

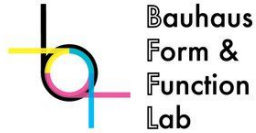
Paper, Ink & Electronics



Introduction & Course Overview
Clemens Wegener
October, 18th 2021

Bauhaus-Universität Weimar

Who is Clemens?



- BA Musicology, MS Computer Science
- In charge of printed electronics in the BFFL



- Hardware & software engineer
- Music addict and producer
- Creates synthesizers and sound modules

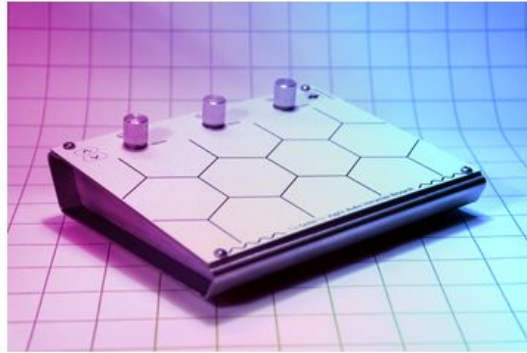
Who is Clemens?



EXCITE Snare Drum

Check out our snare drum VST3 plugin! It features ultra-realistic sound and new tactile interaction schemes.

[Read more...](#)



Tickle tactile instrument

The tickle is a new type of electronic instrument that allows very fine control of sounds. Touching, hitting or bowing it feels like playing an acoustic instrument.. A small batch of instruments is currently available for developers.

[Read more...](#)



Piezoelectric fiber preamp kit

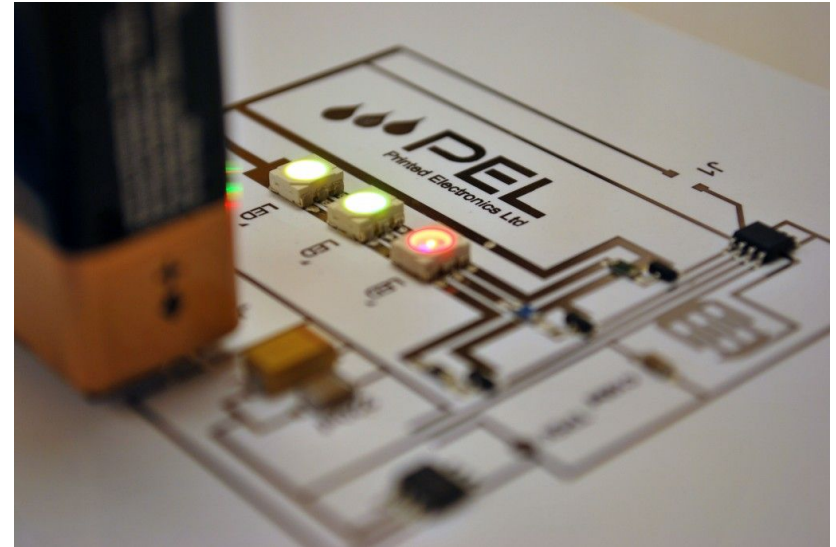
We developed a preamplifier for piezoelectric fibers. It can be powered by 48V phantom power or two AAA batteries and delivers a professional audio quality. Schematic and Hardware is open source.

[Read more...](#)

What is printed electronics?

