

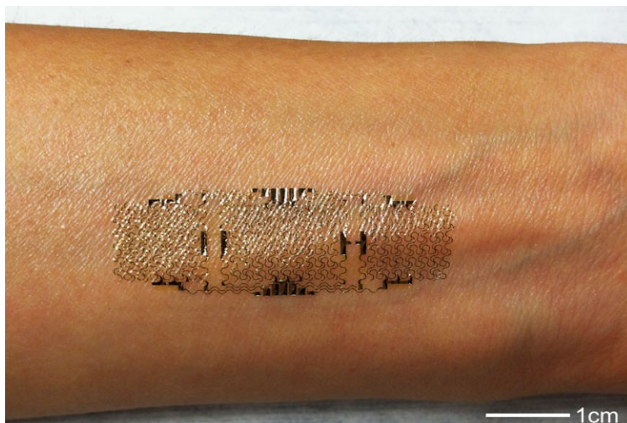
R4nger5 Radio



When you absolutely, positively just gotta kill every motherfucker
in the room....

201/03/2013

News



FitBit too bulky? Why not glue a sensor array to your skin?

The quantified self goes nanoscale with a stick-on silicon electrode network that could not only change the way we measure health metrics, but could enable a new form of user interface. And the researchers behind it aim to have the device available in the next few weeks through a spinoff company, [MC10](#).

The development takes wearable technology to the extreme, designed as a non-invasive diagnostic sensor that could be used to measure hydration, activity, and even infant temperature. It bonds to the skin, somewhat like a temporary tattoo, flexing and bending in sync with your skin the way you wish a Band-Aid would. How? Researchers at the University of Illinois, Dalian University of Technology in China, and the University of California at San Diego made it really, really small.

With a thickness of 0.8 micrometers at the widest — around one-thousandth the diameter of a human hair — the thin mesh of silicon actually nestles in to the grooves and creases in your skin, even the ones too small to see. Being small helps, but it's also important that the silicon is laid out in a serpentine pattern and bonded to a soft rubber substrate, allowing the stiff material to flex, a little bit like an accordion.

“Although electronics, over the years, has developed into an extremely sophisticated form of technology, all existing commercial devices in electronics involve silicon wafers as the supporting substrate,” says John Rogers, who led the study [published this week](#) in *Advanced Materials*.

Those wafers are mismatched to the body's mechanics and geometry, he says. The goal here was to develop a system that matches the body more naturally.

“By doing that, you can much more easily integrate electronics, either onto the surface of the skin, or on internal organs like the heart and the brain,” he says.

The epidermal electric system is either stamped onto the skin using a silicon wafer, or glued there with a water-soluble polyvinyl alcohol layer. Then it's covered with spray-on bandage to keep it protected and watertight. After a couple of weeks, the layer will peel off as the underlying skin particles naturally exfoliate.

But aside from natural skin shedding, it's actually quite robust, says Rogers. To test its durability, they stretched and compressed subjects' skin, over and over, to see how much the device could take. It lasted easily through 500 cycles, and through washings.

It's a lot more convenient than the electrodes that scientists used to connect to skin via a conducting gel. And it can offer more data, too, from high-resolution electric biopotential measurements, like electrocardiograms.

“We try to design not just point-contact electrodes, but full integrated circuits on platforms that have physical properties matched to the skin,” says Rogers. “They really can laminate on the surface of the skin, conform to all the microscale roughness that's kind of intrinsic and natural to the surface of the skin, to provide a completely different class of interface between electrodes and electronics and the skin.”

Such a technology has many potential uses, from continual electrocardiogram readings, to precise measurements of temperature and hydration, to many other health and wellness readings.

“That could be relevant for advanced surgical procedures, implantable devices, or even systems that are designed to do continuous health and wellness monitoring or to track the progress or accelerate the wound healing process,” Rogers says.

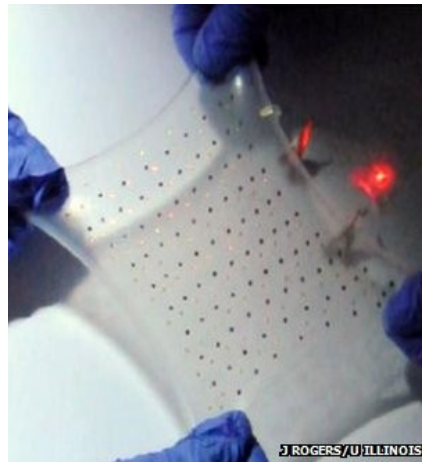
“We're interested not only in demonstrating concepts and an underlying scientific foundation around new measurement modalities through the skin, but also in their ultimate commercial realization,” he says.

