“All Good Things Must Come to an End”

Maria R. Ebling, IBM T.J. Watson Research Center

It is difficult to believe, but 2017 marks the end of my second two-year term as Editor in Chief of IEEE Pervasive Computing, so this issue will be my last. As I look back over the journey of the past four years and all that has happened, I am astonished at the changes that have occurred and the progress we have made. I hope that readers are enjoying the new columns we have introduced. In addition, I look forward to seeing the impact of the IoT portal we plan to launch in 2018 (look for more details next issue), as it will bring together the IoT and pervasive computing communities, and I firmly believe that both communities have very similar technical backgrounds and interests.

PASSING THE BATON

I am pleased to announce that the IEEE Computer Society has confirmed Marc Langheinrich as my successor. Langheinrich will officially begin his term on 1 January 2018, although he and I have already started working together to ensure a smooth transition.

Langheinrich has served our community in a variety of roles. He has served as an Associate Editor in Chief for IEEE Pervasive Computing, as an Associate Editor of the Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT), as an Area Editor of Elsevier’s Pervasive and Mobile Computing, as well as an editor of Dagstuhl’s OpenAccess Services in Informatics (OASiCs). In addition, he has served as program co-chair and general chair for numerous conferences over the years.

Langheinrich received a 10-year impact award at the 2011 ACM International Joint Conference on Pervasive and Ubiquitous Computing (UbiComp 11) for his 2001 UbiComp publication, “Privacy by Design—Principles of Privacy-Aware Ubiquitous Systems.” In this work, Langheinrich has served our community in a variety of roles. He has served as an Associate Editor in Chief for IEEE Pervasive Computing, as an Associate Editor of the Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT), as an Area Editor of Elsevier’s Pervasive and Mobile Computing, as well as an editor of Dagstuhl’s OpenAccess Services in Informatics (OASiCs). In addition, he has served as program co-chair and general chair for numerous conferences over the years.

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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.

THANKS SHANI

In this issue we say farewell to Shani Murray, who helped to launch IEEE Pervasive Computing as its Associate Lead Editor and has been involved in the magazine in one way or another since that time. She will be stepping down from her current role as the freelance managing editor at the end of the year. Readers should know that she has shaped almost every issue that has appeared in IEEE Pervasive Computing since its inception. She has also supported every editor-in-chief, helping to ensure that the issues come out on time. I thank her for her many contributions to the magazine on behalf of the authors, editorial board members, my predecessor EICs (M. Satyanarayanan, Roy Want, and Nigel Davies), and our readers.
he outlines a brief history of privacy and discusses the legal issues upon which privacy is founded. He then explains why researchers in the field of ubiquitous computing should be more concerned about privacy than the average computer scientist. Specifically, pervasive computing is ubiquitous and invisible, with sensors that are constantly decreasing in size and increasing in capabilities, and its storage capabilities can maintain data pertaining to every incident in our daily lives. He concludes the paper by outlining guiding principles to help us navigate the privacy landscape created by pervasive computing.

Langheinrich is clearly a leader and visionary in our field. With his extensive experience in the field and his many years of service with IEEE Pervasive Computing in particular, I am confident that the magazine will be in good hands moving forward.

IN THIS ISSUE
The focus of this issue is on physical computing. It explores how we can leverage flexible and shape-changing interaction techniques to improve the user experience. There are some interesting articles I think you will enjoy. Many thanks to our guest editors, Yoshihiro Kawahara, Céline Coutrix, Jason Alexander, and Albrecht Schmidt, for bringing this issue together.

Our new Social Impact department also covers this topic, with Heather Patterson examining the social implications of physical computing. She considers questions such as whether interfaces that physically change will be less discoverable. Furthermore, she examines the privacy implications of interfaces that truly disappear into the fabric of our everyday lives.

