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### Supercomputing 2014 Recognizes Outstanding Achievements in HPC SC14 (11/24/14)

Both novice and veteran researchers were honored for their contributions to high-performance computing in a special awards session at the Supercomputing 2014 (SC14) conference. The ACM Gordon Bell Prize for best performance of a high-performance application was awarded to "Anton 2: Raising the Bar for Performance and Programmability in a Special-Purpose Molecular Dynamics Supercomputer," by David E. Shaw and collaborators at D.E. Shaw Research. A team of Carnegie Mellon University researchers was recognized with the Best Paper Award for their "Scaling File System Metadata Performance with Stateless Caching and Bulk Insertion," while the Best Student Paper Award went to ETH Zurich researchers' "Slim Fly: A Cost Effective Low Diameter Network Topology." Meanwhile, Sandia National Laboratories' Bruce Hendrickson and Rob Leland were presented with the second annual SC Test of Time Award for their paper, "A Multi-level Algorithm for Partitioning Graphs." The University of Illinois' Harshitha Menon and the Technical University of Munich's Alexander Breuer received the George Michael Memorial Fellowship for outstanding Ph.D. students, and the University of Texas-Austin won the Student Cluster Challenge, in which student teams built a small cluster on the SC14 exhibit floor and raced to illustrate the greatest sustained performance across a slate of applications.

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### Hour of Code to Feature 'Frozen' Characters

*The Washington Post* (11/19/14) Lyndsey Layton

Educational nonprofit Code.org this year is collaborating with Disney to open its week-long "Hour of Code" event during Computer Science Education Week, which takes place Dec. 8-14. This year's hour-long coding tutorial will feature the lead female characters from Disney's animated film "Frozen." Hour of Code is an online event that features hour-long coding tutorials tailored for difference grade levels, from kindergarten to high school, and lectures from technology






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industry leaders. Hour of Code was inaugurated last year with tutorials featuring characters from the popular video games Angry Birds and Plants vs. Zombies and video lectures from Mark Zuckerberg and Bill Gates. This year's "Frozen" tutorials will feature the film's princesses, Anna and Elsa, and ask students to use a drag-and-drop interface to create commands that move the characters around on the ice and draw snowflakes, snowmen, and fractals. This year's event will focus on getting girls interested in computer science and will feature lectures from female tech leaders, including Polyvore CEO Jess Lee, Microsoft engineer Paola Mejia, and app developer Lyndsey Scott. Code.org founder Hadi Partovi says helping to increase female participation in computer science is one of the organization's chief goals.

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### **Molecular Flash Memory Could Store Massive Amounts of Data**

*IDG News Service (11/20/14) Tim Hornyak*

Novel molecules could help expand the storage capacity of flash memory, which is widely used in mobile devices such as smartphones. European scientists report polyoxometalate (POM) molecules can serve as storage nodes for MOS flash memory. Metal-oxide clusters can retain an electrical charge, act as random access memory, and form a new basis for data cells used in flash memory, according to the team from the University of Glasgow and Rovira i Virgili University. The researchers created a new type of memory, called write-once-erase, using tungsten to synthesize POM metal-oxide clusters and adding selenium to their inner cores in a process known as doping. They validated the approach at the nanoscale using realistic, industry-standard device simulations. The team believes POMs could potentially be used as a realistic nanoscale flash memory. Moreover, POMs can be fabricated with devices already widely used in industry, and there would be no need to expensively overhaul production lines, notes Glasgow researcher Lee Cronin. Previous research in this area has grappled with problems such as low thermal stability and low electrical conductivity, which has complicated the application of molecular models to MOS technologies.

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### **Silicon Valley Turns Prisoners Into Programmers at San Quentin**

*USA Today (11/21/14) Jessica Guynn*

Hack Reactor, a San Francisco-based programming boot camp, has launched Code.7370, a program in which inmates at San Quentin State Prison will learn the basics of computer coding. The program's goal is that in six months inmates will have the coding skills to work as entry-level Web developers. California has one of the U.S.'s largest prison populations and one of the highest rates of recidivism. Code.7370 is one of a growing number of initiatives designed to address the challenge of helping former inmates become successful members of society. At the end of the course, inmates present their ideas in five-minute pitches to dozens of Silicon Valley investors and executives. For example, one student developed an idea for a mobile app that directs first responders to the location of underground utilities. Code.7370, believed to be the first of its kind in the U.S., was developed by Chris Redlitz and Beverley Parenti, who have been teaching entrepreneurship to inmates through a nonprofit program called the Last Mile. When paroled, Last Mile graduates are given paid internships at high-tech startups. Redlitz says beyond teaching coding skills, the program enables participants to believe "they are worthy of having a job and contributing to society when they get out."

