

Knowledge making in fashion and textiles

30.1.2023

- 13.15-14.15 Short lectures on data collection and analysing methods in practice-based research by Emmi and Leonardo
- 14.15-14.30 Coffee break
- 14.30-14.50 Julia and Noora, introductions
- 14.50-16.30 Panel discussion (Julia, Noora, Leonardo, Emmi)
- 16.30- Final words

Knowledge making through reflective weaving

30.1.2023

Agenda

- Practice-based design research
 - Experimental scientific research vs. practice-based research
 - Textile thinking in practice-based design research
- Case Touch Interwoven – knowledge creation in practice-based eTextile development

**How is practice-based research
different from experimental
scientific research?**

Practice-based research vs. experimental scientific research

- Scientific knowledge building starts from constructing a hypothesis based on precise and established theories, carefully designed and executed experimentation which produces evidence to either support or oppose the hypothesis, interpreting the implications of the research findings to propose knowledge claims, and eventually exposing the claims to scrutiny and opposing theoretical arguments (Driver, 2000)
- Produces results independent from their producer, verified by different characterization and analytic tools
- practice-based research can be understood as “an original investigation undertaken in order to gain new knowledge partly by means of practice and through the outcomes of that practice” (Linda Candy, 2020, ch. 6)
- generates new knowledge through creative practice and its outcomes, by acknowledging the influence of embodied knowledge and reflective practice in knowledge creation, and partially subjective relationship between the researcher and research outcomes
- → Both approaches base on experimental approach, but have different principles on how knowledge is constructed

Practice-based design research

- In design, practice-based research approach has many names → Research through Design, constructive design research, practice-based design research
- Constructive design research – design experiments → The experimental process follows three key phases of hypothesis construction, experiment(s), and evaluation, and aims to ensure both knowledge creation, as well as relevance (Krogh and Koskinen, 2020)

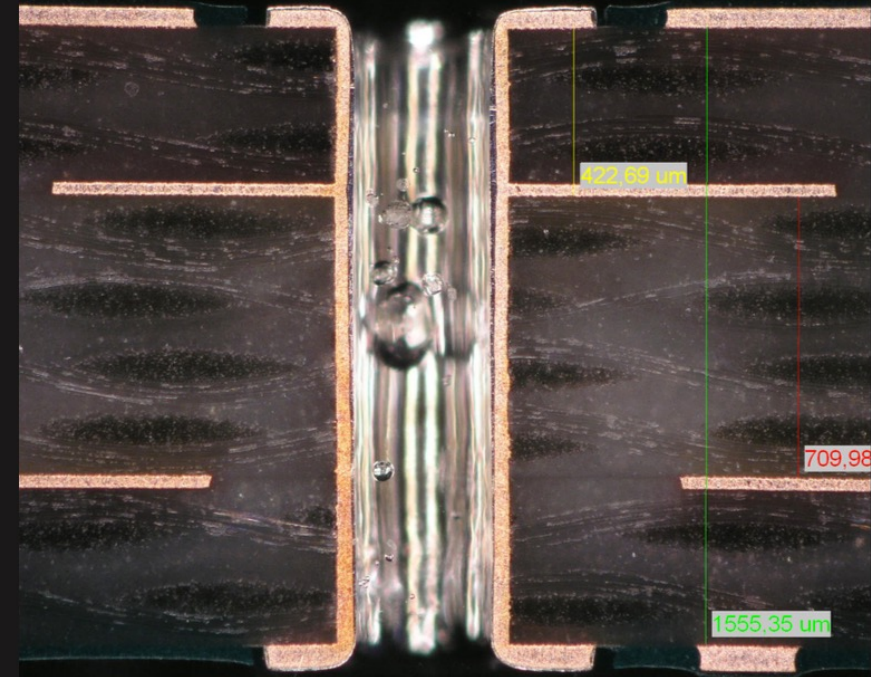
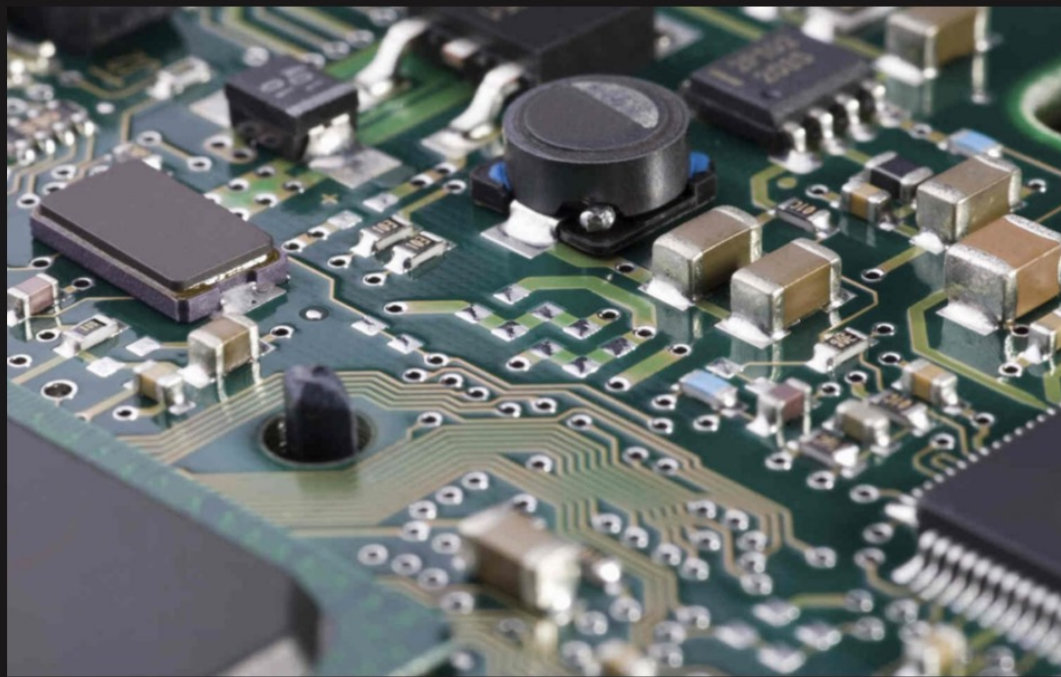
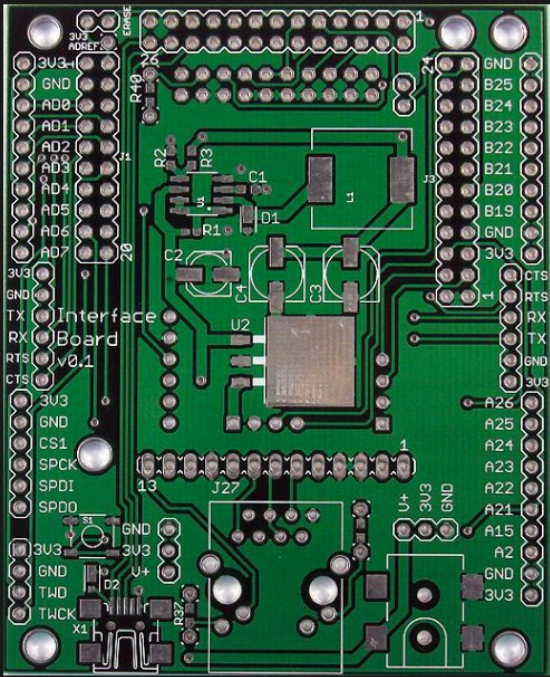
Touch Interwoven – research approach

