From the Editor in Chief

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W e have an exciting agenda planned for 2015, beginning with our current issue and its focus on privacy and security in pervasive systems. Our April–June issue will look at interacting with smart spaces and the challenges we face as we try to make smart spaces more pervasive. Then, in our July–September issue, we will look at the many ways reality can be enhanced with digital content, such as using digital recordings of life experiences to enhance our memories. Finally, our October–December issue will look at food and the food chain, all the way from the farm to your fork.

FOOD, GLORIOUS FOOD!
In discussing our 2015 editorial calendar, the topic of how pervasive computing is used in the food chain captured my attention, in part because my Girl Scout troop is currently working on the “Sow What?” journey—a series focused on the food chain. I knew that years ago, ubicomp researchers had started looking into using sensor networks in the agricultural field, but I didn’t know how that technology had been adopted by the agriculture industry.

What I learned in my exploration of this topic is that this type of technology is really starting to gain a foothold. I found robots that can harvest certain crops, like strawberries (www.youtube.com/watch?v=RKT351pQHfI) or lettuce (www.youtube.com/watch?v=_i62juq8Euk). Other robots navigate down rows of crops as people, suspended over the plants while laying down—a much more ergonomic position than bending over the plants (www.youtube.com/watch?v=AuGlYXXVpKk). There are also robots that automatically weed fields using image recognition technology to avoid chopping the desired plant (www.youtube.com/watch?v=NmeAAPLMSlw).

I even found researchers working toward a vision of automated farming (www.youtube.com/watch?v=aMF7EuCAVbl).

In addition to agricultural robots, I found information on precision agriculture, using GPS as well as sensors embedded in the fields (www.youtube.com/watch?v=boCiBpWrggl). Sensors are also being used on equipment and the plants themselves to improve harvesting efficiency and quality (www.youtube.com/watch?v=ps3AcpZl0lY).

And I found robotic bees—small flying robots that might someday take the place of real bees in pollinating crops (http://modernfarmer.com/2013/08/5-robots-on-the-farm). This “robobee” project was particularly intriguing. It made me imagine robobugs designed to be the enemy of specific pests, going out to seek and destroy bugs that injure crops. Such robotic bugs could alleviate the need for harsh chemicals or genetic engineering. They could “live” in the soil and climb onto plants each season to protect the plants from specific bugs.

They could get their energy from the sun. We’re not there yet—but it’s fun to imagine what might be possible someday.

My journey also left me wondering where the field of robotics leaves off and the field of pervasive computing comes into play. Some of the technologies I discovered in my (brief) foray into agriculture are clearly robots, such as the automated harvesters and robotic weeders. But other technologies expand into the area of pervasive computing, with sophisticated sensors to measure soil composition and plant needs. The boundary is fuzzy and perhaps not critical given we’re all working toward similar goals—to make farming more efficient and productive with the least impact on our environment.

MISSION STATEMENT: IEEE Pervasive Computing is a catalyst for advancing research and practice in mobile and ubiquitous computing. It is the premier publishing forum for peer-reviewed articles, industry news, surveys, and tutorials for a broad, multidisciplinary community.
2015 CHANGES: IT’S NOW A DIGITAL WORLD

Speaking of a reduced impact on our environment, as I reported to you a year ago, IEEE Pervasive Computing has gone digital. Our primary channel for publication is now the digital edition, though the print edition is available as a premium service. Our move to digital now gives us more opportunities for multimedia content. Everyone submitting a paper is encouraged to consider whether a video demonstration, a podcast, or other content would enhance their paper. Any digital content should be submitted along with your manuscript so that reviewers can view the entire submission at once.

There are also changes in the editorial board for 2015. IEEE Pervasive Computing would not exist without the hard work of our editorial and advisory board members, who help shape the magazine’s content and provide reviews using their extensive expertise. This month, we’re introducing three new board members and saying goodbye to two long-time contributors to the magazine (see the “Editorial Board Changes” sidebar for more information). We’re also bringing on a new Associate Editor in Chief. Anind Dey will be taking over for Sumi Helal (again, see the sidebar), so our four AEICs will each be responsible for the following topic areas:

- HCI and context awareness: Anind Dey;
- HCI, usable security, and privacy: Jason Hong; and
- hardware technologies and robotics: Steve Hodges; and
- privacy and security: Marc Langheinrich.

