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Software Design Research Adds New Perspective to High-Tech Gender Gap Associated Press (09/24/07) Mintz, Jessica

Laura Beckwith, a new computer science Ph.D. from Oregon State University, and her adviser, Margaret Burnett, believe that examining and altering software programs may be the key to attracting more women to the computer science industry. Beckwith and Burnett specialize in how people use computers to solve problems. During their research they found that men are more likely than women to use advanced software features, specifically debugging features that help users find and correct errors. After researching gender differences in problem solving and computer use, Beckwith found that in most studies women have less confidence than men in their computer skills, even women who study computer science. Beckwith tested her theory by asking a group of men and women if they believed they could find and fix errors in spreadsheets filled with formulas. Participants were then asked to test formulas in two spreadsheets for any bugs. The spreadsheets contained a debugging feature. The debugging feature was used by men at all confidence levels, but only women who believed they could successfully complete the task used it. Beckwith then created two more options for the debugging tool, "seems right maybe" and "seems wrong maybe," and eliminated the need to right click the mouse to make the feature less intimidating. Tests with the new feature showed that women were more willing to use the softer options on the software, and occasionally used the debugging tool more than men. "We know from our colleagues in psychology and sociology that there are gender differences that can be very important to take into account in human-computer interaction and software design," says Julie Jacko, a professor at the Georgia Institute of Technology and president of ACM's Special Interest Group on Computer-Human Interaction (SIGCHI). "Projects like this can help us have a better impact, even at younger ages, where I believe interventions need to happen."

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Where Have All the Techies Gone?

St. Petersburg Times (FL) (09/23/07) Bora, Madhusmita

Misconceptions about the availability of tech jobs are dampening the desires of many potential hires for a career in IT. Computer Science Teachers Association executive director Chris Stephenson sees a recent plummet in IT enrollments that is far more precipitous than in previous years, which she says is attributable to perceptions that the IT sector is experiencing "a major ongoing downturn." On the other hand, AeA estimated a 3 percent increase in American high-tech employment last year. "Experts attribute the job growth to renewed interest among corporations toward developing business applications now that companies are done pouring money into post-Enron accounting compliance efforts," notes AeA's Matthew Kazmierczak. "We are getting to the point where there's more job creation than people to fill them." Employers are increasingly nervous about the impending retirement of workers from the baby boomer generation. Co-ounder of IBM's Services Sciences, Management, and Engineering IT Services curriculum Paul Kontogiorgis says the next five to 12 years will witness the departure of 70 million workers, and only 40 million fresh workers will be coming in to fill the void. Increasing competitiveness in the marketplace means smaller businesses in smaller markets will suffer the most from the labor shortage, and hotspaces.net owner Fritz Eichelberger points out that salaries for some IT positions have climbed \$20,000 to \$30,000 annually. The looming shortage is also prompting companies to bolster their hiring policies, and requiring prospective IT staff to possess social skills and industry acumen in addition to technical knowledge.

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Collecting of Details on Travelers Documented

Washington Post (09/22/07) P. A1; Nakashima, Ellen

The Automated Targeting System has been used to screen travelers since the mid 1990s, but the amount of information gathered and how it is used has changed drastically since 2002, according to former Department of Homeland Security officials. The system is used to collect electronic records on the travel habits of millions of Americans who fly, drive, or take cruises, including information on who they travel with, the personal items they carry, and even the books they bring, according to documents obtained by civil liberty advocates and statements from government officials. The personal travel records are preserved for up to 15 years. A group of civil rights activists requested copies of their own travel records, which included a description of a book on marijuana that one of them carried, and the phone number of one of the activist's sisters in Japan. Department of Homeland Security officials, including DHS secretary Michael Chertoff, insist that the collection of such information is vital to making connections between possible terrorist suspects, and that the department only gathers information related to possible criminal activities. "I flatly reject the premise that the department is interested in what travelers are reading," says DHS spokesman Russ Knocke. "We are completely uninterested in the latest Tom Clancy novel that the traveler may be reading." Knocke says that if the traveler's behavior or belongings lead an inspection officer to believe there may be a possible violation of the law, it is the officer's duty to further scrutinize the traveler and to record the incident.