- grounded on professional practices applied in the textile design process and on textile thinking
- Textile thinking
 - "the understandings developed through the practice of using textiles to explore new concepts and design challenges" (Lean, 2020)
 - embraces the role of embodied knowledge, embedded in the textile design practice and its outcomes
 - What differentiates textile design from other design disciplines equally emphasising the role of making and embodied knowledge, such as ceramics (Groth, 2017), are the specific properties of textile materials (Philpott and Kane, 2017). The sensitivity to textile materials
 - Another distinguishing feature specific for textile thinking stems from the characteristics of textile techniques applied to construct, treat and decorate textiles
- Woven textile design practices
 - research focus typically on the interdependency of different structural and material variables, and generates knowledge on how those influence for example the visual, tactile, technical, and functional characteristics of woven textiles, or their construction process

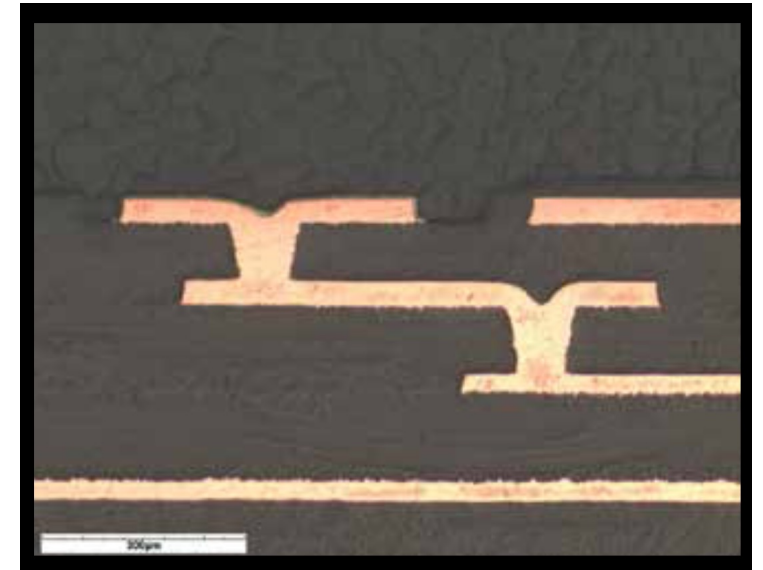
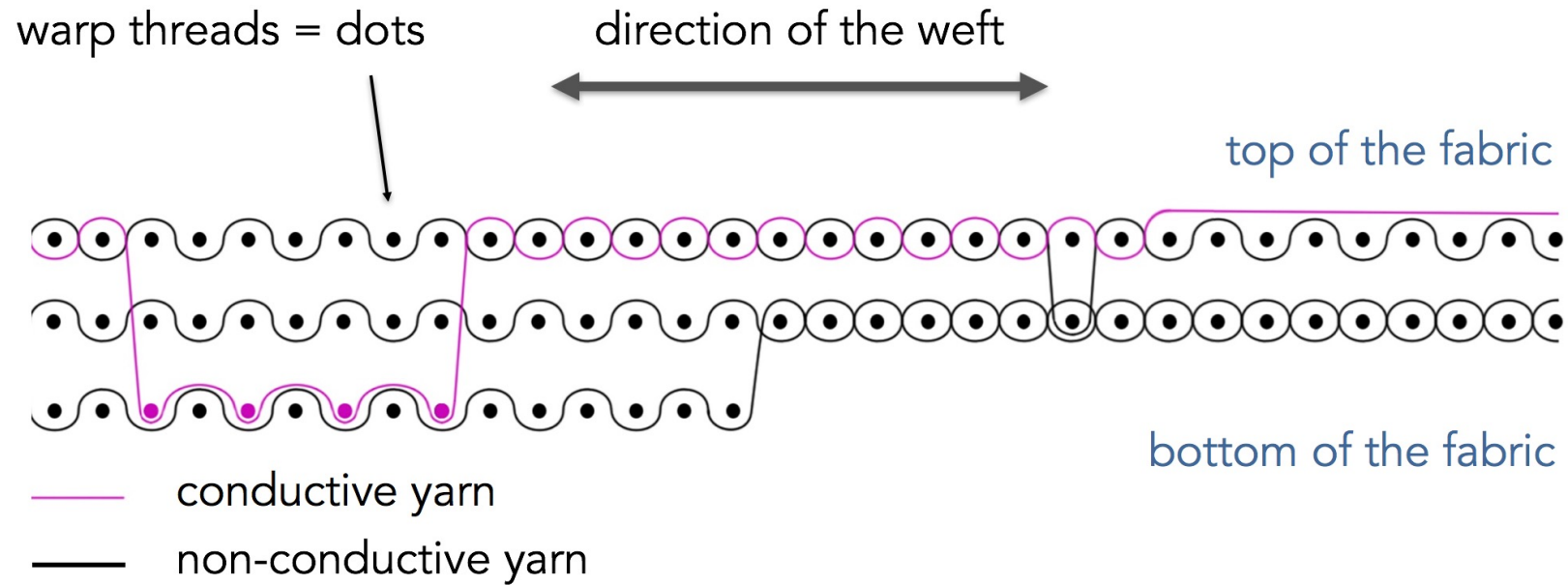
Questions driving my research