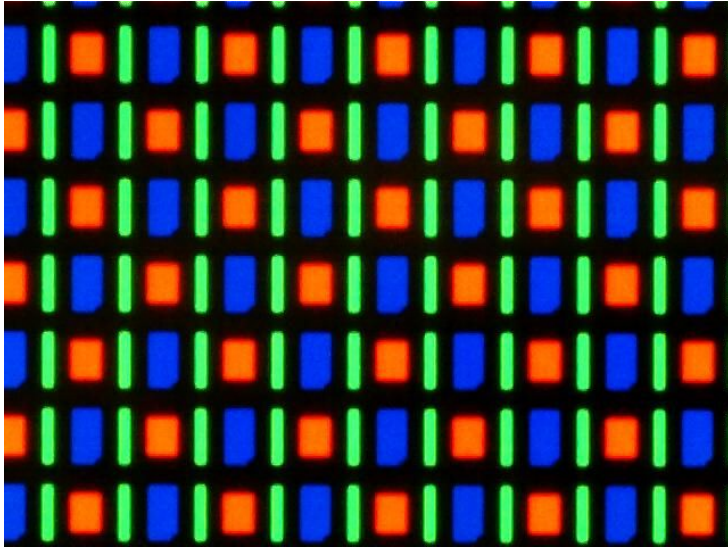


Fingies Project - printed silver ink on paper [1].

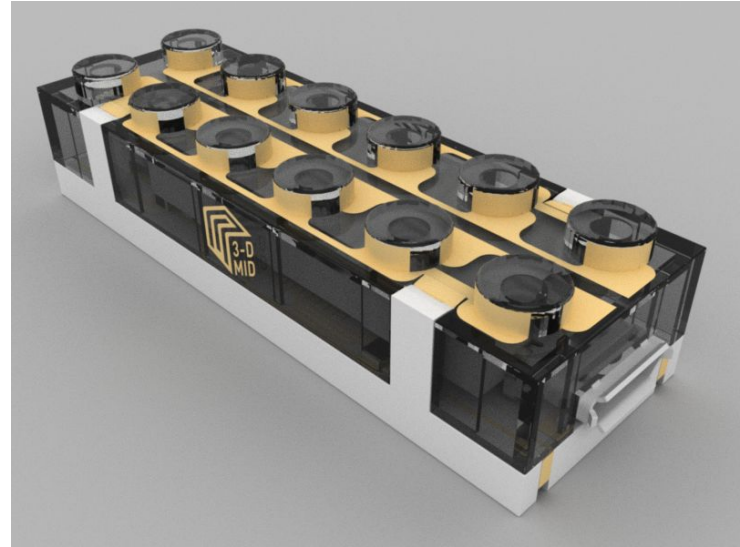


Printed Electronic Circuit [2].

What is printed electronics?



Amoled Display [3].

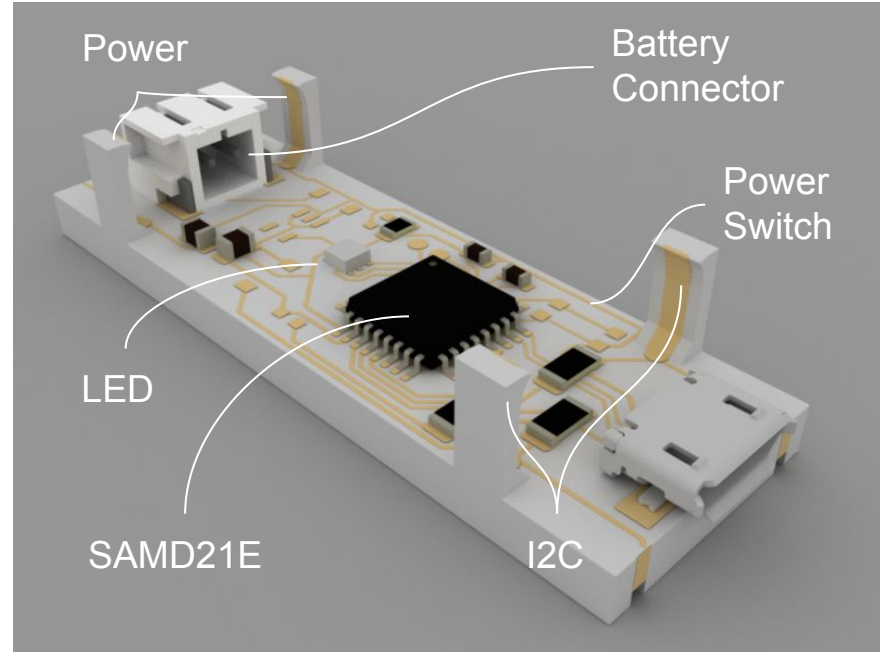


Current Prototype for 3-D MID e.V.

