

Scientists 3D print electronics directly on human hand

Researcher checking human cells during a bio- 3D printing | Photo Credit: [REUTERS](#)

In a groundbreaking study, scientists have successfully 3D printed electronics on the human hand for the first time, that could enable soldiers on the battlefield to quickly make temporary sensors and detect hazardous agents. They also successfully printed biological cells on the skin wound of a mouse. The technique could lead to new medical treatments for wound healing and direct printing of grafts for skin disorders.

“We are excited about the potential of this new 3D-printing technology using a portable, lightweight printer costing less than USD 400,” said Michael McAlpine, from University of Minnesota in the US. “We imagine that a soldier could pull this printer out of a backpack and print a chemical sensor or other electronics they need, directly on the skin. It would be like a ‘Swiss Army knife’ of the future with everything they need all in one portable 3D printing tool,” said McAlpine, lead author of the study published in the journal *Advanced Materials*.

One of the key innovations of the new 3D-printing technique is that this printer can adjust to small movements of the body during printing. Temporary markers are placed on the skin and the skin is scanned. The printer uses computer vision to adjust to movements in real-time.

“No matter how hard anyone would try to stay still when using the printer on the skin, a person moves slightly and every hand is different,” McAlpine said. “This printer can track the hand using the markers and adjust in real-time to the movements and contours of the hand, so printing of the electronics keeps its circuit shape.”

Another unique feature of this 3D-printing technique is that it uses a specialised ink made of silver flakes that can cure and conduct at room temperature. This is different from other 3D-printing inks that need to cure at high temperatures (up to 100 degrees Celsius or 212 degrees Fahrenheit) and would burn the hand.

To remove the electronics, the person can simply peel off the electronic device with tweezers or wash it off with water. In addition to electronics, the new 3D-printing technique paves the way for many other applications, including printing cells to help those with skin diseases.

Researchers successfully used a bioink to print cells on a mouse skin wound, which could lead to advanced medical treatments for those with skin diseases.

“I’m fascinated by the idea of printing electronics or cells directly on the skin,” McAlpine said. “It is such a simple idea and has unlimited potential for important applications in the future.”

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