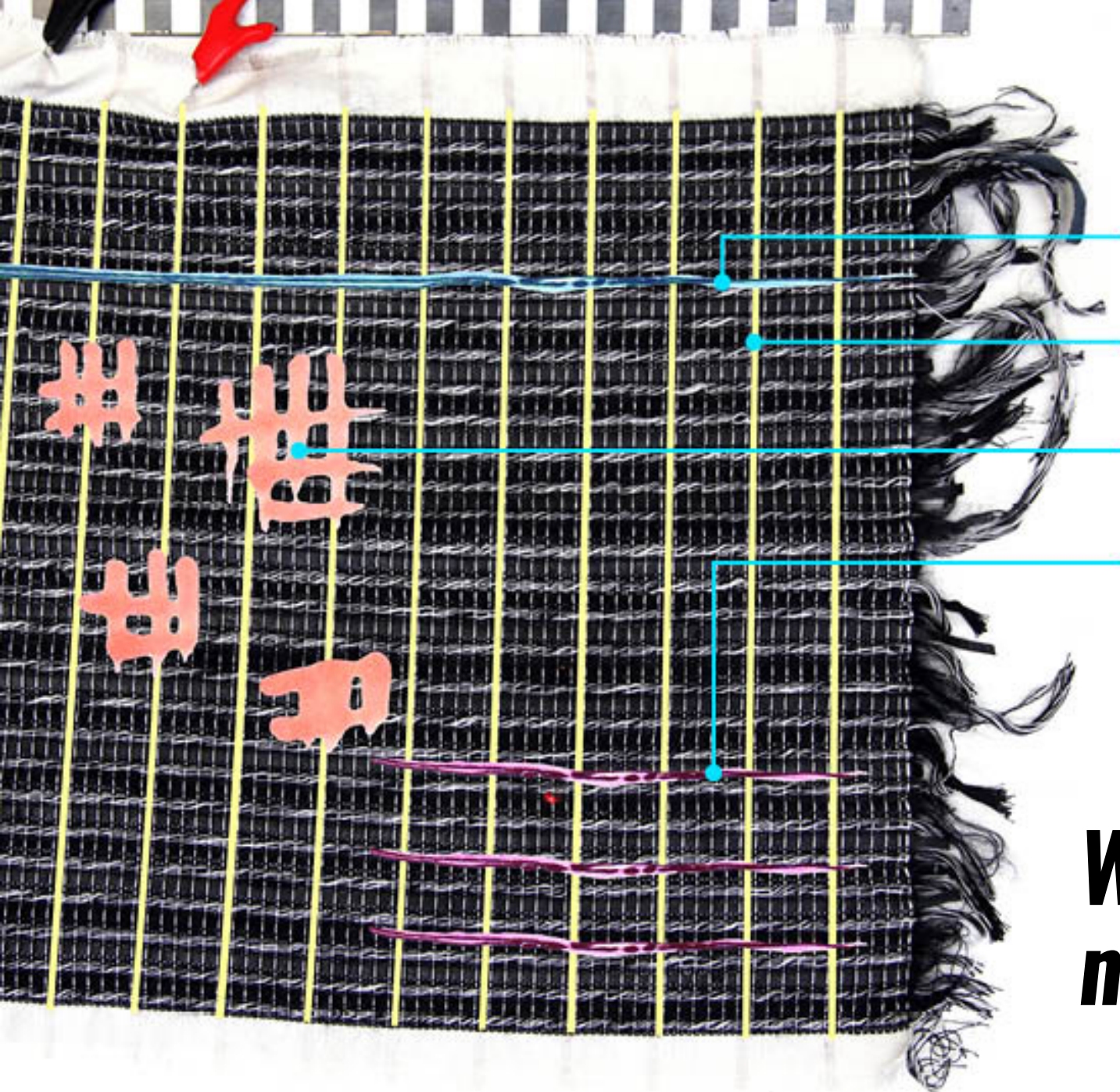
- How can weaving be used to explore new concepts and design opportunities for eTextiles?
- How can the electrical and sensorial properties of eTextiles be merged in complex woven structures to expand the experiential qualities of woven smart materials?
- How can textile designer's knowledge be utilised in smart material development?

