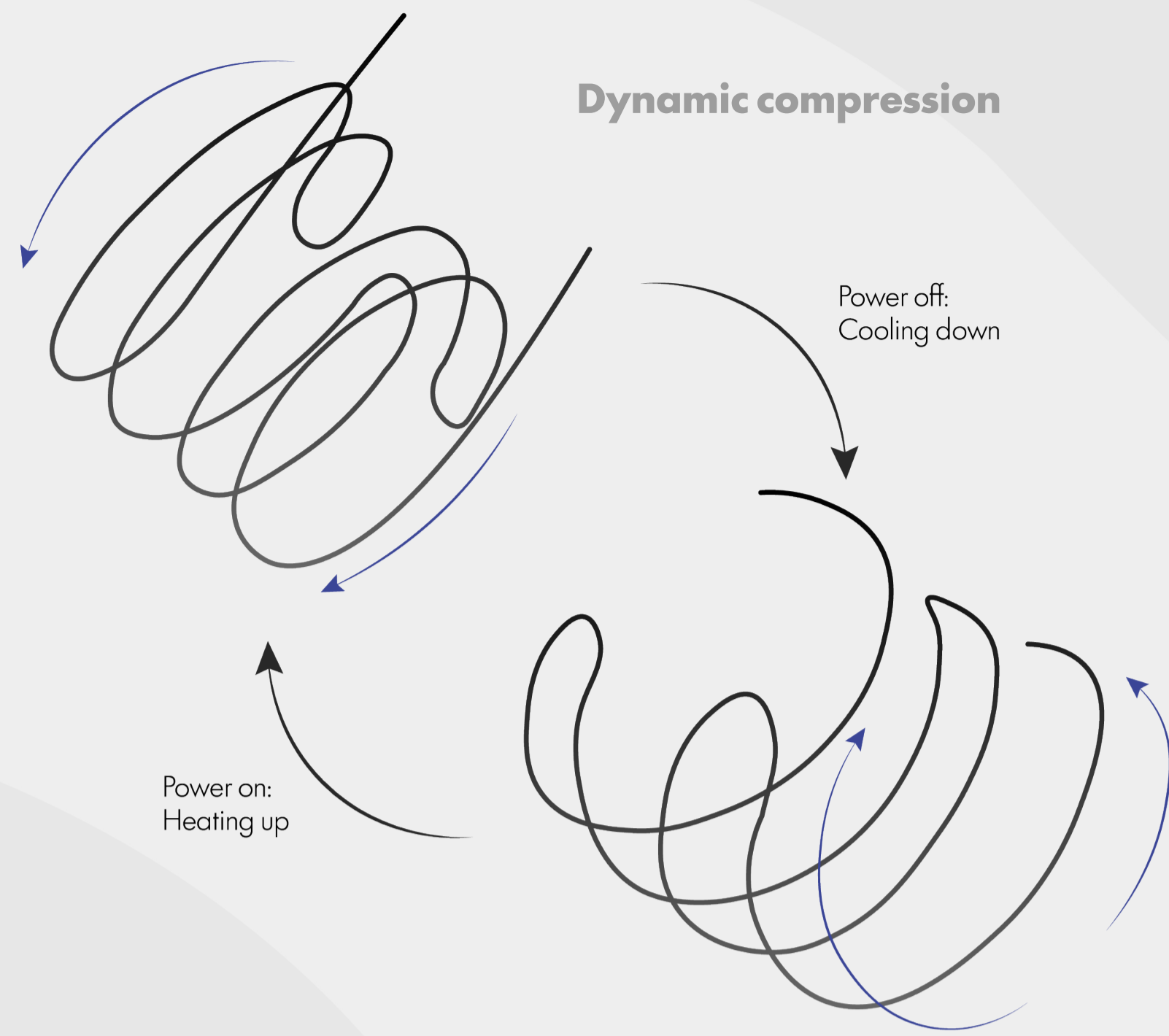


A FUNGAL TEXTILE WEARABLE WITH SMA WIRES

Toward dynamic compression in a well-being context

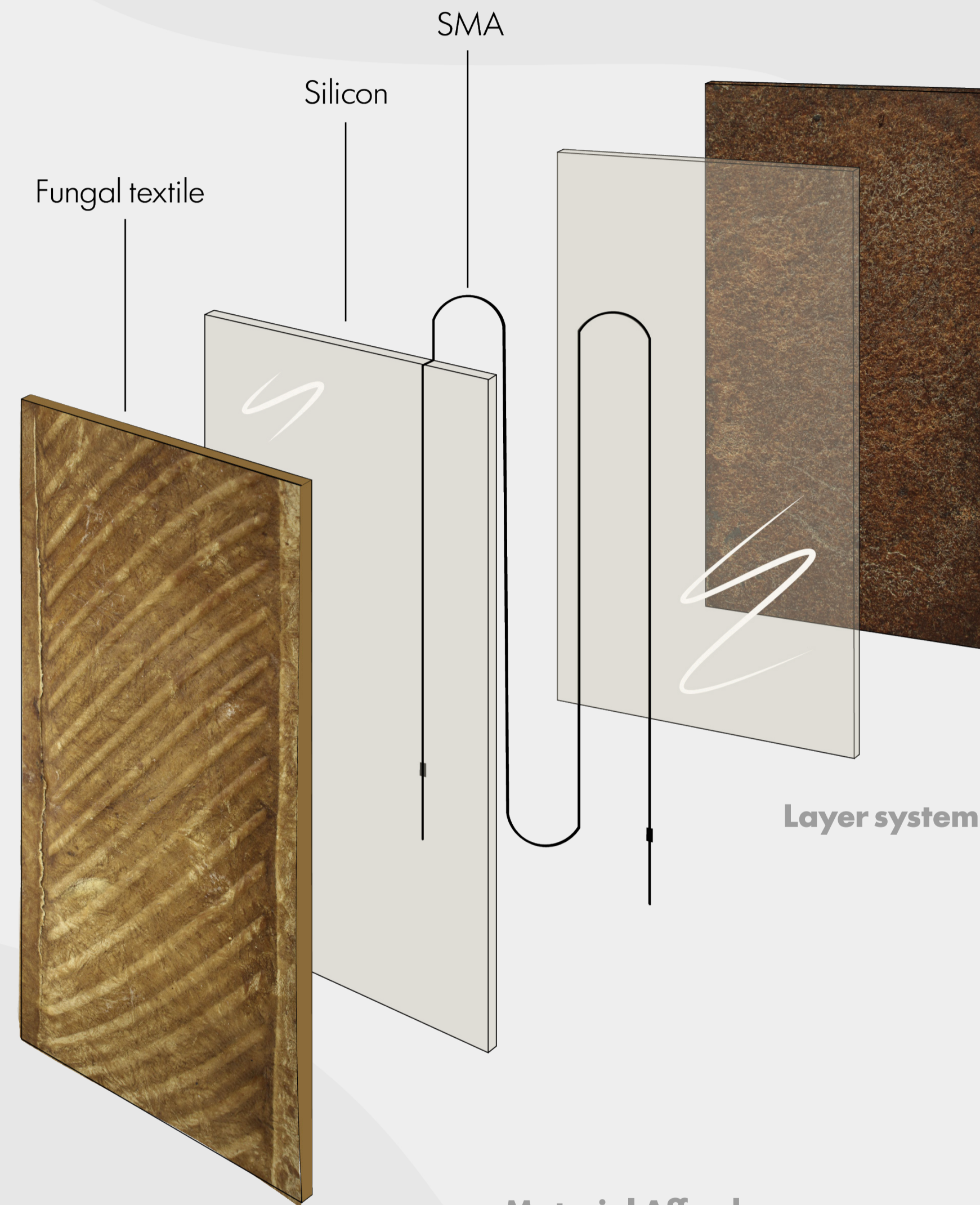


Material System

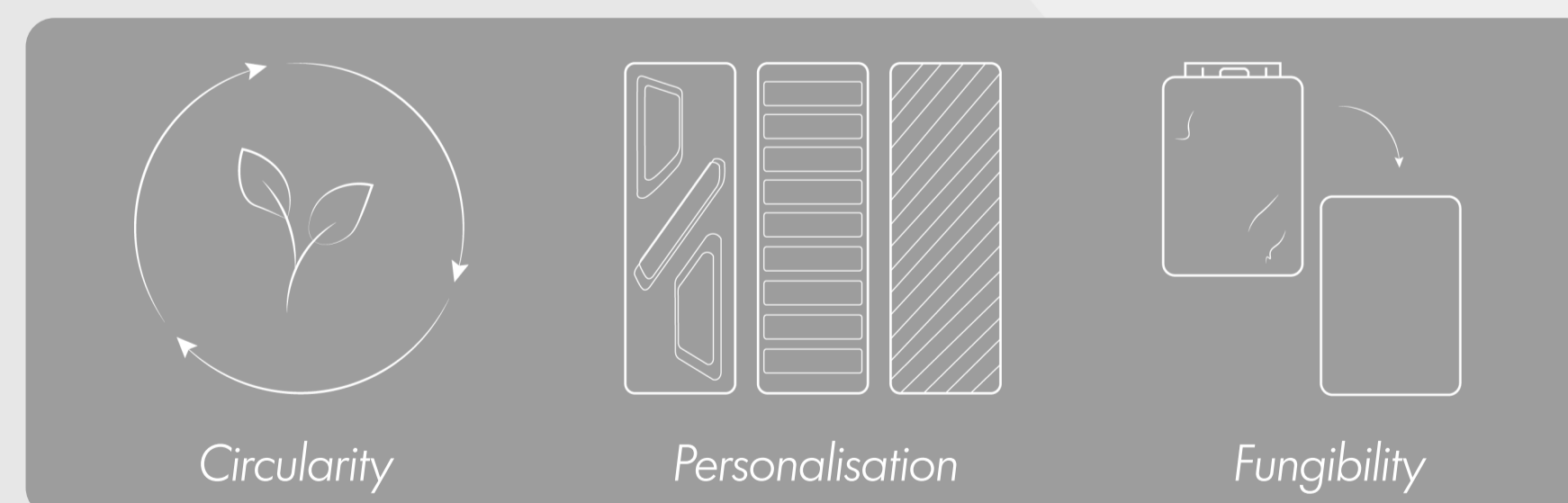
A three-layer material system was designed, consisting of two outer layers made from fungal textile and an inner functional layer. The exterior and interior fungal textile layers are connected to form an interchangeable pocket, which allows for easy replacement and customisation. The inner layer, acting as a consistent part, contains a bent Shape Memory Alloy (SMA) wire embedded in silicone.

Dynamic compression is achieved by alternately supplying and removing electrical current, thereby generating Joule heating in the SMA wire. When heated, the wire contracts and conforms around the user's body, creating compression. When cooled down, the body acts as a counterforce, returning the wire to its original shape and creating a cyclical movement.

The fungal textile layers can be tailored to combine both textile-like and cushion-like properties. By selectively heat-pressing specific areas while leaving others in their freeze-dried state, variations in stiffness and softness can be created. This allows the inner layer to be adapted to functional needs, while the outer layer can be customised to fit aesthetic preferences.



