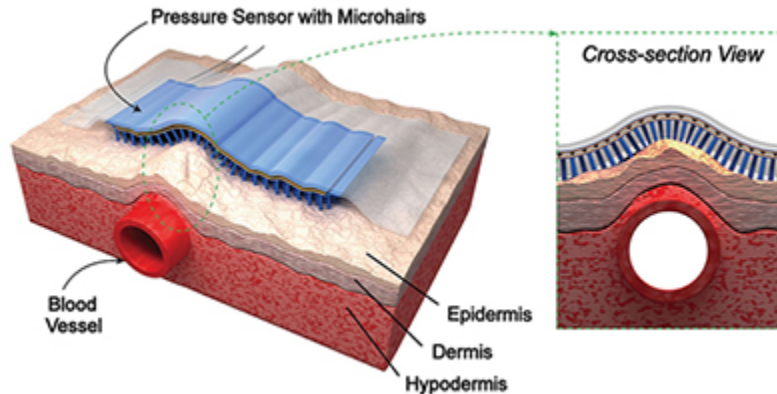


Skin-like, Wearable Pressure Sensor

Stanford researchers have developed a wearable, flexible, high sensitivity pressure sensor that provides information about cardiovascular health, emotional state, and other aspects of human physiology. Attached like a medical bandage, the ultra-thin sensor measures pulse waveforms over arteries or veins with high repeatability (> 3000 cycles). Bio-inspired microstructures enhance the skin-device interface and amplify the signals of physical forces.



Wearable, pressure sensor applied to detect neck pulse

In proof of concept, researchers applied the sensors on the skin over arterial or venous sites to measure pulse waveforms. The waveforms provide important cardiovascular information for healthcare monitoring. Integrated into a simple, portable transmitter and receiver, the device can quickly diagnose cardiovascular and cardiac illnesses.

Related Technologies

[Stanford docket S14-211](#) Self-Powered Electronic Skin

Stanford's stretchable, energy harvesting electronic skin (e-skin) senses and distinguishes between normal pressure, tension, and bending. This human skin-like capability allows object manipulation, grasp control, and texture determination without needing external power.

[Stanford docket 15-225](#) **Electrochromic Resistive Pressure Sensor**

Stanford researchers have developed a stretchable, low power consumption, highly-tunable resistive pressure sensor and organic electrochromic device (ECDs). This electronic skin device detects applied pressure and distinguishes varying applied pressures through real-time visible color change.

NPR "All Tech Considered" Feature

["Just Like Human Skin, This Plastic Sheet Can Sense And Heal"](#), April 11, 2016

Applications

- **Pressure sensors** with end user applications in:
 - Physiological / healthcare monitoring
 - Medical devices, especially cardiovascular

Advantages

- Simple to fabricate
- Simple to deploy – attaches like a bandage
- Stretchable, flexible and conforming – amplifies and improves pulse signal
- Biocompatible
- High repeatability (> 3000 cycles)

Publications

- C. Pang, J. H. Koo, A. Nguyen, J. M. Caves, M. G. Kim, A. Chortos, K. Kim, P. J. Wang, J. B.-H. Tok, Z. Bao, "[Highly Skin-Conformal Microhairy Sensor for Pulse Signal Amplification](#)". *Advanced Materials*, 27(4), pp.634-640.

Patents

- Published Application: [20160051195](#)

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