Starting point - a circuit board



Applying woven structures into electronic circuit design





Computational power integrated into the fabric, e.g. processor suitable for soft structures

Soft conducting wires for connecting different components

Soft, textile-made sensor and actuator structures

Other input / output components

What could this mean in practice?



**Design experimentation
through reflective weaving**



Reflective practice

- **Knowing-in-action**
 - skills and knowledge professionals display in their practice
- **Reflection-in-action**
 - when situation needs reframing
 - Follows experimental approach
- **Reflective conversation with the situation**

A close-up photograph of a hand weaving a dark grey thread on a loom. The loom has many vertical white threads. The hand is on the left, holding a bundle of dark grey threads. The threads are being woven into a pattern that is visible at the bottom of the frame. The background is slightly blurred, showing the wooden frame of the loom.

Reflective weaving

- Hypothesis / experimentation / evaluation
 - Subjective sensorial evaluation
 - Initial technical evaluation
 - Multimeter measurements

Data collection

- Autoethnographic data of the weaving process
 - Think-aloud accounts, video, reflective notes
- Used to gain understanding of the decision making and the characteristics of textile thinking applied through the process

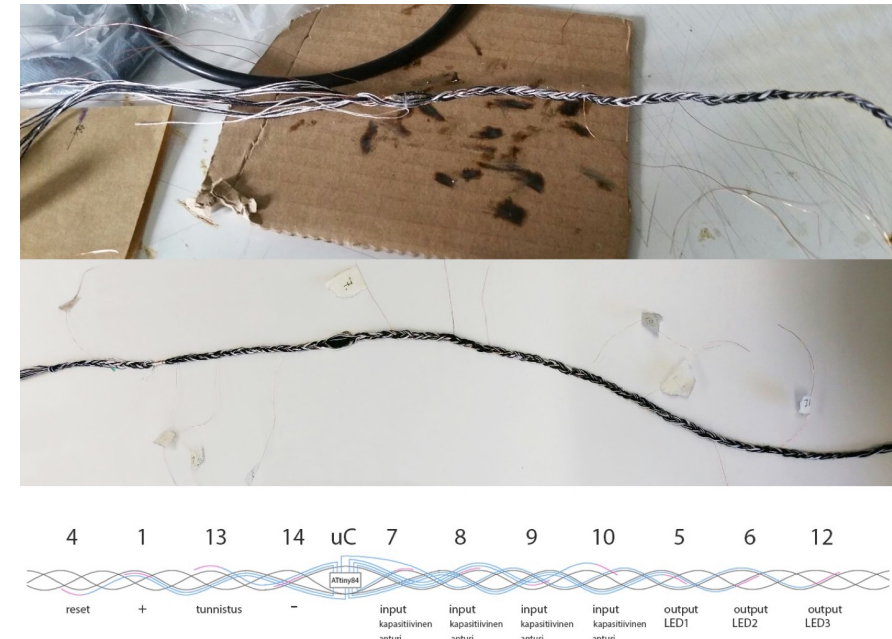
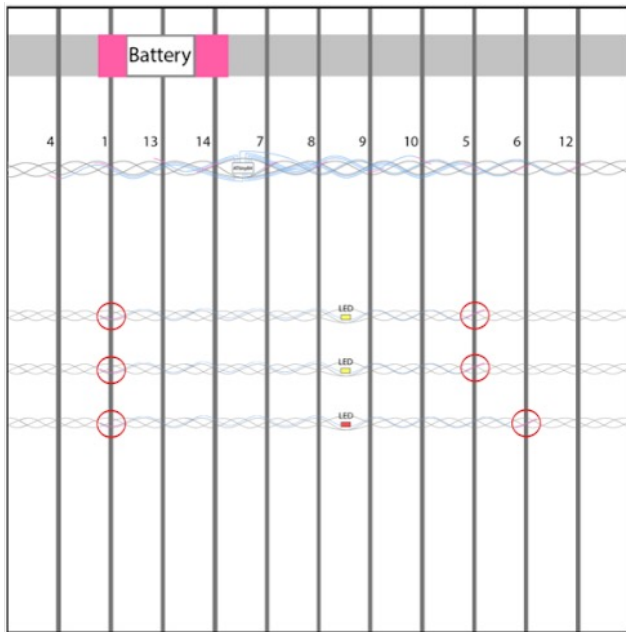
Design experiments / after weaving

The background image shows a close-up of an eTextile prototype. A white fabric with several small metal pins is connected to a blue microcontroller board (likely an Arduino Pro Mini) mounted on a white PCB. Multiple colored wires (purple, yellow, orange, blue, black) are connected to the board. The scene is set against a dark, textured background.