Base System Design Proposal

Features:

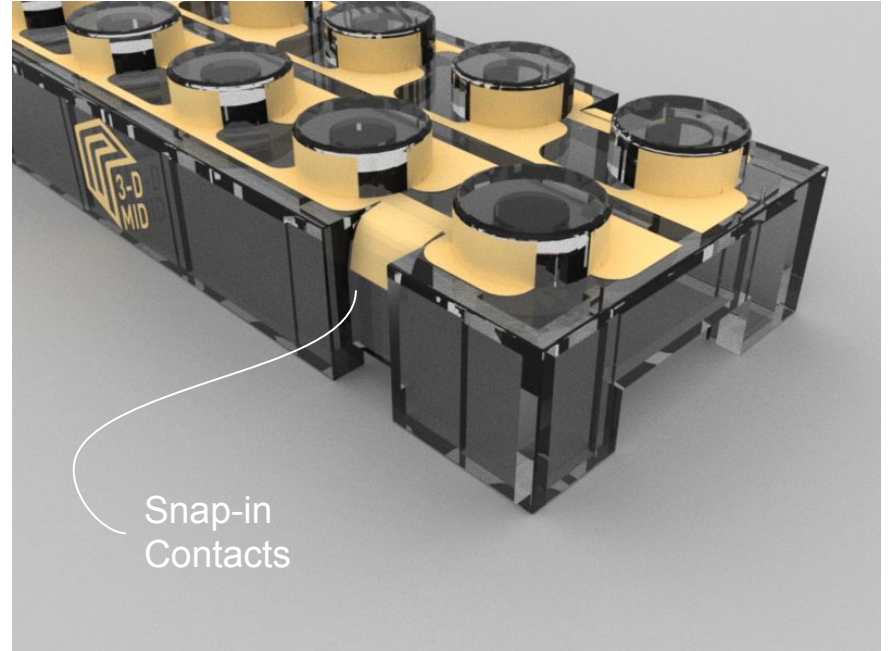
- SAMD21E Microcontroller
 - 48Mhz Cortex M0
 - Programmable USB interface
 - Bootloader preinstalled
 - SWD interface (solder pads)
- 3 color SMD LED
- 3.7V Lipo battery
 - Battery connector
 - Charging circuit
 - ON/OFF switch



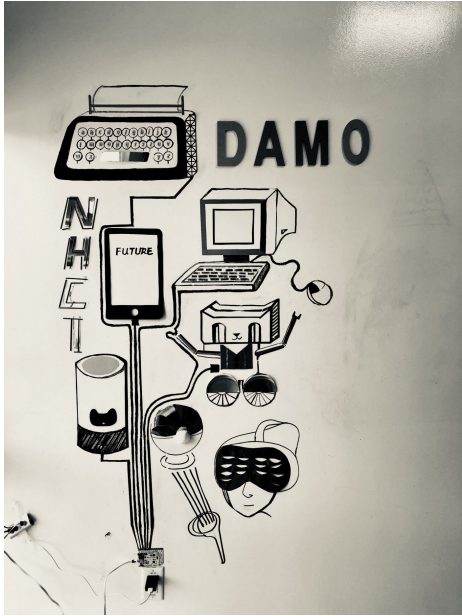
Base System Design Proposal

Features:

- SAMD21E Microcontroller
 - 48Mhz Cortex M0
 - Programmable USB interface
 - Bootloader preinstalled
 - SWD interface (solder pads)
- 3 color SMD LED
- 3.7V Lipo battery
 - Battery connector
 - Charging circuit
 - 100mAh ~ 3.5 hours running LED



