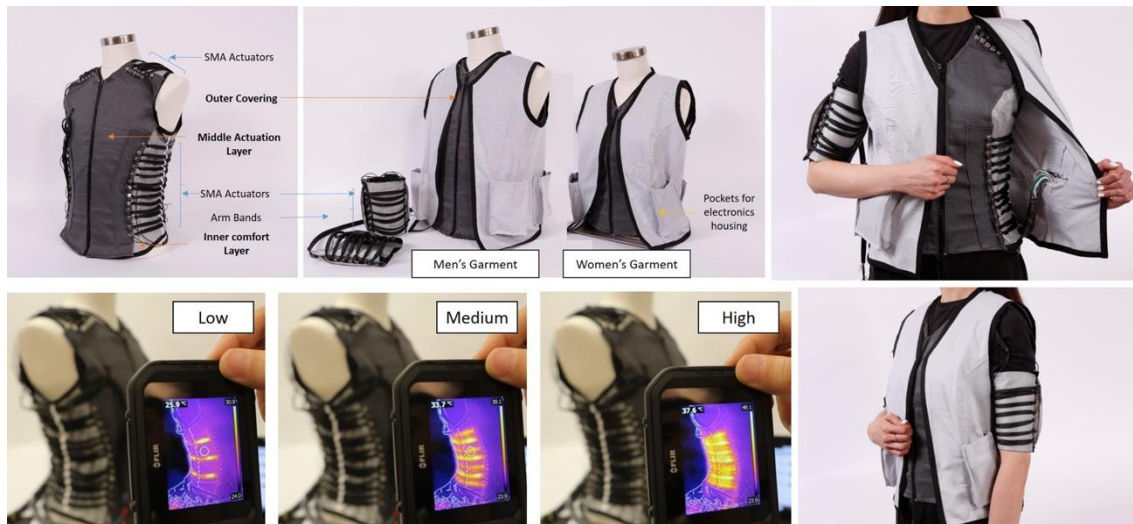


[DS01]

Garment-based, Computer-Mediated Dynamic Compression System using Shape Memory Alloys

*Esther W Foo, J. Walter Lee, Simon Ozbek, Crystal Compton, Nicholas Schleif and Brad Holschuh*

*University of Minnesota, United States*



Compression is ubiquitous and is used in many applications including clinical interventions, yet remains largely understudied as a haptic modality. This work involves the development of garment-based compression technologies that are dynamic, low-mass, and remotely controllable. Shape memory alloys (SMAs) (a form of active material), embedded into garments are capable of creating spatially- and temporally- dynamic compression on the body in an unobtrusive form factor. The developed technologies will serve as a platform to better understand the objective/subjective effects of compression on users. This work also enables new modes of interaction between users separated by distance, including the potential as novel tele-rehabilitation technologies to enrich the lives of those in need.

[DS02]

### Synesthesia Suit

*Nobuhisa Hanamitsu, Yukari Konishi, Kouta Minamizawa, Ayahiko Sato and Tetsuya Mizuguchi*

*Keio University Graduate School of Media Design / Rhizomatiks Research / Enhance Inc., Japan*