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Buy a Laptop for a Child, Get Another Laptop Free

New York Times (09/24/07) P. C1; Lohr, Steve

Although mass production of the One Laptop Per Child's XO Laptop computers is set to begin next month, initial orders for the machine have been less than expected. "I have to some degree underestimated the difference between shaking the hand of a head of state and having a check written," says Nicholas Negroponte, chairman of the nonprofit project. To boost slow sales, the project will offer Americans and Canadians the opportunity to buy two laptops for \$399, with one of the laptops to be donated to the project while the other is sent to the buyer, either to be donated to a local school or kept for personal use. The XO Laptop was built to withstand the harsh

conditions in rural villages, and is also extremely energy efficient, with power consumption at 10 percent or less than conventional laptops. Some members of the project were concerned that American children might test the XO Laptops and write bad reviews online, further decreasing sales, but in a focus-group of American children between seven and 11 years old, the children were quite positive. The subjects liked the peer-to-peer functionality and the environmentally conscious power consumption. Originally, the project expected an initial release of about 3 million laptops, but Nigeria and Brazil have not met their expected orders of 1 million each. Peru, however, will buy and distribute 250,000 laptops over the next year, Mexico and Uruguay have made strong commitments, and Italy has agreed to purchase 50,000 laptops. Negroponte hopes to collect an additional \$40 million, which would allow the group to distribute 100,000 laptops to 20 countries.

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Opening Up the Patent Process Technology Review (09/24/07) Schrock, Andrew

The U.S. Patent and Trademark Office is currently participating in a limited trial of the Peer-to-Patent project, a process that uses online collaboration to create a community around each patent application in an effort to encourage public discussion and speed up the patent approval process. The USPTO reports that 173,771 patent applications were approved in 2006, but the backlog of more than 800,000 applications means the new submissions have an approval period of up to 52 months. The current patent application system restricts the conversation to the applicant and the examiner reviewing the application, but the Peer-to-Patent system creates a new level of openness and transparency to the review process. Online participants can upload relevant information, express their opinions on the patent, and point out prior art, expediting the application process. "The U.S. patent system is based on disclosure, and the earlier we can get our examiners the best prior art in front of them to help make that patentability determination, the better," says USPTO deputy commissioner for patent operations Peggy Focarino. The limited trial of the Peer-to-Patent system involves 250 patent applications. U.S. patent agent and Peer-to-Patent participant Mark Nowotarski, president of Markets, Patents & Alliances, says Peer-to-Patent is an improvement because it creates immediate feedback on prior art, but it could improve the system even more by allowing applicants to make changes based on newly-found prior art.

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The IT Godfather Speaks: Q&A With Charles M. Herzfeld Computerworld (09/24/07) Anthes, Gary

Charles M. Herzfeld, who was named the fifth director of the Advanced Research Projects Agency in 1961, which was later renamed Defense Advanced Research Projects Agency, and also served as director of Defense Research & Engineering from 1990 to 1991, says DARPA has lost the ability and drive to invest in long-range, high-risk projects. "There certainly has been a change, and it's not for the better," Herzfeld says. "But it may be inevitable. I'm not sure one could start the old ARPA nowadays. It would be illegal, perhaps. We now live under tight controls by many people who don't understand much about substance." Referencing the \$25 million investment the FBI made in explosives and weapons of mass destruction "computer kits," many of which were abandoned due to functionality problems, Herzfeld says, "We are becoming incapable of handling a technology challenge of any major magnitude. We are losing the ability to do big, complicated things." Herzfeld says it is not a technological failure, but that we are missing leadership that understands what it is doing, and that the whole system is "off the rails." He also says the process for research funding at the National Science Foundation is too risk-averse, which is hurting the country's ability to research big problems. "If the system does not fund thinking about big problems, you think about small problems," he says.

