

Qi Zhu

Associate Professor

Department of Electrical and Computer Engineering

Department of Computer Science and Engineering (Cooperating)

University of California, Riverside

qzhu@ece.ucr.edu

(510) 292-7672

<http://www.ece.ucr.edu/~qzhu>

<http://zhulab.engr.ucr.edu>

Summary

Qi Zhu is an Associate Professor at the Department of Electrical and Computer Engineering in University of California, Riverside. Prior to joining UCR, he was a Research Scientist at the Strategic CAD Labs in Intel from 2008 to 2011. He received a Ph.D. in EECS from University of California, Berkeley in 2008, and a B.E. in CS from Tsinghua University in 2003. His research areas are in model-based design and software synthesis for cyber-physical systems, CPS security, embedded and real-time systems, energy-efficient buildings and infrastructures, and system-on-chip design. He received best paper awards at the Design Automation Conference (DAC) 2006, DAC 2007, International Conference on Cyber-Physical Systems (ICCCPS) 2013, and ACM Transactions on Design Automation of Electronic Systems (TODAES) 2016. He received the National Science Foundation (NSF) CAREER award in 2016, the IEEE Technical Committee on Cyber-Physical Systems (TCCPS) Early-Career Award in 2017, and the Humboldt Research Fellowship for Experienced Researchers in 2017. He has served on the technical program committees and as session organizer and chair for conferences including DAC, ICCAD, DATE, ASP-DAC, CODES+ISSS, RTSS, RTAS, SAC, SIES, MEMOCODE, etc. He is the education committee chair of the IEEE TCCPS. He received the ACM SIGDA Service Award in 2015.

Education

University of California, Berkeley
Tsinghua University

Electrical Engineering and Computer Sciences
Computer Science and Technology

Ph.D. 2008
B.E. 2003

Professional Experience

Associate Professor
Assistant Professor
Department of Electrical and Computer Engineering

July 2017 – present
August 2011 – June 2017
University of California, Riverside

Research Scientist
Strategic CAD Laboratories

October 2008 – August 2011
Intel Corporation

Awards and Honors

- IEEE Technical Committee on Cyber-Physical Systems (TCCPS) Early-Career Award, 2017
- Humboldt Research Fellowship for Experienced Researchers, 2017
- National Science Foundation CAREER Award, 2016
- Best Paper Award in the ACM Transactions on Design Automation of Electronic Systems (TODAES), 2016
- Best Paper Award at the 4th IEEE/ACM International Conference on Cyber-Physical Systems (ICCCPS), 2013

- Best Paper Award at the 44th IEEE/ACM Design Automation Conference (DAC), 2007
- Best Paper Award at the 43rd IEEE/ACM Design Automation Conference (DAC), 2006
- Best Paper Award Nomination at the 21st IEEE/ACM Asia and South Pacific Design Automation Conference (ASP-DAC), 2016
- IEEE Embedded Systems Letters (ESL) top-five accessed articles, 2015
- Best Paper Finalist at the 9th IEEE International Symposium on Industrial Embedded Systems (SIES), 2014
- Regents Faculty Development Award, University of California, 2016
- ACM SIGDA Service Award, 2015
- Regents Faculty Fellowship Award, University of California, 2013
- Invited Speaker at the IEEE Council for Electronic Design Automation (CEDA) Distinguished Speaker Series, 2008
- Pao Family Fellowship from University of California, Berkeley, 2003 – 2004
- Beijing Outstanding Undergraduate Award, 2003
- Tsinghua University Outstanding Undergraduate Award, 2003
- Tsinghua University Outstanding Undergraduate Dissertation Award, 2003

Selected Publications

Model-based design and software synthesis for CPS and embedded systems:

- Peng Deng, Qi Zhu, Abhijit Davare, Anastasios Mourikis, Xue Liu and Marco Di Natale, “An Efficient Control-driven Period Optimization Algorithm for Distributed Real-time Systems”, IEEE Transactions on Computers (TC), Vol. 65, No. 12, December, 2016.
- Bowen Zheng, Chung-Wei Lin, Huafeng Yu, Hengyi Liang and Qi Zhu, “CONVINCE: A Cross-Layer Modeling, Exploration and Validation Framework for Next-Generation Connected Vehicles”, 35th IEEE/ACM International Conference on Computer-Aided Design (ICCAD’16), Austin, TX, November, 2016. (*Invited Paper*)
- Bowen Zheng, Yue Gao, Qi Zhu and Sandeep Gupta, “Analysis and Optimization of Soft Error Tolerance Strategies for Real-time Systems”, 13th IEEE/ACM International Conference on Hardware/Software Codesign and System Synthesis (CODES+ISSS’15), Amsterdam, Netherlands, October, 2015.
- Peng Deng, Fabio Cremona, Qi Zhu, Marco Di Natale and Haibo Zeng, “A Model-based Synthesis Flow for Automotive CPS”, 6th ACM/IEEE International Conference on Cyber-Physical Systems (ICCPS’15), Seattle, WA, April, 2015.
- Peng Deng, Qi Zhu, Marco Di Natale and Haibo Zeng, “Task Synthesis for Latency-sensitive Synchronous Block Diagram”, 9th IEEE International Symposium on Industrial Embedded Systems (SIES’14), Pisa, Italy, June, 2014. (**Best Paper Award Finalist**)
- Qi Zhu, Peng Deng, Marco Di Natale and Haibo Zeng, “Robust and Extensible Task Implementations of Synchronous Finite State Machines”, 16th IEEE/ACM Conference on Design, Automation and Test in Europe (DATE’13), Grenoble, France, March, 2013.

