

Guest Editorial: Special Section on Outstanding Papers from MobiSys 2012

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It gives us great pleasure to introduce this special section on outstanding papers from the ACM MobiSys 2012 conference, for which we were honored to be the program committee cochairs. The conference was held in June 2012 and included 32 high-quality papers selected from 182 submissions, a record high for both paper submissions and paper acceptances. The conference's call-for-papers informed authors that a few outstanding papers would be considered for a fast-tracked special section in the *IEEE Transactions on Mobile Computing* (TMC).

The selection process for the papers included in this special section was a byproduct of the selection process for the MobiSys 2012 Best Paper Award. Immediately after the MobiSys 2012 program committee meeting, we asked the committee members to nominate accepted papers for the Best Paper Award. Based on the responses we received, five papers with the most nominations were selected as candidates for the award. Their nominations were kept confidential until the opening of the conference. We then asked the program committee and external reviewer panel members to volunteer for the Best Paper Award committee to determine the final best paper and select three out of the five nominated papers for this special section. Based on the responses and conflicts of interest, four members of the program committee and one member of the external reviewer panel formed the Best Paper Award committee. At the conference, this committee selected the best paper and the three papers to be fast-tracked for this special section.

The paper review process for the selected papers followed the standard procedure for fast-tracked TMC special sections. The authors were asked to submit a journal version with an explanation of how they addressed the reviews and feedback received at the conference. Note that each of these three papers received five or more conference reviews and had gone through a shepherding process to address reviewer comments for the final, camera-ready version. As required by the TMC fast-tracking procedure, we invited at least two reviewers for each submission. At least one reviewer was a MobiSys program committee member who reviewed the corresponding conference submission and another was not a member of program committee.

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In the end, the review process produced three very high-quality papers that we are proud to present to the readers of TMC. The three papers make novel and deep contributions to diverse topics including context awareness, data mining, localization, and gaming. In addition, each paper has the strong system-building and experimental flavor typical of papers presented at the MobiSys conference.

The first paper, "ACE: Exploiting Correlation for Energy-Efficient and Continuous Context Sensing" by Suman Nath, presents ACE, a middleware system that significantly improves the energy efficiency of continuous context sensing by automatically inferring and exploiting correlations between context attributes. The key idea is elegant and intuitive: Boolean logic relationships may exist between variables that correspond to our context. For example, for many of us, if we are at work, we are not at home. That is, the Boolean variables AtWork and AtHome cannot be true at the same time. The paper reports a deep and comprehensive piece of work built on top of this idea, showing that not only can these relationships be mined from history but that they can also be exploited to significantly reduce the energy cost of assessing the value of context variables. The conference version of this paper won the Best Paper Award from MobiSys 2012.

The second paper, "Mobile Motion Gaming: Enabling a New Class of Phone-to-Phone Action Games on Commodity Phones" by Zengbin Zhang, David Chu, Xiaomeng Chen, and Thomas Moscibroda, presents an acoustic ranging technology that enables two commodity phones to measure their distance with impressive speed, accuracy, and robustness. Using two examples, the paper shows how this technology can be used to empower previously impossible two-user games based on physical manipulations of phones. It is worth noting that the basic acoustic ranging approach is not new; many people, including the authors, have used it to measure the distance between two phones. In this work, the authors made significant contributions that dramatically improve the performance of the acoustic ranging approach. As a result, the paper is an excellent example of how outstanding research can result from a persistent effort at perfecting a technique.

The third paper, "Indoor Localization Using FM Signals" by Yin Chen, Dimitrios Lymberopoulos, Jie Liu, and Bodhi Priyantha, presents a comprehensive treatment of indoor localization using existing broadcast FM signals. The authors show that FM-based localization can achieve similar or even better accuracy compared to the widely studied approach that is based on Wi-Fi fingerprinting for room-level localization. More importantly, they show that

FM-based localization provides strength that is complementary to Wi-Fi-based location and a combination of these two approaches achieves higher accuracy than either of them alone. The results are surprising: in theory, one would consider FM signals a poor choice for localization because of their long wavelengths. Therefore, this work is a great testament to the value of experimental research.

Last, but not least, we thank the reviewers for producing detailed reviews and the authors for carefully addressing the reviewers' comments. Their efforts have been critical to ensuring the quality of this publication. We hope you enjoy this special section.



Srinivasan Seshan received the PhD degree in 1995 from the Computer Science Department at the University of California, Berkeley. He held the Finmeccanica chair from 2004 to 2006. From 1995 to 2000, he was a research staff member at IBM's T.J. Watson Research Center. He is currently a professor in the Computer Science Department at Carnegie Mellon University. His primary interests are in the broad areas of network protocols, mobile computing, and distributed network applications.

In the past, he worked on topics such as transport/routing protocols for wireless networks, large-scale network measurements, RAID system design, performance prediction for Internet transfers, ISP multihoming, new approaches to congestion control, large-scale multiplayer games, and large-scale sensor networks. His current work explores the challenges and opportunities related to new networking architectures and cellular, mobile systems. His webpage is at <http://www.cs.cmu.edu/~srini>.



Lin Zhong received the BS and MS degrees from Tsinghua University and the PhD degree from Princeton University in 1998, 2000, and 2005, respectively. He has been with Rice University since September 2005, where he is currently an associate professor in the Electrical & Computer Engineering Department. He was a visiting researcher with Microsoft Research for the summers of 2011 and 2012. At Rice, he leads the Efficient Computing Group to make

computing, communication, and interfacing more efficient and effective. His recent research focus has been on mobile and embedded systems. He received the US National Science Foundation CAREER Award and Best Paper Awards from ACM MobileHCI 2007, IEEE PerCom 2009, and ACM MobiSys 2011. His webpage is at <http://www.linzhong.org>.