But the tool could offer more than self-measurement. Because of the detail in the signal received, it could be used as a human-machine interface — for example, a videogame or drone controller — based on signals from the user's muscles. It's

really marrying fully integrated electronics to the skin, a non-permanent bionic interface.

Link: <http://www.wired.com/design/2013/02/skin-printed-electrodes/>

Stretchy battery drawn to three times its size

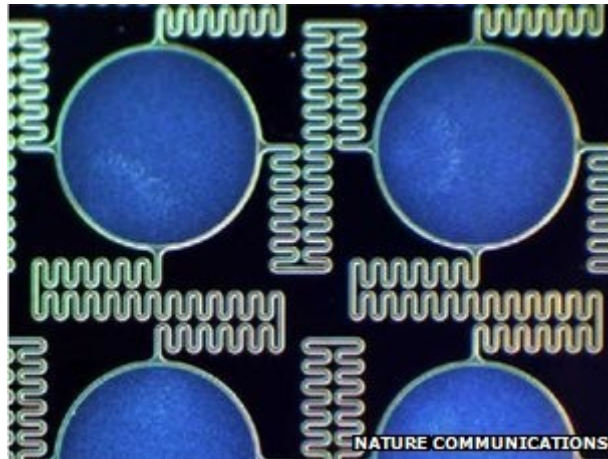


Researchers have demonstrated a flat, "stretchy" battery that can be pulled to three times its size without a loss in performance. While flexible and stretchable electronics have been on the rise, powering them with equally stretchy energy sources has been problematic.

The new [idea in Nature Communications](#) uses small "islands" of energy-storing materials dotted on a stretchy polymer. The study also suggests the batteries can be recharged wirelessly. In a sense, the battery is a latecomer to the push toward flexible, stretchable electronics. A number of applications have been envisioned for flexible devices, from implantable health monitors to roll-up displays.

But consumer products that fit the bendy, stretchy description are still very few - in part, because there have been no equally stretchy, rechargeable power sources for them. "Batteries are particularly challenging because, unlike electronics, it's difficult to scale down their dimensions without significantly reducing performance," said senior author of the study John Rogers of the University of Illinois at Urbana-Champaign.

"We have explored various methods, ranging from radio frequency energy harvesting to solar power," he told BBC News. In recent years, Prof Rogers worked with colleagues at Northwestern University, focusing on stretchy electronics of various sorts made using what they termed a "pop-up" architecture. The idea uses tiny, widely spaced tiny circuit elements embedded within a stretchy polymer and connected with [wires that "popped up" as the polymer was stretched](#).



But batteries do not lend themselves to this idea; traditionally they are much larger than other circuit elements. They could be made from smaller elements wired together, but to create a small battery with sufficient power, the elements must be spaced more closely than those of the pop-up circuits.

The team's new idea was to use "serpentine" connections - wires that loop back on themselves in a repeating S shape, with that string of loops itself looped into an S shape.

Stretching out the polymer in which the tiny solar cells were embedded first stretches out the larger S; as it is stretched further, the smaller turns straighten - but do not become taut, even as the polymer was stretched to three times its normal size.

The team says the stretchy battery can be charged "inductively" - that is, wirelessly over a short distance. Prof Rogers said that the uses for such batteries and the stretchy circuits they power were myriad.

"The most important applications will be those that involve devices integrated with the outside of the body, on the skin, for health, wellness and performance monitoring," he explained.

However, the prototype batteries described in the paper were only run through 20 charge/discharge cycles, and Prof Rogers said that "additional development efforts to improve the lifetime will be required for commercialisation".

