

[Science and technology news](#)

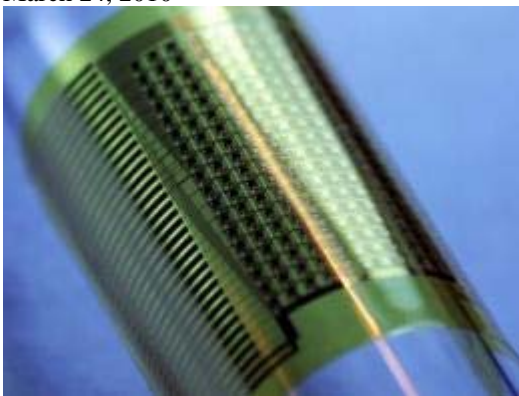
- [Home](#)
- [Nanotechnology](#)
- [Physics](#)
- [Space & Earth](#)
- [Electronics](#)
- [Technology](#)
- [Chemistry](#)
- [Biology](#)
- [Medicine & Health](#)
- [Other Sciences](#)

- [Psychology & Psychiatry](#)
- [Research](#)
- [Medications](#)
- [Cancer](#)
- [Genetics](#)
- [HIV & AIDS](#)
- [Diseases](#)
- [Other](#)
- [Health](#)
- [Neuroscience](#)

-
- Find more articles on [rogers cardiac illinois](#)

Stretchable electronics device holds promise for treating irregular heart rhythms

March 24, 2010



[Enlarge](#)

A new type of implantable device uses flexible silicon technology. Credit: Dae-Hyeong Kim, Ph.D., University of Illinois

The electronics can bend, stretch and twist. No small feat. Now the flexible and stretchable electronics can map waves of electrical activity in the heart with better resolution and speed than that of conventional cardiac monitoring

technology.

[Ads by Google](#)

[Defibrillator Superstore](#) - World's largest and most trusted defibrillator source. Lowest price! - www.AEDSuperstore.com

Researchers from Northwestern University, the University of Illinois at Urbana-Champaign and the University of Pennsylvania are the first to demonstrate a flexible silicon electronics device used for a medical application. The thin device produced high-density maps of a beating heart's electrical activity, providing potential means to localize and treat [abnormal heart rhythms](#).

The results are published as the cover story in the March 24 issue of the journal *Science Translational Medicine*.

The emerging technology holds promise for a new generation of flexible, implantable medical devices, for the treatment of abnormal heart rhythms or epilepsy, as well as new flexible sensors, transmitters, and photovoltaic and microfluidic devices.

"The heart is dynamic and not flat, but electronics currently used for monitoring are flat and rigid," said Northwestern's Yonggang Huang, a senior author of the paper. "Our electronics have a wavy mesh design so they can wrap around irregular and curved surfaces, like the beating heart. The device is thin, flexible and stretchable and brings electronic circuits right to the tissue. More contact points mean better data."

Huang is the Joseph Cummings Professor of Civil and Environmental Engineering and Mechanical Engineering at the McCormick School of Engineering and Applied Science.

The device, capable of directly sensing and controlling activity in animal tissue, is based on flexible electronics developed in 2008 by Huang and his collaborator John A. Rogers at the University of Illinois. Brian Litt, M.D., of the University of Pennsylvania, and his colleagues designed the medical experiments and tested the device in a large animal model.

Rogers and Litt are senior authors of the paper. Rogers is the Flory-Founder Chair Professor of Materials Science and Engineering at Illinois; Litt is associate professor of neurology and associate professor of bioengineering at Penn.

In the experiments conducted at Penn, the team demonstrated that the electronics continue to operate when immersed in the body's fluids, and the mechanical design allows the device to conform to and wrap around the body's irregularly shaped tissues. The device uses 288 contact points and more than 2,000 transistors positioned closely together. Standard clinical systems usually have only five to 10 contact points. (The new device is 14.4 millimeters by 12.8 millimeters, roughly the size of a nickel.)

[Ads by Google](#)

[Barracuda Spam Firewall](#) - 50,000 customers worldwide. No Per User Fees. Free Eval! - www.barracudanetworks.com

By bringing electronic circuits right to the tissue, rather than having them located remotely, the device can process signals right at the tissue. This close contact allows the device to have a much higher number of electrodes for sensing or stimulation than is currently possible in medical devices.

The device can collect very large amounts of data from the body, at high speed. Researchers will be able to map the body's complicated electrical networks in much more detail, with more effective implantable medical devices and treatments likely to emerge.

The current device is not wireless. The next big step in this new generation of implantable devices, say the researchers, will be to find a way to move the power source onto them. One solution could be to have the heart power the device.

Huang and Rogers' so-called "pop-up" technology allows circuits to bend, stretch and twist. Such electronics can be used in places where flat, unbending electronics would fail, like the heart, brain or other places on the human body.

Any significant bending or stretching to circuits renders an electronic device useless, which is what limits current electronics for use on the body. Huang and Rogers jumped this sizeable hurdle by creating an array of tiny circuit elements connected by metal wire "pop-up bridges." When the array is bent or stretched, the wires -- not the circuits -- pop up. This approach allows circuits to be placed on a curved surface. (In the partnership, Huang focuses on theory and design, and Rogers focuses on the fabrication of the devices.)