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### **Research Promises Innovations in Secure Communications Technology**

*Institution of Engineering and Technology (11/20/14)*

Nanjing University researcher Zhang Yixin has created a true random number generator (TRNG) based on photon distribution. His portable TRNG configuration is based on the camera of a smartphone, and he says

randomness in the output bit sequence has been proven with U.S. National Institute of Technology tests. Zhang notes the integration of optics and electronics components on a single chip is necessary for portable and low-cost TRNGs. He says TRNGs only solve the random number generation problem, and a communication protocol that employs true random numbers as secret keys for encryption also needs to be developed. At the Institute of Optical Communication Engineering at Nanjing, Zhang's group will try to improve the Android App for TRNGs to automatically adapt to different types of smartphones, because the camera setting is essential to the overall performance of output random bits. They also are working on high-speed single photon-counting technology based on avalanche photo-diodes to improve the detection speed if higher rates are required. Another research area Zhang is involved in is fiber optical sensing, with the target of locating eavesdroppers as they intercept optical signals from fiber communication links. Zhang says probe pulse coding based on TRNGs will be used for the improvement of measuring speed, spatial resolution, and dynamic range.

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### **U.S. Intelligence Unit Launches \$50K Speech Recognition Competition** *Network World (11/19/14) Michael Cooney*

The U.S. Intelligence Advanced Research Projects Activity (IARPA) has launched the Automatic Speech recognition in Reverberant Environments (ASpIRE) competition, a \$50,000 challenge designed to encourage researchers to build automatic speech recognition technology that can handle a variety of acoustic environments and recording scenarios. The ASpIRE challenge aims to inspire the development of innovative speech-recognition systems that can be trained on conversational telephone speech, while working well on far-field microphone data from noisy, reverberant rooms. Challenge participants will be given access to sample data against which they can test their algorithms, which are different from the test set, but provide a good representation of microphone recordings in real rooms, according to IARPA. Contestants will then use their algorithms to submit transcriptions for the test set. The algorithm that produces the lowest word error rate in the single microphone condition will receive \$30,000, and the algorithm that generates the lowest word error rate in the multiple microphone condition will receive \$20,000. The single-microphone test evaluates the ability to mitigate noise and reverberation given a single microphone recording from speech recorded in several rooms with a variety of microphones, while the multi-microphone competition tests noise and reverberation mitigation given all the microphone recordings of speech.

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### **Machine-Learning Algorithm Ranks the World's Most Notable Authors** *Technology Review (11/17/14)*

Dartmouth College professor Allen Riddell has developed software that automatically ranks those authors and creators whose work has entered the public domain by how likely they are to be of interest to academics and the general public. Riddell's public domain ranking tool uses a machine-learning algorithm to mine and analyze data from Wikipedia and the University of Pennsylvania's database of more than 1 million public domain books. The algorithm gathers data such as length and age from an author's Wikipedia entry and correlates it with the presence of a digital copy of their works in the Pennsylvania database to generate its ratings on the reasoning that authorities with lengthier and more active Wikipedia pages and existing digital copies of their works are more likely to be of interest. Of those authors and personages whose works are entering the public domain in some areas of the world next year, Riddell ranks TS Eliot, Somerset Maugham, Winston Churchill, and Malcolm X the highest. The program also breaks its rankings out by category; for example, Jean-Paul Sartre is the top-ranked French philosopher in the public domain. Riddell acknowledges his algorithm, while independent of the biases of the committees often tasked with ranking artistic works, is still susceptible to biases of Wikipedia and its editors.

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## Hackathon Develops Tech Tools to Fight Ebola Epidemic

*New Scientist (11/19/14) Chris Baraniuk*

The University of Oxford earlier this month hosted the Ebola Crisis Hackathon, which brought together physicians and graduate students to develop software and systems that can be used by the West African communities being affected by the Ebola outbreak. One of the tools developed at the hackathon is the Eulerian video magnification tool, which uses free software developed at the Massachusetts Institute of Technology and Quanta Research in Boston to detect a patient's heart rate using a webcam and a handheld infrared scanner. The tool can help identify those in the throes of the disease's characteristic fever. Another tool developed at the hackathon is a real-time map showing the locations of Ebola cases and qualified medical practitioners. The tool will make it easier to know where to send skilled medical workers. The project is hoping to collaborate with a medical professional social network known as Medicine Africa to get information about physicians. Finally, the hackathon produced a tool developed by student Mark Gilbert that diagnoses individuals by asking them a series of questions via SMS text messages. All of the teams currently are attempting to partner with aid organizations to put their tools to use or to secure further funding.