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Folmer Believes a Virtual World Doesn't Have to Be a Visual One University of Nevada, Reno (09/19/07) Putnam, Sue

University of Nevada, Reno assistant professor of computer science and engineering Eelke Folmer recently received a grant from the National Science Foundation to research the accessibility of online games such as Second Life. "We're working with a massive multiplayer online game that can potentially offer opportunities for social interactions regardless of disabilities," says Folmer, adding that his work is intended to help cognitive and physically disabled people enjoy the socialization and the fun of multiplayer games. "Our goal is to improve the quality of life for millions of people with disabilities and gaming is a part of that," he says. Folmer is building a prototype client that will enable basic accessibility to online games for blind users. Initially, Folmer's prototype will allow blind players to navigate an environment using voice commands, and will later be enhanced to enable players to interact with each other. Folmer's objective will be challenging as the client and the server for Second Life have only recently been made available as open source code and no one has tried to make an accessible client for the environment. "We hope to raise the awareness of game developers so they see that not only is there a market here for them, but that it is really part of their obligation to make these games accessible," Folmer says. "In the case of blind players, there is a lot we can do with audio cues so that it's still fun to play."

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Internet Pipes Not Ready to Burst, Researcher Says **Network World (09/19/07) Brown, Bob**

Internet traffic is growing at a rate of about 50 percent to 60 percent worldwide, according to the Minnesota Internet Traffic Studies (MINTS) Web site. The University of Minnesota Web site shows that Internet traffic growth has slowed from the mid-to-late 90s claims that traffic was doubling ever year or even every 100 days. However, there still could be some problems for the network because more people are using video and content that is heavy on bandwidth, and the exabytes of data in databases and other places could find their way onto the Internet. "The key issue is how quickly [if at all] that data will move to the Internet," says Andrew Odlyzko, principal investigator for the MINTS Web site and a professor of mathematics at the university. The level of Internet traffic is important to the debate over net neutrality and the issue of how careful service providers need to be when doling out bandwidth. The current level of growth may offset advances in technology, according to MINTS. "Thus although service providers are pushing to throttle customer traffic, an argument can be made that they should instead be encouraging more traffic and new applications, to fill the growing capacity of transmission links," says the Web site.

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Apple Co-Founder Looks to Robotics and Artificial Intelligence **eWeek (09/22/07) Vizard, Michael**

Apple co-founder Steve Wozniak is excited about the potential impact of artificial intelligence on the field of robotics. Speaking at an event hosted by ConnectWise, Wozniak said the robotics field should make robots that are easy enough for users to program for different functions, rather than develop systems that can only handle preprogrammed tasks. "People want things that are useful as opposed to things that do a lot of little things that we call artificial intelligence," he contends. Wozniak also said he is optimistic that photonics on a chip will deliver the processing capability needed to usher in next-generation artificial intelligence applications, as current processing architectures cannot stand too much heat. When chips have a terabyte of memory, systems will not need disk drives any longer, and Wozniak added that he cannot wait for the day when displays are more malleable and ubiquitous. "What I'd personally like is a display that would be the shape of the earth running Google Maps," he said. Wozniak also said he likes what he sees of software-as-a-service, but thinks local computing resources will always be in demand.

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Tripedal Robot Swings Itself Into Action **New Scientist (09/20/07) Simonite, Tom**

Researchers in the United States have built an unusual robot that has three legs and flips its body upside-down with each step. STriDER (Self-excited Tripedal Dynamic Experimental Robot) has a graceful and acrobatic gait, and saves energy with each stride. The tripedal robot shifts its weight on two of its legs to fall away from the third leg and to take a step forward, then flips its body 180 degrees as the third leg swings up between the other legs just in time to catch the ground and resume a tripod stance. STriDER is able to change directions by using a different leg for swinging. "This is how humans walk, we do not actively control our knees, we just let them swing," says Dennis Hong, a researcher at Virginia Tech who heads the project. Although the prototype is 1.8 meters tall, the latest version of STriDER is 0.9 meters, and Hong says the robot could be used to place sensors in areas that are difficult to reach. Dave Barnes, a specialist in locomotion for planetary rovers at Britain's Aberystwyth University, describes the robot as a biped with a walking stick, and says it has its advantages. "A tripod stance is very stable, you can just lock the joints," he says.