- Qi Zhu, Haibo Zeng, Wei Zheng, Marco Di Natale and Alberto Sangiovanni-Vincentelli, “Optimization of Task Allocation and Priority Assignment in Hard Real-Time Distributed Systems”, ACM Transactions on Embedded Computing Systems (TECS), Vol. 11, No. 4, December, 2012.
- Abhijit Davare, Qi Zhu, Marco Di Natale, Claudio Pinello, Sri Kanajan and Alberto Sangiovanni-Vincentelli, “Period Optimization for Hard Real-time Distributed Automotive Systems”, 44th IEEE/ACM Design Automation Conference (DAC’07), San Diego, CA, June, 2007. (**Best Paper Award**)

CPS security:

- Bowen Zheng, Peng Deng, Rajasekhar Anguluri, Qi Zhu and Fabio Pasqualetti, “Cross-Layer Codesign for Secure Cyber-Physical Systems”, IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD), Vol. 35, No. 5, May, 2016.
- Chung-Wei Lin, Bowen Zheng, Qi Zhu and Alberto Sangiovanni-Vincentelli, “Security-Aware Methodology and Optimization for Automotive Systems”, ACM Transactions on Design Automation of Electronic Systems (TODAES), Vol. 21, No. 1, December, 2015. (**Best Paper Award**)
- Bowen Zheng, Wenchao Li, Peng Deng, Leonard Gerard, Qi Zhu and Natarajan Shankar, “Design and Verification for Transportation System Security”, 52nd ACM/IEEE Design Automation Conference (DAC’15), San Francisco, CA, June, 2015. (*Invited Paper*)
- Chung-Wei Lin, Qi Zhu and Alberto Sangiovanni-Vincentelli, “Security-Aware Mapping for TDMA-Based Real-Time Distributed Systems”, 33rd IEEE/ACM International Conference on Computer-Aided Design (ICCAD’14), San Jose, CA, November, 2014.
- Chung-Wei Lin, Qi Zhu, Calvin Phung and Alberto Sangiovanni-Vincentelli, “Security-Aware Mapping for CAN-Based Real-Time Distributed Automotive Systems”, 32nd IEEE/ACM International Conference on Computer-Aided Design (ICCAD’13), San Jose, CA, November, 2013.

Energy-efficient buildings:

- Tianshu Wei, Yanzhi Wang and Qi Zhu, “Deep Reinforcement Learning for HVAC Control in Smart Buildings”, 54th IEEE/ACM Design Automation Conference (DAC’17), Austin, TX, June, 2017.
- Tianshu Wei, Qi Zhu and Nanpeng Yu, “Proactive Demand Participation of Smart Buildings in Smart Grid”, IEEE Transactions on Computers (TC), Vol. 65, No. 5, May, 2016.
- Tiansong Cui, Shuang Chen, Yanzhi Wang, Qi Zhu, Shahin Nazarian and Massoud Pedram, “Optimal Co-Scheduling of HVAC Control and Battery Management for Energy-Efficient Buildings Considering State-of-Health Degradation”, 21st IEEE/ACM Asia and South Pacific Design Automation Conference (ASP-DAC’16), Macao, China, January, 2016. (**Best Paper Award Nomination**)
- Tianshu Wei, Qi Zhu and Mehdi Maasoumy, “Co-scheduling of HVAC Control, EV Charging and Battery Usage for Building Energy Efficiency”, 33rd IEEE/ACM International Conference on Computer-Aided Design (ICCAD’14), San Jose, CA, November, 2014.
- Tianshu Wei, Taeyoung Kim, Sangyoung Parky, Qi Zhu, Sheldon X.-D. Tan, Naehyuck Changy, Sadrul Ula and Mehdi Maasoumy, “Battery Management and Application for

Energy-Efficient Buildings”, 51st IEEE/ACM Design Automation Conference (DAC’14), San Francisco, CA, June 2014.

- Mehdi Maasoumy, Qi Zhu, Cheng Li, Forrest Meggers and Alberto Sangiovanni-Vincentelli, “Co-design of Control Algorithm and Embedded Platform for HVAC Systems”, 4th IEEE/ACM International Conference on Cyber-Physical Systems (ICCPS’13), Philadelphia, PA, April, 2013. (**Best Paper Award**)

Others:

- Sanjit Seshia, Shiyang Hu, Wenchao Li and Qi Zhu, “Design Automation of Cyber-Physical Systems: Challenges, Advances, and Opportunities”, to appear in the IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD). (*Keynote Paper*)
- Abhijit Davare, Douglas Densmore, Liangpeng Guo, Roberto Passerone, Alberto Sangiovanni-Vincentelli, Alena Simalatsar and Qi Zhu, “METROII: A Design Environment for Cyber-Physical Systems”, ACM Transactions on Embedded Computing Systems (TECS), Vol. 12, No. 49, March, 2013. (author names listed in alphabetical order)
- Qi Zhu, Nathan Kitchen, Andreas Kuehlmann and Alberto Sangiovanni-Vincentelli, “SAT Sweeping with Local Observability Don’t-Cares”, 43rd IEEE/ACM Design Automation Conference (DAC’06), San Francisco, CA, July, 2006. (**Best Paper Award**)

Full Publication List (reverse chronological order)

Journal Articles:

1. Sanjit Seshia, Shiyang Hu, Wenchao Li and Qi Zhu, “Design Automation of Cyber-Physical Systems: Challenges, Advances, and Opportunities”, to appear in the IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD). (*Keynote Paper*)
2. Ying Zhang, Mohammad Hajiesmaili, Sinan Cai, Minghua Chen and Qi Zhu, “Peak-Aware Online Economic Dispatching for Microgrids”, to appear in the IEEE Transactions on Smart Grid (TSG).
3. Yongxiang Bao, Mingsong Chen, Qi Zhu, Tongquan Wei, Frederic Mallet and Tingliang Zhou, “Quantitative Performance Evaluation of Uncertainty-Aware Hybrid AADL Designs Using Statistical Model Checking”, to appear in the IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD).
4. Tiansong Cui, Shuang Chen, Yanzhi Wang, Qi Zhu, Shahin Nazarian and Massoud Pedram, “An Optimal Energy Co-Scheduling Framework for Smart Buildings”, to appear in the Integration, the VLSI Journal.
5. Peng Deng, Qi Zhu, Abhijit Davare, Anastasios Mourikis, Xue Liu and Marco Di Natale, “An Efficient Control-driven Period Optimization Algorithm for Distributed Real-time Systems”, IEEE Transactions on Computers (TC), Vol. 65, No. 12, December, 2016.
6. Samarjit Chakraborty, Mohammad Abdullah Al Faruque, Wanli Chang, Dip Goswami, Marilyn Wolf, Qi Zhu, “Automotive Cyber-Physical Systems: A Tutorial Introduction”, IEEE Design and Test, Vol. 33, No. 4, August, 2016.