- **Technical evaluation**
 - Testing the functionality of eTextile samples in lab setting (controlled environment)
- **Structural analysis**
 - Examining crosscuts and unraveling weft and warp yarns
- **Subjective sensory assessment**
 - Evaluating the textile hand of the prototypes
- **User testing in lab**
 - Behavioural data of people using eTextile user interfaces
 - Video, think-aloud, semi-structured interviews

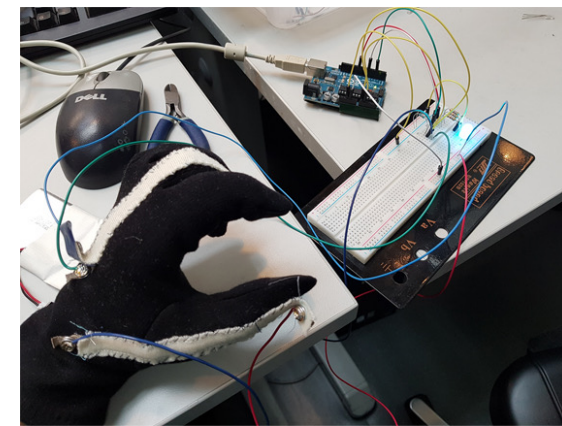
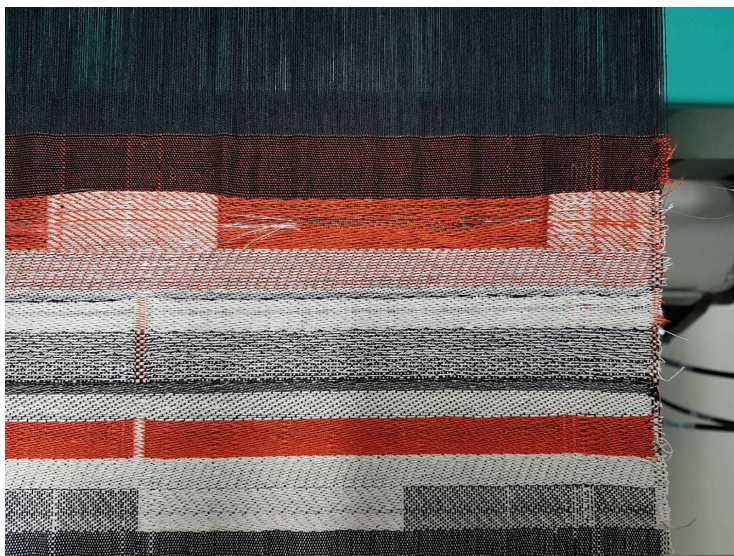
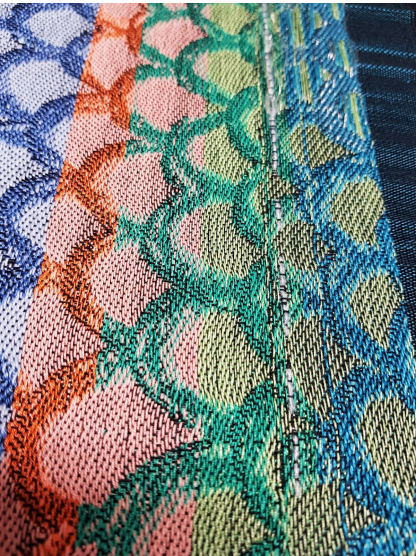
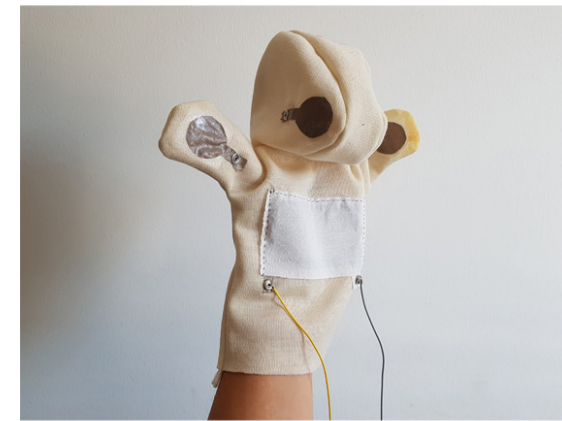
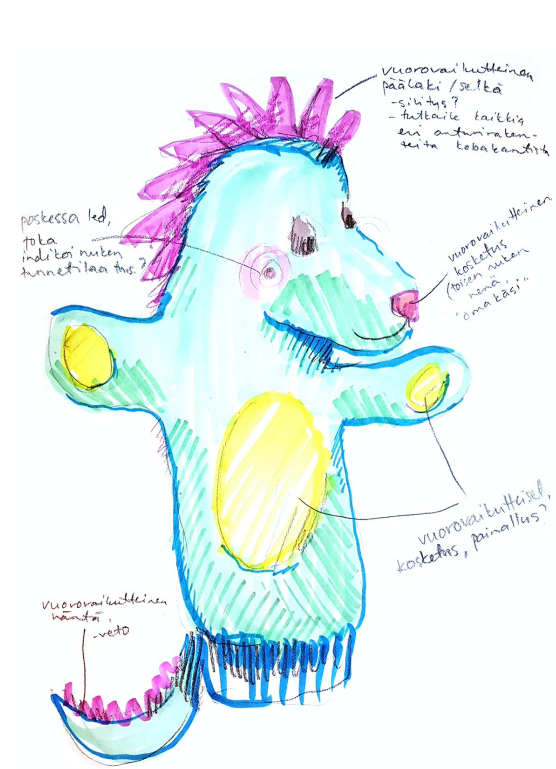
Experiment 1

- How can the orthogonal yarn architecture of woven structures enable integration of electrical circuitry?



