The IEEE Computer Society offers a lineup of 12 peer-reviewed technical magazines that cover cutting-edge topics in computing including scientific applications, design and test, security, Internet computing, machine intelligence, digital graphics, and computer history. Select articles from recent issues of Computer Society magazines are highlighted below.

**Software**

Climate change is likely to be one of the defining global issues of the 21st century. The past decade—the hottest in recorded history—has witnessed countries around the world struggling to deal with drought, heat waves, and extreme weather. The sheer scale of the problem also makes it hard to understand, predict, and solve. Climate science journals regularly publish special issues on specific climate models, typically timed to present results from a major new release of a given model. However, these tend to focus on the new science that the model enables, rather than describing the software and its development. The November/December special issue of *Software* focuses on the software behind climate change models.

In “Hierarchical and Modular Surveillance Systems in ITS” in the September/October issue of *IS*, the authors describe video surveillance system studies aimed at developing and increasing the capacity to obtain various types of traffic information. Based on the analysis of problems in present surveillance systems and their understanding of the current status and future of surveillance systems, the authors propose a new framework for video surveillance systems, the hierarchical and modular surveillance system (HMSS).

**Intelligent Systems**

Over the past 30 years, video surveillance systems have been a key part of intelligent transportation systems (ITSs), which use various image sensors to capture visual information about vehicles and pedestrians to provide real-time information about traffic conditions. Specifically, they capture vehicles’ visual appearances and support mining more information about them through detection, localization, classification, recognition, behavior analysis, and so on. Video systems also help generate overall vehicle statistics such as estimations of flow rate, average speed, and density.

Researchers have previously studied brain injury in children by assessing linear and angular accelerations, but without taking into account vibratory loads. In “Modeling Neck and Brain Injuries in Infants” in the November/December issue of *CG&A*, authors Ernesto Ponce, of the Universidad de Tarapacá, and Daniel Ponce, of the Universidad Federal de Santa Catarina, propose an approach that employs a new mathematical head model that includes vibration to analyze how shaken-baby syndrome affects infants. To account for vibrations, the model applies finite-element methods to model the stresses, strains, and displacements in the neck vertebrae and brain.

Scientific computing increasingly involves massive data; in astronomy, observations and numerical simulations are on the verge of generating petabytes. This innovative data-centric computing requires a new look at computing architectures and strategies. In “Extreme Data-Intensive Scientific Computing” in the November/December issue of *CiSE*, author Alex Szalay of Johns Hopkins University says that by using Amdahl’s law to characterize architectures and workloads, it’s possible to use existing commodity parts to build systems that approach an ideal Amdahl machine.
Techniques that enhance television sports broadcasts use algorithms to track objects such as a ball or puck to create informative, graphical visualizations embedded into the broadcast image. A coalition of researchers from sports broadcasters and Georgia universities investigate recent advances in sports visualizations in “Augmenting Live Broadcast Sports with 3D Tracking Information,” in the October-December issue of *MultiMedia*.

In the basement of the Hoover building in Washington, D.C., FBI employees and contractors are working together to create Sentinel, a case-management software system designed to revolutionize how the FBI gathers, stores, and links its data. Read “The FBI Gets Agile” in the September/October issue of *IT Pro* to learn how the FBI team used agile methods to transform this time-consuming, expensive, and off-track government IT project into a successful program. The FBI’s experience in developing Sentinel provides practical insight into how government agencies and other traditionally nonsoftware-development-focused organizations can exploit agile methodologies.

The electrical efficiency of computation has doubled roughly every year and a half for more than six decades, a pace of change comparable to that for computer performance and electrical efficiency in the microprocessor era. “Implications of Historical Trends in the Electrical Efficiency of Computing” in the July-September issue of *Annals* looks at how these efficiency improvements enabled the creation of laptops, smartphones, wireless sensors, and other mobile computing devices, with many more such innovations yet to come. A Web Extra appendix outlines the data and methods used in this study.

“GPUs and the Future of Parallel Computing” in the September/October issue of *Micro* discusses the capabilities of state-of-the art GPU-based high-throughput computing systems and considers the challenges to scaling single-chip parallel-computing systems, highlighting high-impact areas that the computing research community can address. A team of authors from Nvidia Research describes the firm’s Echelon project for developing architectures and programming systems that aim specifically at the energy efficiency and locality challenges facing future systems.