More information: The title of the paper is "A Conformal, Bio-Interfaced Class of Silicon Electronics for Mapping Cardiac Electrophysiology."

Provided by Northwestern University ([news](#) : [web](#))

[Ads by Google](#)

[Coronary CT Angiography](#) - Learn to perform coronary CTA at the highest level of expertise. - www.riainvision.com

[Flex Circuits & Rigid Flex](#) - Flex Circuits Design to Assembly Thinking Flex Think Lenthor - www.Lenthor.com

[Illinois Solar Install](#) - Servicing Illinois for 100 Years Haenig Solar Power Installations - Haenig.CleanPowerPlan.com



[send feedback to editors](#)

Rate this story - not rated yet

- rank
- [1](#)
- [2](#)
- [3](#)
- [4](#)
- [5](#)

[view popular](#)

Please [register](#) or [sign in](#) to add a comment. Registration is free, and takes less than a minute. [Read more](#)

Sign in with

Email

Password

Sign In

Forgot your password? [Click here](#) to reset it.

Notify me via email of follow-up comments posted here

- [print](#)
- [email](#)
- [pdf](#)
- [txt](#)
- [blog](#)
- [bookmark](#)
- [aA](#)
- [Aa](#)

March 24, 2010 [all stories](#)

Comments: [0](#)

- rank
- [1](#)
- [2](#)
- [3](#)
- [4](#)
- [5](#)

not rated yet

-
-
-
-

-
-
-



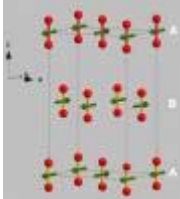
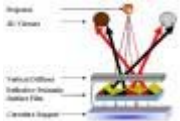

ARTICLE [Are Current Economic Conditions Trending Toward a Value Added Tax in the U.S.?](#)
 Discover how the global recession can potentially change the future of...

- [hide](#)
- **Related Stories**
- [Researchers make new electronics -- with a twist](#)
Nov 19, 2008 | not rated yet | 0
- [UI licenses flex electronics technology](#)
Dec 19, 2006 | not rated yet | 0
- [University of Miami engineer designs stretchable electronics with a twist](#)
Jan 21, 2009 | not rated yet | 0
- [Ultrathin light-emitting diodes create new classes of lighting and display systems](#)
Aug 20, 2009 | not rated yet | 0
- [Printable silicon for ultrahigh performance flexible electronic systems](#)
Jun 17, 2004 | not rated yet | 0
- [hide](#)
- **Tags**

[electronic circuit](#), [implantable medical device](#), [beating heart](#), [cardiac monitoring](#), [microfluidic device](#), [beating heart](#), [abnormal heart rhythms](#)

- [hide](#)
- [Feature stories](#)
- [Popular](#)
- [Spotlight](#)



[Invisibility cloak that generates virtual images gets closer to realization](#)[Physics / General Physics](#)1 hour ago | 5 / 5 (1) | 0 | [Physicists demonstrate 100-fold speed increase in optical quantum memory](#)[Physics / Optics & Photonics](#)Apr 01, 2010 | 4.8 / 5 (18) | 0 | [Probing the magnetic properties of solid oxygen](#)[Physics / General Physics](#)Mar 26, 2010 | 4.6 / 5 (17) | 2 | [Conical nanocarbon structures could lead to flexible, transparent field emission displays](#)[Nanotechnology / Nanomaterials](#)Mar 25, 2010 | 4.5 / 5 (13) | 4 | [Prism-patterned screen brings paradigm shift to 3D displays](#)[Technology / Engineering](#)Mar 23, 2010 | 4.6 / 5 (42) | 15 |

- [hide](#)
- **Relevant PhysicsForums posts**
- [The effects of high blood pressure transient](#)
📅 Mar 24, 2010
- [Is there a good way to cure hypertension?](#)
📅 Mar 22, 2010
- [Erythema chronicum migrans](#)
📅 Mar 22, 2010
- [How do we percieve violet?](#)
📅 Mar 22, 2010
- [wavelength to hue conversion](#)
📅 Mar 21, 2010
- [Hey dudes! Radiology Math](#)
📅 Mar 21, 2010
- More from [Physics Forums - Medical Sciences](#)

Other News[Study examines regional use of minimally invasive repair of aneurysms](#)[Medicine & Health / Other](#)

19 minutes ago | not rated yet | 0

While health policy researchers commonly suggest that geographic variations in the amount of medical care provided can be attributed to hospital costs or physician practice patterns, a new study examining regional utilization ...

[Spanking sparks aggression, does little to reduce behavior problems](#)

[Medicine & Health](#) / [Psychology & Psychiatry](#)

15 hours ago | 3.6 / 5 (11) | 12 |

(PhysOrg.com) -- Discipline -- whether it's spanking, yelling or giving time-outs -- may sometimes do little to reduce children's behavior problems, a new study indicates.

