

Kickstarting Collaboration

By Peter Corcoran

Last issue, I laid out a long-term vision for *IEEE Consumer Electronics Magazine*. In a nutshell, the goal of this vision was to reach out to a wider audience across the IEEE, creating in the process a cross-disciplinary focal point for articles relating to consumer electronics (CE)—more readers, more content, but keeping the same focus on CE.

As I commented in the last issue, our circulation to date has been limited to members of the IEEE CE Society, and we are not one of the larger IEEE Societies. That is why it is important to break out of our own closed loop and bring *IEEE Consumer Electronics Magazine* to a larger audience both in terms of readership and an author base for new content challenging our established worldview.

Of course, six months ago, this was all just an idea, an aspiration that evolved out of some discussions at our September face-to-face meeting of the CE Society Board of Governors. But with the support of other members of our board, and, in particular, the support of the current CE Society president, Stefan Mozar, I'm happy to say that we are moving theory into practice starting with this issue.

REACHING OUT

As with any such initiative, there has been a degree of reaching out to colleagues in other Societies and at various levels throughout the IEEE. In January, we provided a wider distribution of the

magazine, and this continued in April for some of the smaller Societies as we have also published some articles related to their fields of interest.

But to date, most of these interactions had been quite tentative. Yes, everyone was supportive, many expressed how impressed they were with past issues of the magazine, and we did have some additional content submitted, but then discussions would turn to the practical matter of how this would work.



Our vision resonates strongly with one of the most relevant IEEE Societies to compliment our CE focus.

For me, this should be simple—any IEEE Member can now subscribe to *IEEE Consumer Electronics Magazine* regardless of their Society memberships. Each Society can thus decide if and how *IEEE Consumer Electronics Magazine* is made available to their members (e.g., as a free member benefit, optional discounted subscription, etc.). The other matter open for discussion is financial partnership—the magazine is more expensive to edit and publish than an archival research publication, so it makes sense to share some of those costs.

Of course, this is where the discussion starts to become quite complicated, in fact, more complicated than you might imagine! I was becoming a little

concerned that I might still be theorizing about my grand vision for the magazine in a year's time.

ESTABLISHING RESONANCE

Fortunately, our vision resonates strongly with one of the most relevant IEEE Societies to compliment our CE focus. The IEEE Society on Social Implications of Technology (SSIT) was founded in 1972 as the Committee on Social Implications of Technology and moved to full Society status in 1982. The field of interest of the SSIT is “the impact of technology (as embodied by the fields of interest of IEEE) on society, including both positive and negative effects, the impact of society on the engineering profession, the history of the societal aspects of electro technology, and professional social and economic responsibility in the practice of engineering and its related technology.” And where does electronic engineering have greater impact on our daily lives than through CE?

Thanks for establishing this relationship are due to our president, Stefan Mozar, who is working on a full memorandum of understanding with SSIT. For bringing the relationship into practical realization, thanks to Katina Michael, the editor-in-chief of *IEEE Technology and Society Magazine*. Originally established in 1982, *IEEE Technology & Society Magazine* is one of the most established and award-winning IEEE magazine publications, with a long track record.

I will say a little more about Katina's role, as she has been very helpful in pre-selecting a range of articles for suitability

to include in *IEEE Consumer Electronics Magazine*. Largely because of her help, we have been able to bring you the new “Impacts” section in this issue. Thanks are also due to Tom Coughlin, Tom Wilson, and William Lumpkins for their help with some accelerated reviews on the articles in the “Impacts” section.

THEORY INTO PRACTICE

Regular readers of the magazine will know that I am always interested in highlighting the broader impacts of CE engineering on society [1]–[4]. As engineers working in the field of CE, we are the electronic architects of tomorrow. But the scope and scale of impact that our designs and architectures can have on society and on the economy place significant responsibility on our shoulders.

CE is not just about the design and manufacture of electronic systems and products. These devices and their ecosystems have been changing our lives since the introduction of the TV set in the 1950s and 1960s. And today, their impacts are felt on a global scale, not just in the developed world, but increasingly among those in the developing world.

Thus, I am very happy to be able to introduce a new section of *IEEE Consumer Electronics Magazine*, aptly titled “Impacts” and launched this issue in collaboration with *IEEE Technology & Society Magazine*. This new section is introduced to help facilitate a broadening of our perspective on the world of CE and to learn more of the various impacts of CE on society. It is introduced in partnership with the IEEE SSIT.

This is our first attempt at such a cross-disciplinary section, but I think it is a pretty good start—at the same time, I would really like to hear what some of you think. So please feel free to contact either me or Katina to give your feedback. We welcome suggestions for topics or subject areas that should be addressed in future editions of “Impacts.”

WHAT'S IN THIS ISSUE

Back to business with our usual round-up of what is in the current issue, with background, editorial comments, and acknowledgments for each item where appropriate.

