

# Diego Yáñez-Laguna

Portfolio

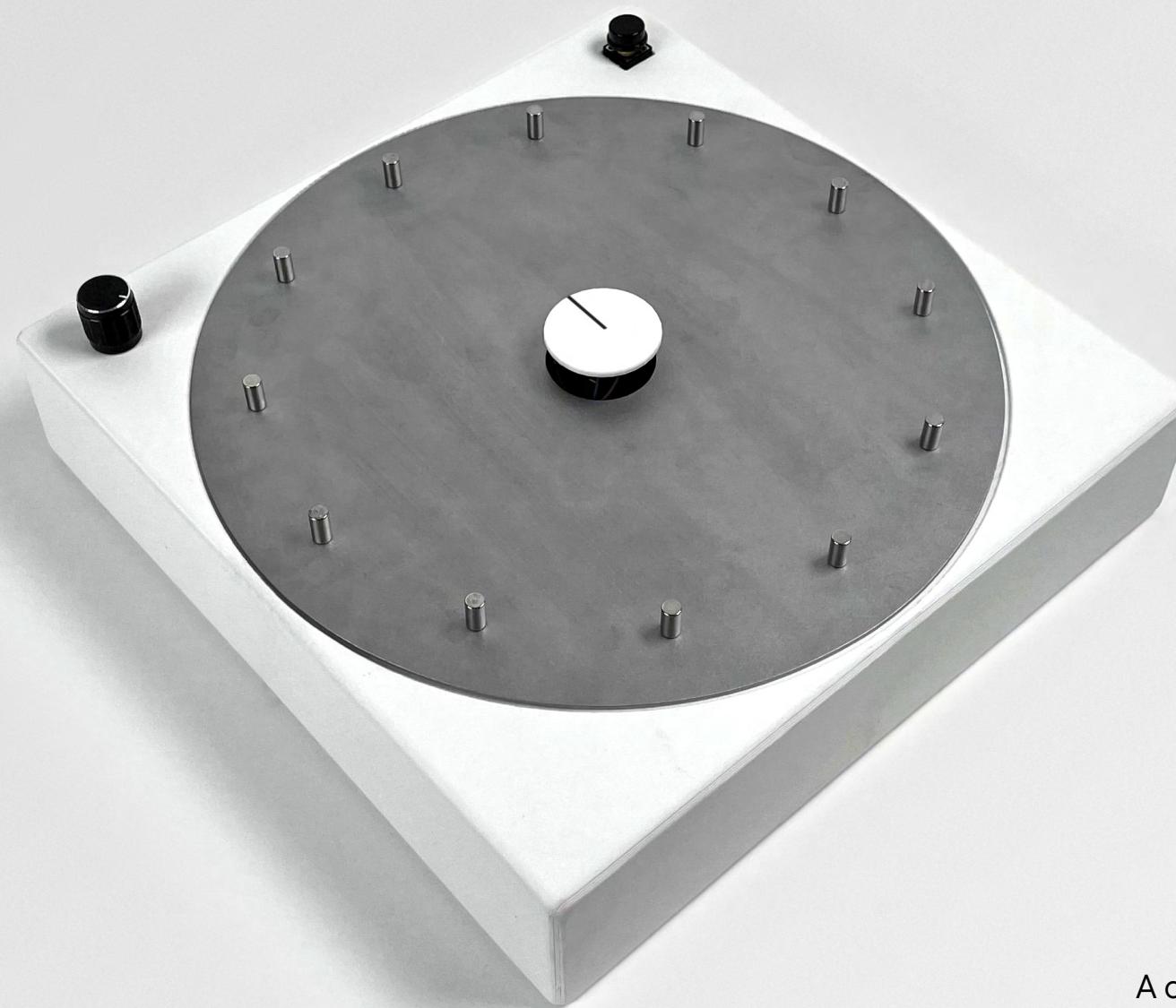
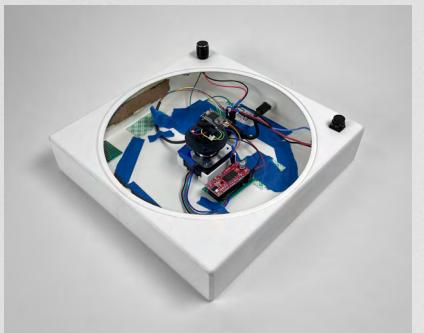
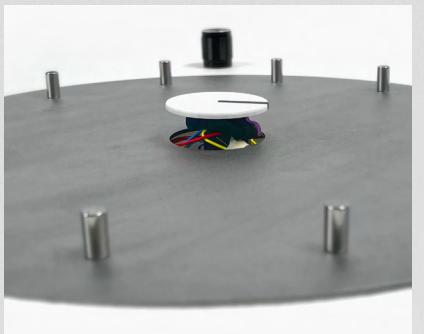
October 2024

# Sequencer Clock

A MIDI instrument inspired by clocks and how we experience time. It provides an alternative way of making music by ditching the conventional linear interface and quantization of traditional beat sequencers.

