The IEEE Computer Society’s lineup of 13 peer-reviewed technical magazines covers cutting-edge topics in computing, including scientific applications, Internet computing, machine intelligence, pervasive computing, security and privacy, digital graphics, cloud computing, and computer history. Here, we highlight recent issues of other Computer Society magazines.

Software

Testing in Safety-Critical Software Systems
The failure of some computing systems can cause frustration at the very least or economic loss at the most. But some systems designed for use in health monitoring or transportation can cause severe injury or even death. Jane Cleland-Huang, professor of software engineering at the University of Notre Dame, proposes an agile approach to developing safety-critical systems that includes brainstorming and analyzing safety failures, testing the system thoroughly, and creating a detailed record that connects each safety failure directly to every measure taken to fix it. Read more about testing and fixing safety-critical systems in the July/August 2017 issue of IEEE Software.

Computing in Science & Engineering

Equitable Computer Science Education for People with Learning Disabilities
An unprecedented effort is underway to expand learning opportunities in K–12 CS education, especially among women and minorities. However, those with specific learning disabilities and related attention-deficit disorders are often overlooked. As CS education initiatives grow, teachers need guidance to make computing more accessible for students who learn differently. Sarah Wille and Jeanne Century of Outlier Research and Evaluation, and Miriam Pike of the Wolcott School in Chicago, report on the first phase of a National Science Foundation–supported study in “Exploratory Research to Expand Opportunities in Computer Science for Students with Learning Differences,” published in the May/June 2017 issue of Computing in Science & Engineering.

Datacenters Are Seeing Green
The largest datacenters can consume 100 MW of energy—equal to the power consumption of 10,000 US households. As modern computing workloads, storage, and processing continue to grow at an unprecedented rate, datacenter operators continually search for more energy-efficient designs. However, operators closely guard their designs to give themselves a competitive advantage. Fortunately, the Massachusetts Green High-Performance Computing Center opened its doors to researchers so they could study the energy efficiency of the sprawling 90,000 square-foot facility. The center uses key advances in cooling and power distribution such as evaporative cooling towers that take advantage of the relatively low outdoor air temperatures, spinning flywheels for energy storage, and high-voltage/low-current power networks to reduce transformer losses. Read more about the design and operation of a “green” datacenter in the July/August 2017 issue of IEEE Internet Computing.
Legal Challenges to Auditing Elections

George Washington University computer science professor Poorvi Vora once said, “Brush your teeth. Eat your spinach. Audit your elections.” This is the prevailing wisdom among researchers who were disappointed that the 2016 US presidential election results were not audited to confirm who won. “Auditability, or verifiability, of election outcomes is perhaps the most important security requirement for voting systems,” write authors Ronald L. Rivest of MIT and Philip B. Stark of the University of California, Berkeley. Read more about the challenges faced by researchers in creating reliable voting systems in the May/June issue of IEEE Security & Privacy.

Stopping Cybercrime and Pursuing Criminals

With sensors and devices everywhere, cybercriminals have a rich environment to steal personal information, wreak havoc on business operations, engage in malicious attacks, stalk people, or even engage in the abuse and exploitation of children. Companies are fighting back, and researchers note a two-pronged approach: First, computer scientists must close loopholes that leave individuals and organizations vulnerable. Second, forensics experts must collect evidence and relentlessly pursue criminal investigations to put cybercriminals away. Furthermore, they must do it while simultaneously protecting individual privacy. It’s a tall order. Read more about the future of cloud forensics in the May/June 2017 issue of IEEE Cloud Computing.

A Multibillion Dollar Industry Ups Its Game

With profits topping $91 billion worldwide last year, the world of gaming technology is reinventing the gameplay experience. Researchers are studying the latest innovations in user interface technologies to see which features provide the most satisfying, realistic user experience. They conducted a study with 50 participants (38 males and 12 females), of varying ages and gaming expertise, playing a variety of popular games including Hustle Kings, Pain, The Fight, and Tumble. Their findings concluded that combining three significant features provides the most immersive and engaging experience: stereoscopic 3D visuals, head tracking, and hand-gesture interfaces. The increased physicality and realism these features bring to gaming allows players to face off against zombies, monsters, enemy soldiers, and athletes, or explore places they’ve never been. Learn more about these gaming developments in the May/June 2017 issue of IEEE Computer Graphics and Applications.