CE NEWS, EVENTS, AND CHAPTERS

We still have our usual round-up of CE conferences, meetings, and local Chapter events.

AHEAD OF THE TIMES

An interesting piece recalls the work of long-time CE Society member and innovator Richard Doherty on the Pratt urban transport vehicle. Richard’s team developed the first rearview system based on electronic video—an even more impressive achievement as it was undertaken more than 40 years ago, in 1972. Interestingly, today’s regulators have just caught up with Richard and his team, as the United States has recently announced that such rearview



The IoT refers to uniquely identifiable objects and their virtual representations in an Internet-like structure.

systems will be mandated for all new vehicles by 2016. As Richard was overheard recently, while commenting on the rewards of being an engineer, “...sometimes you have to be patient—very, very patient!” Congratulations to Richard for his perseverance in 1972 to show the feasibility of this technology and his exemplary patience in the meantime, waiting for over 40 years to see it finally adopted.

THE BEST PAPER AWARDS AT ICCE 2014

In this issue, we have a detailed news item on the Best Paper Awards from Narisa Chu, the current awards chair of the CE Society Board of Governors. This year, the CE Society funded several award-winning students from different CE conferences to travel to the IEEE International Conference on Consumer Electronics (ICCE) 2014 to participate in a special session and also experience firsthand our premier international CE conference, ICCE.

Each of these young CE researchers has provided a short article based on his

or her experiences at ICCE and his or her perspectives on various conference events and presentation sessions. This is a very nice way to recapture the excitement and atmosphere of ICCE through the eyes of the next generation, and I do hope that we will see it repeated for ICCE 2015. A big thank you to Narisa and all of the participating students.

A 60-YEAR TRADITION LOOKS TO ITS YOUNG MEMBERS

Other articles in this issue’s news and events section include some reports from our Young Professionals chair, Carsten Dolar, and a short piece from the editor of *IEEE Transactions on Consumer Electronics (T-CE)*, Simon Sheratt, reminding us of the diamond anniversary of *T-CE*. This represents 60 years of CE—one of the longest-running IEEE journals and a proud tradition for the CE Society. Well done to Simon and the editorial board of *T-CE*!

On the subject of youth, we have a detailed article by Tom Coughlin with details of the Young Member Survey carried out by him in 2013. The survey was designed to gain an understanding of the experiences and perceptions that the younger generation has with respect to CE. By better understanding their perceptions and motivations, we can better adapt the CE Society to meet the needs of our younger members. Tom is an unstoppable force within the CE Society, and I hope that his new senior role within the IEEE will not keep him from continuing his exemplary contributions to the Society. Thanks for your work on this survey, Tom, among many other things!

Finally, there are reports from two CE Chapters—the Malaysian Chapter from Thinagaran Perumal and the West Japan Chapter from Tomohiro Hase. Our president, Stefan Mozar, has visited both Chapters recently, and you will find some details of his visits in each of these reports.

SOAPBOX—NO TECHNOLOGY LEFT BEHIND

We have a “Soapbox” column from Craig Hillman of DfR Solutions, a leading provider of electronics design reliability engineering services for the electronics

industry. DfR supports clients across electronic technology markets including aviation and aerospace, automotive, consumer, industrial, medical, military, solar, and telecommunications as well as throughout the electronic component and material supply chain—so they have a very broad perspective on the electronics industry. In this article, the focus is on the recent problems experienced with the hard drives in the latest gaming consoles. Even though many of the underlying technologies in a hard drive system are quite mature, it is still important to understand the underlying complexity and the sensitivity of such systems—and despite the market growth in SSD technology, disk drive technology is not going away any time soon. Hence, the mantra of this “Soapbox”: if you drop the relevant expertise in older technologies from your design team, you do so at your own peril. We thank Dr. Hillman for his welcome insights.

MAIN FEATURES

POWER FROM THE VOID?

One of our feature articles this issue from Steve Perlman’s review and assessment of a new wireless technology known as pCell (www.artemis.com). Our review by Imran Akbar is a mix of technical evaluation and some interesting extrapolation of the hidden potential of pCell technology. This article is more technical in places than a typical *IEEE Consumer Electronics Magazine* feature, but I feel it is important to see that there is a practical foundation to what appears to be such a revolutionary technology. In this regard, pCell offers a means to properly enable next-generation mobile networks based on the LTE and G4 technologies that are currently being rolled out globally. Most importantly, it works with current devices that are LTE enabled, so you would not need to change your existing iPhone or Galaxy to take advantage of pCell. In fact, pCell appears to be an improved variant on network MIMO—a beam-forming technology that is included in proposals for G5 networks. But it is interesting because it is here today and has been demonstrated to work with today’s mobile devices.

