Guest Editorial: Special Issue on Smart Homes, Buildings and Infrastructures

Our physical living environment, from residential homes to commercial buildings and civil infrastructures, is becoming more and more intelligent, thanks to the rapid advancement of various cyber-technologies. Examples include smart sensors and actuators, sophisticated control and communication algorithms, and efficient and reliable communication protocols. By integrating these technologies, smart homes, buildings and infrastructures can be built to improve service quality and reliability and to reduce energy and monetary costs.

However, the design, implementation and operation of these cyber-physical systems still face significant challenges that arise from the rapid increase of functional complexity, the significant uncertainty from physical environment and human activities, the increasing deployment of distributed and networked architecture, and the stringent requirements on system performance, safety, security, flexibility, reliability and fault tolerance. This special issue aims to present the state-of-the-art cyber-physical systems research for building efficient smart homes, buildings, and infrastructures.

In response to this special issue topic, we received 17 submissions covering a broad range of topics including smart grid, wireless network, real-time system, smart building, internet of things, electric vehicle, healthcare, and so on. These articles were contributed by researchers from both academia as well as industry. After the review process, the following six articles were accepted for publication:

1. "Demand Response and Smart Buildings: A Survey of Control, Communication, and Cyber-Physical Security"
2. "Towards Cyber-Physical Systems Design for Structural Health Monitoring: Hurdles and Opportunities"
3. "Adaptive Real-Time Scheduling of Cyber-Physical Energy Systems"
4. "A Cloud-based Black Box Solar Predictor for Smart Homes"
5. "Data Analytics for Managing Power in Commercial Buildings"
6. "Optimal Control of PEVs with a Charging Aggregator Considering Regulation Service Provisioning"

We would like to thank all authors who submitted their articles to this special issue. We also express our sincere gratitude to the reviewers for providing high-quality reviews in a timely fashion to enhance the quality of the accepted papers. We are indebted to Dr. Tei-Wei Kuo, the editor-in-chief of the *ACM Transactions on Cyber-Physical Systems*, and his editorial team for their consistent support on this special issue. We hope that the readers will enjoy the articles picked for this special issue and that it will facilitate further research in this exciting area.

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2378-962X/2017/08-ART17

<https://doi.org/10.1145/3127020>

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Shiyan Hu received his Ph.D. in Computer Engineering from Texas A&M University in 2008. He is currently an associate professor at Michigan Tech., where he is the director of Center for Cyber-Physical Systems. He has been a visiting professor at IBM Research (Austin) in 2010, and a visiting associate professor at Stanford University from 2015 to 2016. His research interests include CPSs, CPS security, data analytics and computer-aided design of VLSI circuits, where he has published more than 100 refereed papers. He is an ACM distinguished speaker, an IEEE Systems Council distinguished lecturer, an IEEE Computer Society Distinguished Visitor, an invited participant for U.S. National Academy of Engineering Frontiers of Engineering Symposium, a recipient of National Science Foundation (NSF) CAREER Award, a recipient of ACM SIGDA Richard Newton DAC Scholarship (as the faculty advisor), and a recipient of JSPS Faculty Invitation Fellowship. He is the chair for IEEE Technical Committee on Cyber-Physical Systems. He is the editor-in-chief of *IET Cyber-Physical Systems: Theory & Applications*. He serves as an associate editor for *IEEE Transactions on Computer-Aided Design*, *IEEE Transactions on Industrial Informatics*, and *IEEE Transactions on Circuits and Systems*. He is also a guest editor for eight IEEE/ACM journals such as the *Proceedings of the IEEE* and *IEEE Transactions on Computers*. He has held chair positions in several IEEE/ACM conferences. He is a fellow of IET.

Qi Zhu is an associate professor in the Department of Electrical and Computer Engineering at the University of California, Riverside. Prior to joining University of California, Riverside, he was a research scientist at the Strategic CAD Labs in Intel from 2008 to 2011. Dr. Zhu received his Ph.D. in EECS from University of California, Berkeley, in 2008, and a B.E. in Computer Science from Tsinghua University in 2003. His research interests include model-based design and software synthesis for CPSs, CPS security, embedded and real-time systems, energy-efficient buildings and infrastructures, and system-on-chip design. He received several best paper awards at DAC 2006, DAC 2007, ICCPS 2013, and ACM TODAES 2016. He received the National Science Foundation (NSF) CAREER Award in 2016, and the IEEE TCCPS Early-Career Award in 2017. Dr. Zhu has served on the technical program committees for DAC, ICCAD, DATE, ASP-DAC, CODES + ISSS, RTSS, RTAS, SAC, SIES, MEMOCODE, and so on. He is the education committee chair of IEEE TCCPS. He received the ACM SIGDA Service Award in 2015.