## SKILLS

Electronics  
Programming  
Interaction Design  
Fabrication



VIDEO LINK

## HOW IT WORKS

A distance sensor located in the center spins around so that it is able to detect the presence of magnets placed on the clock face. The distance of each magnet to the center is mapped to a MIDI parameter (volume, pitch, or instrument sound), depending on which mode the clock is in. The knob controls motor speed, therefore tempo.

# Squish

is a

squishable

modular

MIDI controller



## BACKGROUND

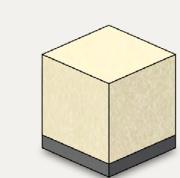
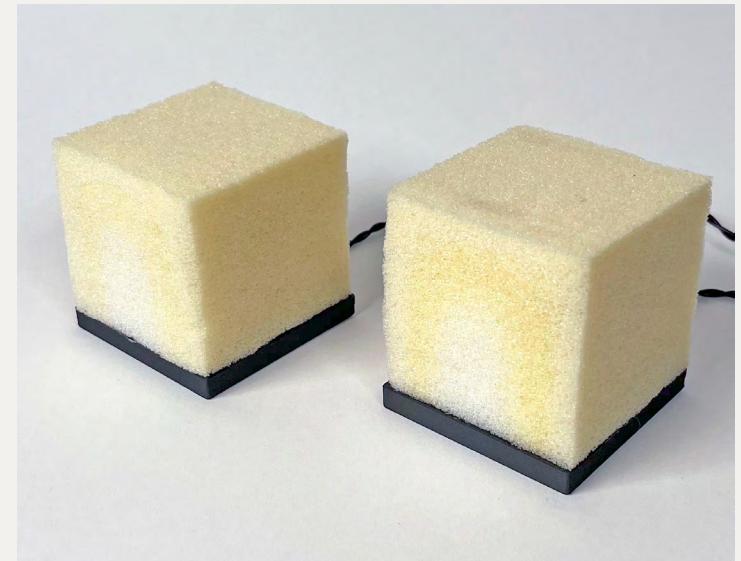
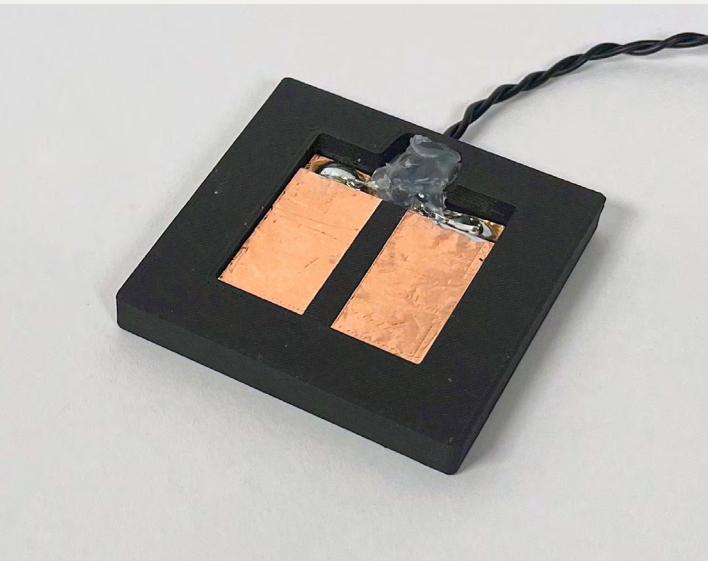
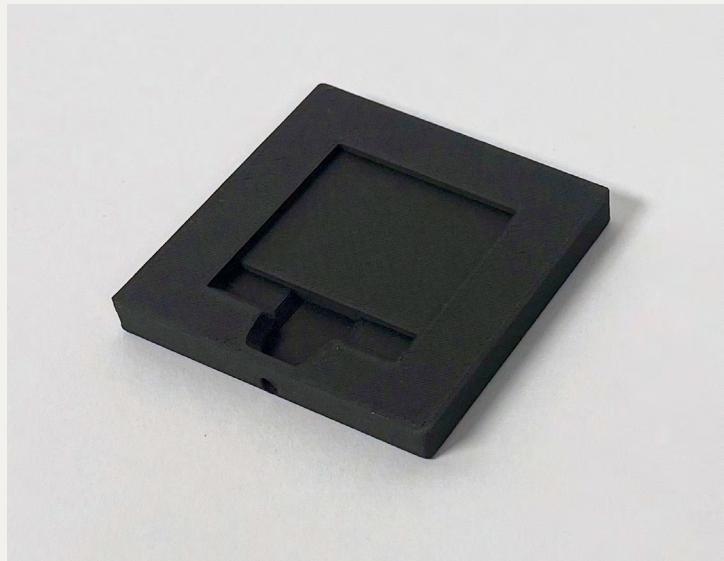
Despite the growing popularity of digital music instruments (DMIs) and relevant technological advances, accessibility and expressive potential remain significant challenges for musical interface designers. These issues stem from generic input-output mappings, sensor limitations, and a lack of physical connection between musicians and instruments. *Squish* explores the benefits of incorporating soft materials into musical interfaces and why DMIs should be designed with musician-instrument relationships as a priority in order to enhance intuitiveness and expressiveness.

