



## Views You Can Use

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Over the past several months, I have had numerous discussions with school leaders throughout the country to identify their greatest challenges. To help them meet these challenges, I have identified some of the nation's most respected leaders to be keynoters and advisers. These distinguished leaders articulate best practices regarding innovation, school improvement, and 21<sup>st</sup> century leadership. For more information on our keynoters and how they can serve your organization, contact the Karen at karen@daggett.com.

Sincerely,

Bill Daggett

## Biotechnology Trends

### Put on Your Electronic Thinking Cap

Researchers at the U.S. National Institute of Neurological Disorders and Stroke in Maryland have developed a device that boosts brain function with a flick of a switch. The device, based on a technique called transcranial direct current stimulation (tDCS), has been shown to increase verbal and motor skills as well as improve learning and memory in healthy people. It also could be used to cure migraines and to speed recovery after a stroke. In the more than 100 volunteers tested, researchers saw a 20% improvement in the ability to generate a list of words from the alphabet.

Although tDCS is considered a form of electric shock, it is much different from what was used on mentally ill patients in the past; electric currents for tDCS are 100 times milder. Researchers say that the technology could help students to concentrate on their studies and employees to be more productive at their jobs. However, the long-term effects of passing even a small electric current through a human head on a regular basis is unknown.

Source: *Edutopia*, November/December 2007

## Nanotechnology Trends

### Self-Healing Materials

Imagine that a crack appears in the wing of an aircraft and just as quickly the defect disappears as the material molds itself out in repairing the wing to its original state. This scenario soon could be a reality, according to researchers at Rensselaer Polytechnic Institute. The researchers have developed a simple technique for identifying and repairing small, potentially dangerous cracks in high-performance aircraft

wings and many other structures made from a combination of materials called polymer composites. By infusing a polymer with electrically conductive carbon nanotubes and then monitoring the structure's electrical resistance, the researchers can pinpoint the location and length of a stress-induced crack in a structure. Once a crack is located, they send a short electrical charge to the area to heat up the carbon nanotubes and, in turn, melt an embedded healing agent that will flow into and seal the crack with a 70% recovery in strength.

Source: [www.eetimes.com/news/semi/showArticle.jhtml?articleID=202102871](http://www.eetimes.com/news/semi/showArticle.jhtml?articleID=202102871)

### **Supercomputer on a Chip**

Supercomputers, which consist of thousands of “cores” connected by miles of copper wire, could soon be the size as a laptop. IBM researchers have discovered a way to use pulses of light through silicon instead of electrical signals on wires to send information between multiple cores on a chip. The more cores a computer has, the more processing power it encompasses.

IBM's technical advancement revolves around modifying a device, called a modulator, used to transform electrical impulses into beams of light. The device is similar to what is used in optical networks built by telecommunication companies. IBM scientists have found a way to shrink the modulator to a size where it can fit within a multicore computer processing unit (a CPU is the “brains” of a computer), a requirement for incorporating the technology into computers. One of the most advanced chips in the world — IBM's Cell processor that powers the Sony Playstation 3 — contains nine cores on a single chip. The new technology aims to enable the connection of hundreds or thousands of cores on a tiny chip by eliminating the wires required to connect them.

Source: [www.informationweek.com/shared/printableArticle.jhtml?articleID=204702120](http://www.informationweek.com/shared/printableArticle.jhtml?articleID=204702120)

## **Information Technology Trends**

### **Using Bug Protein to Store Data**

DVDs coated with a layer of microbe protein could hold so much information that storing data on a computer hard drive will become obsolete, according to researchers at Florida International University and Harvard Medical School. The new protein-based DVD will have advantages over current optical storage devices (such as the Blu-ray). It will be able to store at least 20 times more than the Blu-ray and eventually up to 50,000 gigabytes of information.

The protein, called bacteriorhodopsin (bR), is light activated and is found in the membrane of a salt marsh microbe, *Halobacterium salinarum*. The protein captures and stores sunlight to convert it into chemical energy. When light shines on bR, it is converted to a series of “intermediate molecules,” each with a unique shape and color, before returning to its “ground state.” The intermediate molecules typically only last for hours or a few days, but researchers have modified the protein to produce an intermediate that lasts for several years, which paves the way for a binary system to store data.

Source: [www.abc.net.au/science/news/stories/s1680304.htm](http://www.abc.net.au/science/news/stories/s1680304.htm)

### **Speed Matters**

U.S. citizens enjoy a fraction of high-speed Internet access available in other countries, according to *Speed Matters: A Report on Internet Speed in all 50 States* released by the Communications Workers of

America. The average U.S. download speed is 1.97 megabits per second. Compare that to the 61 megabits per second, or 30 times faster speed, enjoyed by the Japanese. The U.S. also trails South Korea, Sweden, Finland, and Canada (see Technology by the Numbers below for related statistics). According to the report, an entire movie can be downloaded in two minutes in some countries, but the same task can take two hours or more in the United States.

The Internet has contributed to innovations in nearly every aspect of society, from telemedicine and education to public safety. “Most U.S. Internet connections today are not fast enough to permit interactive home-based medical monitoring, multimedia distance learning, or to send and receive data to run a home-based business,” the report concludes.

Sources [www.speedmatters.org](http://www.speedmatters.org) and [www.usatoday.com](http://www.usatoday.com)

## **Education Trends**

### **A Tone that Only Classmates Can Hear**

In continually testing their boundaries on the technology front, students have found a way to receive cell phone text messages, generally forbidden in class, without the likelihood of their teachers hearing the incoming “call.” The technology, developed in Britain and spread via the Internet, is based on high-pitched tones that youngsters can hear but which most people gradually lose the ability to hear by adulthood. Ironically, the technology originally was marketed as a way to help shopkeepers disperse teenagers from loitering along storefronts while leaving adults unaffected.

Source: [www.nytimes.com/2006/06/12/technology/12ring.html](http://www.nytimes.com/2006/06/12/technology/12ring.html)

### **More Student Responsibility Means More Engaged Learning**

A three-year study has shown that engagement in learning increases markedly when students are given responsibility for decision making and planning. The study, titled *Greener Voices*, was based on school and community-based gardening programs in which researchers wanted to get a better understanding of how youngsters engage in project planning. The report concluded: “Ongoing efforts are needed to assist sites/leaders, including strategies to expand thinking about the capabilities of children and youth, help [them] adjust to new roles, and identify ways for younger children to increase their participation.” The project focused on children ages 3-18 at six sites in New York and Pennsylvania consisting of rural, suburban, and urban settings.

The complete study is available at <http://horttech.ashspublications.org/cgi/content/abstract/17/2/247>

## **Technology by the Numbers**

The top 10 states that have the speediest Internet access in rank order of megabits are:

- |                  |       |
|------------------|-------|
| 1. Rhode Island  | 5.011 |
| 2. Kansas        | 4.167 |
| 3. New Jersey    | 3.680 |
| 4. New York      | 3.436 |
| 5. Massachusetts | 3.004 |
| 6. Louisiana     | 2.751 |
| 7. Georgia       | 2.714 |

8. New Hampshire	2.700
9. Delaware	2.657
10. Maryland	2.589

Alaska has the lowest Internet speed, with 0.545 megabits.