We also have a number of departments, with regular contributions. The department editors are as follows:

- Conferences: Elizabeth Belding;
- Innovations in Ubicomp Products: Albrecht Schmidt;

EDITORIAL BOARD CHANGES

I welcome three new board members and a new AEIC and bid farewell to two long-time contributors.

New Board Members

Nayeem Islam is vice president of Qualcomm Research Silicon Valley, where he oversees research in location-based technologies, mobile software and application-acceleration technologies, mobile security, and mobile cloud technologies. Islam has a PhD in computer science from University of Illinois at Urbana–Champaign. Contact him at nayeem.islam@gmail.com.

Yoshiihro Kawahara is an associate professor in the department of Information and Communication Engineering at the University of Tokyo. His research interests are in the areas of computer networks and pervasive and mobile computing. He is currently interested in developing tools and techniques to develop electrical circuits using off-the-shelf tools such as commodity inkjet printers. Kawahara received his PhD in information communication engineering from the University of Tokyo. He’s a member of IEICE, IPSJ, and IEEE. Contact him at kawahara@akg.t.u-tokyo.ac.jp.

Shwetak N. Patel is an associate professor in the departments of Computer Science & Engineering and Electrical Engineering at the University of Washington, where he directs his research group, the ubicomp lab. His research interests are in the areas of human-computer interaction, ubiquitous computing, sensor-enabled embedded systems, and user interface software and technology. His research focuses on developing new sensing technologies with a particular emphasis on energy monitoring and health applications for the home. He is also a MacArthur Fellow, Microsoft Research Faculty Fellow, and Sloan Fellow. Contact him at shwetak@cs.washington.edu.

New AEIC

Anind Dey will be stepping into the role of Associate Editor-in-Chief. Dey is an associate professor in the HCI Institute at Carnegie Mellon University, and serves as the Charles M. Geschke Director of the HCII. He is also the director of the Ubicomp Lab, which performs research at the intersection of ubiquitous computing, HCI, and machine learning, in the areas of mobile computing, health, and sustainability, among others. Dey received his PhD in computer science from Georgia Tech. Contact him at anind@cs.cmu.edu.

Retiring

With this issue, we give a special thanks to two of our founding members: Gaetano Borriello and Sumi Helal.

Borriello was a founding member of the magazine and served as editorial board member, AEIC, and most recently as a member of our steering committee. He has made innumerable contributions over the past decade. We will greatly miss collaborating with him on the magazine and we wish him well!

Helal is stepping down as an AEIC of IEEE Pervasive Computing on 31 December 2014 so that he can step into the role of Editor-in-Chief of Computer on 1 January 2015. Helal was a founding member of our board and has made many contributions to the magazine over the years. We wish him all the best in his new role!
This special issue focuses on privacy and security in pervasive computing. Readers with strong interest in this area will also appreciate IEEE Security & Privacy magazine (www.computer.org/security). One recent article from the Sept./Oct. 2014 issue is “Can We Afford Privacy from Surveillance?” by Jeffrey MacKie-Mason (http://doi.ieeecomputersociety.org/10.1109/MSP.2014.88). With much private information originating from pervasive computing devices, this article is particularly relevant to Pervasive readers. Another recent article, from the July/Aug 2014 issue, is “Improving App Privacy: Nudging App Developers to Protect User Privacy,” by Rebecca Balebako and Lorrie Cranor. The authors focus on ways to help app developers do a better job of improving user privacy—again, a topic particularly relevant to Pervasive readers (http://doi.ieeecomputersociety.org/10.1109/MSP.2014.70).

**SECURITY & PRIVACY MAGAZINE**

- Notes from the Community: Mary Baker and Justin Manweiler;
- Pervasive Health: Anind Dey, Jesus Favela, and Stephen Intille;
- Smartphones: Nayeem Islam; and
- Wearables: Bernt Schiele.

Note that Nayeem Islam has taken over for Roy Want for the Smartphones department. I thank Want for starting this department for Pervasive and I welcome Islam as he takes on this new role.

In fact, I would like to take this opportunity to thank all of the board members, AEICs, and department editors for their many contributions. I also thank the IEEE Computer Society staff, who continue to provide strong support for the magazine.