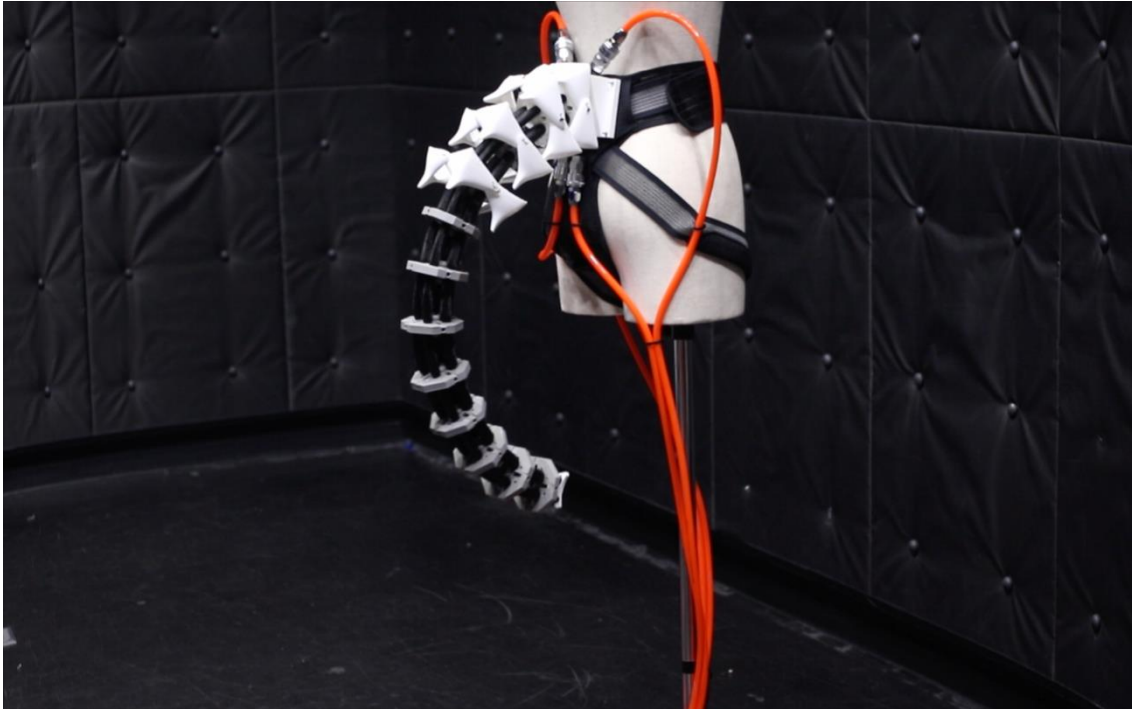
The “Synesthesia Suit” was created to embody the multi-sensory concept behind Rez Infinite. The 26 actuators placed within the suit vibrate throughout the person’s body along with the music, and simultaneously light up via LED. There is an element of texture to the vibrations – whether it be the feeling of stringed instruments or drums being played – to which the LED colors and light patterns synchronize as the game progresses. This multimodal suit allows the person to experience music not just through its ears but also through the senses of touch and sight.

[DS03]

Artificial Prosthetic Tail for Augmentative and Full-body Haptic Feedback

*Junichi Nabeshima, MHD Yamen Saraiji and Kouta Minamizawa*

*Keio University Graduate School of Media Design, Japan*



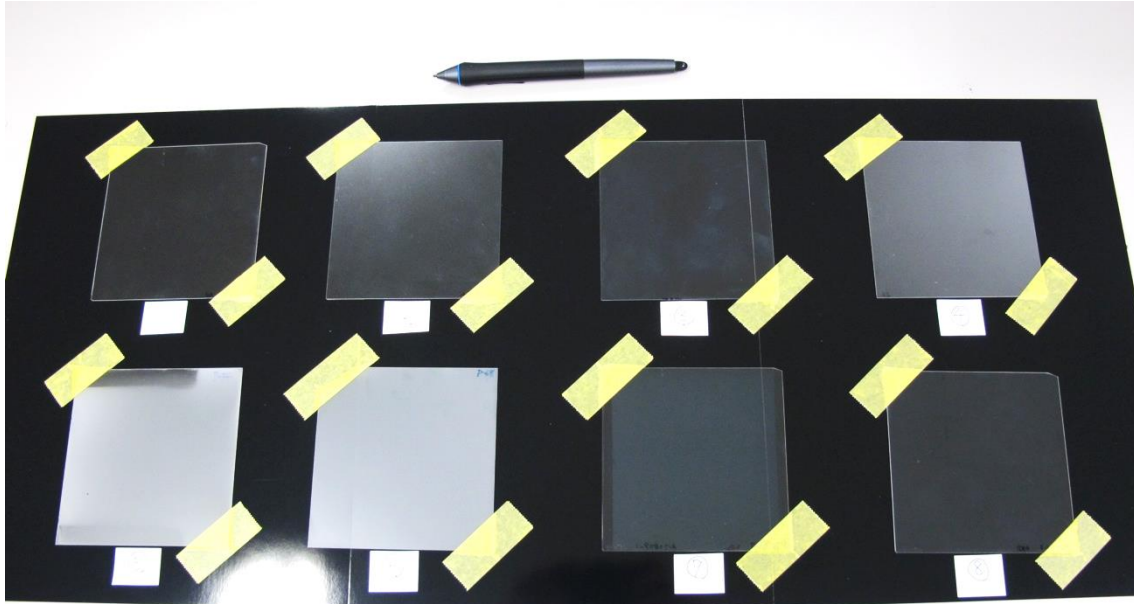
For most mammals and vertebrate animals, tail plays an important role for their body providing variant functions to expand their mobility, or as a limb that allows manipulation and gripping. In this work, Arque, we propose an artificial biomimicry-inspired anthropomorphic tail to allow us alter our body momentum for assistive, and haptic feedback applications. The proposed tail consists of adjacent joints with a spring-based structure to handle shearing and tangential forces, and allow managing the length and weight of the target tail. The internal structure of the tail is driven by four pneumatic artificial muscles providing the actuation mechanism for the tail tip. Here we highlight potential applications for using such prosthetic tail as an extension of human body to provide active momentum alteration in balancing situations, or as a device to alter body momentum for full-body haptic feedback scenarios.

