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HEADLINES AT A GLANCE

- [F.C.C. Moves to Ease Wireless Congestion](#)
- [Coursera and edX Add Universities and Hope to Expand Global Reach](#)
- [Insects Inspiring New Technology](#)
- [Brain-Scanning Headset Monitors Your Mental Workload](#)
- [Google Searches for Style](#)
- [House to Launch Nationwide Contest Encouraging Students to Develop Mobile 'Apps'](#)
- [New Analysis of Genesis Reveals 'Death Sandwich' Literary Theme](#)
- [MIT Wants Tomorrow's Soldiers to Talk Through Their Shirts](#)
- [Mentoring Models to Move Minorities to Majorities in STEM](#)
- [New, Multifunctional Electronic Devices May Soon Be Possible, New Research Suggests](#)
- [Contest Aims to Boost State of Password Encryption](#)
- [Beefing Up Public-Key Encryption](#)
- [Finding Tools vs. Making Tools: Discovering Common Ground Between Computer Science and Journalism](#)

F.C.C. Moves to Ease Wireless Congestion

New York Times (02/20/13) Edward Wyatt

The U.S. Federal Communications Commission (FCC) has proposed setting aside a large chunk of high-frequency spectrum for unlicensed use by devices to alleviate overcrowded Wi-Fi networks. The new rules would allow for transmission speeds of up to 1 Gbps, more than 100 times faster than the average U.S. home Internet connection. The new unlicensed spectrum could foster innovation, particularly by unleashing the potential of the new Wi-Fi 802.11ac standard. The FCC will accept public comments before drafting final rules, which could take more than a year. Obstacles exist because part of the spectrum proposed for the new applications is in use by the U.S. military and other government agencies, as well as by private organizations. Congress required the FCC's unlicensed spectrum expansion and the Obama administration encourages sharing the spectrum allocated to the federal government. However, some government agencies have cautioned against consumer use that could interfere with existing government applications. The FCC proposes freeing up 195 MHz of spectrum, which would increase unlicensed airwave availability by up to 35 percent in the 5-GHz spectrum band. The FCC also voted to allow consumers and companies to use approved and licensed signal boosters to amplify signals between wireless devices.

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Coursera and edX Add Universities and Hope to Expand Global Reach

Inside Higher Ed (02/21/13) Ry Rivard

Coursera and edX both recently announced they are doubling the number of universities offering classes through their open online education sites. For

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Coursera, the expansion means an additional 29 new universities will join the company's 33 existing partners. Sixteen of Coursera's new partners are international institutions, including universities in Italy, Hong Kong, France and Spain. Coursera co-founder Andrew Ng says the international additions should help the company attract non-English-speaking students around the world. To expand its international appeal, Coursera plans to offer more classes in languages other than English. It currently offers one or two courses in French, but plans to have more classes in French as well as Spanish, Chinese, and Italian. edX will add six new universities, five of which are international. "In the longer term, our mission is to dramatically increase access to education worldwide," says edX president Anant Agarwal. All edX courses currently are only offered in English, but Agarwal notes that officials at Ecole Polytechnique Federale de Lausanne want to offer classes in French. Both Coursera and edX say they want their students to get credit for taking their classes, and Coursera already offers five classes that lead to credit recommendations from the American Council on Education.

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Insects Inspiring New Technology

University of Lincoln (02/21/2013) Marie Daniels

Researchers at the University of Lincoln and Newcastle University have developed an autonomous navigation system for mobile robots based on the visual system of locusts. The project aims to build international capacity and cooperation in the field of biologically inspired visual-neural systems. The researchers have created a visually stimulated motor control system, consisting of two movement detector types and a motor generator. Each detector processes images and extracts relevant visual clues, which are then converted into motor commands. "This system was then used in a robot to enable it to explore paths or interact with objects, effectively using visual input only," says University of Lincoln professor Shigang Yue. He says the research could provide a foundation for the development of highly accurate vehicle-collision sensors, surveillance technology, and video games. "This research demonstrates that modeling biologically plausible artificial visual-neural systems can provide new solutions for computer vision in dynamic environments," Yue says.

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Brain-Scanning Headset Monitors Your Mental Workload

New Scientist (02/20/13) Hal Hodson

Tufts University researchers are developing a computer system with the ability to directly monitor a user's brain in real time. The system will be able to act as a filter, letting through desired information while blocking the rest. "We can really supercharge the way you consume information," says Tufts researcher Even Peck. The system features a headset that beams infrared light from emitters on a user's forehead into their prefrontal cortex, a part of the brain associated with planning and decision-making. By measuring the amount of light reaching receivers on the forehead, the system can tell when a user is concentrating intently or not. Matching the readings to what a user is looking at on a screen enables the system to determine what is useful information and what is not, a technique known as functional near-infrared spectroscopy (fNIRS). Massachusetts Institute of Technology researchers are working with fNIRS technology to enhance how people drive cars, and are developing a system that could be useful for researching the cognitive demands of new car features. "It's very exciting, and shows promise to be used in everyday life, opening up new ways of managing individuals' cognitive workloads," says Drexel University's Hasan Ayaz.