[Smoking is dumb: Researcher finds link between cigarette smoking and IQ](#)

[Medicine & Health](#) / [Health](#)

19 hours ago | 4.8 / 5 (10) | 18 |

"Only dopes use dope," goes the memorable warning about drugs. Now a Tel Aviv University researcher cautions that the same goes for cigarettes.

[New research explains repeated infection by some viruses](#)

[Medicine & Health](#) / [Research](#)

20 hours ago | 4.9 / 5 (9) | 0 |

New research conducted at the Oregon Health & Science University Vaccine and Gene Therapy Institute explains how a virus that has already infected up to 80 percent of the American population can repeatedly re-infect individuals ...



[Researchers discover weak link in Alzheimer's drug candidates](#)

[Medicine & Health](#) / [Research](#)

17 hours ago | not rated yet | 0 |

Some current therapies being investigated for Alzheimer's disease may cause further neural degeneration and cell death, according to a breakthrough discovery by UC San Diego researchers.



[A step toward lighter batteries: Metal catalysts play important role in improving efficiency](#)

[Physics / Condensed Matter](#)

36 minutes ago | not rated yet | 0 |

[Traces of early Native Americans -- in sunflower genes](#)[Biology / Biotechnology](#)

35 minutes ago | not rated yet | 0 |

- [Startup to develop new solid-state technology at UCLA for use in medical imaging](#)

[Technology / Engineering](#)

39 minutes ago | not rated yet | 0 |

- [Verizon to take \\$970M charge from health care bill](#)

[Technology / Business](#)

57 minutes ago | not rated yet | 0 |

[Stockholm's Green City award for what you can't see](#)[Space & Earth / Environment](#)

9 minutes ago | not rated yet | 0 |

- [Rapid response team investigates coral disease outbreak in Kaneohe Bay, O'ahu](#)

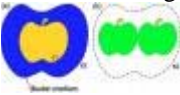
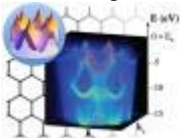
[Biology / Ecology](#)

49 minutes ago | not rated yet | 0 |

- [Japan agrees to end cellphone SIM lock: report](#)

[Technology / Telecom](#)

39 minutes ago | not rated yet | 0 |

[Invisibility cloak that generates virtual images gets closer to realization](#)[Physics / General Physics](#)1 hour ago | 5 / 5 (1) | 0 | [Shining Light on Graphene-Metal Interactions](#)[Nanotechnology / Nanophysics](#)

2 hours ago | 5 / 5 (2) | 0 |

[Sharp shows 3-D touchscreen displays for mobile devices](#)[Electronics / Hardware](#)







6 hours ago | 5 / 5 (3) | 0 |

- [Register](#)
- [Sign In](#)
- [Newsletter](#)
- [Favorites](#)
- [Activity](#)
- [PM](#)
- [My News](#)

- [Feature Stories](#)
- [Weblog & Reports](#)
- [Archive](#)

- [Video](#)
- [Free Magazines](#)
- [Free White Papers](#)

search [advanced search](#)

- 
- 
- 
- 
- 
- 

- [news feed by category](#)
- **▼ Quick Navigation ▼**

- [Nanotechnology News](#)

[Bio & Medicine](#) - [Nanophysics](#) - [Nanomaterials](#)

- [Physics News](#)

[General Physics](#) - [Condensed Matter](#) - [Optics & Photonics](#) - [Superconductivity](#) - [Plasma Physics](#) - [Soft Matter](#) - [Quantum Physics](#)

- [Space & Earth News](#)

[Earth Sciences](#) - [Astronomy](#) - [Environment](#) - [Space Exploration](#)

- [Electronics News](#)

[Consumer & Gadgets](#) - [Hardware](#) - [Robotics](#)

- [Technology News](#)

[Internet](#) - [Software](#) - [Business](#) - [Engineering](#) - [Semiconductors](#) - [Other](#) - [Telecom](#) - [Energy](#) - [Computer Sciences](#) - [Hi Tech & Innovation](#)

- [Chemistry News](#)

[Biochemistry](#) - [Polymers](#) - [Analytical Chemistry](#) - [Materials Science](#) - [Other](#)

- [Biology News](#)

[Plants & Animals](#) - [Evolution](#) - [Ecology](#) - [Cell & Microbiology](#) - [Biotechnology](#) - [Other](#)

- [Medicine & Health News](#)

[Psychology & Psychiatry](#) - [Research](#) - [Medications](#) - [Cancer](#) - [Genetics](#) - [HIV & AIDS](#) - [Diseases](#) - [Other](#) - [Health](#) - [Neuroscience](#)

- [Other Sciences News](#)

[Mathematics](#) - [Archaeology & Fossils](#) - [Other](#) - [Social Sciences](#) - [Economics](#)

- [top](#)
- [Home](#)
- [Help](#)
- [What's new](#)
- [About us](#)
- [Partners](#)
- [Search](#)
- [PDA version](#)
- [Contact us](#)
- [RSS feeds](#)