*Squish* is a set of foam blocks embedded with custom pressure sensors, which encourage tactile interaction and give the user nuanced control over various musical parameters. The modular design of the foam blocks allows for versatile configurations, enabling users to control multiple parameters simultaneously with simple, but responsive gestures.

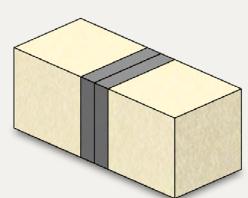
# Squish

## HOW IT WORKS

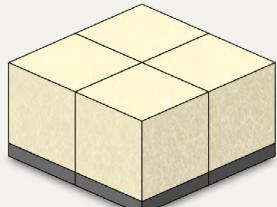
Compressive force is transferred from the yellow foam blocks to a small piece of velostat foam, which connects two pieces of copper tape. The velostat's resistance varies with pressure which allows applied pressure to be digitally read with an ESP32. These readings are then converted into MIDI messages that can be mapped to any parameter or trigger.



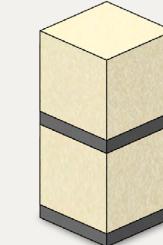
SLIDER / BUTTON / RECORDER



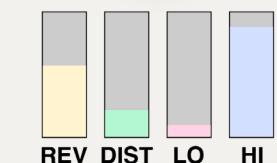
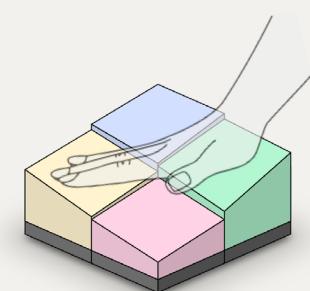
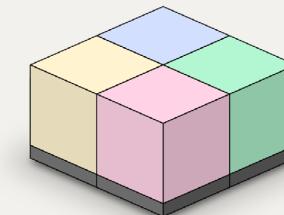
ACCORDION