7. Bowen Zheng, Peng Deng, Rajasekhar Anguluri, Qi Zhu and Fabio Pasqualetti, “Cross-Layer Codesign for Secure Cyber-Physical Systems”, IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD), Vol. 35, No. 5, May, 2016.
8. Tianshu Wei, Qi Zhu and Nanpeng Yu, “Proactive Demand Participation of Smart Buildings in Smart Grid”, IEEE Transactions on Computers (TC), Vol. 65, No. 5, May, 2016.
9. Chung-Wei Lin, Bowen Zheng, Qi Zhu and Alberto Sangiovanni-Vincentelli, “Security-Aware Methodology and Optimization for Automotive Systems”, ACM Transactions on Design Automation of Electronic Systems (TODAES), Vol. 21, No. 1, December, 2015. (***Best Paper Award***)
10. Fabio Pasqualetti and Qi Zhu, “Design and Operation of Secure Cyber-Physical Systems”, IEEE Embedded Systems Letters, March, 2015. (***Top-five Accessed Article***)
11. Chung-Wei Lin, Qi Zhu and Alberto Sangiovanni-Vincentelli, “Security-Aware Modeling and Efficient Mapping for CAN-Based Real-Time Distributed Automotive Systems”, IEEE Embedded Systems Letters, March, 2015. (***Top-five Accessed Article***)
12. Haibo Zeng, Marco Di Natale and Qi Zhu, “Minimizing Stack and Communication Memory Usage in Real-time Embedded Applications”, ACM Transactions on Embedded Computing Systems (TECS), Vol. 13, No. 149, November, 2014.
13. Marco Di Natale, Qi Zhu, Alberto Sangiovanni-Vincentelli and Stavros Tripakis, “Optimized Implementation of Synchronous Models on Industrial LTTA Systems”, Journal of Systems Architecture (JSA), Vol. 60, April, 2014.
14. Abhijit Davare, Douglas Densmore, Liangpeng Guo, Roberto Passerone, Alberto Sangiovanni-Vincentelli, Alena Simalatsar and Qi Zhu, “METROII: A Design Environment for Cyber-Physical Systems”, ACM Transactions on Embedded Computing Systems (TECS), Vol. 12, No. 49, March, 2013. (author names listed in alphabetical order)
15. Qi Zhu, Haibo Zeng, Wei Zheng, Marco Di Natale and Alberto Sangiovanni-Vincentelli, “Optimization of Task Allocation and Priority Assignment in Hard Real-Time Distributed Systems”, ACM Transactions on Embedded Computing Systems (TECS), Vol. 11, No. 4, December, 2012.
16. Yang Yang, Qi Zhu, Mehdi Maasoumy and Alberto Sangiovanni-Vincentelli, “Development of Building Automation and Control Systems”, IEEE Design and Test of Computers, Special Issue on Green Buildings, Vol. 29, No. 4, pp. 45-55, August, 2012.
17. Qi Zhu, Yang Yang, Marco Di Natale, Eelco Scholte and Alberto Sangiovanni-Vincentelli, “Optimizing the Software Architecture for Extensibility in Hard Real-Time Distributed Systems”, IEEE Transactions on Industrial Informatics (TII), Vol. 6, No. 4, pp. 621-636, November, 2010.
18. Qi Zhu, Hai Zhou, Tong Jing, Xianlong Hong and Yang Yang, “Spanning Graph-Based Nonrectilinear Steiner Tree Algorithms”, IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD), Vol. 24, No. 7, pp. 1066-1075, July, 2005.
19. Yang Yang, Tong Jing, Xianlong Hong, Qi Zhu and Yin Wang, “An Efficient 2-Step Heuristics for Rectilinear Steiner Minimal Tree Construction among Obstacles”, Journal of Computer-Aided Design & Computer Graphics, Vol. 17, No. 2, pp. 223-229, 2005. (in

Chinese)

20. Xianlong Hong, Qi Zhu, Tong Jing, Yin Wang, Yang Yang and Yici Cai, “Non-rectilinear On-Chip Interconnect - An Efficient Routing Solution with High Performance”, *Journal of Semiconductors*, Vol. 24, No. 3, pp. 2-10, 2003. (in Chinese)

Conference Papers:

