From the Editor in Chief

Editor in Chief: Maria R. Ebling ■ IBM T.J. Watson Research Center ■ ebling@us.ibm.com

The Road Ahead: Diverse and Digital

Maria R. Ebling

IEEE Pervasive Computing begins its 13th year this month—its founding issue was in January 2002. It's had three strong leaders over the years in Mahadev "Satya" Satyanarayanan, Roy Want, and Nigel Davies. I feel honored to stand on the shoulders of these giants and will do my best to maintain and grow the strong magazine they built. I also thank Nigel for the excellent job he did during his tenure as Editor in Chief.

THE MAGAZINE'S DIVERSITY

The single biggest strength of *Pervasive* is its diversity. Any issue might discuss topics ranging from both hardware and software systems to user experience and field deployment. Often, all of these topics will appear in a single issue. Success in the field of pervasive computing depends on this diversity.

The magazine also provides diversity of coverage. The departments cover topics as far ranging as what's happening in conferences to what innovations are coming down the product pipeline and what's going on with smartphones. To move the field forward, we need a forum that brings together researchers, educators, and practitioners from diverse backgrounds, providing wide-ranging discussions on a variety of topics. *Pervasive* serves this purpose well. It's clear that the community agrees, as evidenced by the magazine's download statistics, which place it in the top third of IEEE publications.

IT'S A DIGITAL WORLD

Perhaps the biggest challenge facing the magazine is the changing nature of publications. *Pervasive* shares this challenge with all printed publications, but we're starting to adapt to this new environment. We now have a mobile-friendly blog that allows free content from the magazine to be read easily from mobile devices. In addition, we've created a presence on Facebook and Twitter. We need to continue down these paths and expand our presence on pervasive devices and social networking sites.

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In the near future, I hope we'll feature more demonstration videos and interviews online and reference this content in the printed publication, letting readers simply follow the link as they read through the magazine. Ultimately, we'll need to let readers consume the entire magazine via pervasive devices. As the premiere magazine for pervasive computing, we need to embrace these changes in the world of publishing to create an outstanding digital magazine experience for pervasive devices.

In fact, as I write this, I'm in an airplane, returning from my first Magazine/Transactions Operations Committee (MOC/TOC) Workshop, which takes place each fall with all the editors in chief of IEEE Computer Society magazines and transactions. The workshop gives the EICs an opportunity to discuss common challenges and best practices. It also lets us make (nonbinding) recommendations to the IEEE Board of Publications, and I'm delighted to report that the magazine EICs voted unanimously to recommend that the default distribution of IEEE Computer Society magazines take place electronically beginning January 2015. (Printed copies can be offered as a premium services for those who prefer a hardcopy.) Of course, the final decision of the Board of Publications won't be made until long after this issue goes to press, so stay tuned for more details.

I'm also pleased to announce that a preview of the *Pervasive* digital edition is now available for your evaluation and comment. You can find the digital edition of our last issue, the special issue on the Edge of the Cloud, at http://

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computer.org/PervasiveBrowser. I'm excited by this possible change and look forward to your reactions to this digital edition. Feel free to join the discussion on our Facebook page (www.facebook.com/pervasivecomputing), on reddit (reddit.com/r/pervasivecomputing), or on Twitter (https://twitter.com/ieeepervasive).

The move to digital first also gives us opportunities for multimedia content that we never had before. I encourage anyone submitting a paper to consider including a related video demonstration, podcast, or other content would enhance the final article.

THE TEAM

Pervasive wouldn't exist without the hard work of many people. The first group of people are the Associate Editors In Chief. Each associate editor is responsible for a particular topic area and manages the manuscripts submitted in that area:

- HCI and context awareness—Albrecht Schmidt;
- HCI and usable security and privacy—Jason Hong;
- hardware technologies and robotics—Steve Hodges; and
- sensor networks, energy harvesting, and HCI—Joseph Paradiso.

We also have a strong team of Department Editors:

- Conferences—Elizabeth Belding;
- Innovations in Ubicomp Products—Albrecht Schmidt;
- Pervasive Health—Anind Dey, Jesus Favela, and Stephen Intille;
- Notes from the Community—Jason Hong and Mary Baker;
- Smartphones—Roy Want; and
- Wearable Computing—Bernt Schiele.