Artistic Works

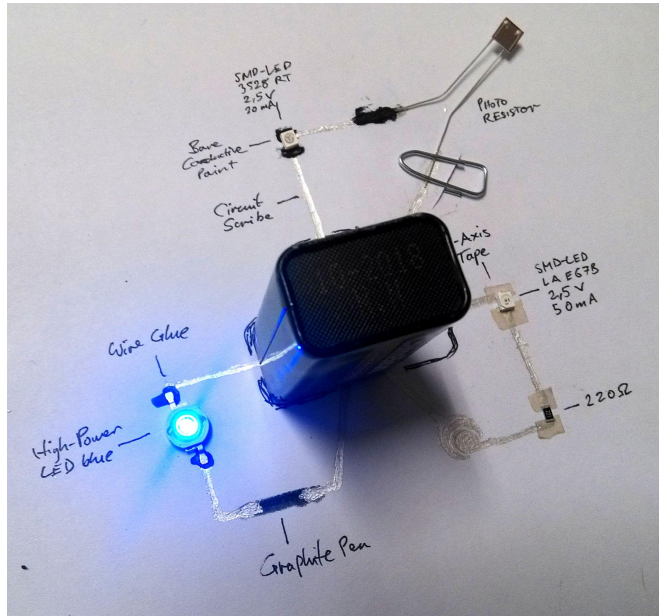


Puhe Liang. Wall paintings with carbon ink [4].

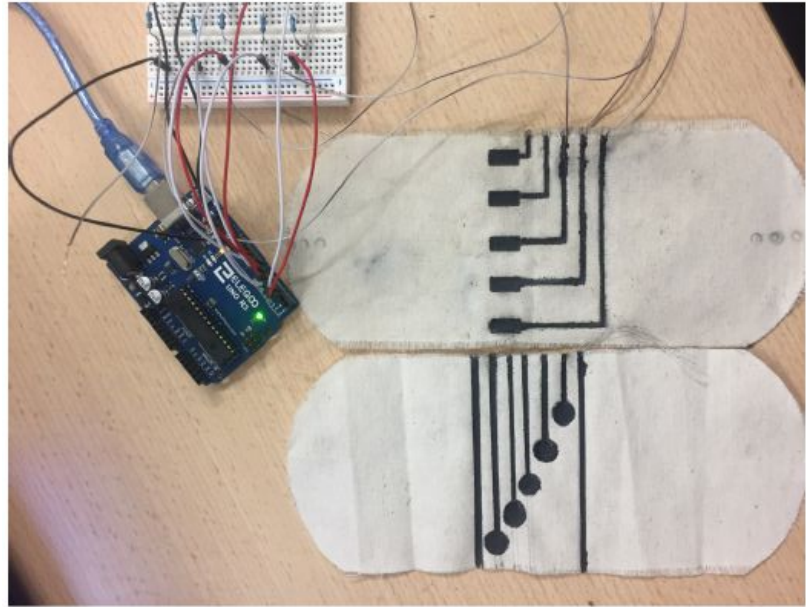


Victoria Shen. Copper foil speaker [5].

Prototyping & Research



Studying materials and tools [6].