21. Tianshu Wei, Yanzhi Wang and Qi Zhu, “Deep Reinforcement Learning for HVAC Control in Smart Buildings”, 54th IEEE/ACM Design Automation Conference (DAC’17), Austin, TX, June, 2017.
22. Qi Zhu, Hengyi Liang, Licong Zhang, Debayan Roy, Wenchao Li and Samarjit Chakraborty, “Extensibility-Driven Automotive In-Vehicle Architecture Design”, 54th IEEE/ACM Design Automation Conference (DAC’17), Austin, TX, June, 2017. (*Invited Paper*)
23. Bowen Zheng, Chung-Wei Lin, Hengyi Liang, Shinichi Shiraishi, Wenchao Li and Qi Zhu, “Delay-Aware Design, Analysis and Verification of Intelligent Intersection Management”, 3rd IEEE International Conference on Smart Computing (SMARTCOMP’17), Hong Kong, China. May, 2017.
24. Tianshu Wei, Mohammad Atiqul Islam, Shaolei Ren and Qi Zhu, “Co-Scheduling of Datacenter and HVAC Loads in Mixed-Use Buildings”, 7th IEEE International Green and Sustainable Computing Conference (IGSC’16), Hangzhou, China, November, 2016.
25. Bowen Zheng, Chung-Wei Lin, Huafeng Yu, Hengyi Liang and Qi Zhu, “CONVINCE: A Cross-Layer Modeling, Exploration and Validation Framework for Next-Generation Connected Vehicles”, 35th IEEE/ACM International Conference on Computer-Aided Design (ICCAD’16), Austin, TX, November, 2016. (*Invited Paper*)
26. Xiaodao Chen, Yuchen Zhou, Hong Zhou, Chaowei Wan, Qi Zhu, Wenchao Li and Shiyan Hu, “Analysis of Production Data Manipulation Attacks in Petroleum Cyber-Physical Systems”, 35th IEEE/ACM International Conference on Computer-Aided Design (ICCAD’16), Austin, TX, November, 2016. (*Invited Paper*)
27. Shu Zhang, Qi Zhu and Amit K. Roy-Chowdhury, “Adaptive Algorithm Selection, with Applications in Pedestrian Detection”, 23rd IEEE International Conference on Image Processing (ICIP’16), Phoenix, AZ, September, 2016.
28. Hang Su, Peng Deng, Dakai Zhu and Qi Zhu, “Fixed-Priority Elastic Mixed-Criticality Systems: Schedulability Analysis and Performance Optimization”, 22nd IEEE International Conference on Embedded and Real-Time Computing Systems and Applications (RTCSA’16), Daegu, South Korea, August, 2016.
29. Bowen Zheng, Hengyi Liang, Qi Zhu, Huafeng Yu and Chung-Wei Lin, “Next Generation Automotive Architecture Modeling and Exploration for Autonomous Driving”, 15th IEEE Computer Society Annual Symposium on VLSI (ISVLSI’16), Pittsburgh, PA, July, 2016. (*Invited Paper*)
30. Tianshu Wei and Qi Zhu, “Co-scheduling of Flexible Energy Loads in Building Clusters”, 49th IEEE International Symposium on Circuits and Systems (ISCAS’16), Montreal, Canada, May, 2016. (*Invited Paper*)
31. Tiansong Cui, Shuang Chen, Yanzhi Wang, Qi Zhu, Shahin Nazarian and Massoud Pedram,

- “Optimal Co-Scheduling of HVAC Control and Battery Management for Energy-Efficient Buildings Considering State-of-Health Degradation”, 21st IEEE/ACM Asia and South Pacific Design Automation Conference (ASP-DAC’16), Macao, China, January, 2016. (*Best Paper Award Nomination*)
32. Tianshu Wei and Qi Zhu, “Proactive Demand Participation of Heterogeneous Flexible Loads in Smart Grid”, 6th IEEE International Green and Sustainable Computing Conference (IGSC’15), Las Vegas, NV, December, 2015. (two-page abstract)
 33. Tianshu Wei, Bowen Zheng, Qi Zhu and Shiyan Hu, “Security Analysis of Proactive Participation of Smart Buildings in Smart Grid”, 34th IEEE/ACM International Conference on Computer-Aided Design (ICCAD’15), Austin, TX, November, 2015. (*Invited Paper*)
 34. Bowen Zheng, Yue Gao, Qi Zhu and Sandeep Gupta, “Analysis and Optimization of Soft Error Tolerance Strategies for Real-time Systems”, 13th IEEE/ACM International Conference on Hardware/Software Codesign and System Synthesis (CODES+ISSS’15), Amsterdam, Netherlands, October, 2015.
 35. Nanpeng Yu, Tianshu Wei and Qi Zhu, “From Passive Demand Response to Proactive Demand Participation”, 11th IEEE International Conference on Automation Science and Engineering (CASE’15), Gothenburg, Sweden, August, 2015.
 36. Bowen Zheng, Wenchao Li, Peng Deng, Leonard Gerard, Qi Zhu and Natarajan Shankar, “Design and Verification for Transportation System Security”, 52nd ACM/IEEE Design Automation Conference (DAC’15), San Francisco, CA, June, 2015. (*Invited Paper*)
 37. Tiansong Cui, Shuang Chen, Yanzhi Wang, Shahin Nazarian, Qi Zhu and Massoud Pedram, “Optimal Control of PEVs for Energy Cost Minimization and Frequency Regulation in the Smart Grid Accounting for Battery State-of-Health Degradation”, 52nd ACM/IEEE Design Automation Conference (DAC’15), San Francisco, CA, June, 2015.
 38. Mehmet Belviranlı, Peng Deng, Laxmi Bhuyan, Rajiv Gupta and Qi Zhu, “PeerWave: Exploiting Wavefront Parallelism on GPUs with Peer-SM Synchronization”, 29th ACM International Conference on Supercomputing (ICS’15), Newport Beach, CA, June, 2015.
 39. Peng Deng, Fabio Cremona, Qi Zhu, Marco Di Natale and Haibo Zeng, “A Model-based Synthesis Flow for Automotive CPS”, 6th ACM/IEEE International Conference on Cyber-Physical Systems (ICCPS’15), Seattle, WA, April, 2015.
 40. Zaid Al-Bayati, Youcheng Sun, Haibo Zeng, Marco Di Natale, Qi Zhu and Brett Meyer, “Task Placement and Selection of Data Consistency Mechanisms for Real-Time Multicore Applications”, 21st IEEE Real-Time and Embedded Technology and Application Symposium (RTAS’15), Seattle, WA, April, 2015.
 41. Tianshu Wei, Qi Zhu and Mehdi Maasoumy, “Co-scheduling of HVAC Control, EV Charging and Battery Usage for Building Energy Efficiency”, 33rd IEEE/ACM International Conference on Computer-Aided Design (ICCAD’14), San Jose, CA, November, 2014.
 42. Chung-Wei Lin, Qi Zhu and Alberto Sangiovanni-Vincentelli, “Security-Aware Mapping for TDMA-Based Real-Time Distributed Systems”, 33rd IEEE/ACM International Conference on Computer-Aided Design (ICCAD’14), San Jose, CA, November, 2014.
 43. Taeyoung Kim, Bowen Zheng, Hai-Bao Chen, Qi Zhu, Valeriy Sukharev and Sheldon Tan,

