

Qi Zhu

Associate Professor
Electrical and Computer Engineering
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Summary

Dr. Qi Zhu is a tenured Associate Professor at the Department of Electrical and Computer Engineering (ECE) in Northwestern University. He was an Assistant Professor and later Associate Professor at the ECE Department in University of California, Riverside from 2011 to 2017, and a Research Scientist at the Strategic CAD Labs in Intel from 2008 to 2011. Dr. Zhu 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 interests include design automation for cyber-physical systems (CPS) and Internet of Things, cyber-physical security, safe and secure machine learning for CPS, and system-on-chip design, with applications in domains such as automotive electronic systems, connected vehicles, and energy-efficient buildings. He received best paper awards at Design Automation Conference (DAC) 2006, DAC 2007, International Conference on Cyber-Physical Systems (ICCPs) 2013, and ACM Transactions on Design Automation of Electronic Systems (TODAES) 2016. He received the 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.

Dr. Zhu is an Associate Editor for IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD) and IET Cyber-Physical Systems: Theory & Applications. He has served as an Associate Editor for IEEE TCCPS, IEEE TC-VLSI, and ACM SIGDA Newsletters; and as a Guest Editor for Proceedings of the IEEE, ACM Transactions on Cyber-Physical Systems (TCPS), Journal of Systems Architecture (JSA), and Integration, the VLSI Journal. Dr. Zhu is the Conference Chair of IEEE TCCPS, and VP of Young Professionals at IEEE Council for Electronic Design Automation (CEDA). He has served as the General Chair for the 15th IEEE International Conference on Embedded Software and Systems (ICCESS), the Program Chair for the 1st and 2nd ACM/IEEE Workshops on Design Automation for CPS and IoT (DESTION), and on the technical program committee and as organizer for a number of conferences in design automation, cyber-physical systems, embedded systems, and real-time systems, including DAC, ICCAD, DATE, ASP-DAC, ICCPS, ICPS, CODES+ISSS, RTSS, RTAS, ICCESS, GLVLSI, SAC, SIES, MEMOCODE, SAMOS, FDL, etc. He received the ACM SIGDA Service Award in 2015.

Education

Doctor of Philosophy (2008)
University of California, Berkeley – Electrical Engineering and Computer Sciences
Dissertation: *Optimizing Mapping in System Level Design*; Advisor: Alberto Sangiovanni-Vincentelli

Bachelor of Engineering (2003)
Tsinghua University – Computer Science and Technology

Professional Experience

Associate Professor (January 2018 – present)
Northwestern University – Department of Electrical and Computer Engineering

Associate Professor (July 2017 – December 2017)
Assistant Professor (July 2011 – June 2017)
University of California, Riverside – Department of Electrical and Computer Engineering

Research Scientist (October 2008 – June 2011)
Intel Corporation – Strategic CAD Laboratories

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 ACM/IEEE International Conference on Cyber-Physical Systems (ICCPS), 2013
- Best Paper Award at the 44th ACM/IEEE Design Automation Conference (DAC), 2007
- Best Paper Award at the 43rd ACM/IEEE Design Automation Conference (DAC), 2006
- Best Paper Award Nomination at the 21st ACM/IEEE Asia and South Pacific Design Automation Conference (ASP-DAC), 2016
- 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 (full list at the end of CV)

Synthesis and verification of intelligent CPS and real-time embedded systems:

- Chao Huang, Kai-Chieh Chang, Chung-Wei Lin and Qi Zhu, “SAW: A Tool for Safety Analysis of Weakly-hard Systems”, 32nd International Conference on Computer-Aided Verification (CAV’20), Los Angeles, CA, July, 2020.
- Chao Huang, Shichao Xu, Zhilu Wang, Shuyue Lan, Wenchao Li and Qi Zhu, “Opportunistic Intermittent Control with Safety Guarantees for Autonomous Systems”, 57th ACM/IEEE Design Automation Conference (DAC’20), San Francisco, CA, July, 2020.
- Hengyi Liang, Zhilu Wang, Debayan Roy, Soumyajit Dey, Samarjit Chakraborty and Qi Zhu, “Security-driven Codesign with Weakly-hard Constraints for Real-time Embedded Systems”, 37th IEEE International Conference on Computer Design (ICCD’19), Abu Dhabi, United Arab Emirates, November, 2019.
- Jiameng Fan, Chao Huang, Wenchao Li, Xin Chen and Qi Zhu, “Towards Verification-Aware Knowledge Distillation for Neural-Network Controlled Systems”, 38th ACM/IEEE International Conference on Computer-Aided Design (ICCAD’19), Westminster, CO, November, 2019. (*Invited Paper*)

