

# The artificial finger

August 14 2012, By Corinna Engelhardt

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To touch something is to understand it – emotionally and cognitive. It's one of our important six senses, which we use and need in our daily lives. But accidents or illnesses can disrupt us from our sense of touch.

Now European researchers of the projects NanoBioTact and NanoBioTouch delve deep into the mysteries of touch and have developed the first sensitive artificial finger.

The main scientific aims of the projects are to radically improve understanding of the human mechano-transduction system and tissue engineered nanobiosensors. Therefore an international and multi disciplinary team of 13 scientific institutes, universities and companies put their knowledge together. “There are many potential applications of biometric tactile sensing, for example in prosthetic limbs where you've got neuro-coupling which allows the limb to sense objects and also to feed back to the brain, to control the limb. Another area would be in robotics where you might want the capability to have sense the grip of objects, or intelligent haptic exploration of surfaces for example”, says Prof. Michael Adams, the coordinator of NanoBioTact.

The scientists have already developed a prototype of the first sensitive artificial finger. It works with an array of pressure sensors that mimic the spatial resolution, sensitivity and dynamics of human neural tactile sensors and can be directly connected to the central nervous system. Combined with an artificial skin that mimics a human fingerprint, the device's sensitivity to vibrations is improved. Depending on the quality of a textured surface, the biomimetic finger vibrates in different ways,

when it slides across the surface. Thereby it produces different signals and once it will get used by patients, they could recognise if the surface is smooth or scratchy. “The sensors are working very much like the sensors are doing on your own finger”, says physicist Dr. Michael Ward from the School of Mechanical Engineering at the University of Birmingham.

Putting the biomimetic finger on artificial limbs would take prostheses to the next level. “Compared to the hand prostheses which are currently on the market, an integrated sense of touch would be a major improvement. It would be a truly modern and biometric device which would give the patient the feeling as if it belonged to his own body”, says Dr. Lucia Beccai from the Centre for Micro-Robotics at the Italian Institute for Technology. But till the artificial finger will be available on large scale a lot of tests will have to be done. Nevertheless with the combination of computer and cognitive sciences, nano- and biotechnology the projects NanoBioTact and NanoBioTouch have already brought us a big step closer to artificial limbs with sensitive fingers.

**More information:**

[www.nanobiotact.org/](http://www.nanobiotact.org/)  
[nanobiotouch.org/](http://nanobiotouch.org/)

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