- “Lifetime Optimization for Real-Time Embedded Systems Considering Electromigration Effects”, 33rd IEEE/ACM International Conference on Computer-Aided Design (ICCAD’14), San Jose, CA, November, 2014.
44. Liangpeng Guo, Qi Zhu, Pierluigi Nuzzo, Roberto Passerone, Alberto Sangiovanni-Vincentelli and Edward Lee, “Metronomy: A Function-Architecture Co-simulation Framework for Timing Verification of Cyber-Physical Systems”, 12th IEEE/ACM International Conference on Hardware/Software Codesign and System Synthesis (CODES+ISSS’14), New Delhi, India, October, 2014.
 45. Qi Zhu, “Model-based Synthesis for Real-time Embedded Systems”, 57th IEEE International Midwest Symposium on Circuits and Systems (MWSCAS’14), College Station, TX, August, 2014. (*Invited Paper*)
 46. Peng Deng, Qi Zhu, Marco Di Natale and Haibo Zeng, “Task Synthesis for Latency-sensitive Synchronous Block Diagram”, 9th IEEE International Symposium on Industrial Embedded Systems (SIES’14), Pisa, Italy, June, 2014. (**Best Paper Award Finalist**)
 47. Tianshu Wei, Taeyoung Kim, Sangyoung Parky, Qi Zhu, Sheldon X.-D. Tan, Naehyuck Changy, Sadrul Ula and Mehdi Maasoumy, “Battery Management and Application for Energy-Efficient Buildings”, 51st IEEE/ACM Design Automation Conference (DAC’14), San Francisco, CA, June 2014.
 48. Peng Deng, Qi Zhu, Abhijit Davare, Anastasios Mourikis, Xue Liu and Marco Di Natale, “WiP Abstract: An Efficient Control-driven Period Optimization Algorithm for Distributed Real-time Systems”, 5th IEEE/ACM International Conference on Cyber-Physical Systems (ICCPs’14), Work-in-Progress session, Berlin, Germany, April 2014. (one-page abstract)
 49. Qi Zhu and Peng Deng, “Design Synthesis and Optimization for Automotive Embedded Systems”, 14th International Symposium on Physical Design (ISPD’14), Petaluma, CA, March, 2014. (*Invited paper*)
 50. Chun Zhang, Peng Deng, Hui Geng, Jianming Liu, Qi Zhu and Yiyu Shi, “MSim: A General Cycle Accurate Simulation Platform for Memcomputing Studies”, 17th IEEE/ACM Conference on Design, Automation and Test in Europe (DATE’14), Germany, March, 2014.
 51. Chung-Wei Lin, Qi Zhu, Calvin Phung and Alberto Sangiovanni-Vincentelli, “Security-Aware Mapping for CAN-Based Real-Time Distributed Automotive Systems”, 32nd IEEE/ACM International Conference on Computer-Aided Design (ICCAD’13), San Jose, CA, November, 2013.
 52. Mehdi Maasoumy, Qi Zhu, Cheng Li, Forrest Meggers and Alberto Sangiovanni-Vincentelli, “Co-design of Control Algorithm and Embedded Platform for HVAC Systems”, 4th IEEE/ACM International Conference on Cyber-Physical Systems (ICCPs’13), Philadelphia, PA, April, 2013. (**Best Paper Award**)
 53. Qi Zhu, Peng Deng, Marco Di Natale and Haibo Zeng, “Robust and Extensible Task Implementations of Synchronous Finite State Machines”, 16th IEEE/ACM Conference on Design, Automation and Test in Europe (DATE’13), Grenoble, France, March, 2013.
 54. Haibo Zeng, Marco Di Natale and Qi Zhu, “Optimizing Stack Memory Requirements for Real-time Embedded Applications”, 17th IEEE International Conference on Emerging Technology and Factory Automation (ETFA’12), Krakow, Poland, September, 2012.