Additionally, members of our editorial board help shape the magazine's content and provide reviews using their extensive expertise. I'm delighted to introduce Mike Hazas as a new board member. Hazas brings expertise in location-aware computing, sensing, and sustainability. His addition to the board will help to maintain our strength in these important areas for the magazine.

Along with our editorial board, we have an advisory board that provides guidance as needed. I'm pleased to announce that Nigel Davies now sits on this board, along with M. Satyanarayanan (chair), Gaetano Borriello, Daniel Siewiorek, and Roy Want.

I also thank the staff at IEEE Computer Society, who have graciously answered my many questions and satisfied my many requests for extra information during this transition—particularly, Brian Kirk, Jennifer Stout, Hilda Carman, Kathleen Clark-Fisher, and Shani Murray.

Finally, I thank our guest editors, who coordinate the submission and peer-review process for our special issue articles. We have an exciting set of special issues planned for this year. The current issue is focused on managing attention in pervasive environments, with Joe Paradiso, Alois Ferscha, and Roger Whitaker serving as guest editors. The April–June issue will focus on Pervasive Data and Citizen Science, guest edited by John Canny, Cecilia Mascalo, and Eric Paulos. The July–September issue will cover fabrication and printing for pervasive computing and is guest edited by Steve Hodges, Hans Gellersen, Albrecht Schmidt, and Bjoern Hartmann. Finally, the October–December issue will focus on wearable devices, such as glasses and watches, and the guest editors are Mary Baker, Mark Billinghurst, and Jason Hong.

In addition, I want to draw readers' attention to an upcoming special issue of *Computer*. Their April issue will focus on situational context representation and reasoning. They will look at *aware computing*, which involves systems that combine techniques that detect and process emotional information to let computers recognize, interpret, process, and ultimately simulate human affections, which are then adapted to the context in which they're operating. I look forward to this issue and know many of you will as well.

NEW EDITORIAL BOARD MEMBER

Mike Hazas is a lecturer in the School of Computing and Communications at Lancaster University. He started his research career in sensing and signal processing for location-aware computing. He has more recently focused on developing new understandings of technology, social practice and sustainability, within and beyond the home. Hazas received his PhD in mobile computing from the University of Cambridge. He regularly serves on the program committees for the Ubicomp and Pervasive conference series. Contact him at hazas@comp.lancs.ac.uk.

IN THIS ISSUE

This issue focuses on the fact that human attention has become the single most important resource in computing today—more so than processor speed, bandwidth, storage, or battery life. Yet, even with that increased importance, it's not well understood. I thank our guest editors for bringing focus to this topic and think you'll find the related articles fascinating and thought provoking.

Feature Articles

We also have in this issue several feature articles. In "The Clash Between Privacy and Automation in Social Media," Sami Vihavainen, Airi Lampinen, Antti Oulasvirta, Suvi Silfverberg, and Asko Lehmuskallio consider how automation influences people's feelings of privacy when using social media services. They examine three highly automated social media services and the privacy concerns expressed by their users. The authors found that users compensated for these

FROM THE EDITOR IN CHIEF

IEEE Computer Society Publications Office
10662 Los Vaqueros Circle
Los Alamitos, CA 90720

STAFF

Lead Editor
Brian Kirk
bkirk@computer.org

Content Editor
Shani Murray

Manager, Editorial Services
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privacy concerns by either changing their behavior or foregoing use of the service. Overall, the article gives readers food for thought as they look at their own use of social media services. Also, it presents issues to consider when developing such services.

In "ConvenienceProbe: A Phone-Based System for Retail Trade-Area Analysis," Chuang-Wen You, Hsin-Liu Kao, Bo-Jhang Ho, Yu-Han Chen, Wei-Fehgn Wang, Lien-Ti Bei, Hao-hua Chu, and Ming-Syan present a system for collecting information about consumer flow through convenience stores. With this system, a marketing professional can collect quantitative data about where consumers come from prior to entering a retail store and where they go after leaving, as well as how much time was spent in the store and whether any items (and how many) were purchased. The authors provide a comparison against the traditional interviewing method and also discuss the implications of findings on where and how companies spend marketing dollars. This study shows pervasive computing's potential in providing marketing insights.