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Google Searches for Style

New York Times (02/20/13) Claire Cain Miller

Google and others are developing wearable technology such as glasses and watches, but the unbecoming appearance of some of the devices is prompting efforts to improve aesthetics. Google is in discussions with online eyeglass retailer Warby Parker to create a more stylish version of its Google Glass frames, which enable wearers to see the Internet but require an ungainly battery and small processor. A significant advance in ubiquitous computing, Google Glass uses a voice-controlled Wi-Fi or Bluetooth Internet connection to enable users to record videos, take pictures, use email, view maps, and search the Web. However, making the device trendy remains a hurdle, and Google employees who have worn the glasses publicly have received negative feedback on their appearance. Google's design team worked to reduce the size of components in the frame, which 18 months ago weighed more than eight pounds and now weighs less than an average pair of sunglasses. Striving to woo fashion-forward women, Google also has introduced new frame colors and might open retail stores to enable consumers to try on the glasses. Meanwhile, Apple designers are developing curved glass that is both attractive and comfortable for possible use in a smart watch.

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House to Launch Nationwide Contest Encouraging Students to Develop Mobile 'Apps'

The Hill (02/20/13) Pete Kasperowicz

The U.S. House of Representatives is expected to pass a resolution establishing a nationwide technology competition for students, encouraging contestants to develop new applications for smartphones and tablets. The House would run the contest, and students from each congressional district would compete in science, technology, engineering, and math (STEM) fields. "Because of the importance of computer science it would be appropriate to initially challenge students to develop so-called 'apps' for mobile, tablet, and computer platforms," the resolution says. The resolution was motivated by a recent study which found that only one-third of the bachelor's degrees earned in the United States are in a STEM field. "Bringing together members of Congress and their younger constituents to participate in activities that will result in a deeper appreciation for STEM fields will foster enthusiasm for education in the sciences," the resolution says. "The support which students will gain through Congressional recognition of their work on STEM-related projects will encourage them to pursue career paths in STEM studies and research." The Committee on House Administration would regulate the contest.

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New Analysis of Genesis Reveals 'Death Sandwich' Literary Theme

AlphaGalileo (02/20/13)

Researchers at Keele and Amridge universities have discovered a common rhetorical structure known as bracketing in the Book of Genesis by using a new text analysis tool called Search Visualizer, which they say could revolutionize the search and analysis of large texts. The rhetorical technique brackets one theme between two occurrences of another; for example, negative information is often bracketed between two pieces of positive information. The researchers found that the opening and closing verses of Genesis often refer to life, while death is mentioned only in the middle, in a pattern they refer to as the "Genesis Death Sandwich." Search Visualizer, developed by Keele University's Gordon Rugg, depicts entire texts as a grid in which squares represent individual words, and keywords appear in color. Rugg says the keywords "life" and "death" in the King James Version of Genesis clearly reveal the rhetorical bracketing structure, although whether

this was intentional remains unclear. He says Search Visualizer "offers a quick and simple way for researchers to identify patterns, or see which of their ideas might be red herrings, which is an important insight for researchers dealing with large texts."

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MIT Wants Tomorrow's Soldiers to Talk Through Their Shirts

Wired News (02/18/13) Spencer Ackerman

The Institute for Soldier Nanotechnologies, staffed by researchers from the Massachusetts Institute of Technology and the U.S. Army, is developing microscopic fibers that can be woven into soldiers' uniforms to enable them to communicate with other soldiers on the battlefield. The researchers set out to fabricate a uniform that included a kind of fiber-optic-like thread that would enable a soldier's uniform to detect light, heat, and sound. "These are new kinds of fibers that are themselves devices," says Institute for Soldier Nanotechnologies director John Joannopoulos. The fibers currently are about a millimeter in diameter and too thick for a uniform, but the researchers want to scale them down to 100 microns. Joannopoulos says the researchers plan to spend the next 10 years refining the technology. "The idea with these fibers is that eventually, we'd like to enable full-body sensing for the soldier," he says. However, the fibers currently are line-of-sight devices, meaning that if something gets in the way of a straight line between two soldiers wearing the uniforms, the data transmission is compromised. The fibers also have only been tested up to 75 meters, and the researchers have yet to determine the best data transmission method.

