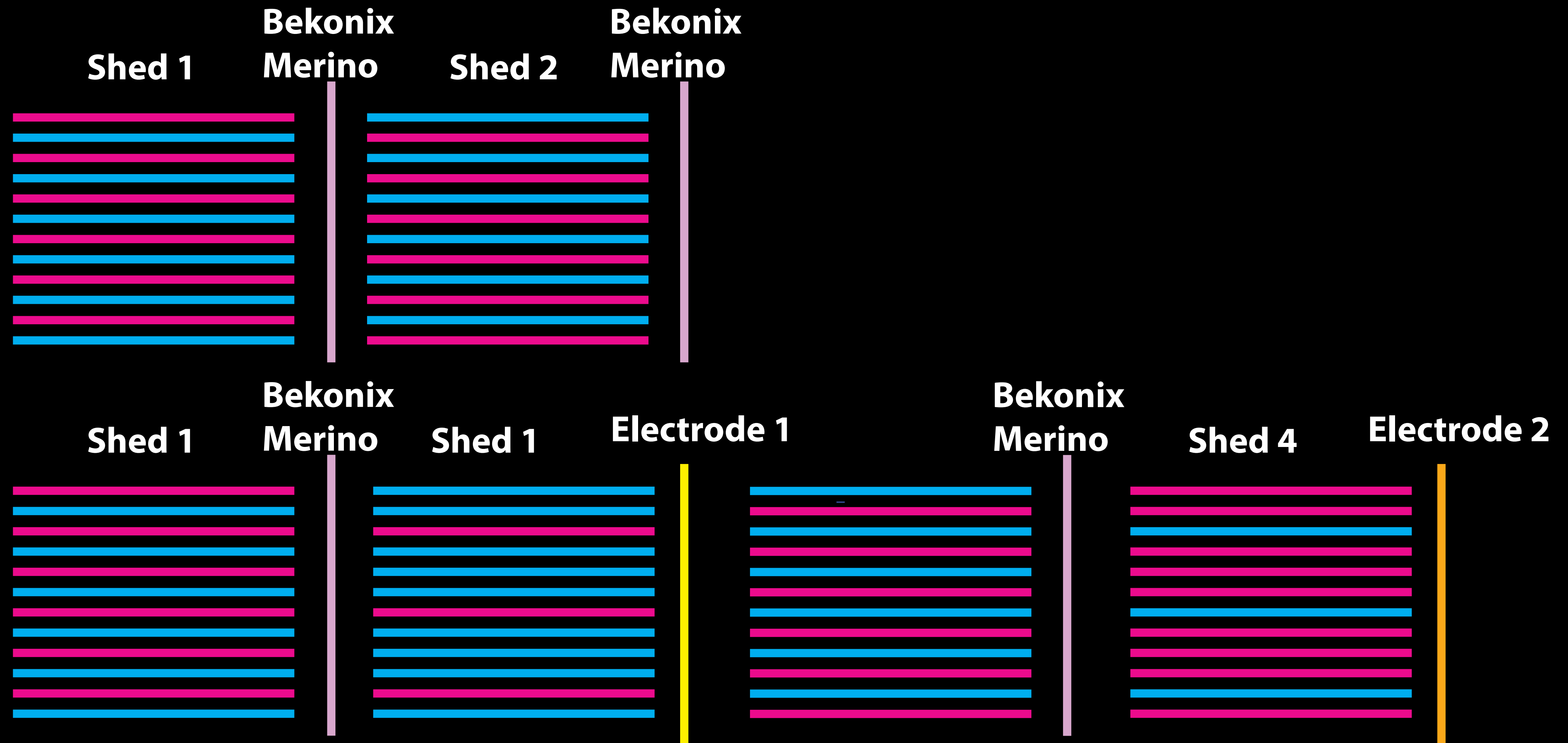
Add Holes with a laser cutter



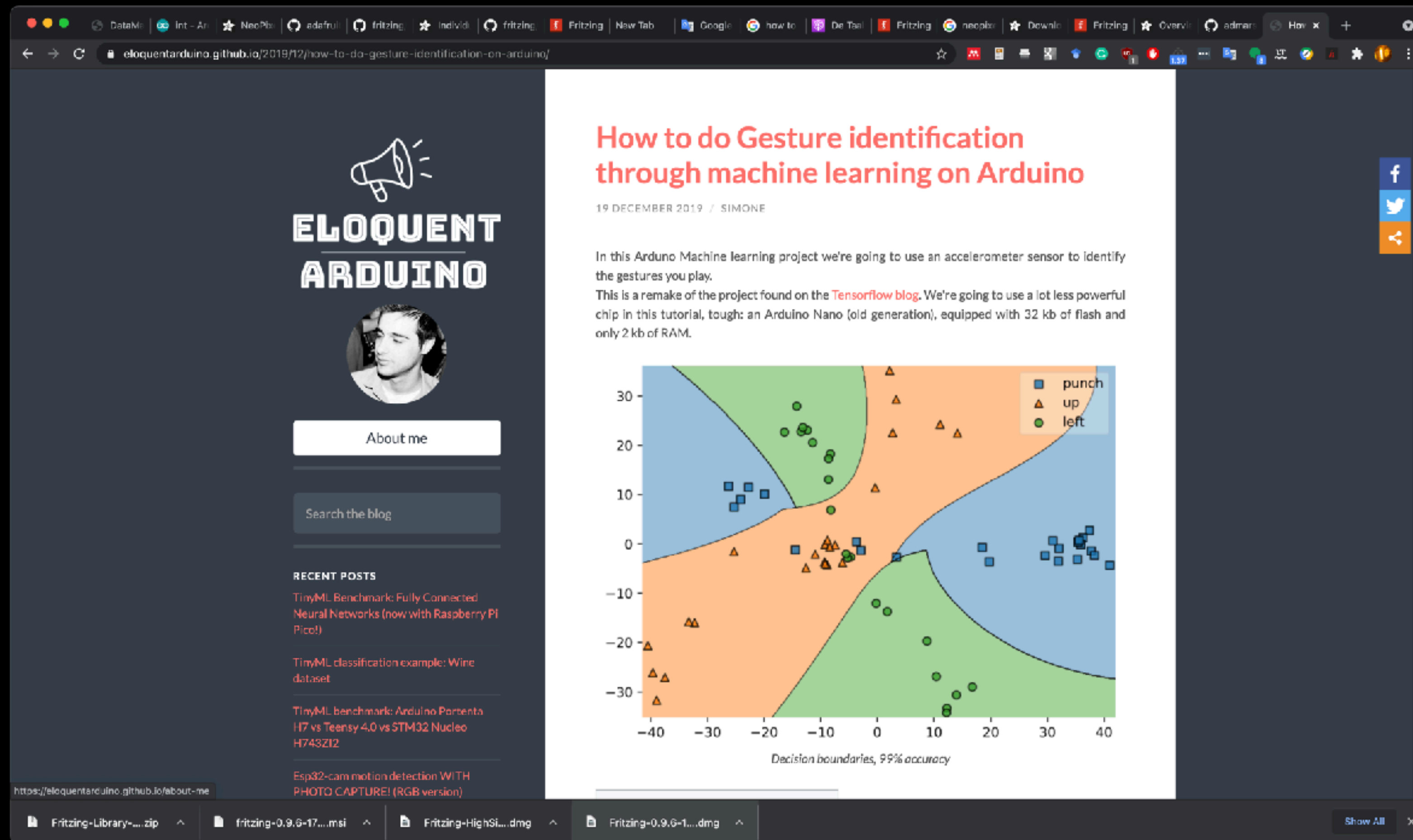
Weaving



Weaving



Machine Learning



<https://eloquentarduino.github.io/2019/12/how-to-do-gesture-identification-on-arduino/>

Recalibration

- Replace the Configurations

```
sketch_may26a | Arduino 1.8.15
sketch_may26a $
Serial.begin(115200);
delay(500);
Serial.println();
Serial.println();

/*
 * Configuration for sensor 0:
 * Type: capacitive (CVD method)
 * Analog pin: A0
 */
tlSensors.initialize(0, TlSampleMethodCVD);
tlSensors.data[0].tlStructSampleMethod.CVD.pin = A0;
tlSensors.data[0].releasedToApproachedThreshold = 34;
tlSensors.data[0].approachedToReleasedThreshold = 31;
tlSensors.data[0].approachedToPressedThreshold = 182;
tlSensors.data[0].pressedToApproachedThreshold = 164;
tlSensors.data[0].calibratedMaxDelta = 1051;
tlSensors.data[0].enableSlewrateLimiter = true;

/*
 * Configuration for sensor 1:
 * Type: capacitive (CVD method)
 * Analog pin: A5
 */
tlSensors.initialize(1, TlSampleMethodCVD);
```