- Chao Huang, Jiameng Fan, Wenchao Li, Xin Chen and Qi Zhu, “ReachNN: Reachability Analysis of Neural-Network Controlled Systems”, 19th ACM International Conference on Embedded Software (EMSOFT’19), New York City, October, 2019.
- Chao Huang, Wenchao Li and Qi Zhu, “Formal Verification of Weakly-Hard Systems”, 22nd ACM International Conference on Hybrid Systems: Computation and Control (HSCC’19), Montreal, Canada, April, 2019.
- Shuyue Lan, Chao Huang, Zhilu Wang, Hengyi Liang, Wenhao Su and Qi Zhu, “Design Automation for Intelligent Automotive Systems”, 49th IEEE International Test Conference (ITC’18), Phoenix, AZ, October, 2018.
- 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 ACM/IEEE 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 ACM/IEEE 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 ACM/IEEE 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 ACM/IEEE Design Automation Conference (DAC’07), San Diego, CA, June, 2007. (**Best Paper Award**)

Cyber-physical security and safety:

- Xiangguo Liu, Neda Masoud and Qi Zhu, “Impact of Sharing Driving Attitude Information: A Quantitative Study on Lane Changing”, IEEE Intelligent Vehicles Symposium (IV’20), Las Vegas, NV, October, 2020.
- Bowen Zheng, Chung-Wei Lin, Shinichi Shiraishi and Qi Zhu, “Design and Analysis of Delay-Tolerant Intelligent Intersection Management”, ACM Transactions on Cyber-Physical Systems (TCPS), Vol. 4, No. 1, November, 2019.
- Ahmed Abdo, Sakib Md Bin Malek, Zhiyun Qian, Qi Zhu, Matthew Barth and Nael Abu-Ghazaleh, “Application Level Attacks on Connected Vehicle Protocols”, 22nd USENIX International Conference on Research in Attacks, Intrusion and Defenses (RAID’19), Beijing, China, September, 2019.

- Hengyi Liang, Matthew Jagielski, Bowen Zheng, Chung-Wei Lin, Eunsuk Kang, Shinichi Shiraishi, Cristina Nita-Rotaru and Qi Zhu, “Network and System Level Security in Connected Vehicle Applications”, 37th ACM/IEEE International Conference on Computer-Aided Design (ICCAD’18), San Diego, CA, November, 2018. (*Invited Paper*)
- 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 ACM/IEEE 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 ACM/IEEE International Conference on Computer-Aided Design (ICCAD’13), San Jose, CA, November, 2013.

Energy-efficient buildings:

- Tianshu Wei, Shaolei Ren and Qi Zhu, “Deep Reinforcement Learning for Joint Datacenter and HVAC Load Control in Distributed Mixed-Use Buildings”, IEEE Transactions on Sustainable Computing, 2019.
- Tianshu Wei, Xiaoming Chen, Xin Li and Qi Zhu, “Model-based and Data-driven Approaches for Building Automation and Control”, 37th ACM/IEEE International Conference on Computer-Aided Design (ICCAD’18), San Diego, CA, November, 2018. (*Invited Paper*)
- Tianshu Wei, Yanzhi Wang and Qi Zhu, “Deep Reinforcement Learning for HVAC Control in Smart Buildings”, 54th ACM/IEEE 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 ACM/IEEE 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 ACM/IEEE 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 ACM/IEEE 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 ACM/IEEE International Conference on Cyber-Physical Systems (ICCPs’13), Philadelphia, PA, April, 2013. (**Best Paper Award**)

Others:

- Qi Zhu and Alberto Sangiovanni-Vincentelli, “Codesign Methodologies and Tools for Cyber–Physical Systems”, Proceedings of the IEEE, Vol. 106, No. 9, September, 2018.
- Shuyue Lan, Rameswar Panda, Qi Zhu and Amit K. Roy-Chowdhury, “FFNet: Video Fast-Forwarding via Reinforcement Learning”, 30th IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR’18), Salt Lake City, Utah, June, 2018.
- Sanjit Seshia, Shiyan Hu, Wenchao Li and Qi Zhu, “Design Automation of Cyber-Physical Systems: Challenges, Advances, and Opportunities”, IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD), Vol. 36, No. 9, September, 2017. (*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 ACM/IEEE Design Automation Conference (DAC’06), San Francisco, CA, July, 2006. (*Best Paper Award*)