55. Yang Yang, Alessandro Pinto, Alberto Sangiovanni-Vincentelli and Qi Zhu, “A Design Flow for Building Automation and Control Systems”, 31st IEEE Real-Time Systems Symposium (RTSS’10), San Diego, CA, December, 2010.
56. Qi Zhu, Yang Yang, Eelco Scholte, Marco Di Natale and Alberto Sangiovanni-Vincentelli, “Optimizing Extensibility in Hard Real-time Distributed Systems”, 15th IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS’09), San Francisco, CA, April, 2009.
57. Qi Zhu, Abhijit Davare and Alberto Sangiovanni-Vincentelli, “A Formal Approach for Optimizing Mapping in System Level Design”, TECHCON, Austin, TX, November, 2008.
58. Wei Zheng, Qi Zhu, Marco Di Natale and Alberto Sangiovanni-Vincentelli, “Definition of Task Allocation and Priority Assignment in Hard Real-Time Distributed Systems”, 28th IEEE Real-Time Systems Symposium (RTSS’07), Tucson, AZ, December, 2007.
59. Abhijit Davare, Qi Zhu, Marco Di Natale, Claudio Pinello, Sri Kanajan and Alberto Sangiovanni-Vincentelli, “Period Optimization for Hard Real-time Distributed Automotive Systems”, 44th IEEE/ACM Design Automation Conference (DAC’07), San Diego, CA, June, 2007. (*Best Paper Award*)
60. Abhijit Davare, Douglas Densmore, Trevor Meyerowitz, Alessandro Pinto, Alberto Sangiovanni-Vincentelli, Guang Yang, Haibo Zeng and Qi Zhu, “A Next-Generation Design Framework for Platform-Based Design”, Design and Verification Conference (DVCon’07), San Jose, CA, February, 2007.
61. Qi Zhu, Nathan Kitchen, Andreas Kuehlmann and Alberto Sangiovanni-Vincentelli, “SAT Sweeping with Local Observability Don’t-Cares”, 43rd IEEE/ACM Design Automation Conference (DAC’06), San Francisco, CA, July, 2006. (*Best Paper Award*)
62. Qi Zhu and Nathan Kitchen, “SAT Sweeping with Local Observability Don’t Cares-Implementation in Open Access Environment”, 15th IEEE/ACM International Workshop on Logic and Synthesis (IWLS’06). Vail, CO, June, 2006.
63. Abhijit Davare, Qi Zhu, John Moondanos and Alberto Sangiovanni-Vincentelli, “JPEG Encoding on the Intel MXP5800: A Platform-Based Design Case Study”, 3rd IEEE Workshop on Embedded Systems for Real-Time Multimedia (ESTIMedia’05), New York, September, 2005.
64. Yang Yang, Tong Jing, Xianlong Hong, Yu Hu, Qi Zhu, Xiaodong Hu and Guiying Yan, “Via-Aware Global Routing for Good VLSI Manufacturability and High Yield”, 16th IEEE International Conference on Application-Specific Systems, Architectures, and Processors (ASAP’05), Samos, Greece, July, 2005.
65. Qi Zhu, Hai Zhou, Tong Jing, Xianlong Hong and Yang Yang, “Efficient Octilinear Steiner Tree Construction Based on Spanning Graphs”, 9th IEEE/ACM Asia and South Pacific Design Automation Conference (ASP-DAC’04), Yokohama, Japan, January, 2004.
66. Yang Yang, Qi Zhu, Tong Jing, Xianlong Hong and Yin Wang, “Rectilinear Steiner Minimal Tree among Obstacles”, 5th IEEE International Conference on ASIC (ASICON’03), Beijing, China, October, 2003.
67. Qi Zhu, Ling Shao, Rong Yan, Jian Zhang and Dong Xie, “Buffer Replacement Algorithm

for Merge-based Multicast Video-on-Demand System”, 10th IEEE International Conference on Telecommunications (ICT’03), Tahiti, French Polynesia, February, 2003.

Book Chapters:

68. Qi Zhu, Nathan Kitchen, Andreas Kuehlmann and Alberto Sangiovanni-Vincentelli, “SAT Sweeping with Local Observability Don’t-Cares”, in *Advanced Techniques in Logic Synthesis, Optimizations and Applications*, Sunil P. Khatri and Kanupriya Gulati, Editors, Springer, 2010.
69. Felice Balarin, Massimiliano D’Angelo, Abhijit Davare, Douglas Densmore, Trevor Meyerowitz, Roberto Passerone, Alessandro Pinto, Alberto Sangiovanni-Vincentelli, Alena Simalatsar, Yosinori Watanabe, Guang Yang and Qi Zhu, “Platform-Based Design and Frameworks: Metropolis and Metro II”, in *Model-Based Design for Embedded Systems*, Gabriela Nicolescu and Pieter J. Mosterman, Editors, CRC Press, 2009.

Technical Reports:

70. Qi Zhu, “Optimizing Mapping in System Level Design”, Technical Report No. UCB/EECS-2008-126, September, 2008. (Ph.D. dissertation)
71. Douglas Densmore, Trevor Meyerowitz, Abhijit Davare, Qi Zhu and Guang Yang. “Metro II Execution Semantics for Mapping”, Technical Report, No. UCB/EECS-2008-16, February, 2008.
72. Qi Zhu, “Semantic Driven Synthesis for Heterogeneous Systems”, Technical Report No. UCB/EECS-2007-43, April, 2007. (M.S. thesis)
73. Abhijit Davare, Jike Chong, Qi Zhu, Douglas Densmore and Alberto Sangiovanni-Vincentelli, “Classification, Customization, and Characterization: Using MILP for Task Allocation and Scheduling”, Technical Report No. UCB/EECS-2006-166, December, 2006.
74. Qi Zhu, Farhana Sheikh and Philip Chong, “A Placement Technique for Multiple-Voltage Design”, Technical Report No. UCB/EECS-2006-133, October, 2006.
75. Qi Zhu, Zhengya Zhang, Alessandro Pinto and Alberto Sangiovanni-Vincentelli, “On-Chip Networks Modeling and Simulation”, Technical Report No. UCB/EECS-2006-126, October, 2006.
76. Abhijit Davare, Qi Zhu and Alberto Sangiovanni-Vincentelli, “A Platform-based Design Flow for Kahn Process Networks”, Technical Report No. UCB/EECS-2006-30, March, 2006.

Professional Activities

- *Technical Program Committee Member:*

IEEE/ACM International Conference on Cyber-Physical Systems (ICCPS) 2018

IEEE/ACM Design, Automation and Test in Europe (DATE) 2018, 2017

IEEE International Green and Sustainable Computing Conference (IGSC) 2017

IEEE/ACM International Conference on Hardware/Software Codesign and System Synthesis (COEES+ISSS) 2015 – 2017

IEEE/ACM Asia and South Pacific Design Automation Conference (ASP-DAC) 2015 – 2017