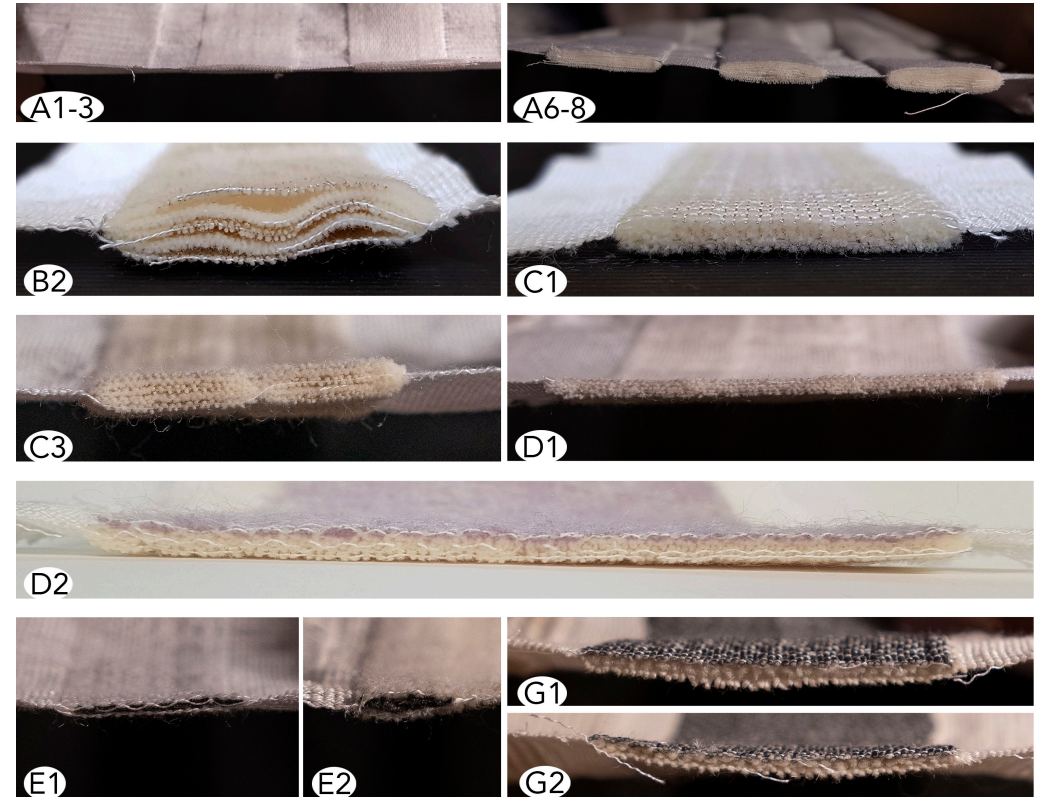
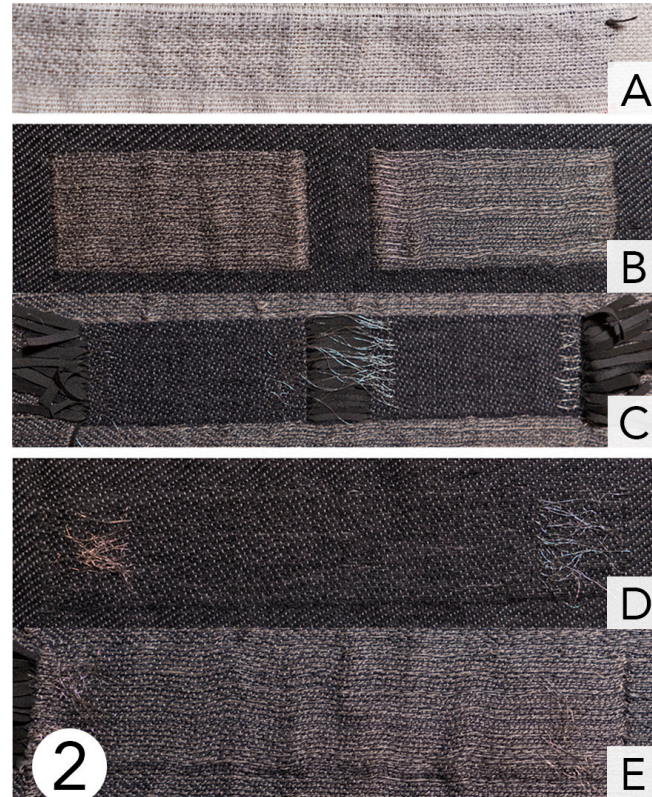
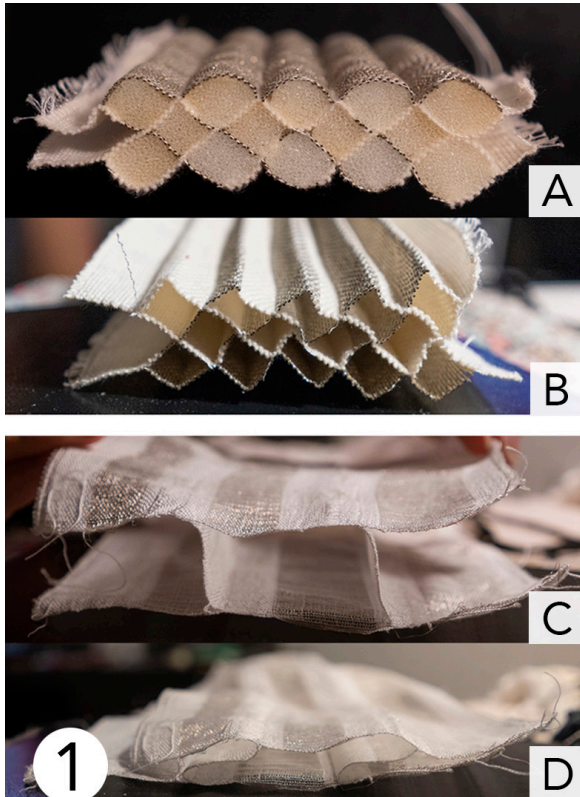
Experiment 2