**IN THIS ISSUE**

This issue focuses on the privacy and security of pervasive computing. Sunny Consolvo, Jason Hong, and Marc Langheinrich have served as guest editors for this issue, and I think you will enjoy the articles they selected. (We had planned on having a related Wearable Computing department on the topic of privacy, by Thad Starner and Annie I. Anton, but their research is still in the works. Look for their discussion in a future issue of Pervasive.) In addition to our theme articles, we also have three feature articles.

Zhanpeng Jin and Yu Chen examine the impact that mobile computing and cloud computing will have on medicine in their article, “Telemedicine in the Cloud Era: Prospect and Challenges.” Telemedicine holds the potential to transform healthcare, but many technical and legal challenges remain. These technical challenges present promising research opportunities for our community. The legal challenges, though, are also important for this community.

Although we might not be in a position to address these challenges directly, we can address them indirectly, and we might also influence the lawyers (or politicians) as they tackle the legal aspects.

In “A Participatory Service Framework for Indoor Location-Based Services,” Hoeing Shin, Johan Chon, Young’un Kim, and Honing Cha present a system that makes it easier to create a Wi-Fi location map of a large indoor space. The system is bootstrapped by “site trainers” who initiate the creation of the indoor positioning service and perform a simplified training session to collect an initial map of the space. Then “crowd users” subscribe to the map and use various location-based services. In doing so, they also share their readings to improve the map database for future users. Although system accuracy suffers (3 m with traditional systems versus nearly 7 m with this system), the location map is generated with far less initial investment (approximately 9 minutes) in a large indoor mall. All in all, it’s a pretty impressive system.

Our final feature article is “Competitive Live Evaluations of Activity-Recognition Systems,” by Hristijan Gjoreski, Simon Kozino, Matjaž Gams, Mitja Luštrek, Juan Antonio Álvarez-Garcia, Jin-Hyuk Hong, Julian Ramos, Anind Dey, Maurizio Bocca, and Neal Patwari. The authors present a competition to evaluate activity recognition systems in a live trial. Their goal is to create a gold standard evaluation for measuring the quality of activity recognition by different systems. They present the competitive set-up and describe how the competition is run. Then they present the two strongest competitors in their most recent competition. They close with ideas for maturing this competition and the field of activity recognition.

The Conference Department provides a summary of Ubicomp 2014, which was held this past September in Seattle, Washington. One of the highlights of the conference was its inclusion of remote participants who were able to “attend” sessions and “interact” with attendees via Beams robots by Suitable Technologies. Mateusz Mikusz, Alexis Hinker, and Seungchul Lee provide a good overview of the conference and the research presented there.

Mary Baker and Justin Manweiler bring us Notes from the Community to keep us informed about new developments available in the wild. They begin with a discussion of technology to keep you and your loved ones safe, in the home and on the go. They also present home automation technologies that listen to your every command. I guarantee they will make you laugh!

Jan Rabaey explores the concept of swarms of smart devices that interact opportunistically based on what happens to be nearby in the smartphones department. In this vision, the smartphone might be the central hub of a human-centered swarm, because it’s relatively rich in resources compared to devices such as jewelry or glasses. Other swarms might surround a car or physical location. The department provides an interesting evolutionary vision for the future of smartphones and the Internet of Things.

In the New Products Department, Albrecht Schmidt reminds us to question the impact of our technologies on society and to include such conversations...
in our research. He points out how various technologies from Mark Weiser’s seminar paper are now commonplace and how current technologies are moving beyond that vision. Glasses and monitoring devices open new concerns about privacy and surveillance. Should we perhaps expect future submissions for publication to address the societal cost and benefits of the proposed technology?

The technologies that we see coming to our future bring incredible capabilities and possibilities. They can help keep us safe. They can help us feed more people using fewer resources. But as Albrecht reminds us, we must consider the impact these new capabilities will have on society. One of the profound impacts pervasive computing has is on our privacy and on our security. I encourage you to dive into our theme for this issue.

**REFERENCE**


**Maria R. Ebling** is a director at the IBM T.J. Watson Research Center. She manages a team building systems capable of supporting a Smarter Planet while not forgetting about the people who use such systems. Ebling received her PhD in computer science from Carnegie Mellon University. She’s a member of the IBM Academy of Technology, a distinguished member of the ACM, and a senior member of IEEE. Contact her at ebling@us.ibm.com.