Converging on Consumer Needs

The IEEE future directions Committee, along with the Future Directions Committee of the IEEE Consumer Electronics (CE) Society, will host an IEEE convergence event at the IEEE International Conference on Consumer Electronics (ICCE), organized by the CE Society. The title of the event is "Conversion of Human Needs" and will take place for a half day on 10 January 2014, the first day of the 2014 ICCE.

Two sessions, from 10 a.m. to 1:20 p.m., will explore the anchor topic, cloud computing and big data, with distinguished expert speakers representing life sciences, the smart grid, and transportation electrification. The event will feature a keynote talk by David Alan Grier, 2013 president of the IEEE Computer Society, who will demonstrate how all the IEEE groups represented in this event tie back to cloud computing and big data.

Each expert in the event will detail how his/her topic leads to a convergence with the overall event theme and provide clear examples. All of these talks center around the 2014 ICCE theme of "next-generation mobility, the level of experience with the promise of collective intelligence, richer features and functionality, as well as improved connectivity, interoperability, and interaction for the large and growing base of smartphone users."

Converging technologies, formerly seen as very different and unconnected

David Alan Grier will demonstrate how IEEE groups tie back to cloud computing and big data.

fields, have the potential to enhance consumers' daily life in diverse areas, including transportation, health care, energy use and availability, education and human communication, and almost every way that humans have to interact with each other and the world around them. At the conclusion of the presentations, a Q&A session with all of the presenters will allow interaction with the audience to create a new vision of human prosperity, health, and hopes.

KEYNOTE TALK

David Alan Grier from the Center for International Science and Technology Policy at George Washington University will give a keynote talk at the ICCE on 10 January 2014 titled "The Technology and the Application: The Challenges of Targeted Development."

ABSTRACT

When trying to plan and manage research and development, all organizations must address a list of well-known problems. Targeted research and development (R&D) can be expensive, carries a high risk of failure, and disrupts organizations. Perhaps no problem is subtler than the problem of mismatching technology and initial application. When a new technology is matched with an application that is unlikely to be successful, the technology can develop in an awkward way that ultimately slows its progress. This talk reviews four classes of successful software and technology applications and assesses the prospects of the current and past Future Direction Committee initiatives in light of those classes.

DAVID ALAN GRIER

David Alan Grier was the president of the IEEE Computer Society in 2013 and has spent much of the past decade helping the Society develop new electronic products, edit its periodicals, and write for its members. He has served as editor-in-chief of *IEEE Annals of the History of Computing*, chair of the Magazine Operations Committee, and an editorial board member of *Computer*. He formerly wrote the monthly column "The Known World" (www.computer.org/theknownworld).

Outside the Society, he works as an associate professor of science and technology policy at George Washington University in Washington, D.C., with a particular interest in policy regarding digital technology and professional societies (www.gwu.edu/~cistp/). There, Grier has worked as a university administrator for the past 20 years and has demonstrated a capacity for

organizational management. He served as leader of the undergraduate computer systems degree, director of the university honors program, assistant dean of engineering, and associate dean of international affairs.

Grier has worked extensively within the computer industry. He started as a programmer and systems designer for the Burroughs Corporation. He has also worked extensively as a consultant in the field. A more detailed biography can be found at www.dagrier.net.

PARTICIPATING IEEE FUTURE DIRECTIONS COMMITTEES

CLOUD COMPUTING AND BIG DATA

With the continued steep growth and demand for smart mobile devices, leveraging cloud computing and big data technology is critically important. Portio Research predicts that the number of mobile subscribers worldwide will reach 6.5 billion by 2013, 6.9 billion by 2014, and 8 billion by 2017 (http://www.portioresearch.com/en/ reports/current-portfolio/worldwide-mobile-handset-installed-base-2012–2016.aspx). Cloud computing offers the promise of ubiquitous, scalable, on-demand computing resources provided as a service to support all of these mobile devices and their support infrastructure.

The last few years have seen a remarkable explosion in the scale of data problems relevant to industry, government, and society. From genetic analysis to fraud detection, the scale of the data landscape combined with the unstructured nature of the data types has led to new forms of distributed information processing and storage. This rising field has come to be known simply as "big data."

Life sciences, the smart grid, and transportation electrification technologies are viewed as separate and distinct technologies. When these technologies are introduced relative to how they use cloud computing and big data services, they become interrelated and converged.

LIFE SCIENCES

There is excitement in the current movement toward consumer-driven health care. This movement is fueled by the advancements and convergence of cloud computing, big data, life sciences, and next-generation mobility. The sector of medical electronics with mobile devices, handheld devices, and wearable devices is growing strong, with shorter time-to-market and more rapid development cycles. Consumers now have access to an unprecedented volume of health-related information, including electronic medical records, genomic data, medical images, measurements from wearable monitoring devices measurements, data from mobile health-care apps, and information from social media channels and online forums.

Cloud-based platforms give consumers enormous processing power to analyze and interpret massive amounts of data with machine learning technologies and data-analysis tools. We are able to manage our health care at a new level, with data-rich diagnosis and personalized treatments. Of course, there are challenges that will need to be addressed, such as the security of protected health information, the role of the doctor versus that of the patient, the classification of reimbursable medical expenses, and others. Nevertheless, there is great potential for health-care improvements with the integration of cloud computing, life sciences, and next-generation mobility.