Link: <http://www.bbc.co.uk/news/science-environment-21585817>

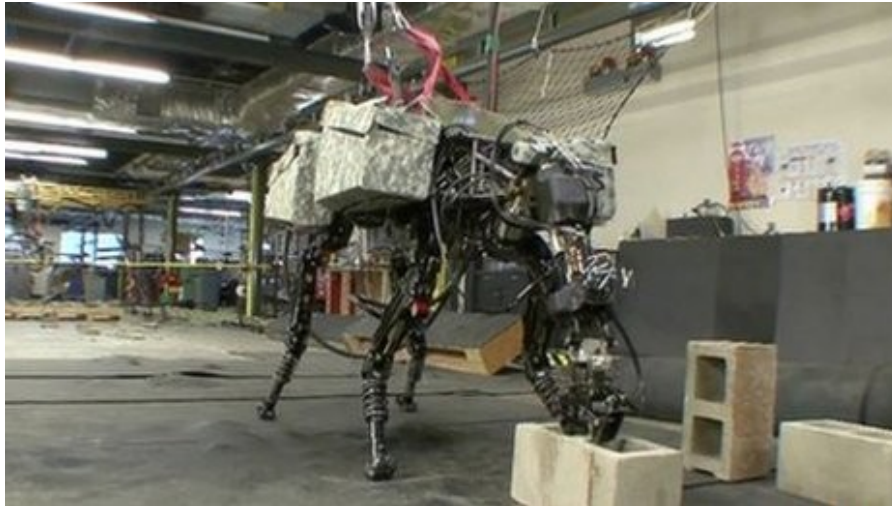
Add this story to ideas about carbon nanotube and new materials superconductors – to get a ‘super battery’

Watch a live feed as SpaceX's Dragon capsule attempts to launch to the International Space Station carrying supplies and experiments. NASA's coverage starts at 5:30 a.m. PT/8:30 a.m. ET and, if all goes well, blast off is scheduled for 7:10 a.m. PT/10:10 a.m. ET. This will be SpaceX's third launch to the space station. The previous Dragon launch was mostly a success, though [the failure of one engine](#) meant that an experimental satellite it was carrying failed to reach orbit.

Among Dragon's cargo this time around is [food for the ISS crew, computer hardware, and several experiments](#). The spacecraft is also bringing a special treat for the astronauts that was grown in the orchard of a SpaceX employee's father, said company president [Gwynne Shotwell](#) during a NASA press briefing on Feb. 28,

though she didn't specify what fruit it was. This treat is similar to the previous SpaceX docking, when the company [brought the ISS astronauts ice cream](#).
Link: <http://www.ustream.tv/nasahdtv>

BigDog four-legged robot now sports throwing arm



Developer footage of the robot performing a "hurl" - Courtesy of Boston Dynamics

A four-legged robot called BigDog now sports an arm powerful enough to lift and throw breeze blocks. Made by US robotics company Boston Dynamics, the machine is backed by the Pentagon.

BigDog was designed primarily for military use, and the arm could help soldiers pick up and carry heavy loads. But one robotics expert said the technology's potential was "enormous" for use in other areas, such as search and rescue.

BigDog is one of several robots created by the Massachusetts-based firm and funded by the US Defense Advanced Research Projects Agency (Darpa).

[Imagine] setting off these units across a rough terrain if they were looking for a lost child or a walker on a mountainside"

It has been in development since 2005 and is the the size of a large dog "or a small mule," [says the company](#).

Its legs mimic an animal's legs, and are able to absorb shock and recycle energy as the machine moves around. It is powered by an engine which drives a hydraulic pump to send oil under high pressure around its plumbing in order to animate its limbs.

In a video created by Boston Dynamics, BigDog is seen lifting a breeze block with an arm attached to where the head would go on its animal equivalent, and then throwing it backwards.

"The goal is to develop techniques for using the strength of the legs and torso to help power motions of the arm," posted the company underneath the video.

"This sort of dynamic approach is routinely used by human athletes and is now improving the performance of robots."

The mechanical "dog" is already able to move about a varied, rugged terrain while carrying a load. It can perform simple tasks and obey voice commands.

Chris Melhuish, director of Bristol Robotics Laboratory, told the BBC it was "a phenomenal piece of technology".

"It's cost a lot of money, but you tend to spend a lot of money on first prototypes, and later on as these things get rolled out, they get cheaper," he said.

He added that the robot's ability to follow a person made it "an interesting navigation machine which might end up useful in other domain, such as search and rescue".

"[Imagine] setting off these units across a rough terrain if they were looking for a lost child or a walker on a mountainside.

"I think the potential is enormous - from pets to robots that are going to help you move your shopping, to a robot on a building site that's moving bricks from one place to another, following a bricklayer around.

"I wouldn't be surprised if they could even do sport one day - such as robot racing."

BigDog is one of a range of robots developed by Boston Dynamics, among them the Cheetah - a headless machine that is able to reach 28.3mph (45.5km/h) on a treadmill, faster than the fastest human

Reccomedia – big dog info pack

NOTE: Kev says that apparently, the thing is too noisy for the military to like

The number of students forced to "intern" on iPhone assembly lines has increased, says a new report from a China-based labour rights watchdog.