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An Oracle Part Man, Part Machine New York Times (09/23/07) P. WK 1; Johnson, George

Today's algorithms are highly advanced calculations, but they are still calculations, which is why computers have difficulty with tasks that humans can perform easily such as describing pictures or the contents of Web sites. To compensate for these shortcomings, companies are tapping human resources. Google's Image Labeler creates a game where contestants try to list as many descriptive words as possible. Google itself uses a similar system to collect data during searches, so the user is gathering information from the network while the network gathers information from the user. In the 1950s, British psychiatrist and cyberneticist William Ross Ashby predicted something similar to this process when he wrote about intelligence amplification, human thinking leveraged by machines, or software running on both hardware and "wetware." And in "Computing Machinery and Intelligence," Alan Turing predicted a time when it would be difficult to determine the difference between the responses of humans and computers. Wikipedia is another example of an amalgamation of humans and machines, an active digital resource constantly being edited by humans, which is then in turn edited by machines to ensure the human additions are correct and from unbiased sources. Enough computing power could allow the entire monitoring process to be semi-automated by automatically scanning the database and marking suspicious edits for humans to inspect, bringing the merger of humans and machines another step closer.

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Summit to Address Online Threats to Security The Tartan (09/24/07) Kang, Eugene

Carnegie Mellon University's CyLab will host the second annual Anti-Phishing Working Group e-crime Researchers' Summit on Oct. 4 and 5. The summit will feature top e-crime research experts, including Cigital CTO Gary McGraw, who will deliver a keynote address on security threats in online multi-player games. "With hundreds of thousands of interacting users," McGraw says, "today's online games are a bellwether of modern software yet to come. The kinds of attack and defense technique I [will] describe are tomorrow's security techniques." The summit will focus on security threats created by massive multiplayer online role-playing games (MMORPG) and phishing, but will also discuss the precautions needed to prevent e-crime and how to determine the risk of a particular threat. McGraw says that MMORPGs threaten not only the security of individual players but the welfare of the entire online gaming community. Panelists from the Harvard Center for Research on Computation and Society, Indiana University, and People for the American Way will address the issue of phishing, focusing on how phishing could potentially affect the 2008 elections and how to prevent phishing using both new and old techniques.

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A Global Climate of Change HPC Wire (09/21/07) Vol. 16, No. 38, Lazou, Christopher

The National Center for Atmospheric Research's bi-annual Computing in Atmospheric Sciences workshop on the application of high performance computing to meteorology was attended by dozens of meteorologists and HPC experts from large-scale computing centers in 11 countries. A central theme of the workshop was the need to refine climate models so that the potentially devastating effects of global warming can be addressed realistically by mitigation strategies. Such efforts require computing muscle for data assimilation, internal oscillation modeling, external forces forecasting, and hurricane/climate feedback. The Community Climate System Model (CCSM) will expand over the next several years to encompass reactive troposphere chemistry, aerosol physics and microphysics, biogeochemistry, ecosystem dynamics, and the impact of urbanization and land use change. The range of earth system science that can be investigated with CCSM and similarly complex climate models will expand significantly as a consequence. The computing power necessities for next-generation climate models cannot be fulfilled without substantial advances in computer hardware, software, and storage, and the momentum building with sustained teraflops computing performance is allowing meteorologists to transition from climate to Earth System Modeling. Supercomputer systems suffer from classic climate model problems, including an imbalance between processor speed, memory bandwidth, and communication bandwidth between processors; greater programming and optimization difficulty; and a weak relationship between peak performance and performance on actual working climate model programs. Some of the presentations at the workshop focused on grid computing's prospects for facilitating international collaboration between climate modeling efforts.

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When the Numbers Crunch Guardian Unlimited (UK) (09/21/07) Arthur, Charles

The collapse of U.K. mortgage lender Northern Rock is largely due to a software-driven problem, not because the software did not work, but because it could not determine how its decisions would affect people's behavior, writes Charles Arthur. When the software said to make a loan, the bankers did so without question. Although a certain number of sub-prime mortgages are expected to collapse, it was impossible to predict how people would react upon hearing how many loans failed, highlighting how easy it is to forget that software drives much of today's money market. The problem with financial software programs is that they cannot calculate the random patterns of human behavior, such as people trying to buy a house lying about their finances and people selling the house lying about the interest rate. No amount of programming will be able to predict such behavior, particularly when people hear that their mortgage lender is built on such uncertain foundations. Statisticians do know a technique, known as the Monte Carlo method, for working out what such random inputs will produce by repeatedly running the calculation until it produces an answer that explains what makes the simulation deviate so drastically. This method, however, is a far cry from a program that can predict how humans will behave.