IEEE/ACM International Conference on Formal Methods and Models for Codesign

(MemoCODE) 2017, 2013, 2012

- IEEE International Conference on Embedded Computer Systems: Architectures, Modeling and Simulation (SAMOS) 2015 – 2017
- ACM Symposium on Applied Computing (SAC) 2015 – 2017
- IEEE Real-Time Systems Symposium (RTSS) 2016
- IEEE International Symposium on Industrial Embedded Systems (SIES) 2013 – 2016
- IEEE Forum on Specification and Design Languages (FDL) 2016
- IEEE/ACM International Conference on Computer-Aided Design (ICCAD) 2013 – 2015
- IEEE International Conference on Embedded Software and Systems (ICCESS) 2015
(Subcommittee chair)
- IEEE International Symposium on Nanoelectronic and Information Systems (iNIS) 2015
(Subcommittee chair)
- IEEE/ACM Design Automation Conference (DAC) 2012 – 2014
- IEEE International Conference on Emerging Technology & Factory Automation 2014, 2013
- IEEE Real-time and Embedded Technology and Applications Symposium (RTAS) 2012
- IEEE International Conference on Parallel and Distributed Systems (ICPADS) 2012
- IEEE International Conference on Embedded Software and Systems (ICCESS) 2011
- IEEE International Symposium on VLSI Design, Automation and Test 2010 – 2013
- *Member and Education Chair* of the IEEE Technical Committee on Cyber-Physical Systems
 - *Session Organizer* at DAC 2017, ICCAD 2016, DAC 2015
 - *Session Chair* at DAC 2017, ICCAD 2016, DAC 2016, HLDVT 2016, ISPD 2016, DAC 2014, ICCAD 2013, MemoCODE 2012
 - *Workshop Co-Chair* for the First IEEE International Workshop on Design Automation for Cyber-Physical Systems (CPSDA), 2016
 - *Vice Chair* for ACM SIGDA University Demonstration at DAC, 2017
 - *Publicity Chair* for ACM SIGDA University Demonstration at DAC, 2016
 - *Associate Editor* for IET Cyber-Physical Systems: Theory & Applications, 2016 – present
 - *Associate Editor* for IEEE TC-CPS Newsletter, 2016 – present
 - *Associate Editor* for IEEE TC-VLSI Newsletter, 2016 – present
 - *Associate Editor* for ACM SIGDA e-Newsletter, 2013 – 2016
 - *Guest Editor* for the Proceedings of IEEE, 2017
 - *Guest Editor* for ACM Transactions on Cyber-Physical Systems, 2016
 - *Panelist* for NSF, 2017, 2016; *Ad-hoc Reviewer* for NSF, 2014, 2012
 - *Reviewer* for Hong Kong Research Grant Council (RGC), 2017, 2016
 - *Reviewer* for Springer book chapters, 2016, 2012
 - *Reviewer* for Masri Institute of Energy and Natural Resources, 2016
 - *Reviewer for Journals*, including IEEE Transactions on Computers (TC), IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD), IEEE Transactions on Industrial Informatics (TII), IEEE Transactions on Systems, Man, and Cybernetics (TSMC), IEEE Transactions on Parallel and Distributed Systems (TPDS), IEEE Transactions on Circuits and Systems for Video Technology (TCSVT), IEEE Transactions on Computational Social Systems (TCSS), IEEE Embedded Systems Letters (ESL), ACM Transactions on Cyber-Physical Systems (TCPS), ACM Transactions on Embedded

Computing Systems (TECS), ACM Transactions on Design Automation of Electronic Systems (TODAES), ACM Transactions on Architecture and Code Optimization (TACO), ACM Journal of Emerging Technologies in Computing Systems (JETC), European Association for Signal Processing Journal on Embedded Systems, Journal of Systems Architecture, Design Automation for Embedded Systems (DAES), Real-Time Systems, Leibniz Transactions on Embedded Systems, Integration, the VLSI Journal.

Talks

- “Extensibility-Driven Automotive In-Vehicle Architecture Design”, 54th IEEE/ACM Design Automation Conference (DAC’17), June, 2017.
- “Design Automation for Tackling Key Challenges in Cyber-Physical Systems: Timing, Security, and Heterogeneity”, United Technologies Research Center, June, 2017.
- “Delay-Aware Design, Analysis and Verification of Intelligent Intersection Management”, 3rd IEEE International Conference on Smart Computing (SMARTCOMP’17), May, 2017.
- “Design Automation for Time-Critical Cyber-Physical Systems”, Fudan University, May, 2017.
- “Design Automation for Tackling Key Challenges in Cyber-Physical Systems: Timing, Security, and Heterogeneity”, Northwestern University, University of Washington, University of California at Santa Barbara, University of California at San Diego, University of Maryland at College Park, February to April, 2017.
- “Design Automation for Cyber-Physical Systems: Challenges and Opportunities”, tutorial at the 18th IEEE International Symposium on Quality Electronic Design (ISQED), 2017.
- “Addressing Time and Security in Cyber-Physical Systems”, University of Southern California, January, 2017.
- “Design Automation for Cyber-Physical Systems: Challenges and Opportunities”, Tsinghua University, Peking University, Chinese Academy of Sciences, December, 2016.
- “SOLSTICe: Software Synthesis with Timing Contracts for Cyber-Physical Systems”, Seventh Annual Cyber-Physical Systems Principal Investigators’ Meeting, October, 2016.
- “Design Automation for Cyber-Physical Systems”, University of Pennsylvania, Boston University, Syracuse University, September, 2016.
- “Cross-layer Software Synthesis for Dependable and Secure Automotive Systems”, 4th International Workshop on Cross-layer Reliability, July, 2016.
- “Next Generation Automotive Architecture Modeling and Exploration for Autonomous Driving”, 15th IEEE Computer Society Annual Symposium on VLSI (ISVLSI’16), July, 2016.
- “Design Automation of Cyber-Physical Systems: from Cars to Buildings”, University of Science and Technology of China, Nanjing University, East China Normal University, June, 2016.
- “Co-scheduling of Flexible Energy Loads in Building Clusters”, 49th IEEE International Symposium on Circuits and Systems (ISCAS’16), May, 2016.
- “Design Automation of Cyber-Physical Systems: from Cars to Buildings”, Technical University of Munich, March, 2016.