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## Data Analysis Proves Existence of Rostigraben

*Scientific Computing (11/19/14) Joël Burri*

Researchers at the Swiss Federal Institutes of Technology in Lausanne (EPFL) are using data analysis methods to examine information gathered from the Swiss voting system. EPFL's Vincent Etter and Julien Herzen have developed a platform called Predikon.ch to predict the results of a federal election based on the initial results coming in, in addition to past election data. The researchers performed a dimensionality reduction on the district results for all elections since 1981. The districts nearest the intersection of the groups on the graph also are those that are geographically closest to the linguistic border, Herzen reports. Etter says over time, the Italian-speaking districts appear to move away from the French-speaking districts to join their German-speaking counterparts. The researchers also found the positions of 25.8 percent of the socialist candidates were closer to the median of the green party positions than to their own party's position. Furthermore, Etter and Herzen demonstrated it would be easy for a candidate who filled in his or her own Smartvote profile to select responses that would optimize the number of times they would be recommended to voters that trusted the site. However, it appears this did not have an impact in 2011, when the difference between the voting records of parliamentary politicians and their Smartvote profile was small.

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## Researchers Create First Image-Recognition Software That Greatly Improves Web Searches

*Dartmouth College (11/18/14)*

A machine-vision system developed by researchers from Dartmouth College, Tecnalia Research & Innovation, and Microsoft Research Cambridge is accurate and efficient enough to improve large-scale document searches online. In a test involving more than 600 search queries on a database of 50 million Web pages, the system was 30 percent more precise than the original search engine purely based on text, according to the researchers. The system enables computers to learn without being explicitly programmed by extracting semantic data from the pixels of photos in Web pages. The information is used to enhance the description of the HTML page used by search engines for document retrieval. The system learns to recognize pixels associated with a search phrase by studying results from text-based image search engines. The researchers note this knowledge can be applied to other photos without tags or captions, leading to more accurate document search results. "Images abound on the Internet and our approach means they'll no longer be ignored during document retrieval," says Dartmouth professor Lorenzo Torresani. The team is now looking to expand the capability to video.

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## Stanford Cyber Initiative Will Tackle Internet Technology Concerns From Many Angles

*Stanford Report (CA) (11/18/14) Clifton B. Parker*

Stanford University researchers have launched the Stanford Cyber Initiative, a program that will apply broad campus expertise to the challenges and opportunities associated with cybersecurity, cyberspace, and networked information. The initiative will be highly interdisciplinary in developing a new policy framework for cyber issues, and it will draw on the campus' experience with multidisciplinary, university-wide initiatives to focus on the themes of trustworthiness, governance, and the emergence of unexpected impacts of technological change over time. "Our increasing reliance on technology, combined with the unpredictable vulnerabilities of networked information, pose future challenges for all of society," says Stanford president John Hennessy. "Stanford has a long history of fostering interdisciplinary collaborations to find thoughtful and enlightened answers to these paramount questions." The initiative will develop faculty seminars and conferences, organize working groups of faculty and students to address policy-relevant problems in information security, and provide support for internal research awards, teaching, and curriculum development. "Faculty and students will expand existing research efforts and conversations with the goal of building a safer, better world that balances humanity's concerns with the promise of new technologies," says Stanford professor Mariano-Florentino Cuellar.

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## Penn State Researchers Tackle Social Network Privacy Gaps

*Campus Technology (11/13/14) Joshua Bolkan*

A new academic project could help users of social media networks better understand the boundaries of personal information and sharing, and ultimately improve privacy. Pennsylvania State University (PSU) is collaborating with the University of Kansas on the project, called "Privacy Protection in Social Networks: Bridging the Gap Between User Perception and Privacy Enforcement." PSU researchers say they plan to develop methods to identify those discrepancies, "design a user-centered and computationally efficient formal model of user privacy in social networks," and develop a mechanism for enforcing privacy policies. The project will seek to combine technological solutions with human-oriented fixes, according to PSU professor Dongwon Lee. "We feel that if we take advantage of both frameworks, we'll be able to come up with a better solution," he says. Once complete, the researchers say they want to implement their tools in a way that will enable users to more easily control their privacy, such as through an app that would work with various social media accounts. "Hopefully, we will develop better, very vigorous underpinnings of the privacy model and a slew of technological tools to enforce this newly developed model," Lee says.

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