In a personal aside, I will note that this technology suggests a more energy-efficient way to use LTE networks. As I have commented in previous works [2], [5], the potential growth in the power requirements of wireless networks was a key factor in evaluating the future energy demands related to networked CE devices. But the efficiencies introduced by pCell technology mean that far more users can be supported with significantly reduced broadcast power levels. That’s good news for global



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electricity demand and also for the CE sector, as practically every device is getting connected these days.

But perhaps the most exciting aspect of this technology is that it allows a small focused bubble of RF energy to be created in the vicinity of each mobile device. Although Perlman has not publicly discussed this potential application, his company has filed multiple patents directed at this and related principles. The article references some of these and joins a few dots together, painting a picture of an interesting future that may offer a genuinely practical solution for the wireless powering of consumer devices. There is, perhaps, a bit more math and speculation than we would normally feature, but I hope you find it interesting.

TUTORIALS AND THE INTERNET OF THINGS

Our first tutorial covers the silicon processes involved in today’s manufacturing and how these impact chip design. This is authored by Larry Zhang, a past president of the CE Society and editor of *IEEE RFID Virtual Journal*, and provides a useful overview of current practices. It will be

useful for our readers seeking to better understand how the components at the heart of today’s devices are manufactured and the limitations that apply.

The second article covers the writing of archival research articles for *TCE*. As mentioned previously, *TCE* just celebrated its 60th birthday, and this article is from *TCE* Editor-in-Chief Simon Sherratt. Thanks, Simon.

Elsewhere in this issue, you will find a call for papers for the January 2015 issue on the topic of CE and the Internet of Things (IoT). Here, we have an article from Joseph Wei, who is also an active volunteer in the Santa Clara Chapter of the CE Society. Joe acts as industry liaison for that Chapter, and he has gathered some thoughts and perspectives on how the growing market for wearable technologies will begin to enhance and transform today’s IoT technologies. Are we seeing a new synergy emerge? Joe’s article can point you in the right direction to understand these emerging industry trends.

CE IMPACTS

I have already covered this new section of *IEEE Consumer Electronics Magazine* in my introduction. Suffice it to say, this is where you get to read about the wider impacts of CE technologies. In this issue, we will cover security robots, public perceptions of biometric technology, lessons the developed world can learn from cell phone banking in Africa, and the impacts of recent public revelations of extensive U.S. National Security Agency eavesdropping on our personal privacy. Not a bad selection of topics to tackle in our first issue!

ROBOCOP—SECURITY FOR THE WORLD CUP

Soccer is a sport that often brings out strong emotional reactions among team supporters. Sometimes, this can erupt into fighting between the supporters of rival teams and even threaten the players on the field. Any of our readers with an interest will know that the 2014 World Cup takes place in Brazil, and it will be over by the time you read this issue. But what is really interesting is the approach that the Brazilian authorities have taken

regarding security. They have invested in a pack of 30 specialized military-grade robots to suppress incidents in the crowd during games.

Katina Michael and M.G. Michael explain the use of these machines in Brazil and consider a range of wider implications not only for sporting events but within a broader social context. The use of these robots is still far removed from Robert Sheckley's dystopian novella *Watchbird*, but it is certainly a first step along that path.

BIOMETRICS—PUBLIC PERCEPTIONS IN THE CZECH REPUBLIC

I recently penned a “Soapbox” article on the topic of biometrics and CE [3]. A central argument was that personal devices combined with biometrics offer a powerful means of personal authentication but also some of the core problems associated with a widespread use of biometrics. The “Soapbox” column in this issue focuses on a detailed survey of public opinions on biometric technology. It deals with the attitudes and thoughts of inhabitants of the Czech Republic. These data are useful for the manufacturers of systems and appliances incorporating biometric technology to understand and adapt their systems to meet the needs and expectations of their users and customers. It is also useful for researchers to better understand these new technologies and, more specifically, the knowledge and attitude of the average citizen to them.

The results of this study clearly show some of the challenges in gaining acceptance of these technologies by the everyday consumer, although it is also shown that people are widely convinced that the increased use of biometrics will improve their personal safety and security.

POSTCRISIS ACCESS TO THE FINANCIAL SYSTEM—LESSONS FROM AFRICA

This article discusses the problem of the unbanked in the developed world. This problem has increased since the global financial crisis, and many citizens live their daily lives outside the

regular banking system. The author looks to the experiences in Africa, where mobile phone technology led to an economic minirevolution in countries where it has been introduced.

I had always been curious to understand how m-banking operated and how Africa came to lead in this area, and in this article, we not only gain such insights but it is also explained how the same economic effects might be encouraged in the developed world. The author discusses how new European Union legislation requiring financial institutions to provide a basic cost-free banking service might be reasonably met using mobile phone technology



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and a pay-as-you-go credit system as in Africa. In this regard, it appears that there are lessons to be learned from the developing world and, in particular, the African m-banking experience.

