

# HUMAN-COMPUTER INTERACTION CLOSER TO THE BODY

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## **Abstract**

In the early days of Computing, the first Human-Computer Interaction system designers implement quite inconvenient-to-use interaction methods such as card readers. Human operators interact with these interfaces far away from the computer, resulting in a spatial distance of the interaction between user and computer. Inch by inch, every development of computing technology reduces this distance: With the advent of typewriters that succeeded card readers users sit in front of the interface, and then with the direct interaction of PCs and workstations users are in a "touch" distance to the computing system. The invention of Smartphones and Smart Watches started a new era of intimate interaction between the human (body) and the computer, with computing that is always on, always accessible and always with the user. Today the potential of such truly wearable interaction interfaces is still not fully leveraged, but the next wave of Human-Computer Interaction is already setting up. Interfaces that are attached directly to the skin of the body, put into the body or even implanted in the body.

This keynote will provide a closer look on interaction methods, interfaces and the required technology for upcoming novel types Human-Computer Interaction (HCI) that is attached on and partially in the body. Such interfaces show great potential not only to replace existing interfaces with the computer, but also to create completely new type of interfaces thus inventing novel type of Human-Computer Interaction. For example, HCI on the human body must not necessary be explicit, as this is mostly the case with traditional HCI where you e.g. press a (virtual) button to tell a computer what you want him to do. Being closer to the body, a computer system can use also implicit and subconscious expressions as an input – without requiring the user to consciously "think" about it. Even more, novel interfaces may allow implementing novel human senses or even allowing for implicit, subconscious learning.

In particular, the talk will draw a light on novel body worn Human-Computer Interfaces by showing examples of these interfaces such as Haptic Displays, Second Skin Interfaces, Tattoo Computing, Earables or Head attached interfaces. I will illustrate what the technical requirements are to implement them, how the interfaces can be attached at or in the body, and how to use these interfaces to create novel ways of Human-Computer Interaction.

## **Short Biography**

Michael Beigl is professor for Pervasive Computing Systems at the Karlsruhe Institute of Technology (KIT) and head of the TECO research lab. He obtained both his M.Sc. and Ph.D at the University of Karlsruhe (now KIT). Previously he was professor at the TU Braunschweig from 2006-2010, visiting associate professor at Hide Tokuda Labs, Keio University, Japan in 2005 and research director of the TECO, University of Karlsruhe, Germany from 2001-2005. He is heading the national competence center for Big Data AI, the Smart Data Innovation Lab (SDIL) and the state competence center for Big Data AI in Baden-Württemberg, the Smart Data Solution Center (SDSC-BW) since 2014. His research interests evolve around blending human with computing, with specific interest In Human-Computer Interaction, sensing systems and blending Artificial and Human Intelligence. Contact him at [Michael.Beigl@kit.edu](mailto:Michael.Beigl@kit.edu).