Professional Activities

- *Program Co-Chair and Steering Committee Member* of the 2nd ACM/IEEE Workshop on Design Automation for CPS and IoT (DESTION), 2020
- *Hot Topics Day Chair* of the 41st IEEE Real-Time Systems Symposium (RTSS), 2020
- *Program Co-Chair* of the 3rd IEEE International Conference on Industrial Cyber-Physical Systems (ICPS), 2020
- *General Chair* of the 15th IEEE International Conference on Embedded Software and Systems (ICCESS), 2019
- *Workshops Chair* of the Cyber-Physical Systems and Internet-of-Things Week (CPS-IoT Week), 2019
- *Program Chair* of the 1st ACM/IEEE Workshop on Design Automation for CPS and IoT (DESTION), 2019
- *Hot Topics Day Chair* of the 40th IEEE Real-Time Systems Symposium (RTSS), 2019
- *Chair* of the 3rd IEEE International Workshop on Design Automation for Cyber-Physical Systems, 2018
- *Co-Chair* of the 1st IEEE International Workshop on Design Automation for Cyber-Physical Systems, 2016
- *Local Chair* of the 28th ACM Great Lakes Symposium on VLSI (GLVLSI), 2018.
- *Chair* of the ACM SIGDA University Demonstration at DAC, 2019, 2018
- *Vice Chair* of the ACM SIGDA University Demonstration at DAC, 2017
- *Publicity Chair* of the ACM SIGDA University Demonstration at DAC, 2016
- *Technical Program Committee Member:*
 - ACM/IEEE International Conference on Computer-Aided Design (ICCAD) 2020 (Track Chair), 2019 (Track Chair), 2013 – 2015
 - ACM/IEEE International Conference on Cyber-Physical Systems (ICCPS) 2020, 2018
 - ACM/IEEE Design Automation Conference (DAC) 2020, 2018, 2012 – 2014
 - ACM/IEEE Asia and South Pacific Design Automation Conference (ASP-DAC) 2020, 2015 – 2017

- IEEE Real-Time Systems Symposium (RTSS) 2019, 2016
ACM/IEEE Design, Automation and Test in Europe (DATE) 2017 – 2019
ACM Symposium on Applied Computing (SAC) 2019 (Track Chair), 2015 – 2017
ACM/IEEE International Conference on Hardware/Software Codesign and System Synthesis (COEES+ISSS) 2015 – 2018
IEEE International Green and Sustainable Computing Conference (IGSC) 2017
ACM/IEEE 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
IEEE International Symposium on Industrial Embedded Systems (SIES) 2013 – 2016
IEEE Forum on Specification and Design Languages (FDL) 2016
IEEE International Conference on Embedded Software and Systems (ICESS) 2015 (Subcommittee Chair)
IEEE International Symposium on Nanoelectronic and Information Systems (iNIS) 2015 (Subcommittee Chair)
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 (ICESS) 2011
IEEE International Symposium on VLSI Design, Automation and Test 2010 – 2013
- *Session Organizer* at ICCAD 2018, ICCAD 2017, DAC 2017, ICCAD 2016, DAC 2015
 - *Session Chair* at DAC 2019, DAC 2018, DAC 2017, ICCAD 2016, DAC 2016, HLDVT 2016, ISPD 2016, DAC 2014, ICCAD 2013, MemoCODE 2012
 - *Conference Chair* of the IEEE Technical Committee on Cyber-Physical Systems (TCCPS)
 - *Associate Editor* of the IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD), 2018 – present
 - *Associate Editor* of the IET Cyber-Physical Systems: Theory & Applications, 2016 – present
 - *Associate Editor* of the IEEE TCCPS Newsletter, 2016 – 2019
 - *Associate Editor* of the IEEE TC-VLSI Newsletter, 2016 – 2019
 - *Associate Editor* of the ACM SIGDA e-Newsletter, 2013 – 2016
 - *Guest Editor* for the Journal of Systems Architecture, 2019 – 2020
 - *Guest Editor* for the Proceedings of the IEEE, Special Issue on Design Automation for Cyber-Physical Systems, 2017 – 2018
 - *Guest Editor* for the ACM Transactions on Cyber-Physical Systems, Special Issue on Artificial Intelligence and Cyber-Physical Systems, 2020; Special Issue on Smart Homes, Buildings, and Infrastructure, 2016
 - *Panelist* for NSF, 2019, 2018, 2017, 2016; *Ad-hoc Reviewer* for NSF, 2018, 2014, 2012
 - *Reviewer* for Hong Kong Research Grant Council (RGC), 2019, 2018, 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), Proceedings of the IEEE, 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 Transactions on Very Large Scale Integration Systems (TVLSI), IEEE Transactions on Emerging Topics in Computing (TETC), IEEE Software, IEEE Embedded Systems Letters (ESL), IEEE Consumer Electronics Magazine, 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

