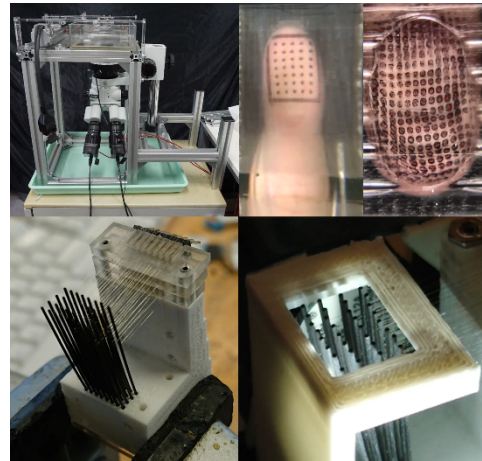


## Measurement and Reproduction of Finger Skin Deformation

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While many tactile displays have been proposed in the history of haptics research, it is still hard to reproduce arbitrary realistic tactile feeling. One important consideration is that many tactile displays are skin-deformation device, not surface-reproduction device. In other words, we need to know the mapping function from surface property (shape, friction, etc.) and interaction (finger speed, etc.), to skin deformation (spatial and temporal distribution) before making an appropriate rendering algorithm. From this viewpoint, measurement of skin deformation when touching an object is indispensable. Here I show a method for three-dimensional skin deformation measurement when finger traces the texture. The technique of optical index matching and stereoscopy are combined; the former makes the texture plate virtually transparent, and the latter enables three-dimensional measurement of markers on skin. The proposed method can observe skin deformation in the normal and tangential directions when the texture is larger than 2 mm. The observed results are reasonable at the level that the progress of the sinusoidal wave is also observed on the skin when the texture is sinusoidal, and the deformation with the same period is observed when the texture is rectangular linear grating. I also introduce novel tactile display utilizing heat actuation of Nichrome wire that achieved high resolution and fast activation.

### Reference:

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### Biography:

Hiroyuki Kajimoto received bachelor's degree in mathematical engineering and the PhD degree in information science and technology from the University of Tokyo, in 1998 and in 2006, respectively. He is a professor with the University of Electro-Communications, Japan. He was a research fellow of the Japan Society for the Promotion of Science from 2001-2003, and was assistant professor of the University of Tokyo from 2003-2006. His research interests include tactile display, tactile sensor, electrical nerve stimulation, human computer interaction, welfare device, and virtual reality. He is a member of the IEEE.