XY PAD



STACK / LINKED PARAMETERS



Potential Configurations

## SKILLS

Electronics  
Programming  
Interaction Design  
Fabrication  
Sound Design

## TOOLS

Python  
Arduino  
Force Sensing  
Pure Data  
CAD  
3D Printing

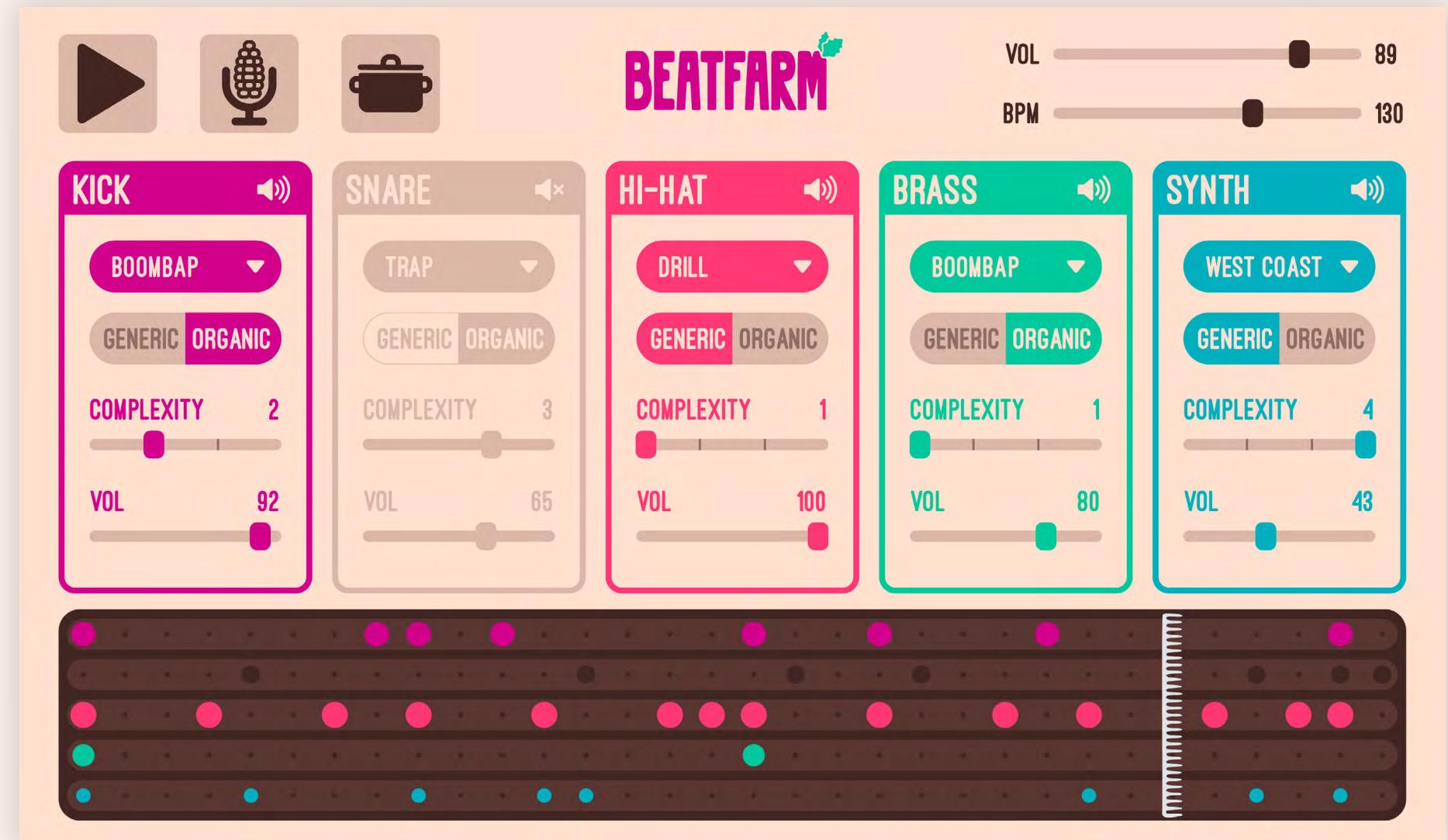


Beatfarm is a beginner friendly tool for learning how to make hip-hop beats and sampling. Pre-programmed patterns can be mixed and matched while also introducing users to different styles of hip-hop. Beats can be further customized by recording your own sounds for each instrument.

**Collaborators** / Lucy Kim & Collin Wen

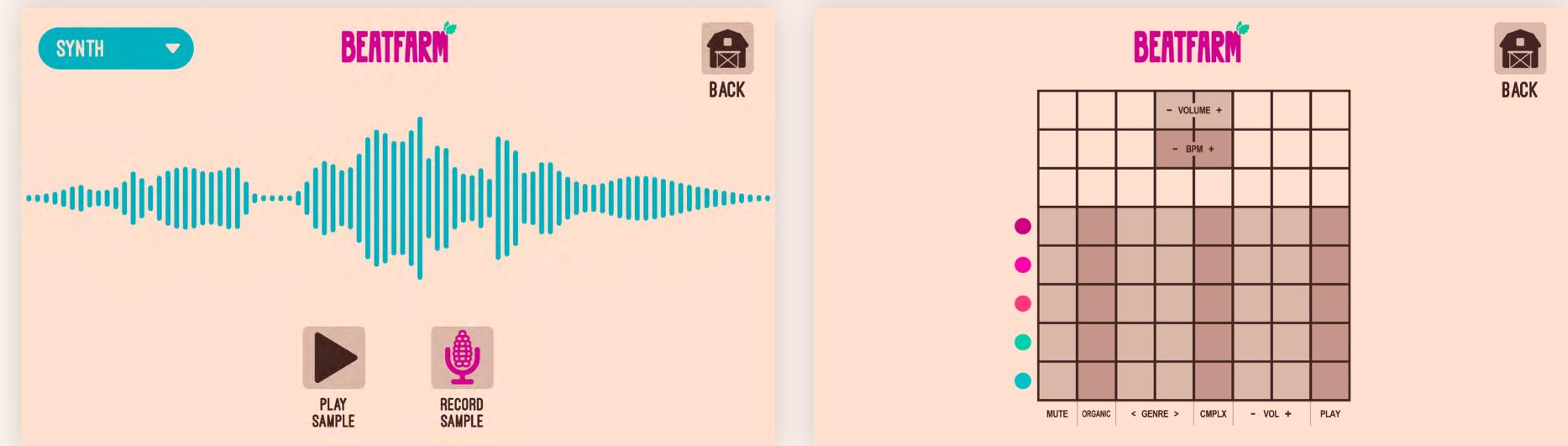
## HOW IT WORKS

- Database** / Stores samples and rhythmic patterns
- Sound Processing** / Samples are mixed and modified using Pedalboard library
- Frontend** / Includes user controls for live production and sampling, as well as a display
- Hardware** / Users have the option to control the system with an external launchpad



## SKILLS

- Figma
- Python
- UI/UX Design
- Kivy
- Adobe Suite



# 21M.080 Web Synth

I designed a customizable, drag-and-drop GUI system using p5.js and the Web Audio API. Users can create UI elements with live-coding and specify different functional and aesthetic settings for each element. These elements appear in the GUI and can be interacted with and reorganized by dragging around.