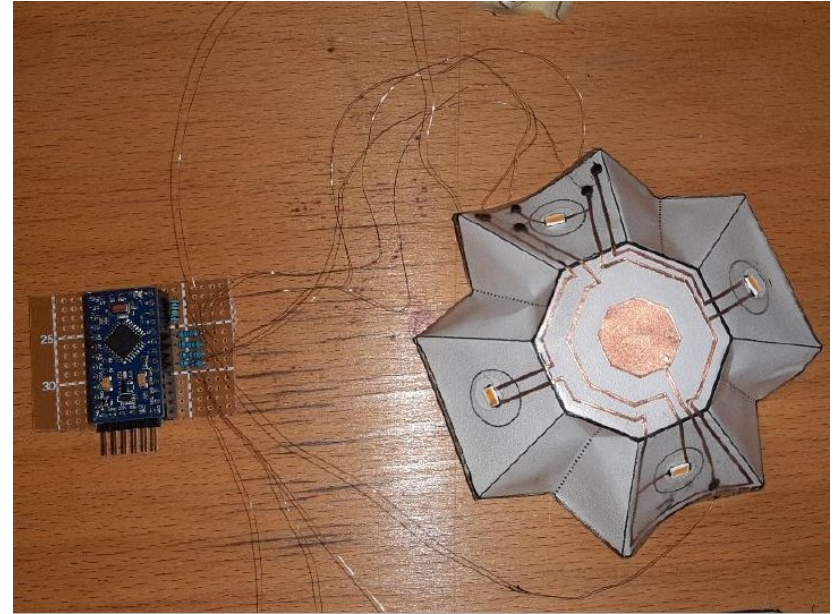


Josephine Engelhart, *A bracelet's noises*,
Printed Interfaces WS19/20.

Last Course's Results

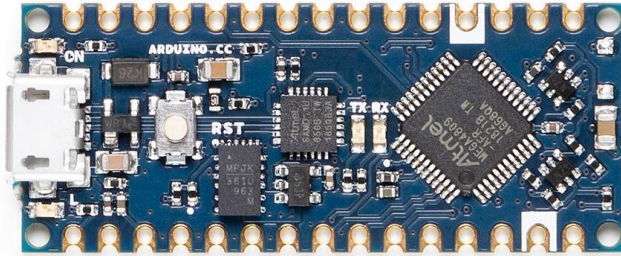


Angelina Damm, *Ein blinkender Leuchtturm*,
Printed Interfaces WS19/20.



Cäcilie Willkommen: *OriGame*, Printed
Interfaces WS19/20.

Needed Material



Arduino Nano Every [7]

- Arduino Nano, Uno, or Mega
 - 9V battery
 - Some electronic components (depending on your project ideas)
 - Plan for 20-50€
-
- You will have access to the workshop for soldering and other tools in january!

Syllabus (updated 27th Oct.)

- Mo, 18.10.2021 (online)
 - Meet & greet,
 - Short intro
 - Needed material
 - Mo, 25.10.2021 (online)
 - Introduction to electronics
 - Inkjet & screen printing
 - Manual circuits & Connections
 - Mo, 1.11.2021 (M7 002)
 - Workshop 1: manual circuits
 - Mo, 8.11.2021 (M7 002)
 - Workshop 2: inkjet printing
 - Mo, 15.11.2021 (M7 002)
 - Workshop 2: screen printing
 - Mo, 22.11.2021 (online)
 - Arduino programming & libraries
 - Mo, 29.11.2021 (online)
 - circuits for speakers and microphones
 - Mo, 6.12.2021 (online)
 - Project proposals & inspiration sessions
 - **Mo, 13.12.2021 (M7 002)**
 - **Presentation of project ideas**
- Christmas Break! --
- 3.1.2022 - 7.2.2022 Workshop Sessions
 - **Mo, 14.2.2022 Final Presentations**
 - **Mo, 28.3.2022 Hand in documentation**

Sources

- [1] Gehlhaar et. al, Fingies Project. Interface Design, Bauhaus-Universität Weimar 2018.
- [2] <https://www.printedelectronics.com>, access 2021-10-17.
- [3] https://de.wikipedia.org/wiki/Datei:Nexus_one_screen_microscope.jpg, access 2021-10-17.
- [4] Puhe Liang, <https://medium.com/@LiangRR/lessons-in-using-bare-conductive-c1f79cb45b7b>, access 2021-10-17.
- [5] Victoria Shen, <https://www.instagram.com/p/B5h6LMaFAnB/>, access 2021-10-17.
- [6] Florian Wittig, https://www.uni-weimar.de/kunst-und-gestaltung/wiki/File:Printed_electronics_study_IMG_20161122_042447.jpg, access 2021-10-17.
- [7] Arduino Nano Every. <https://store.arduino.cc/products/arduino-nano-every-pack?variant=40830133665943>, access 2021-10-17.