'Smart skin' hope for touch sensor

Scientists have made a step forward in their ability to mimic the sense of touch.

A team from the US and China made an experimental array that can sense pressure in the same range as the human fingertip.

The advance could speed the development of smarter artificial skin capable of "feeling" activity on the surface.

The sensors, which are [**described in Science magazine**](http://www.sciencemag.org/content/early/2013/04/24/science.1234855), could also help give robots a more adaptive sense of touch.

Using bundles of vertical zinc oxide nanowires, the researchers built arrays consisting of about 8,000 transistors.

**“Start Quote**

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End Quote Zhong Lin Wang Georgia Institute of Technology

Each of the transistors can independently produce an electronic signal when placed under mechanical strain.

The touch-sensitive transistors - dubbed taxels - have a sensitivity comparable to that of a human fingertip.

"Any mechanical motion, such as the movement of arms or the fingers of a robot, could be translated to control signals," said Zhong Lin Wang, a professor at the Georgia Institute of Technology.

"This could make artificial skin smarter and more like the human skin. It would allow the skin to feel activity on the surface."

Mimicking the sense of touch electronically has been challenging, and can be achieved by measuring changes in resistance prompted by mechanical touch.

The devices developed by the Georgia Tech researchers rely on a different physical phenomenon - tiny polarisation changes when so-called "piezoelectric" materials such as zinc oxide are moved or placed under strain.

Piezoelectricity essentially refers to current that accumulates in certain solids in response to applied mechanical stress.

In the "iezotronic transistors, the piezoelectric charges control the flow of current through the wires.

The technique only works in materials that have both piezoelectric and semiconducting properties. These properties are seen in nanowires and certain thin films.

"This is a fundamentally new technology that allows us to control electronic devices directly using mechanical agitation," Prof Wang added.

"This could be used in a broad range of areas, including robotics, (very small devices known as MEMS), human-computer interfaces and other areas that involve mechanical deformation."