In addition to material related to our theme, we also have two feature articles. In “Recognizing Detailed Human Context in the Wild from Smartphones and Smartwatches,” Yonatan Vaizman, Katherine Ellis, and Gert Lanckriet present their work in collecting and analyzing an extensive amount of data collected “in the wild.” Participants in this study collected over 300,000 minutes (5,000 hours over more than 200 days) of sensor data using their own personal devices. They did whatever activities were natural to them. They had no constraints on how they carried the device or what activities they performed. As you might expect, identifying activities within this data is harder than identifying activity in data collected in a more constrained fashion. The authors take us through their analysis, demonstrating the importance of fusing data across this multimodal
FROM THE EDITOR IN CHIEF

sensor input. Readers will be delighted to learn that this dataset is available for your own use. I thank the authors for their generous contribution to the community.

Speaking of public datasets, their importance to the progress in our field is highlighted in “An Event-Based Nonintrusive Load Monitoring Approach Using the Simplified Viterbi Algorithm.” In this article, Tianqi Lu, Zhengguang Xu, and Benxiong Huang use the REDD dataset (http://redd.csail.mit.edu), which contains power data for six houses, to demonstrate the efficiency and effectiveness of their new algorithm for detecting the power-on and power-off points for appliances within a home. Having a widely available dataset lets researchers working on algorithms use the same dataset as their colleagues to evaluate new approaches. I strongly encourage readers to share their datasets whenever possible.

In our Pervasive Health department, Tim Althoff discusses “Population-Scale Pervasive Health,” enabled by the wide-scale deployment of pervasive devices that automatically track and collect data such as a user’s heart rate, accelerometer data, gyroscope data, and location. Using this information, it is possible to infer activities and trigger smart notifications. Many challenges arise, however, due to the nature of the data and the uncontrolled manner in which it is necessarily collected. Althoff discusses these challenges and limitations. The discussion of open challenges should help inspire research to find answers. If we can’t address these open issues, we won’t succeed in improving people’s overall health and well-being.

In our Wearable Computing department, Oliver Amft and Kristof Van Laerhoven provide a brief look back at the history of wearable computing, examining its origins and evaluating its current status. They look at some of the market drivers behind the commercial successes and failures of wearable computing and conclude the article by identifying a number of challenges for the community to solve.

Our Education & Training department showcases the importance of international experiences for students. Andrew L. Kun, Orit Shaer, Albrecht Schmidt, and Susanne Boll discuss a program that they have been running to support international experiences for undergraduate and graduate students. In this program, students from the US travel to Germany to work in labs there for two months over the summer. Their experiences range from technical collaborations with European colleagues to cultural immersion in a foreign land. The authors report on the experiences of the students as well as the value such experiences hold within industry. They recommend that we, as a community, find more opportunities to support students looking to gain this broader perspective during their education.

In our Conferences department, Mohamed Khamis, J. Henderson, and Guiying Du provide an excellent summary of the 6th International Symposium on Pervasive Displays, which was held in Lugano Switzerland this past June. The conference included sessions ranging from platforms and frameworks to manage pervasive displays to applications of pervasive displays to interaction techniques and user engagement. I particularly enjoyed the summary of the questions and discussions about each paper—an aspect of the conference you just can’t get from reading the papers.

In our IoT News department, Rob van Kranenburg shares the origins of Council, a think tank focused on IoT technologies. The journey toward creating this IoT resource is an interesting one. Council has the potential to serve an important role as an enabler for the IoT. Readers working in this space should be aware of this resource.

In our Notes from the Community column, you’ll find updates on the latest iteration of Google Glass and on efforts to create ultra-low power sensors. In addition, you’ll learn about people creating wearable Chipper cards for more convenient form factors than the San Francisco Bay Area’s current transit payment cards, and about an experiment for microchipping people (much as we microchip our pets) to make payments and other functions easier. You’ll also read about wearable sponges that can help clean contaminants from water while you swim, efforts to listen above ground using fiber optic cables running underground, and a new method for impersonating people’s voices with very little data. Finally, you’ll learn about wildly successful efforts to show how readily US voting machines can be hacked, the dangers of assuming you’ll always have network connectivity, a unique way to trick autonomous vehicles, and how some folks finally cheated the cheaters.

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.