Material Affordances



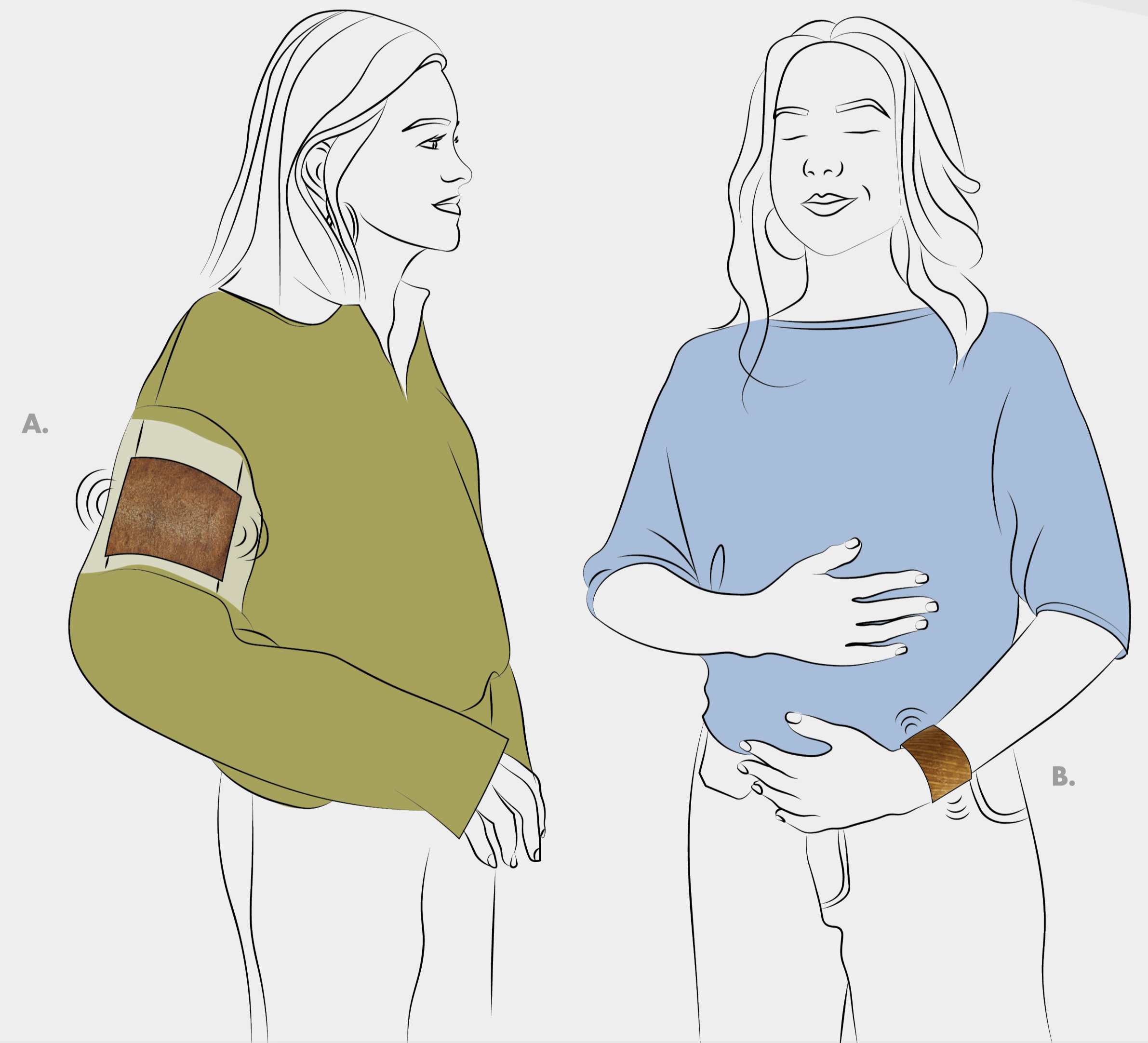
Applications of fungal textile

Research was done into useful applications of the material system with fungal textile and dynamic compression in a context of well-being. A division was made between physical and emotional well-being, showing off the potential of the material within two different directions.

The first direction led to a reassurance wearable (A) for emotional well-being used as a tool for individuals with social anxiety disorder. The wearable provides a calming compression during stressful social situations, comforting its user.

The second application is a breathing-support wearable (B) for physical well-being used for physiotherapy patients experiencing physical complaints related to stress. The dynamic compression of the assistive wearable helps with deep and slow breathing patterns and is a reminder for the user to practise correct posture.

The results show that fungal textile can provide a soft, natural and supportive material experience, while SMA wires can create subtle, muscle-like dynamic compression. A combination of movement, warmth and fungal textile creates a positive experience for the user.



Eunice Cheng

A fungal textile wearable with SMA wires:
Toward dynamic compression in a well-being context
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MSc Integrated Product Design - Thesis

Committee

Dr. S. (Stefano) Parisi
Dr. G. (Gijs) Huisman