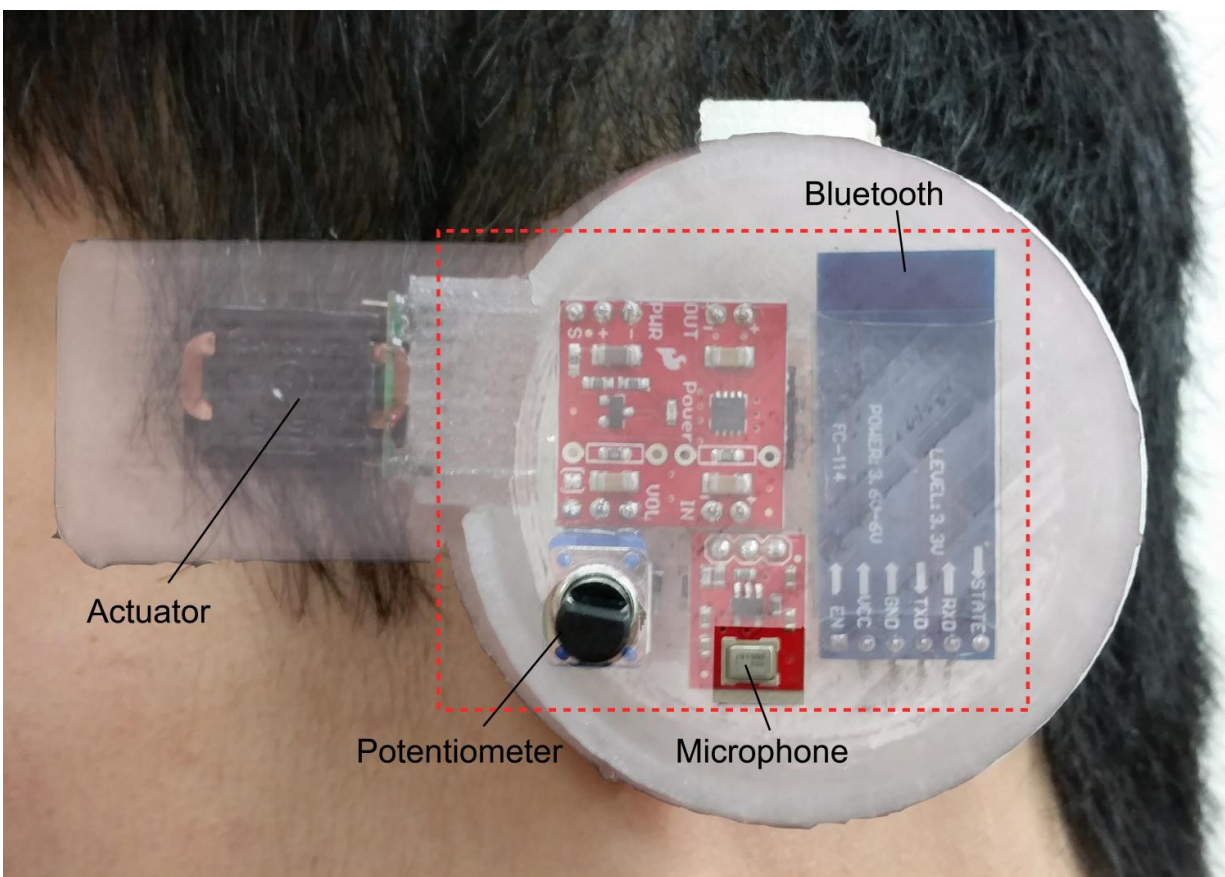


Personalized 'earable' sensor monitors body temperature in real time

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An "earable" sensor can track core body temperature -- a key health indicator -- continuously. Credit: American Chemical Society

Wireless, wearable sensors are all the rage with millions of people now

sporting fitness trackers on their wrists. These devices can count footsteps, monitor heart rate and other vital signs. Now researchers report in the journal *ACS Sensors* that they have developed a 3-D printed sensor worn on the ear that measures one of the most basic medical indicators of health in real time: core body temperature.

The ups and downs of core body [temperature](#) can signal a range of health conditions. The most obvious is an infection, which causes a fever. But [temperature fluctuations](#) can also indicate insomnia, fatigue, metabolic function and depression.

Current [wearable sensors](#) can detect [skin temperature](#), but this can change depending on how hot or cold an environment is. And oral and other thermometers that measure core body temperature are designed only for periodic use and aren't meant to be strapped on for constant detection. So Ali Javey and colleagues set out to develop a convenient device to monitor [core body temperature](#) in real time on a continuous basis.

The researchers integrated data processing circuits, a wireless module and an infrared sensor, which detects ear (and thus core body) temperature, in a 3-D printed device. The disk-like structure covers the ear and can be customized to fit the contours of a person's ear for a comfortable fit. To ensure that users can still hear clearly while wearing the device, the researchers embedded a microphone to capture and transmit outside sounds to the inner ear. And the Bluetooth module transmits temperature measurements to a custom smartphone app.

Testing showed that the "earable" sensor measurements closely matched those of a commercial ear thermometer.

More information: "3D Printed 'Earable' Smart Devices for Real-Time Detection of Core Body Temperature" *ACS Sensors*,

pubs.acs.org/doi/abs/10.1021/acssensors.7b00247

Provided by American Chemical Society

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