

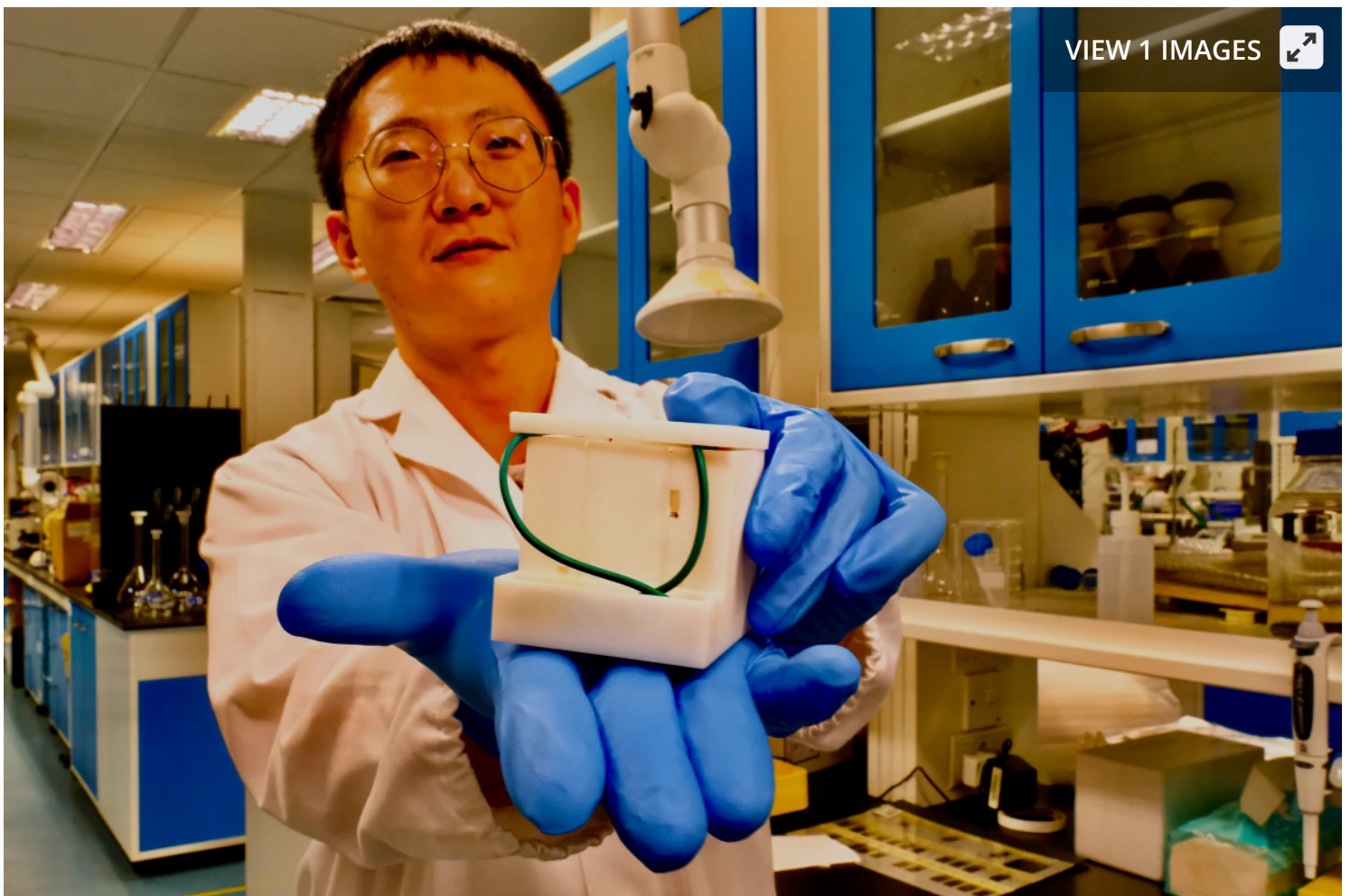


MEDICAL

Low-cost diagnostic device quickly produces 3D images of skin

By Ben Coxworth

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The 3D-printed prototype is powered by a single 1.5-volt battery Nanyang Technological University

When someone has a skin condition such as eczema or psoriasis, it helps to be able to see all of the tiny ridges and grooves in the affected area.

That's where a portable new device comes in, which is designed to produce 3D images of skin in a matter of minutes.

Developed at Singapore's Nanyang Technological University, the inexpensive battery-powered prototype weighs a mere 100 grams (3.5 oz) and measures 7 by 10 cm (2.8 by 3.9 in). By contrast, much larger OCT (optical coherence tomography) machines – which are currently used for obtaining 3D skin imagery – cost thousands of dollars and may weigh up to 30 kg (66 lb).

Users of the new device start by pressing a small rectangle of gold-coated film onto the patient's skin. Doing so transfers a skin oil known as sebum onto the film, but only from the raised areas of the skin. It's not unlike using an ink pad to take someone's fingerprints.

The film is then placed in a liquid solution within the device, to which an electrical charge is applied via a set of electrodes. This causes a polymer called PEDOT:PSS to be deposited onto the sebum-covered parts of the film – no polymer is deposited on the non-covered areas.

What results is a high-resolution three-dimensional map of the skin, replicating the miniature peaks and valleys in a manner that's easier to see than on the skin itself. The whole process takes about 10 minutes.

So far, the setup has been successfully used on pig skin to map wounds such as punctures, lacerations, abrasions, and incisions. It has additionally been utilized to image the skin on the back of a human hand, although the

film is flexible enough that it may also be applied to more uneven areas such as elbows.

"Our non-invasive, simple and inexpensive device could be used to complement current methods of diagnosing and treating skin diseases," says the lead scientist, Asst. Prof. Grzegorz Lisak. "In rural areas that do not have ready access to healthcare, non-medically trained personnel can make skin maps using the device and send them to physicians for assessment."

Clinical trials of the device are planned to take place later this year. A paper on the research was recently published in the journal *Analytica Chimica*.

The device is demonstrated in the following video.

Source: [Nanyang Technological University](#)

Portable 3D skin mapping device developed by NTU Singapore scientists