PAYING FOR PRIVACY

To wrap up our first “Impacts” section, we have an analysis and discussion of privacy in the consumer sector by Stu Lipoff. Stu is our current vice president of publications and has worked for many years as a consultant to the cable industry. His article looks at the current state of privacy and considers how the CE industry will have to work toward improved models to manage and protect customer data. While this will cost companies, it is also clear that as improved models evolve, customers will turn to service providers who adopt improved privacy and security safeguards for their customers.

REGULAR COLUMNS

As usual, we feature most of our regular columns. In this issue, we do not have a “Standards” column, as a new standards chair was appointed at the September meeting of the CE Society Board. I expect we will have a full article next issue once the incoming chair gets up and running in his new role.

BITS VERSUS ELECTRONS

As usual, Bob Frankston provides a thoughtful and insight-laden commentary on how things are and how they should be. Bob's column is one of my favorite parts of the magazine because he so readily integrates the broader socioeconomic perspectives with a strong understanding of the underlying technology.

In this column, he takes a look at connectivity and medical technology. As Bob says, “If I'm in a doctor's office, I can wear a sensor (perhaps a bracelet) that can be wired to a monitor in the doctor's office. I can replace that wire with an Internet connection and the doctor can continue to monitor me anywhere I travel throughout the world...” But naturally, it is not that simple because layers of intermediate protocols are justified by intervening service providers relying on 20th-century business models. As always, Bob's column will get you thinking.

THE ART OF STORAGE

I have already thanked Tom Coughlin in this editorial for his work on our Young Member Survey. Here, he provides us with his quarterly insights on the CE storage sector. This article, “Thanks for the Memories,” looks at the rise of solid-state memory and its impact on CE systems and designs. SSD is still relatively expensive, and it will continue to be with us for a while yet, but Tom looks at how it is likely to evolve and considers how other system components will evolve as costs for solid-state memory become commoditized. As always, it is an interesting and insightful perspective on this topic. Thanks, Tom!

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Similar interest exists in India. We are in the process of establishing a regular conference or two in Hyderabad and Bangalore. Later this year, we will conduct a workshop in Hyderabad in conjunction with the local section under the leadership of Dr. Srinivas and his team. In Bangalore, we are still in the early planning stage. We are working with Prof. Ravikiran and the CE Chapter chair, Mr. Koushik.

We also have plans for expansion of CE activities in Europe. Toward the end of this year, we will host a workshop in London with the support of Prof. Ezendu

Ariwa. Last year, the University of Reading established a chair in CE, and none



Our Society is actively growing Chapters and expanding our conference and workshops.

other than our editor-in-chief of *IEEE Transactions on Consumer Electronics*, Simon Sherratt, has been appointed to this position.

While we are expanding, some members will not be able to participate in these activities due to where they are located. We are planning the establishment of a Virtual Chapter. Thus, members will be able to have the benefits of networking and participating in CE Society events, no matter where they are located.

If you have any suggestions about what kind of membership activities you would like to see, please e-mail me at s.mozar@ieee.org. I look forward to receiving some feedback from you.



Notes from the Editor (continued from page 6)

PRODUCT REVIEWS

We have a lot of great products that are reviewed in this issue. These are products that were first spotted at the Consumer Electronics Show (CES) 2014 by William Lumpkins, our senior editor. The relevant manufacturers sent these on to Will for review. He has diligently tested each new product/technology, many in his own home; hopefully, some of them will also appeal to you and your lifestyle. Read on and enjoy his insights and commentary on the latest and greatest in CE technologies.

CALLS FOR ARTICLES

INTERNET OF THINGS

The IoT refers to uniquely identifiable objects and their virtual representations in an Internet-like structure. The term *Internet of Things* was first proposed by Kevin Ashton in 1999 [6], though the concept has been discussed in the literature since at least 1991 [7], and in the context of CE and home networking since 1996 [8]–[10]. Today, research into the IoT remains in its infancy. For this call, our principal theme is focused on how IoT will integrate with, change, and disrupt different sectors of the CE industry.

A special issue is planned for the January 2015 edition of *IEEE Consumer Electronics Magazine* to coincide with CES 2015, and I would like to encourage readers to submit relevant articles.

SOCIETAL IMPACTS OF CONSUMER ELECTRONICS

Following the launch of a special section titled “Impacts,” a call for articles is announced and will continue on a rolling basis. Articles are sought that facilitate a broadening of our perspective on the world of CE and of our understanding of the various impacts of CE on society. This special section is introduced in partnership with the SSIT.

This is a continuous call for content for the “Impacts” section of the magazine, and further details can be found in a full call for articles, which follows later in this issue.

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