- “Design Automation of Cyber-Physical Systems: from Cars to Buildings”, University of Southern California, January, 2016.
- “Proactive Demand Participation of Heterogeneous Flexible Loads in Smart Grid”, 6th IEEE International Green and Sustainable Computing Conference (IGSC’15), December, 2015.
- “Model-based Design and Synthesis of IoT Applications”, Internet-of-Things Symposium at ESWeek, October, 2015.
- “Analysis and Optimization of Soft Error Tolerance Strategies for Real-time Systems”, 13th IEEE/ACM International Conference on Hardware/Software Codesign and System Synthesis (CODES+ISSS’15), October, 2015.
- “Model-based Design and Synthesis of Cyber-Physical Systems: from Cars to Buildings”, The Chinese University of Hong Kong, August, 2015.
- “Building Smart Cities with IoT: from Infrastructure to Transportation”, International Symposium on Design Technologies for IoT, August, 2015.
- “Model-based Design and Synthesis of Automotive Cyber-Physical Systems”, SYSU-CMU Joint Institute of Engineering, August, 2015.
- “Metronomy: A Function-Architecture Co-simulation Framework for Timing Verification of Cyber-Physical Systems”, 12th IEEE/ACM International Conference on Hardware/Software Codesign and System Synthesis (CODES+ISSS’14), October, 2014.
- “Model-based Synthesis of Cyber-Physical Systems”, UCLA, September, 2014.
- “Model-based Synthesis for Real-time Embedded Systems”, 57th IEEE International Midwest Symposium on Circuits and Systems (MWSCAS’14), August, 2014.
- “Model-based Design and Synthesis of Automotive Embedded Systems”, Toyota, July, 2014.
- “Task Synthesis for Latency-sensitive Synchronous Block Diagram”, 9th IEEE International Symposium on Industrial Embedded Systems (SIES’14), June, 2014.
- “Model-based Design and Synthesis for Distributed Embedded Systems: from Smart Cars to Smart Buildings”, SRI International, June, 2014.
- “Design Synthesis and Optimization for Automotive Embedded Systems”, 14th International Symposium on Physical Design (ISPD’14), March, 2014.
- “Design of Distributed Embedded Systems: from Smart Car to Smart Building”, University of Southern California, September, 2013.
- “Design of Distributed Embedded Systems”, University of Texas at San Antonio, June, 2013.
- “Robust and Extensible Task Implementations of Synchronous Finite State Machines”, 16th IEEE/ACM Conference on Design, Automation and Test in Europe (DATE’13), March, 2013.
- “Platform-based Design for Distributed Embedded Systems”, Cornell University, Peking University, The Ohio State University, University of California at Riverside, University of Minnesota, Spring, 2011.
- “Architectural/Micro-architectural Exploration on Virtual Platforms”, Virtual Platform Workshop at 46th Design Automation Conference (DAC), July, 2009.
- “Optimizing Extensibility in Hard Real-time Distributed Systems”, 15th IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS’09), April, 2009.

- “A Formal Approach for Optimizing Mapping in System Level Design”, TECHCON 2008, November, 2008.
- “Period Optimization for Hard Real-time Distributed Automotive Systems”, IEEE Council on Electronic Design Automation (CEDA) Distinguished Speaker Series, April, 2008.
- “An Extensible Synthesis Approach for Meeting Latency Requirements in Distributed Systems”, GSRC Annual Symposium, September, 2007.
- “Proposals for Metro II Execution Semantics for Mapping”, GSRC Annual Symposium, September, 2007.
- “MetroII: Main Features and Progress Update”, GSRC Workshop, June, 2007.
- “MetroII: Main Features and Pre-Alpha Release”, GSRC Workshop, March, 2007.
- “MetroII”, GSRC Workshop, December, 2006.
- “Common Modeling Domain for System Level Design”, GSRC Workshop, December, 2006.
- “A Semantic-Driven Synthesis Flow for Platform-Based Design”, 4th IEEE/ACM International Conference on Formal Methods and Models for Codesign (MemoCODE’06), July, 2006.
- “SAT Sweeping with Local Observability Don’t Cares”, 43rd Design Automation Conference (DAC’06), July, 2006.

Teaching

- Modeling and Synthesis of Cyber-Physical Systems (EE 258 / CS 256): Winter 2017.
- Embedded Systems Design – New Principles and Applications (EE 260): Winter 2016, Winter 2015, Winter 2014, Fall 2012.
- Logic Design (EE/CS 120A): Winter 2017, Fall 2016, Winter 2016, Fall 2015, Winter 2015, Fall 2014, Winter 2014, Fall 2013, Winter 2013, Fall 2012, Fall 2011.
- Digital Integrated Circuit Layout and Design (EE 134): Winter 2012.

Student Advising

- Current Group: Bowen Zheng (PhD, 2013), Tianshu Wei (PhD, 2013), Hengyi Liang (PhD, 2015), Shuyue Lan (PhD, 2015), Di Chen (PhD, 2016), Zhilu Wang (PhD, 2016), Hyunjong Choi (PhD, 2016), Bryan Glenn Marsh (PhD, 2016); Li Chen (MS, 2015), Xiaoxiong Ding (MS, 2015), Ankith Rakesh Kumar (MS, 2016); David Zhu (undergraduate, junior).
- Alumni: Peng Deng (PhD, graduated in 2016); Zhonghua Zhou (MS, graduated in 2014), Shuheng Li (MS, graduated in 2015), Priyanka Khire (MS, graduated in 2015), Chi-Wei Huang (MS, graduated in 2015), Zhuofu Deng (MS, graduated in 2016), Beixing Yin (MS, graduated in 2016), Yunjian Zhang (MS, graduated in 2016), Aditya Swarup (MS, graduated in 2016); Patrick Smith (undergraduate), Andrew Olguin (undergraduate), Ellison Zhu (undergraduate), Gavin Huang (undergraduate), Jason Terrado (undergraduate), Mark Asfour (undergraduate), Stanley Chang (undergraduate).