

Qi Zhu

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Education

University of California, Berkeley	Electrical Engineering and Computer Sciences	Ph.D. 2008
Tsinghua University	Computer Science and Technology	B.E. 2003

Professional Experience

Assistant Professor	August 2011 – present
Department of Electrical and Computer Engineering	University of California, Riverside
Research Scientist	October 2008 – August 2011
Strategic CAD Laboratories	Intel Corporation

Publications

Book Chapters:

1. 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.
2. 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.

Journal Articles:

3. Tianshu Wei, Qi Zhu and Nanpeng Yu, “Proactive Demand Participation of Smart Buildings in Smart Grid”, accepted by the *IEEE Transactions on Computers (TC)*, 2015.
4. Chung-Wei Lin, Bowen Zheng, Qi Zhu and Alberto Sangiovanni-Vincentelli, “Security-Aware Methodology and Optimization for Automotive Systems”, accepted by the *ACM Transaction on Design Automation of Electronic Systems (TODAES)*, 2015.
5. Fabio Pasqualetti and Qi Zhu, “Design and Operation of Secure Cyber-Physical Systems”, *IEEE Embedded Systems Letters*, March 2015.
6. 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.

7. 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.
8. 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.
9. 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.
10. 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.
11. 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.
12. 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.
13. 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.

Conference Papers:

14. 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.
15. 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.
16. 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.
17. 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.
18. 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.

19. 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.
20. 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.
21. 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.
22. 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.
23. 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.
24. 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.
25. 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.
26. Qi Zhu, "Model-based Synthesis for Real-time Embedded Systems", to appear in the 57th IEEE International Midwest Symposium on Circuits and Systems (MWSCAS'14), College Station, TX, August, 2014. (*Invited Paper*)
27. 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**)
28. 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.
29. 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*)
30. 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.

31. 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.
32. 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**)
33. 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.
34. 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.
35. 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.
36. 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.
37. Qi Zhu, Abhijit Davare and Alberto Sangiovanni-Vincentelli, "A Formal Approach for Optimizing Mapping in System Level Design", TECHCON 2008, Austin, TX, November, 2008.
38. 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.
39. 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**)
40. 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.
41. 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**)
42. 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.

43. 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.
44. 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.
45. 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.
46. 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.

Technical Reports:

47. Qi Zhu, "Optimizing Mapping in System Level Design", Technical Report No. UCB/EECS-2008-126, September, 2008. (Ph.D. dissertation)
48. 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.
49. Qi Zhu, "Semantic Driven Synthesis for Heterogeneous Systems", Technical Report No. UCB/EECS-2007-43, April, 2007. (M.S. thesis)
50. 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.
51. Qi Zhu, Farhana Sheikh and Philip Chong, "A Placement Technique for Multiple-Voltage Design", Technical Report No. UCB/EECS-2006-133, October, 2006.
52. 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.
53. 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.

Awards and Honors

- Regents Faculty Fellowship, University of California, 2013 – 2015
- Best Paper Award at the 4th IEEE/ACM International Conference on Cyber-Physical Systems (ICCPs), 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

- Winner of the first IEEE programming challenge at IWLS, 2006
- Pao Family Fellowship from University of California, Berkeley, 2003 – 2004
- Beijing Outstanding Undergraduate Award, 2003
- Samsung Scholarship, 2003
- Intel Scholarship, 2001

Professional Activities

Technical Program Committee Member:

IEEE/ACM International Conference on Computer-Aided Design (ICCAD) 2013, 2014, 2015
 IEEE/ACM International Conference on Hardware/Software Codesign and System Synthesis (COEES+ISSS) 2015
 IEEE/ACM Asia and South Pacific Design Automation Conference (ASP-DAC) 2015, 2016
 IEEE International Symposium on Industrial Embedded Systems (SIES) 2013, 2014, 2015
 IEEE/ACM Design Automation Conference (DAC) 2012, 2013, 2014
 IEEE International Conference on Emerging Technology & Factory Automation 2013, 2014
 IEEE/ACM International Conference on Formal Methods and Models for Codesign (MemoCODE) 2012, 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 2011
 IEEE International Symposium on VLSI Design, Automation and Test 2010 – 2013
 Workshop on Synthesis and Optimization Methods for Real-time Embedded Systems 2011
 International Workshop on Model-Based Design 2011

Technical Program Sub-Committee Chair:

IEEE International Conference on Embedded Software and Systems (ICCESS) 2015
 IEEE International Symposium on Nanoelectronic and Information Systems 2015

Member of IEEE Technical Committee on Cybernetics for Cyber-Physical Systems (CCPS)

Session Chair at DAC 2014, ICCAD 2013, MemoCODE 2012

Session Organizer at DAC 2015

Invited Speaker at the IEEE Council for Electronic Design Automation (CEDA) Distinguished Speaker Series, 2008

Ad-hoc Reviewer for NSF, 2012, 2014.

Reviewer for Journals, including IEEE Transactions on Computers, IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems, IEEE Transactions on Industrial Informatics, IEEE Transactions on Systems, Man, and Cybernetics, IEEE Transactions on Computational Social Systems, IEEE Embedded Systems Letters, ACM Transactions on Embedded Computing Systems, ACM Transactions on Design Automation of Electronic Systems, ACM Transactions on Architecture and Code Optimization, ACM Journal of Emerging Technologies in Computing Systems, European Association for Signal Processing Journal on Embedded Systems, Journal of Systems Architecture, Design Automation for Embedded Systems, Real-Time Systems, Integration, the VLSI Journal.

Reviewer for Conferences and Workshops, including IEEE/ACM Design Automation Conference, IEEE/ACM International Conference on Computer-Aided Design, IEEE Real-Time and Embedded Technology and Applications Symposium, IEEE/ACM Conference on Design Automation and Test in Europe, IEEE/ACM International Conference on Hardware/Software Codesign and System Synthesis, Society of Automotive Engineers World Congress, IEEE International Conference on ASIC, IEEE/ACM International Workshop on Logic and Synthesis, IEEE Symposium on Industrial Embedded Systems, International Conference on Formal Modeling and Analysis of Timed Systems, IEEE Workshop on Synthesis And System Integration of Mixed Information technologies.

Talks

- “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), 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.