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Five Inventions That Will Change Your Life

Friday, March 27, 2009
FOX NEWS

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By Jennifer Lawinski



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Arizona State University tests a flexible display in June 2008.



Think you live in a high-tech age? We don't — not compared to what the world will be like if technologies scientists are currently working on come to pass.

Imagine cheap, reliable electricity that doesn't need to be generated in real-time ... brain diseases like Alzheimer's and Parkinson's cured with the flick of a switch ... prescription drugs tailored to fit you, and only you.

Across the country, companies, universities and military agencies are working on new things you haven't heard about — until now.

FOXNews.com takes a look at five inventions that are in development at some of the most cutting-edge research labs in the U.S. and explores how they may change the way you live.

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1. Neurotechnology

Imagine a loved one has been diagnosed with epilepsy after a terrifying seizure. Or you've been diagnosed with Parkinson's disease and know that you face years of slow decline as you lose control of your body.

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If you could get a brain implant that would stop your symptoms, would you do it?

At the Massachusetts Institute of Technology's Media Lab, Dr. Ed Boyden is heading up a revolutionary new branch of research — neurotechnology — and using brain implants to do just that.

Boyden works on technologies designed to stimulate the brain from the inside, similar to the cochlear implant device that is put into the ear to help restore hearing.

• [Click here to read more on Dr. Boyden's work with the MIT Media Lab.](#)

One method uses light to turn brain cells on and off, enabling doctors to correct diseases caused by poorly functioning neural pathways.

Via a retrovirus, photosensitive genes are implanted in brain cells to make them respond to signals sent by light-emitting brain implants.

"This is an earlier-stage project, but I think it's useful to see the field of neurotechnology and the emerging trends of how people are using biology and medicine," said Boyden.

"These kinds of technologies ... are going to impact our lives all the way from treating incurable disorders like Parkinson's and epilepsy, at some point to help people manipulate cognition and emotion ... That may be years out."

2. \$100 DNA Sequencing

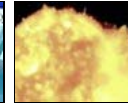
Imagine doctors using our DNA to discover how we will age, or which medications will suit us

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If you're prone to heart disease, or to a certain kind of cancer, could DNA testing allow you to dodge the bullet?

Biotech start-up Bionanomatrix is working to create a simple, reliable and fast test that can sequence a patient's DNA so that your doctor can treat you instead of just anyone.

"They can match the drug to the disease, but not necessarily the drug to the patient. We want to enable the physician to use that information in making decisions," said CEO Mike Boyce-Jacino.

In Bionanomatrix's device, a microchip acts as a sort of tollbooth for DNA strands, forcing them into an orderly line so that they can be analyzed as they pass the "gate."

Bionanomatrix hopes to have a prototype to researchers by 2012, and a finished product in the hands of doctors by 2014. Each test will cost about \$100.

"The technology is intended to allow us to really get at the genome in a much more cost-effective, efficient and accurate way," said Boyce-Jacino. "If we can take advantage of that extremely low cost of [computer](#) chip manufacturing and apply it to the complexity of DNA analysis, we can create a really low-cost device."

3. The Wireless Network After Next

There's been a disaster. Your town is flooded. Buildings are on fire. The power is out. The Internet isn't working. You can't use your [cell phone](#).

How are you going to communicate with friends and family? With the police? What if you need an ambulance?

Military researchers are developing a decentralized "cognitive radio" system that would let public-safety officials and first responders set up their own [wireless networks](#) in times of crisis.

Cell-phone networks have thousands of weak spots — the base stations that connect to land lines. If the power goes out, so do they.

But cognitive radio will let each "smart" handset — picture a cross between a walkie-talkie and a Palm Pilot — act as a base station, much as Wi-Fi enabled laptops already can, creating a local "mesh" [wireless network](#) independent of any fixed center.

"Imagine if you could have gone in after [Hurricane] Katrina and had 10,000 of these radios and you turned them on and they found each other," said Preston Marshall, project manager with the Pentagon's Defense Advanced Research Projects Agency (DARPA). "That would completely change things."

These "smart radios" can find each other when they're turned on, organize into networks and then be used to relay information across groups.

DARPA has been working on cognitive radio for about seven years and on the wireless network for about two. A field-ready test is about a year out.

4. Next-Generation Power

One of the biggest problems with wind and solar power is that they're unreliable. When the wind doesn't blow, or the sun doesn't shine, you get nothing.

And the problem with electricity is that you have to use it, or you lose it. We've never found a good way to store large amounts of electricity, such as what would be needed to power a city or a town. It all needs to be generated in real time for instant delivery.

Existing "smart grid" technology, which lets appliances [schedule](#) themselves around off-peak hours, will reduce the load on the electrical grid but still doesn't solve the main problem of storage.

Enter Professor Donald Sadoway of MIT's Department of Materials and Engineering, who's been working to develop a mega-battery that has the ability to store a lot of power.

"Everybody knows that the sun shines at a time that is a little bit different from peak demand," says Sadoway. "Wind blows when it wants. Without being able to harvest that energy, people are uncomfortable about deploying solar and wind because you don't have a reliable source of electric power."

"We need a better battery if we're going to improve our ability to make use of electric power," he told MIT's Technology Review magazine. "We have no way of harvesting that energy right now."

• [Click here to see Dr. Sadoway explain how his battery works.](#)

His battery design — a layer of electrolytes, a salty liquid that is able to conduct electricity, sandwiched between two layers of metal — isn't like the typical battery, which has solid materials that eventually wear out.

Sadoway hopes someday to wire battery packs together to create a system big enough to meet the demands of New York City, MIT Technology Review reported. But producing the 13,000 megawatts — roughly the city's peak demand — would require a network that covered more than 70,000 square yards.

For now, scientists are experimenting with an early-stage product, trying different combinations of metals and liquids to see which works best.

Researchers believe they could have a battery on the market in five years, according to MIT's magazine Technology Review.

5. Flexible Touchscreen Displays

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How is an iPhone like a wine glass?

Both will shatter if you drop them, and they're kind of hard to use afterward.

Today's PC, PDA and TV displays today are made of glass and can be easily destroyed if they fall, throwing \$200 or more down the drain.

Flexible displays, on the other hand, bend upon impact and withstand much more abuse when klutzy users drop them.

One flexible display being worked on even rolls up into a tube the size of a finger. Developed by Norwegian firm Polymer Vision, the RADIUS portable e-reader uses electronic ink like the Amazon Kindle — but the Kindle can't be rolled up and put into your pocket. Expect it on the market this year.

More rugged, less literary flex-screen devices are also underway.

Arizona State University and the U.S. Army are jointly working on flexible touchscreen displays to be used by soldiers in the field. They'll take a lot of punishment but still be able to function normally.

• [Click here to see a video of a flexible display.](#)

All of these things, if and when they come to pass, will pave the way for us to have healthier, happier lives.

For researchers and scientists, each invention is an inspiration to go above and beyond and stretch the limits of what is possible.

"DARPA developed the Internet, and people invented the Web on top of it," DARPA's Marshall told FOXNews.com by way of an example.

If we are able to develop alternative energy and store power, what will that enable us to do? What problems can we solve next?

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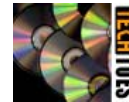
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