[DS04]

Tactile feel designed glass

*Misa Inamoto and Satoru Tomeno*

*AGC Inc., Yokohama, Japan*



Tactile feel of glass has been getting attention due to the widespread use of touch devices such as smartphone, tablet and smart white board. In these devices, glass is used as an interface material, therefore, the tactile feel of cover glass has becoming more important.

The tactile controlled glass have been developed for the cover glass of touch devices. The tactile of finger feel and pen-writing feel can be controlled with fine structure on glass surface. These special treated glass can suggest various design of the feel. For example, a structure express smooth finger touch feel and high frictional pen writing feel, and another structure shows smooth feel for both finger and pen. Additionally, the feel can be also design with visually imperceptible structure. With this nanometer size structure, tactile feel can be controlled without changing its appearance.

In this demonstration, we provide several types of tactile feel cover glass with various appearance. These glass would give experience of variety tactile feel by hand and pen through several movement such as touching, swiping, writing, wiping and so on.



[DS05]

Ikebana : The breathing planter design for augmenting plants' personality

*Hongyu Chang and Daisuke Yamamoto*

*Pratt Institute, United States*



In eastern culture people believe that all things have as soul, and tend to present nature's internal spirit through performances or ceremonies, such as the Japanese flower arrangement 'Ikebana', or by worshiping trees and stones.

However, currently, there are not many ways for nature to express itself to us, the distance between humans and nature is farther apart now than it was in the past.

While, as we have our emotions, plants have their own layers of internal information, and we believe that plants can show their internal feelings, and communicate with us through their bio-currents, which we believe could fill the gap between humanity and plants.

Breath, just like a baby can feel peace of mind from mother's breath rhythm, the rhythm in nature can play a role in connecting humans but also in connecting human and nature by touching and feeling the breath of a plant.

'Ikebana' is a system which deals with collecting a plant's biodata and algorithm design which can generate different styles of physical patterns which will move like it is breathing.

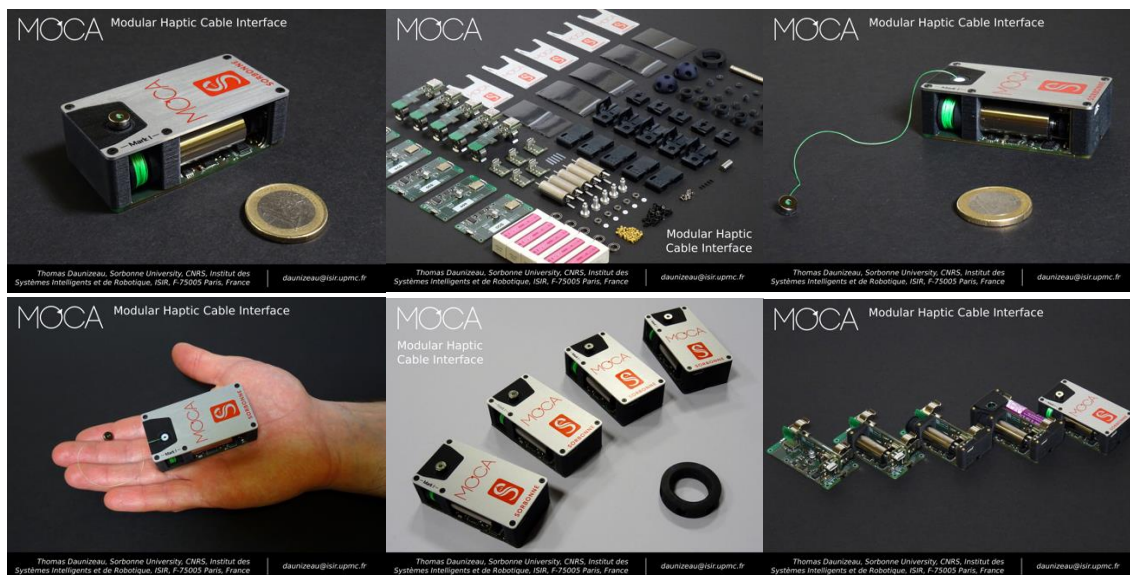
With the final planter design based on bio-datas, planters can show their personalities, and strengthen the relationship between Humans and plants.