This interface was used for an introductory music technology class at MIT where students used the GUI to quickly prototype and build digital synth systems.

Supervisor / Ian Hattwick

Collaborator / Kayli Requenez

## SKILLS

Figma  
HTML/CSS  
JavaScript  
p5.js  
GitHub

The screenshot displays the Lab 1 interface. On the left, a code editor shows the `lab1starter.js` file with the following content:

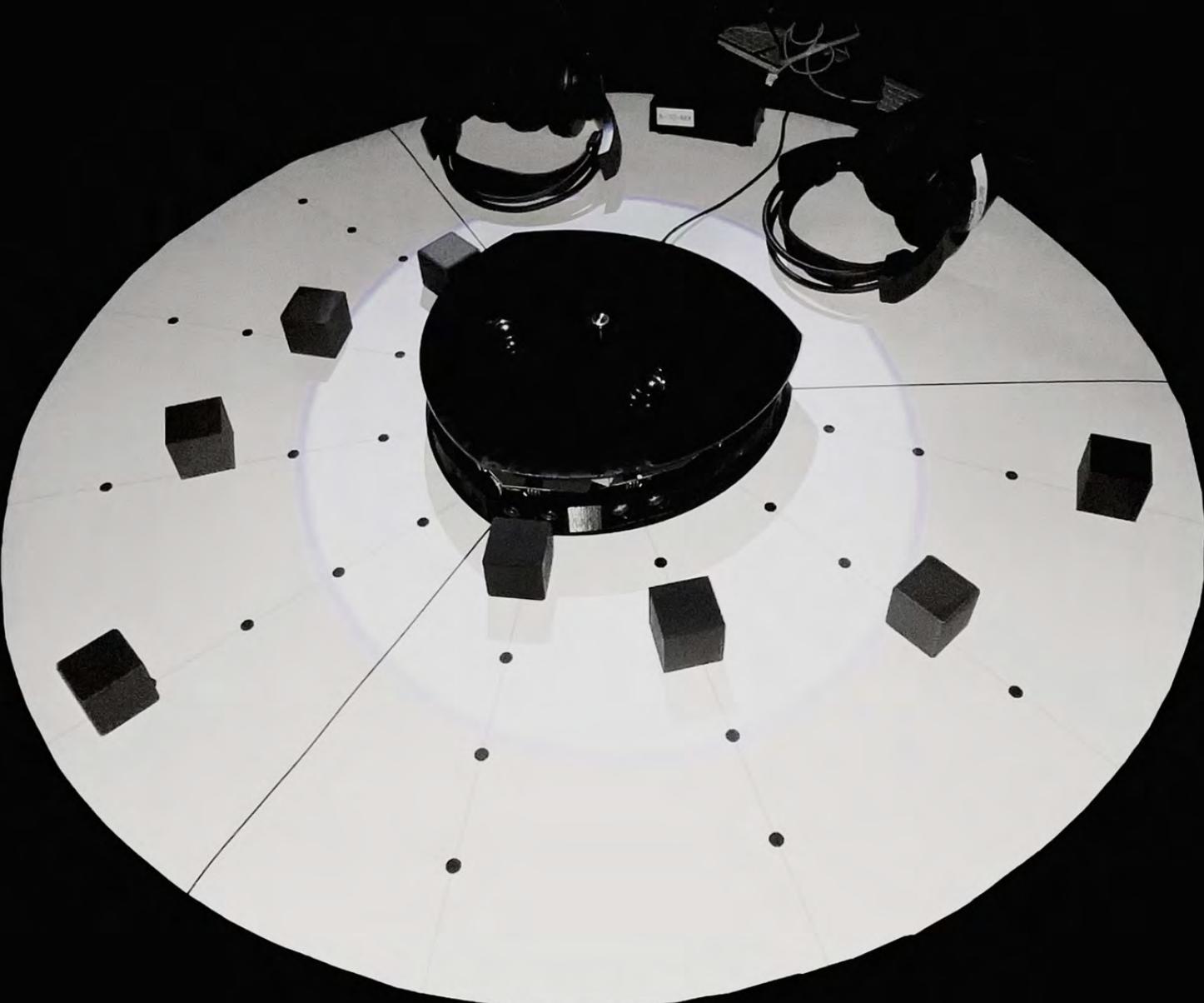
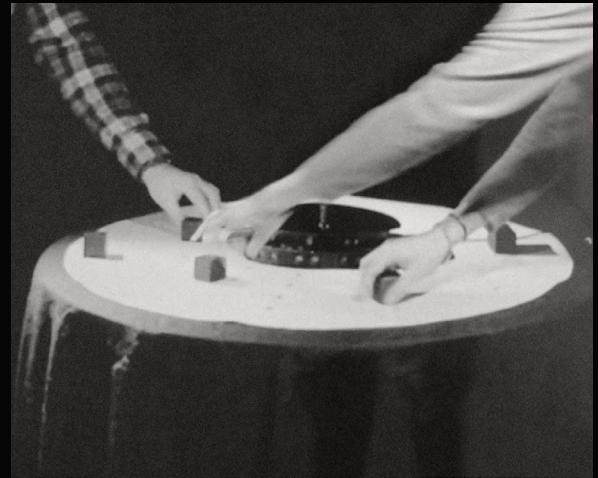
```
21m080 > public > lab1starter.js
1 let vco = new Tone.Oscillator().start()
2 let vcf = new Tone.Filter()
3 let vca = new Tone.Multiply()
4 let output = new Tone.Multiply(0.01).toDestination()
5 vco.connect(vcf), vcf.connect( vca ), vca.connect( output )
6 let env = new Tone.Envelope()
7 env.connect(vca.factor)
8 const gui = new p5( sketch, GUI )
9
10 let vol_knob1 = gui.Knob({
11   label:'VOL1',
12   mapto: vco.frequency,
13 })
14 vol_knob1.set( 50 )
15
16 let vcf_fader = gui.Slider({
17   label:'FADER',
18   mapto: vcf.frequency,
19   orientation: 'horizontal',
20   bipolar: 'true';
21 })
22 vcf_fader.set(0)
23
24 let wave_radio1 = gui.Radio({
25   label:'osc1wav',
26   radioOptions: ['sine','sawtooth','square','triangle'],
27   callback: function(x){ vco.type = x },
28   horizontal: false
29 })
30 wave_radio1.set('SAW')
31
32 let vco = new Tone.Oscillator().start()
33 let vca = new Tone.Multiply()
34 let output = new Tone.Multiply(0.02).toDestination()
35 vco.connect( vca ), vco.type = "square"
36 let env = new Tone.Envelope()
37 vca.connect( output ), env.connect( vca.factor )
38
39 let enable_toggle = gui.Toggle({
40   label:'trig 1',
41   mapto: vca.factor,
42   x: 88, y:30
43 })
44 let enable_toggle2 = gui.Toggle({
45   label:'trig 2',
46   mapto: vca.factor,
47   x: 88, y:30
48 })
```