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Coding and Computing Join Forces Science (09/21/07) Vol. 317, No. 5845, P. 1691; Chazelle, Bernard

Coding and computing are being combined to improve error correction codes, and the effects of these efforts will be felt across all kinds of communication devices, writes Bernard Chazelle, a professor of computer science at Princeton University. List decoding, for instance, is a breakthrough that allows a message to be retrieved from its encoded version even if all but 1 percent of its information has been garbled, and the work that led to this milestone was pioneered by computational theorists. "Thinking now of the encoded message as another problem's 'solution sheet,' we conclude that even an algorithm so bad that it solves the new 'problem' erroneously 99 percent of the time can be used to recover the message correctly, and hence solve the original problem, all of the time," Chazelle explains. "Conversely, a problem known to be hard on just a few inputs can be transformed into one that is hard on nearly all of them." Such problems are highly desirable for cryptographers because they can be utilized to generate hard-to-decode encryption, Chazelle notes. He concludes that the search for a practical solution that addresses private information retrieval is far from over, and a key challenge on the horizon is figuring out a way to convert the mathematics of local decryption into working privacy tools.

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Countervailing Forces Propel Patent Reform **EE Times (09/17/07)No. 1493, P. 1; Merritt, Rick**

Congress, the court system, and the patent office are all pushing patent reform, often in different directions, and currently no one can be certain what the end result will be. Critics of the recently passed House bill, and the upcoming companion bill in the Senate, say that recent rulings from the courts and the patent office make the legislation redundant and unnecessary. Patent attorney and Licensing Executive Society President Allen Baum says the idea of patent reform is finally moving ahead, but no one is discussing its long-term impact and if the new changes will balance the system too much to one side. Baum says the issues surrounding patent reform are so complex that the LES has been unable to develop a unified position. Banking and consulting firm Ocean Tomo CEO James Malackowski argues that there has been almost no coordination in Washington on patent reform, and recently called for a cabinet-level position on intellectual-property policy and enforcement. United States Patent and Trademark Office director Jon Dudas countered by saying the administration has discussed patent reform with "scores of legislators," including sponsors of the House and Senate bills and judges from a variety of districts. The strongest opposition to the reform bills actually has come from the administration, which released a statement the day the bill was voted on in the House that says the administration disagrees with at least seven elements in the bill, though it does support switching to a first-to-file system.

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Election '08: Seeking a 'Tech President' **Business Week (09/19/07) Ricadela, Aaron**

Presidential candidates are courting the tech sector, partly because Silicon Valley has become a key fundraising source. "We want to make sure the next President is a 'tech President'--that they understand how innovation happens and have some concrete ideas about how to keep the tech economy growing," says Google's Adam Kovacevich. Among the promises candidates are making to the tech industry to capture funding and support is a boost in the federal research and development budget, greater importation of highly educated foreign workers into the United States, and improvements to U.S. math and science education. Major tech companies have a big stake in an increase in federal R&D funding, as they stand to gain tremendously from new markets engendered by technology breakthroughs. President Bush allocated \$22 billion to the National Science Foundation, \$17 billion to the Energy Department's Office of Science, and \$2.7 billion to the National Institute of Standards & Technology from 2008 to 2010 with his signing of the America Competes Act, but congressional appropriation of the funding has yet to occur, so tech companies are proceeding with caution. A curtailing of allegedly trivial, innovation-choking litigation by patent holders through patent reform is also desirable by the tech sector. Tech companies also want more foreign workers allowed in the country to fill a void in the tech workforce. Meanwhile, Democrats highly favor proposals to improve the state of math, science, engineering, and computer science education in grades K through 12; Democrats Hillary Clinton, John Edwards, and Barack Obama want broader changes than simple funding increases, with Clinton pledging to vastly raise the size and number of NSF fellowships, and make diversity a required criterion for federal education and research grants to encourage women and minorities to pursue math, science, and engineering-related fields.

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