SMART GRID

Even as the system-of-systems known as the smart grid is in its infancy, developing and evolving around the globe, communications—which by definition is an integral element of the modernized grid—is also evolving. Four years into the Smart Grid Investment Grant, projects launched through the U.S. Department of Energy American Recovery and Reinvestment Act of 2009 are reporting developments from deployments of demand response, microgrids, advanced metering infrastructures, and other myriad technologies. Meanwhile, smart mobile devices, including smartphones, pads, and tablets are becoming more capable computers, and mobile social networks flow and flux in support of everything from simple socializing to fundamental change.

Smart grid apps are in use by early adopter utility companies such as San Diego Gas & Electric, which developed the mobile Power Tools app to help its customers take control of energy use and reduce bills. Energy monitoring or tracking apps will evolve into true home energy management (HEM) system mobile apps to provide remote control and management of smart thermostats, appliances, and hybrid or electric vehicles (EVs). HEM systems are in the early stages of what is expected to be a hockey-stick growth.

Social networks proved to be critical communications outlets for electric utilities during Hurricane Sandy, as several kept customers apprised of service restoration schedules via Twitter and Facebook. They will continue to serve as of-the-moment and on-the-go sources of information on everything from available EV charging stations to energy saving comparisons.

Utility companies will also take advantage of mobility with their modernized grids. At least one service has already been launched that uses the cloud and software-as-a-service to give workers access to real-time data to monitor grid systems and receive alerts.

TRANSPORTATION ELECTRIFICATION

How much of one's time is spent in an automobile, train, bus, plane, or ship? As you commute, have you thought about traffic jams, the greenhouse effect, gasoline prices, oil dependency reduction, and safety or wished someone or something could drive for you? There is a tremendous effort in the industry and academia to create innovative solutions to help the consumers with their commute. Collision-avoidance sensors have begun to be included in some vehicles. With the improvements in battery technologies and charging technologies, electric cars, buses, and commercial trucks are in the news. Connected vehicles will be more prevalent via cloud computing and the smart grid, as consumers can access traffic information before and during

their commute to circumvent congestion and locate the nearest charging station. With the tremendous amount of data collected via sensors, safety, and road data, there are great convergences of cloud computing, life science, and smart grid for cleaner, more efficient, connected, and safe vehicles.

—Tom Coughlin
Chair of the CE Society Future
Directions Committee

The Context for GCCE

The IEEE Consumer Electronics (CE) Society continues to be one of the hot topics within the IEEE public visibility campaign. CE converges and interfaces with many other fields including communications, power grid, and health care, which have enormous ramifications for and value to humanity. CE products include TV and display technologies, audio-visual processing and streaming, wireless and radio frequency in CE, home networks and services, mobile computing and communications, automotive entertainment and information, user interfaces and experience in CE, security and rights management, storage and digital media, smart grid, home medical and health care, embedded technologies, green energy, and enabling technologies. These technologies blur the boundaries between countries to create a diverse technical community reaching consumers around the world.

The IEEE Global Conference on Consumer Electronics (GCCE) 2013 was honored to have had the support of Mr. Hideo Fuseda, group manager, Communication Standard Group, Japan Ministry of Internal Affairs and Communications, and Mr. Hisashi Sekine, director, Digital Consumer Electronics Strategy Office, Japan Ministry of Economy, Trade, and Industry.

If you would like to be a part of one our conferences, please contact me at stephendukes@ieee.org.

We are privileged to have the opportunity to thank you for attending the second GCCE in Makuhari, the greater Tokyo area, Japan. This memorable conference took place in the International Conference Hall of Makuhari Messe simultaneously with CEATEC Japan 2013, which is one of the biggest CE shows in the world.

—Stephen Dukes
Vice President, Conferences,
IEEE CE Society

An Overview of the Second IEEE GCCE

The second IEEE Global Conference on Consumer Electronics (GCCE 2013) was held in Tokyo, Japan, on 1–4 October 2013. This conference was modeled on the long-established—now more than 50-year-old—IEEE Consumer Electronics (CE) Society flagship conference, the IEEE International Conference on Consumer Electronics (ICCE), which is held annually and colocated with the CE Society trade show in Las Vegas.

GCCE is held in conjunction with the Japanese Consumer Electronics Show (CEATEC Japan) and, in Japan, this conference has the support of the CEATEC, for which we are very grateful. Such cooperation allows delegates to attend a very important CE show and attend our conference in the same visit to Japan. Due to the cooperative relationship with CEATEC, GCCE attendees are welcomed to CEATEC Japan, and our keynotes and symposiums are open for CEATEC attendees. This is an exemplary effort to exchange information and knowledge of trends and agendas in the CE field across members of more than 15 professional engineering societies.

The IEEE CE Society has already held two successful conferences, the ICCE in Las Vegas in conjunction with the Consumer Electronics Show and ICCE–Berlin in conjunction with IFA.

The GCCE is a sister conference of the ICCE and the ICCE–Berlin and is held in conjunction with the CE show CEATEC Japan as well. As a result, the IEEE CE Society has three annual conferences in conjunction with famous and large CE shows in three regions—the United States, Europe, and Asia—every year.

CONFERENCE STATUS AND IMPACT

The conference offers a venue for engineers, scientists, and researchers from the academic community and industry to present papers on technology innovation and professional networking. CE is an exciting segment focused on the latest research and technology