[DS06]

## MoCa: A Modular Haptic Cable Interface

*Thomas Daunizeau*

*Sorbonne University, France*



MoCa is a modular cable interface which provides a quick and easy way to create force feedback. One simply needs to lay out modules spatially so that both the desired workspace and degrees of freedom are reached. Their baseframe sticks to flat surfaces by means of a porous elastomeric bottom layer. Conversely, their cable is secured on the end effector with permanent magnets. Hence, no screws nor external tools are required to setup this device. Along with superior ease of use, a special emphasis is given on portability. To this extent, circuit boards are used as a skeleton for mechanical components wrapped around in a seamless integration. As a result, they occupy minimal space (33mm x 64mm x 20mm) and are readily transportable with a mass of only 68g including the embedded battery. A single module is therefore made fully autonomous and communicates wirelessly. Cost is eventually a design factor of prime importance. Dedicated haptic devices are indeed notoriously expensive yet essential either for realistic simulation or rigorous scientific experiments. The versatile nature of this apparatus might tackle this problem as it could be reconfigured to best suit the needs of a given application. Cables also favor low-cost since transmission parts are reduced to the bare minimum thus avoiding extra machining costs.

[DS07]

# Haptic Remembrance Book

*Elaine Czech, Mina Shibasaki, Keitaro Tsuchiya, Roshan L Peiris and Kouta Minamizawa*

*Keio University Graduate School of Media Design, Japan*



While having strong social networks is essential for good quality of life, socializing gets more difficult as we age even if we are surrounded by people in a nursing home setting. Care staff and family members want to be able to connect with residents/loved ones but have limitations (time constraints, unsure how), and it can be challenging to feel a connection to another resident who has differing abilities. We propose that through sharing strong positive memories, members of a nursing home community (residents, care staff, and families) will be able to build empathy for one another and thus strengthen their community bonds. By applying multi-modal technologies to a familiar medium, the book, we provided a means by which intergenerational users, from various backgrounds, could interact with and gain meaning from the content. The book on display is our 1st prototype size and hardware, while other iterations, which varied in size and hardware, may be seen in photos and videos.

[DS08]

Design of Embodied Experience in Picture-Book Storytelling

*Mina Shibasaki, Youichi Kamiyama and Kouta Minamizawa*

*Keio University Graduate School of Media Design, Japan*



We proposed a cushion which supports children's imaginations by allowing them to interact with picture book stories in a physical way. We developed a vibrotactile cushion to be used during the storytelling of picture-books.