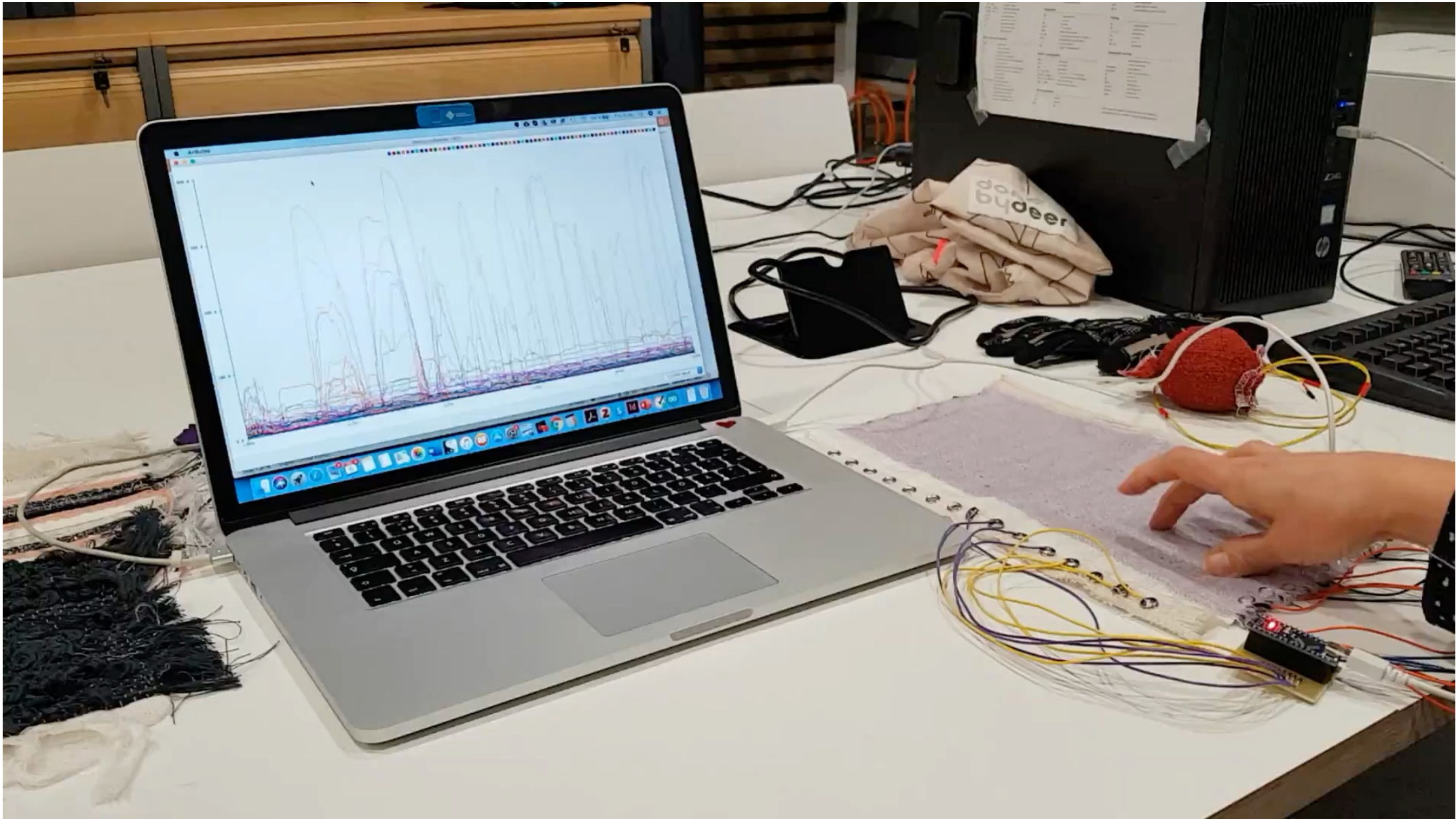
- How can functional woven structures and visual surface characteristics be merged in woven interface design?