The interface features several control panels:

- MASTER CONTROLS:** Includes a master gain slider (mGAIN) set to 79, two pads (PAD1, PAD2), two triggers (TRIG 1, TRIG 2), and a master-reverb slider (MASTER-REV) set to 57.
- OSCILLATORS:** Two oscillators, `osc1wav` and `osc2wav`, each with four waveforms (SIN, SAW, TRI, SQR) and an envelope section.
- SIGNAL FLOW:** Signal flow diagrams show connections between oscillators, filters, and envelopes.
- SYNTH CONTROLS:** Includes volume (VOL1, VOL2) and pan (PAN1, PAN2) sliders for synthesis paths.
- DISTORTION:** Two distortion sliders (DIST1, DIST2).
- FADER:** A fader slider with a piano-roll icon below it, set to -67.

# Tangible Sampling

An installation that encourages collaborative music-making through playful and tactile interaction inspired by hip-hop sampling.  
Previously displayed in the MIT List Visual Arts Center.



## HOW IT WORKS

The music is made up of a drum track and a melodic track, with each track being controlled by their own set of four blocks. Each block represents 1/4th of a sample and the position of the blocks determines in what order the sections of the sample are played. Moving the blocks around resembles the chopping and looping techniques used by hip-hop producers. Users can also press buttons to change the drum or melody sample and can also use a knob to change the speed of the samples or even play them in reverse.