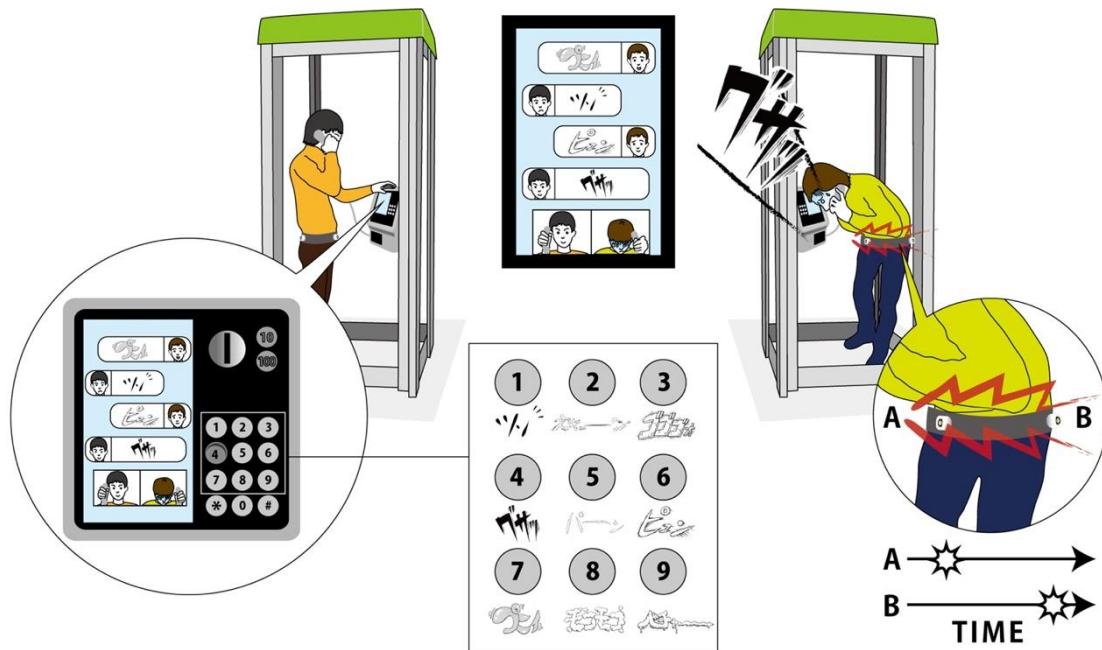


[DS09]

Communication with Vibro-tactile Phone

*Junji Watanabe*

*NTT Communication Science Laboratories, Japan*

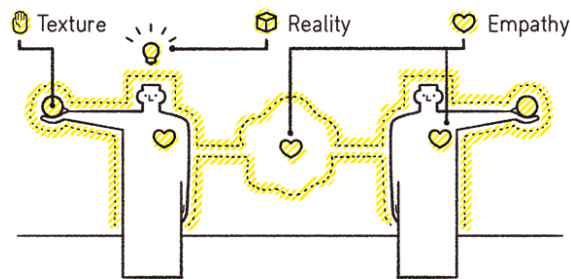


We have developed a belt for presenting vibrations passing through the body for conveying emotion, and use it for communication with phone. The speakers wear two vibrators on one's stomach and back. When one of the speakers press a button of the phone, a vibrator is sent to the other speaker, and the tactile sensation that passes the body is produced. Nine buttons on the phone represents different types of sensations, including the sense of shots, punches and stabs. By conveying sensations bilaterally, a rule would emerge between the two speakers, and message would be exchanged, though it is limited to concise and emotional one. For example, it can represent apologies for being late, when a contextual situation is shared. The haptic conversation between the two users are visualized on a monitor for audiences. The vibro-tactile "language", which is based on the fundamental property of the human perception, is a new way of dialogues, which potentially overcomes differences of abilities.

[DS10]

Invited works from Haptic Design Award 2016 & 2017

*Haptic Design Project, Japan*



Our sense of touch lets us perceive, with our bodies, where we end and the world around us begins.

Through physical contact with our skin, we can feel the texture of objects around us. At the same time, this touch conveys a realness: the realness of the other entity; the realness of ourselves. Touch is also strongly connected to our emotions, the empathy we feel for that outside entity, and it can help to deepen those feelings.

HAPTIC DESIGN is design that consciously utilizes three characteristic elements of our sense of touch: not only texture and the transfer of information, but the relationships formed between people and the world around them through their bodies. HAPTIC DESIGN AWARD, held in 2016 and 2017, called for touch-based designs of works or projects.

Invited works:



“The Third Thumb”, Dani CLODE, UK

*Haptic Design Award 2017 GRAND PRIZE*



“Ridgeline User Interface”, Shigeta YASUI, Japan

*Haptic Design Award 2016 GRAND PRIZE*



“tsumishi”, Minami KAWASAKI, Japan

*Haptic Design Award 2016 FIRST PRIZE*



“Haptic Exercise”, Haptic Design Project, Japan