The report '[Apple Fails in its Responsibility to Monitor Suppliers](#)', published on 26 February by Students and Scholars Against Corporate Misbehaviour ([SACOM](#)) also says that Apple manufacturers have "intensified military style management" for conveyor belt workers. An Apple spokesperson told *The Register* that Apple is making progress in the goals laid out in the [Supplier Code of Conduct](#) it released last year.

Based on its interviews with 130 workers in three factories that made USB cables and iPhone and iPad cases, SACOM says that some conditions have actually worsened for the people piecing together the computer components since Apple released its Supplier Code of Conduct last year.



The report added that in the three factories run by Pegatron, Wintek and Foxlink there had been an increasing use of students and factory floor "interns" - which meant that up to 80 per cent of the workforce were itinerant workers with fewer rights and lower incentive to organise for better treatment. Deals between universities and

factories means that students are often required to complete a spell fitting iPhone parts on low pay as a compulsory part of passing their degree.

Again, Apple's particular business practices came under criticism: with the fast turnaround required for Apple's big product launches putting more pressure on suppliers than the product timelines of other tech companies. Apple's very tight inventory supply allowed no slack for suppliers and a hard line on component quality and extensive testing also reduces profit margins for factory owners.

Sacom claims:

The long working hours, unachievable production quotas, and alleged unpaid overtime work has driven workers from Apple suppliers and accelerated the turnover rate, which in turn, has compelled Apple suppliers to depend heavily on labor agencies to recruit an increasing number of dispatch workers (in one case, a labor agency recruited up to 1000 workers a day). In addition, dispatch labor is deprived of the benefits that regular, full-time workers are entitled to. Overall, labor conditions are deteriorating, both for regular workers and dispatch workers

Other findings in the Sacom report showed the persistence of previously identified problems - with long weeks of 70 to 100 hours and infringements on worker privilege including requesting workers to turn up to work for meetings before work, cutting meal times and limits on bathroom breaks.

Apple hit back at the allegations, citing its [latest audit](#) into supply chain responsibility that claims success in tackling core issues such as work hours: finding an average of 92 per cent compliance with a maximum 60-hour work week. Apple stressed the large extent of its auditing process: and claims it is now tracking more than 1 million workers weekly and publishing the results monthly on its website.

Apple also promised action on the student intern issue, stating that in 2013 it will require factories to provide the number of student workers along with school affiliations so we can monitor this issue more carefully.

The Apple spokesperson also sent *The Register* a link to an article about Samsung's supply chain and complaints about child workers in French paper [Le Parisien](#).

Deflecting much? ®

Link:

http://www.theregister.co.uk/2013/03/01/apple_supply_chain_working_conditions/

Late last year, a group of 3-D printing gunsmiths developed a key component for an [AR-15 rifle](#) that anyone with a 3-D printer could download and make at home. The problem: It only lasted six shots before snapping apart. Now the group is back with a new and improved receiver that can fire more than **600 rounds.**

Defense Distributed demonstrated the receiver — the base of a gun that includes the trigger mechanism — in a video posted this week to the group's [blog](#). Its arrival comes the week Congress returned from vacation to debate a series of [potential gun regulations](#). In the video, dozens of bullets contained in a high-capacity drum magazine are seen being fired by the printed receiver. (The magazine was shoved into the printable receiver, itself attached to traditional rifle parts.) It's also the first printable receiver to fire .223 caliber high-pressure rifle rounds without breaking. [An earlier version](#) fired low-pressure .22 caliber cartridges.

It's important to note that *fully* 3-D printed guns don't exist yet. So far, activist groups like Defense Distributed and individual hobbyists have produced only *partially* printed weapons — usually, printed magazines.

That's still a big deal, though. With no lower receiver, printable or not, there's no gun. For legal and regulatory purposes, the lower receiver is the piece of the firearm that's considered *the* gun — not the barrel, magazine, buttstock or other component. A world where the blueprints for a gun's most critical component can be freely shared online, downloaded, and then printed out, raises thorny questions about the feasibility of regulating them. Last week, one 3-D printing pioneer told Danger Room it'd be [more feasible to regulate the gunpowder](#).

The printable components are also getting more advanced. Printable magazines have been produced that don't fail [after releasing hundreds of rounds](#). Late last year, Defense Distributed tested a 3-D printed lower receiver for an AR-15, but it [snapped apart after firing only six shots](#). Pushing up that failure point became the difference between having a 3-D printed gun that works and a gun that doesn't — not to mention one that's safe to use.