## SKILLS

Electronics  
Programming  
Installation Design  
Fabrication  
Sound Design

## TOOLS

Arduino  
Distance Sensing  
MAX/MSP  
CAD  
3D Printing  
Laser cutting  
Adobe CC

# FORTING

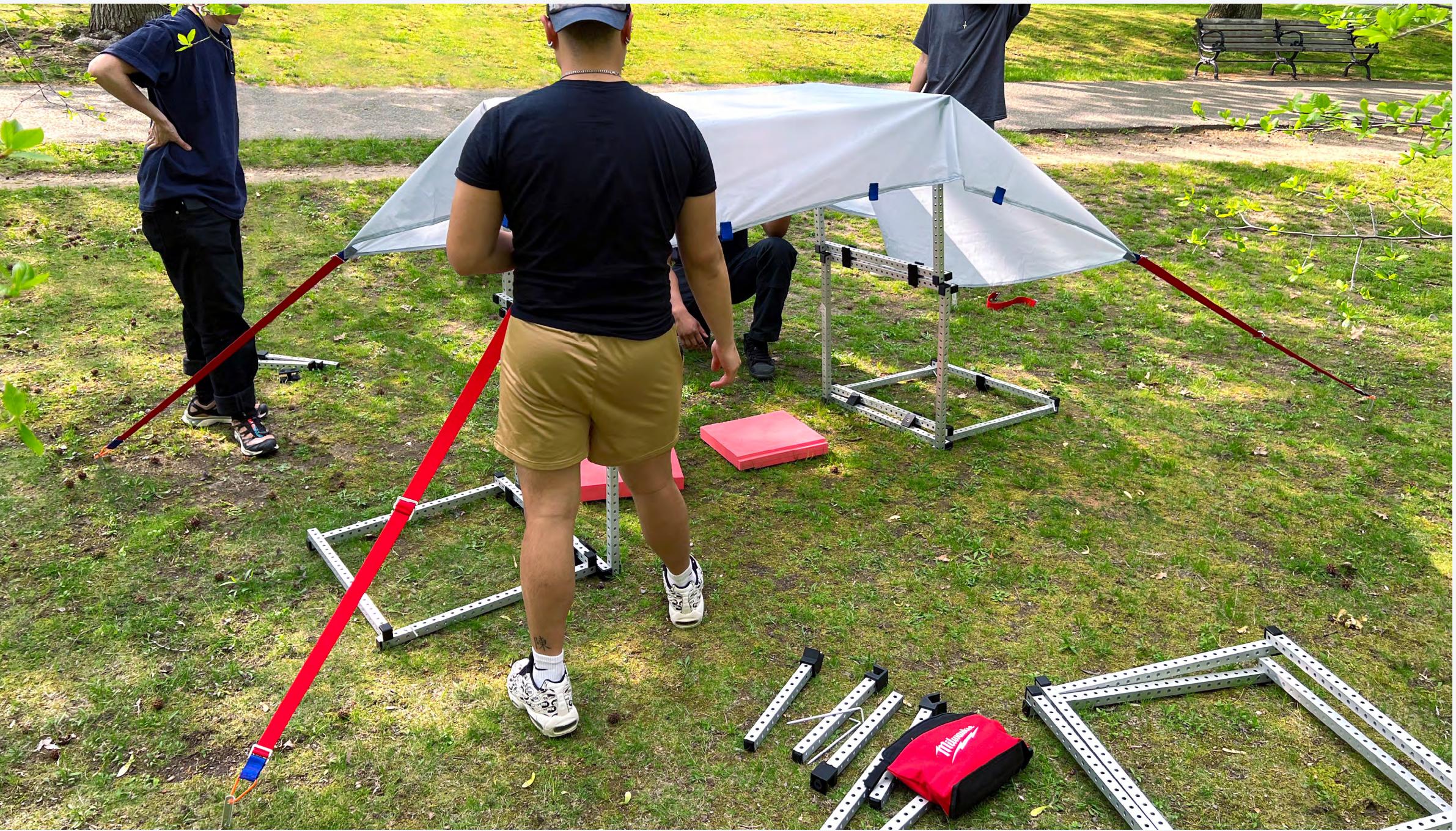
Forting is a kit of parts inspired by the idea of outdoor pillow forts. The kit includes metal struts, 3D printed adjustable joints, waterproof tarps, stakes, and hookable elastic bands. Users can choose how to combine the parts and the kit is designed for easy assembly/disassembly to promote customization and play.

## SKILLS

Physical UX Design  
Metal Fabrication  
Sewing  
Rendering  
Rapid Prototyping

## TOOLS

CAD  
3D Printing  
Laser Cutting  
Adobe CC



# FORTINS

metal struts can be connected  
to create square **FRAMES** ...