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Mentoring Models to Move Minorities to Majorities in STEM

ASU News (02/16/13) Peggy Coulombe

Arizona State University (ASU) professor Carlos Castillo-Chavez says accelerating programs that mentor and move minorities forward to majorities in science, technology, engineering, and math (STEM) subjects is one method that is gaining momentum in the effort to shift U.S. demographics in STEM. Although there is a common belief that promoting underrepresented groups cannot be addressed without long-term changes in the K-12 school system, there are successful models currently being used that show how mentoring can change lives, Castillo-Chavez says. He is the executive director of the Mathematical and Theoretical Biology Institute (MTBI), a program that hosts a summer undergraduate research experience program and has developed integrative degrees in applied mathematics for the life and social sciences for undergraduate and doctoral students. In 2010-2011, ASU was the leading producer of Hispanic Ph.D.'s in the mathematical sciences and fifth in the U.S. for all minority groups combined, according to the National Center for Education Statistics. "The success of this type of intervention is not in question," Castillo-Chavez says. "We have seen remarkable outcomes at Arizona State University and Cornell University, because of MTBI and other late stage mentoring interventions."

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New, Multifunctional Electronic Devices May Soon Be Possible, New Research Suggests

Penn State Live (02/15/13) Barbara Kennedy

Penn State University researchers have designed a material interface that can improve the functionality of non-silicon-based electronic devices as well as enhanced nanoelectronic components, says professor Qi Li. "Our goal was to create a multifunctional device with improved function by adding...a ferroelectric-magnetic interface--a ferroelectric layer replacing the insulator

barrier and a special interface layer--built into the device that acts to change from metal to insulator as well as from ferromagnetic to antiferromagnetic in response to the negative or positive charge polarization of the barrier," Li says. The researchers say the device enhances the binary-state resistance difference by up to 10,000 percent. Li says the interface is special because its oxide materials are multiferroic, which means that one side is magnetic and the other is ferroelectric. "Because our new interface combines both magnetic and ferroelectric properties and because we utilize the coupling effect between the two, we can reproduce a similar binary system with a much larger resistance difference between the two charge-polarization directions," Li says. The system will result in sharper switching or fewer memory errors and better and faster information processing and storage power.

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Contest Aims to Boost State of Password Encryption

CSO Online (02/15/13) Antone Gonsalves

A group of cryptographers from academia and the tech industry has organized the Password Hashing Competition to raise awareness of the need for better password hashing. The organizers are looking to develop a new password hash algorithm that is more difficult for hackers to break. Technologies can be submitted to the competition website by Jan. 31, 2014. The group is interested in a standard that can generate hashed passwords much slower, but does not want to keep people waiting too long when they log into a site, says Kudelski Security's Jean-Philippe Aumasson, one of the competition's judges. "From a secure standpoint, the slower the better," Aumasson says. "From a usability standpoint, the faster the better, so it's a tradeoff between usability and security." The U.S. National Institute of Standards and Technology (NIST) has a member on the panel of judges and will monitor the contest. NIST could use the winning technologies in future standards. Aumasson says contest organizers hope that such efforts will boost awareness of the need for better password hashing.

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Beefing Up Public-Key Encryption

MIT News (02/15/13) Larry Hardesty

Massachusetts Institute of Technology (MIT) researchers have developed a technique for taking a vulnerable, error-prone chosen-ciphertext attack (CCA) scheme and turning it into a secure CCA scheme, which could lead to more secure encryption protocols. The technique relies on the observation that although the probability of distinguishing weakly encrypted ciphertexts may be unacceptably high, in some specific cases it is negligible. In addition, it is possible to compute the probability that the encrypted version of a randomly generated plaintext will be secure. The researchers have found that combining a weakly encrypted ciphertext with a strongly encrypted one produces a strongly encrypted hybrid. Their technique secures transmissions against attackers who have some examples of successful decryption, in addition to securing transmissions against adversaries who have a black box that can decrypt any ciphertext. "By considering the strongest attack, we automatically become immune to all possible scenarios, which are hard to enumerate," says MIT's Huijia Lin.

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Finding Tools vs. Making Tools: Discovering Common Ground Between Computer Science and Journalism

Nieman Journalism Lab (02/14/13) Nick Diakopoulos

Computer scientists and journalists attending the Georgia Tech College of Computing's recent Computation + Journalism Symposium discussed ways in

which their two disciplines could blend to create a better news information environment. Many journalists say they have a "forager" mindset, using available tools to address immediate issues related to generating news, while technologists say they tend to "forge" more generalized tools. Journalism students would benefit from learning to cultivate computational tools, for example, through training in user-centered design and computational thinking. However, not all journalists will actually need to code, and specialization for building and coding tools could occur. Computational journalism could play a role in efforts to quantify the impact of journalistic influence on social networks. As data sets expand and instrumentation improves in media, a computational influence engine could be optimized for revenue, an informed audience, and accountability impact. Computational news media algorithms also could be engineered toward "good" exposure to correct for existing biases of perception and cognition. Another possibility in blending computer science and journalism is that narrative might not prevail in news information, with theories and models also capable of structuring data. Data can be abstracted via models to enable efficient computation in what is known as an analytic-dominant frame.

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