Our final feature article, "RFID in Underground Mining Services Applications," by Pankaj Mishra, Ron Stewart, Miodrag Bolic, and Mustapha Yagoub, considers the use of RFID in the hostile environments of mining. These environments are inherently dangerous and rugged. After summarizing the various RFID technologies, the authors consider how these technologies can best be applied in a mining scenario to address the key challenges presented by these environments. These challenges include ones that many of our readers are familiar with, such as tracking and tracing personnel, vehicles, and equipment, but also a few that most readers aren't familiar with, such as tracing the ore through the continuous process of mining.

Departments

The Conferences department highlights the 2013 ACM International Joint Conference on Pervasive and Ubiquitous (UbiComp 2013) and the result of the merger between Pervasive and Ubicomp. Given that the conference had 700 attendees and three parallel tracks, we don't have the space for a complete summary of the event. However, Nemanja Memarovic, Simon Mayer, Paul Baumann, and Marco Pasch have done a nice job of highlighting the two keynote presentations, selected sessions, and the town hall discussion.

The Smartphones department, written by Ashish Sharma, Paul Eastham, and Francesco Nerieri this issue, focuses on the impact cellular communications have on battery life. The authors consider two different push-message scheduling algorithms and compares the amount of battery consumed under the two algorithms. This experiment serves to highlight an important area for future work- that is, the ability such algorithms have to improve battery consumption and, ultimately, the availability of these phones, which are so important to our daily activities.

The Wearable Computing department highlights the IEEE International Symposium on Wearable Computing, which was held in conjunction with UbiComp. The detailed summary, provided by Daniel Roggen, Daniel Gatica Perez, Masaaki Fukumoto, and Kristof van Laerhoven, gives an excellent overview of the papers presented and should prove invaluable if you weren't able to attend the conference.

In the New Products department, Albrecht Schmidt, Bastian Pfleging, Christian Holz, and Lars Erik Holmquist follow the transition from analog to digital technology. They provide an insightful perspective on how a technology change can influence an entire industry and the way we think about the world.

Finally, in the Notes from the Community department, Jason Hong and Mary Baker summarize the contributions to our Reddit community (www.reddit.com/r/pervasivecomputing). They describe a particularly interesting gadget that helps you find your stuff.

Unfortunately, it seems to assume that you can find your cell phone to use it, an assumption that I often don't meet. The news in 3D printing makes me very excited about our special issue on that topic later this year. I also found the discussion about wearable computing that serves as distraction apropos for the theme of this issue.

As I look back over the past 12 years of *Pervasive*'s and 20-plus years since Mark Weiser's seminal *Scientific American* article, "The Computer for the 21st Century," I am simultaneously overwhelmed and underwhelmed by our progress. On the one hand, I look at my smartphone, think back to my days as a summer intern working on the ParcTab, and I find it hard to believe how much technology has progressed over this time period. On the other, I look at my smartphone and grimace when it allows a nonemergency text message to wake me in the middle of the night. How can we have come so far in terms of device capabilities yet achieved so little in terms of managing the user's attention effectively?

When we look back on the evolution of pervasive computing, I predict that we'll look at those systems that break through the attention management barrier as being a key turning point in our progress. Those systems that succeed in serving the user's needs while minimizing the amount of attention they require will thrive, and those that fail to do this will fade into a distant memory. How do we break that barrier? We need people from a wide variety of disciplines and backgrounds, working together, to figure out how best to accomplish these goals.

I look forward to seeing the progress we'll make in the years to come, and I hope that *Pervasive* will continue to serve as a forum for this diverse community to come together to push this field forward. Onward!

Maria R. Ebling is a research staff member and 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.

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Send letters to
Brian Kirk, Lead Editor
IEEE Pervasive Computing
10662 Los Vaqueros Circle
Los Alamitos, CA 90720
pervasive@computer.org

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