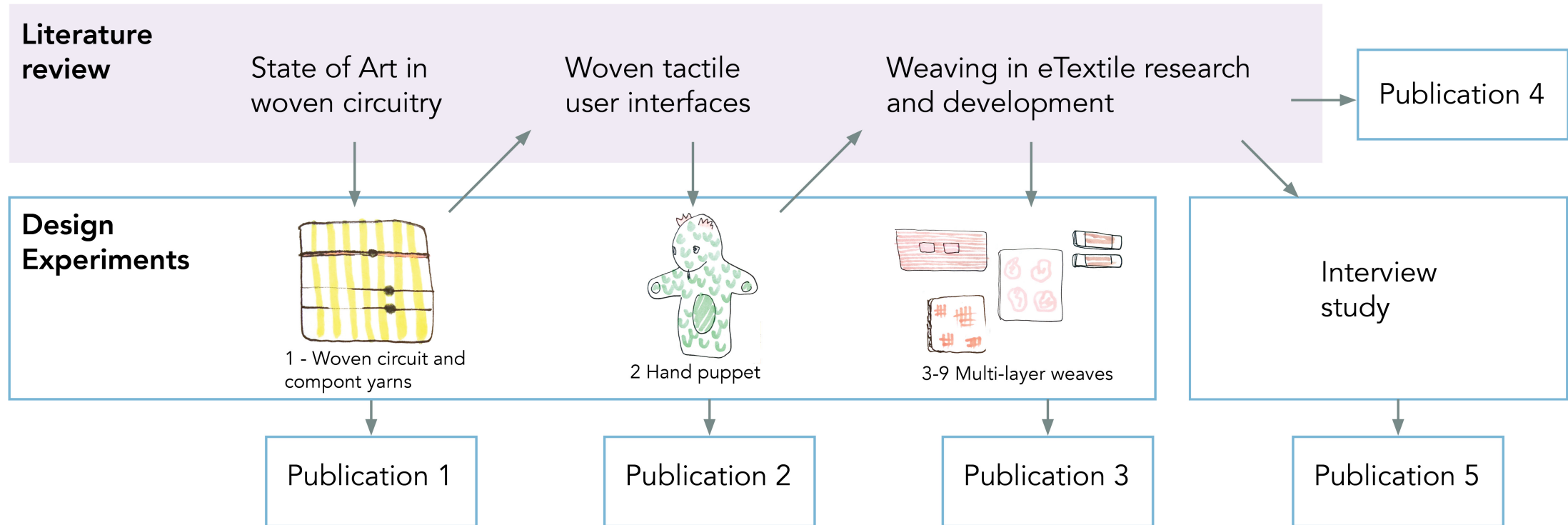
Experiment 3

- How can woven multi-layer structures be used in eTextile prototyping?

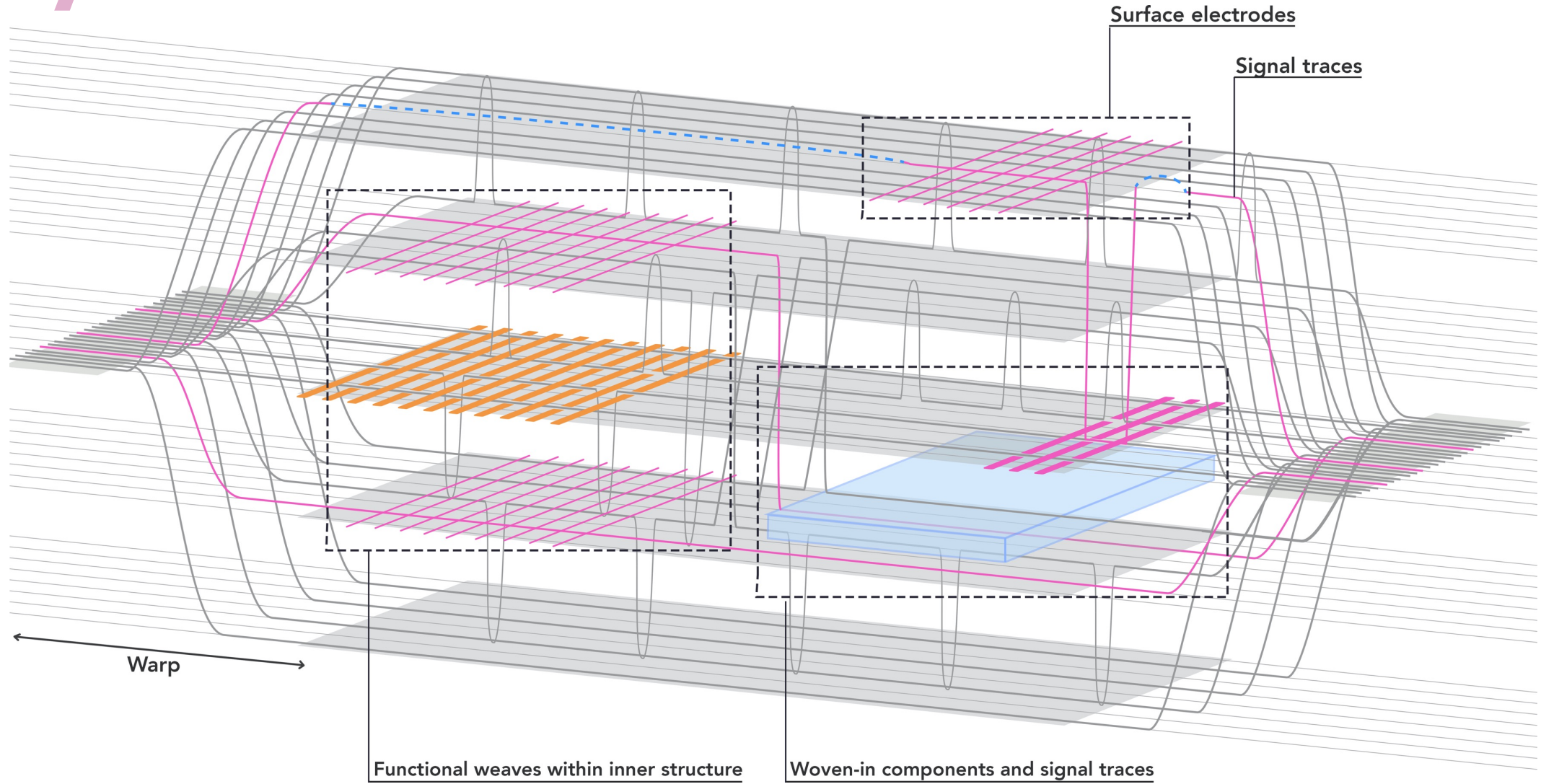




Research process



Synthesis



Thank you!

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