How to Use Amazon and Twitter to Fine-Tune Your Advertising Campaign

Any effective ad campaign must target the right audiences and say the right things. Typically, marketers mine social media and product reviews, track geographical locations, and monitor the purchase histories of consumers to fine-tune their advertising. The problem is that, while companies may be told what consumers like, they aren’t told why. Mauro Dragoni, a research scientist at Fondazione Bruno Kessler, in his article “A Three-Phase Approach for Exploiting Opinion Mining in Computational Advertising” published in the May/June 2017 issue of IEEE Intelligent Systems, describes a system that mines Amazon’s highly detailed reviews for the product features people mention.
most, determines their opinion about them, and extracts that information to create effective advertising tweets that can be posted quickly to the timelines of the best audiences. As proof that the system works, Dragoni’s team was able to boost user engagement more than 12 percent when their messages hit Twitter timelines.

**Telepresence Robots at Conferences**

With recent US restrictions on international travel, the continuing high cost of airfare, and the recent airline scandals involving passengers, the thought of flying seems anything but friendly. However, it gave Susanne Boll—professor for media informatics and multimedia systems at the University of Oldenburg—a chance to attend a conference in Denver remotely by using a BeamPro telepresence robot to interact with other conference attendees. Her experience showed some of the benefits and drawbacks to using the BeamPro robot in a conference environment. Read more about Boll’s experience as a robot in the July—September 2017 issue of *IEEE MultiMedia*.

**Child Exploitation: How Detectives and Algorithm Engineers Partner to Catch Predators and Rescue Kids**

Computer forensics experts have developed algorithms that scour the Internet for images and video of child sexual assault so they can help build a case against the perpetrators, find missing children, and get the images and videos removed from the Internet. Mitali Thakor of Northwestern University, on the history of forensic science as it relates to child exploitation, reminds us that, “The detection and removal of child pornography online is a vexing process, weighted with moral urgency.” Read more in the April—June 2017 issue of *IEEE Annals*.

**EMS in Gaming**

Researchers are developing a haptics system based on electrical-muscle stimulation (EMS) that will allow gamers
to feel and interact with objects and people in a virtual environment. Because the EMS electrodes are small and lightweight, the technology lends itself well to wearables and very realistic, full-body experiences. In their July–September *IEEE Pervasive Computing* article, Pedro Lopes and Patrick Baudisch of the Hasso Plattner Institute note that “EMS-based systems entail a kind of human augmentation that is both invisible and well integrated with the user.” These EMS-based systems can also be used to help people learn physical tasks and recover mobility after injury.

**Against All Odds: The Development of Post–Cold War Russian IT**

Russian hackers and their alleged meddling in modern elections is only part of the rich history of Russian information technology. Early Soviet isolation à la the Iron Curtain kept the country’s IT development limited to the military and R&D institutions. However, the country’s developers continued to pursue clever software engineering approaches and algorithms backed by a solid focus on fundamental mathematics. The collapse of the Soviet Union in the early 1990s and the dot-com boom of the late 1990s produced a pool of Russian software developers who provided cheap outsourced labor to US companies. However, the dot-com bust and relative stabilization of the Russian economy in the early 2000s allowed the country’s developers to turn their attention to companies back home. Although the history of Soviet IT is marked by a lag in hardware development, IT infrastructure, and legislation, it’s also characterized by a well-educated population and creative, one-of-a-kind IT projects. Read more about the emergence and development of Russian IT in the May/June 2017 issue of *IT Pro*.

**Energy-Interference-Free Debugger**

Energy-harvesting devices are one giant step closer to simpler, greener technology. They derive power from solar, thermal, wind, and kinetic energy without all the messy wires and batteries. The problem? Software runs best in uninterrupted, continuously powered systems. Unfortunately, energy-harvesting devices experience frequent power failures and interruptions, especially when they need to get juiced up. The constant cycle of charging and discharging makes the interruptions—and resulting program errors—unavoidable. These errors must be debugged, but conventional debuggers don’t work because they interfere with the target’s power supply. That’s why researchers propose the Energy-Interference-Free Debugger (EDB), a tool that can debug while monitoring and manipulating the target’s energy level without permitting any significant current to flow between the debugger and the target. Read more about this energy-efficient system in the May/June 2017 issue of *IEEE Micro*. [Read more](http://mycs.computer.org)