... or attached as extensions to the  
structure by using a **CONNECTOR**  
with a built-in screw



**FRAMES** can be connected to each  
other with an adjustable **CLAMP**



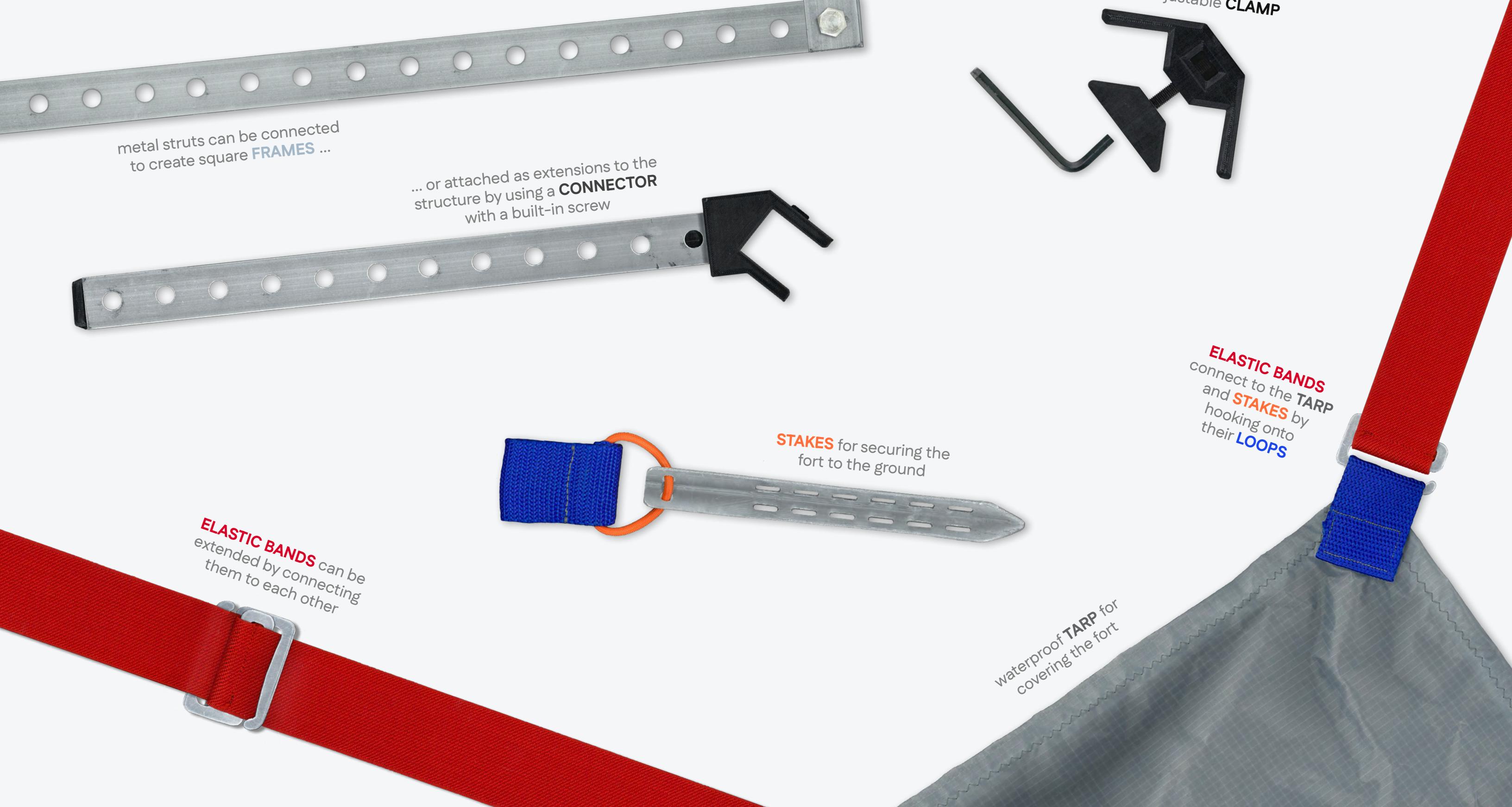
**ELASTIC BANDS** can be  
extended by connecting  
them to each other



**STAKES** for securing the  
fort to the ground

waterproof **TARP** for  
covering the fort

**ELASTIC BANDS**  
connect to the **TARP**  
and **STAKES** by  
hooking onto  
their **LOOPS**



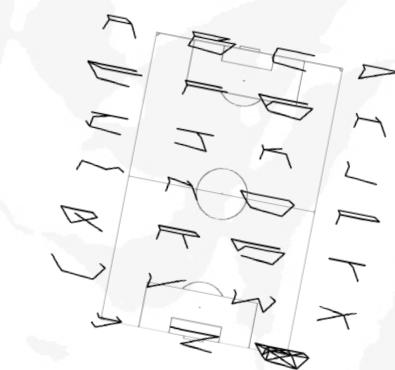
# Thank You!

You can see more of my work on my online portfolio:

[diegoyl.com](http://diegoyl.com)



HONEST  
HOLISTIC  
LOVE



Folkwerk  
xiii