The group had to take out as many angles and points of stress inside the new receiver as possible, thicken several areas to withstand pressure from vibrations, and “let the piece act more as a spring,” developer Cody Wilson e-mails Danger Room. Angles below the buffer tower — which helps absorb recoil — were also curved and strengthened. The group still had to bolster the piece with some metal parts, though. A one-eighth inch compression bushing is embedded in the back.

The group also produced two receivers with two different printers. One was produced by a stereolithography (SLA) printer, which uses beams of [high-powered light](#) to cut light-sensitive liquids — called SLA resin — into a pre-determined shape. The other receiver was produced by a fused deposition modeling (FDM) printer, which uses heat to harden [thermoplastic](#) that's squirted out in very thin layers. The latter also “approximates the result you'd get with an ultimaker or other DIY FDM printer. So both [are] cheap and accessible,” Wilson e-mails.

“The changes had been in note form for a while. It's just that we were directing the lion's share of our efforts on magazines for a month,” he adds. In the meantime, the group plans to get back to testing 3-D printed magazines. This weekend, the group plans to reveal a printable AK-47 magazine, which will be a first. Congress, get ready to freak out.

Link <http://www.wired.com/dangerroom/2013/02/printable-receiver/>

Raspberry Pi-powered Tardis blasts off from 'Blighty's Baikonur'

The diminutive [Raspberry Pi](#) celebrates its first birthday today, and by way of a toast to the million-selling miniature kit, we bring news of high altitude geezer Dave Akerman's latest Raspberry Pi In The Sky tomfoolery - a geekgasmic combination of ARM power and Time Lord tech.

On Wednesday, Dave and Anthony Stirk - they of Low Orbit Helium Assisted Navigator ([LOHAN](#)) SPEARS board [fame](#) - dispatched a Pi-controlled Tardis to 35,409 metres (116,000ft), returning live images from the stratosphere.



Dave's Tardis packed his usual Pi set-up (below left, details from the man himself [here](#)), but with the addition of a 3G dongle so Doctor Who's vehicle could return live images of itself at key moments during the mission. On the right, you can see the batteries and transmitter/GPS/sensor board:



In-flight imaging was provided by an external webcam encased in a Styrofoam sphere, dubbed "The camp Death Star" and seen here gently menacing Dave just before lift-off.

The launch site was Brightwalton in Berkshire - aka "Blighty's Baikonur" - and after 2 hours 20 minutes, the Tardis came down some 55km (34 miles) to the west, just north of Melksham in Wiltshire.



Anthony and Dave have heralded the imaging aspect of the mission as a triumph for the British space programme. Live images were returned at "unheard of speeds" of 600 baud, and the 3G hook-up delivered the goods, as this post-touchdown vid shows:

Well, excellent work there chaps, and we're particularly impressed with the landing site's comfortable distance from the [English Channel](#).

The Tardis wasn't the only kit to head heavenwards on Wednesday. Anthony launched a separate balloon bearing an experimental tracking payload on a classified mission over Europe. We believe this may have formed part of his "[Swift](#)" programme to carry out long-duration HAB flights over the continent. If we can get more details, we'll certainly share them with you next week.

As regular readers know, the Swift board formed the basis of the Special Project Electronic Altitude Release System (SPEARS) [control board](#), designed to launch our *Vulture 2* spaceplane.

We've got some dates pencilled in for a second SPEARS test flight, and once we've firmed up a day, we'll be hooking up again with Anthony and Dave at Blighty's Baikonur. Watch this space... ®

Bootnote

Dave cautioned that Tardis is properly written TARDIS, but evidently I feel like chancing my arm today with Doctor Who pedants.

Half Time Music

Girls With Guns

Zeromancer – Doctor Online

Discussion – The Caravan n stuff

Reccomedia

Space X Launch: http://www.youtube.com/watch?v=tAW72Y_XPF4&feature=player_embedded

Raspberry pi powered tardis http://www.youtube.com/watch?v=XZW8g8bwmiM&feature=player_embedded

Big Dog info Pack http://www.bostondynamics.com/img/BigDog_IFAC_Apr-8-2008.pdf

Interesting interview with a guy that doesnt really eat anymore
<http://www.vice.com/read/rob-rhinehart-no-longer-requires-food> – thx Kev!

Main Links

www.r4nger5.com

www.rantmedia.ca

<http://www.galaxy15radio.com/> - people promising to broadcast our show

<http://www.facebook.com/ospreyradio> – people who do broadcast the show

also – do check out 'homeland' by Cory Doctorow

Outro Music

Everybody's Free to Wear Sunscreen by Baz Luhrman

2 Rant – Conventions