



In 2011, TAMAKI Emi (left) developed PossessedHand (below), a device that transmits proprioceptive sensations to the body. The following year, she co-founded the startup H2L and embarked on developing the business. The company launched “UnlimitedHand,” a more versatile version of PossessedHand for researchers, and “FirstVR” (left photo center) for general consumers. Tamaki said, “I’m glad we started the company because while gaining feedback from our users and thinking about our business priorities, we get closer to providing specific services.” H2L



BODYSHARING: TRANSMITTING THE EXPERIENCE OF PROPRIOCEPTION

Sharing experiences virtually or from a remote location that seem so real, almost as if you have taken over the body of another person—this is a technology and concept known as “BodySharing.” Put forward by a Japanese researcher and entrepreneur, BodySharing aims to make such experiences a reality in the not-so-distant future. What possibilities and new lifestyles can it bring about?

Sharing an enjoyable experience with someone in another place by syncing up with their bodily sensations, and doing so from your home—an innovation that helps make such a sci-fi dream a reality is “PossessedHand,” a device released in 2011 by TAMAKI Emi, who at the time was a student at the University of Tokyo Graduate School. By wrapping a belt with electrodes and cords around your arm, you

can send electrical stimuli similar to the commands issued by the brain to the muscles in your hand and fingers, conveying what is known as proprioception—the deep sensations that allow us to perceive self-movements, the weight of objects, forces applied on the body, and other sensory information. Conveying those sensations to the body, it is possible to reproduce the same movements, positions, and even

the degree of force applied as felt by someone else.

“The transmission of not just sight and sound but also proprioception creates shared experiences that feel more active and realistic,” said Tamaki, who is currently the CEO of H2L Inc., a startup she co-founded, and also a professor at the Faculty of Engineering, University of the Ryukyus. PossessedHand has attracted much global attention

as the world’s first device that allows people to experience the sensations of others not just in theory but in actual practice.

PossessedHand is one fruit of BodySharing—Tamaki’s proposed concept—which refers to the technology and interfaces involved in the mutual sharing of experiences among people, avatars, and robots through the reciprocal transmission of proprioceptive sensations. It makes the sharing of experiences virtually or from a remote location richer and more real, and can be realized in many ways. Not only is it possible



Tamaki giving a presentation on her research when receiving the University of Tokyo President’s Award for the development of PossessedHand. She said that it was very helpful during the development process to have studied a broad range of fields, including basic engineering, AI, and physiology. H2L



In addition to business and research, she also focuses on fostering science-related human resources in her work as an engineering professor at the University of the Ryukyus, where she has taught since 2021 (photo: Tamaki interacting with students during a guest lecture at Waseda University). “With AI about to surpass human capabilities, those people who will be in demand in the future will be the generalists who can create something new through interdisciplinary knowledge.”

to relive what someone else is going through, but you can let someone far away experience the same sensations as you, and the experiences of a remote robot can also be shared while manipulating its movements in real time. The technology has, moreover, the potential for application in a broad range of fields. For example, by reproducing the optimal movements and degree of force applied as demonstrated by a model, the technology could be utilized in developing skills in music or sports, or for physical rehabilitation.

Tamaki’s pursuit of BodySharing was triggered when she was in high school. Having missed a long-awaited family trip due to being hospitalized, she was shown photos and videos of the trip, but it was far from the sensation of a shared experience that she had wanted. “I started searching for a way that would make me feel like I had traveled together with my family, but when I couldn’t find one, I decided to develop one myself,” recalled Tamaki. After graduating from the University of the Ryukyus, Tamaki immersed herself in research on robots and interfaces between humans and computers. She then created the prototype for PossessedHand as an experimental tool at the University of Tokyo Graduate School.

After she obtained her Ph.D., Tamaki co-founded H2L in 2012, and launched “UnlimitedHand,” a more versatile version of PossessedHand for researchers and developers, in 2015. While



Conveying proprioceptive sensations to the body by sending electrical stimuli through a white band worn on the arm, UnlimitedHand can realistically reproduce the weight and presence of a small bird (bottom left) held in the hand. H2L

PossessedHand only transmits electrical stimuli from the computer to the arm, UnlimitedHand can also measure sensory information from the arm itself and send it to the computer. “We wanted to spur on applied research by making the technology easier for researchers to access,” Tamaki said. And just as she had hoped, more than 100 research projects using UnlimitedHand are currently underway around the world.

Tamaki’s ultimate goal in the development of BodySharing is to realize what she calls a “multi-thread lifestyle.” Tamaki believes that if physical constraints, such as time and space, are removed when people experience something, they will be able to extract just the parts they want and enjoy several experiences in parallel. “By 2029, I aim to make it possible for everyone to choose a multi-thread lifestyle. I want to enrich people’s lives by allowing them to enjoy double or triple the number of experiences in the same amount of time.” ●