- “Taming Unpredictability: Leveraging Weakly-hard Constraints in Design and Adaptation”, Dagstuhl Seminar on Future Automotive HW/SW Platform Design, December, 2019.
- “Security-driven Codesign with Weakly-hard Constraints for Real-time Embedded System”, 37th IEEE International Conference on Computer Design (ICCD’19), November, 2019.
- “Towards Verification-Aware Knowledge Distillation for Neural-Network Controlled Cyber-Physical Systems”, 38th ACM/IEEE International Conference on Computer-Aided Design (ICCAD’19), November, 2019.
- “Beyond Functionality: Tackling Timing and Security Challenges in the Design of Intelligent Engineering Systems”, Computer Science Department, Northwestern University, May, 2019.
- “It is about Time”, The Great Chicago Area Systems Research Workshop, May, 2019.
- “Network and System Level Security in Connected Vehicle Applications”, 37th ACM/IEEE International Conference on Computer-Aided Design (ICCAD’18), November, 2018.
- “Model-based and Data-driven Approaches for Building Automation and Control”, 37th ACM/IEEE International Conference on Computer-Aided Design (ICCAD’18), November, 2018.
- “Design Automation for Intelligent Automotive Systems”, 49th IEEE International Test Conference (ITC’18), October, 2018.
- “Panel: Future of CPS: Here to stay or another fad?”, ESWEEK 2018, October, 2018.
- “Beyond Functionality: Combating Timing and Security Challenges in the Design of Intelligent Systems”, ShanghaiTech Workshop on Emerging Devices, Circuits and Systems, June, 2018.
- “Timing and Security Analysis Framework for VANET-based Intelligent Transportation Systems”, 36th ACM/IEEE International Conference on Computer-Aided Design (ICCAD’17), November, 2017.
- “Addressing Extensibility and Fault Tolerance in CAN-based Automotive Systems”, 11th ACM/IEEE International Symposium on Networks-on-Chip (NOCS’17), October, 2017.
- “Extensibility-Driven Automotive In-Vehicle Architecture Design”, 54th ACM/IEEE 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.
- “SOISTICe: 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 ACM/IEEE 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 ACM/IEEE 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 ACM/IEEE 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 ACM/IEEE International Conference on Formal Methods and Models for Codesign, July, 2006.
- “SAT Sweeping with Local Observability Don’t Cares”, 43rd Design Automation Conference (DAC’06), July, 2006.

Teaching

At Northwestern University:

- Cyber-Physical Systems Design and Application (COMP_ENG 364/464): Spring 2020.
- Embedded Systems (COMP_ENG 366/466): Winter 2020.
- Connected and Autonomous Vehicles: Challenges and Design (EECS 495/395): Winter 2020, Winter 2019.
- Modeling and Synthesis of Cyber-Physical Systems (EECS 495/395): Winter 2019, Winter 2018.

At University of California, Riverside:

- 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): Fall 2017, 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: Shuyue Lan (PhD), Hengyi Liang (PhD), Zhilu Wang (PhD), Xiangguo Liu (PhD), Shichao Xu (PhD), Yixuan Wang (PhD), Ruochen Jiao (PhD), Lixu Wang (PhD), Chao Huang (Postdoc), Yuanzhe Jin (MS), Jiazhe Liu (MS), Baiting Luo (MS), Ximeng Wu (MS), Huayi Zhan (MS), Shaocheng Zhang (MS).
- Graduated PhDs: Tianshu Wei (June, 2018; first job: Google), Bowen Zheng (June, 2018; first job: Pony.ai), Peng Deng (June, 2016; first job: Snap Inc.).
- Other Group Alumni: Chunlin Feng (MS, 2020), Varshini Jeevaraj (MS, 2019), Yinni Jin (MS, 2019), Li Chen (MS, 2017), Xiaoxiong Ding (MS, 2017), Beixing Yin (MS, 2016), Yunjian Zhang (MS, 2016), Aditya Swarup (MS, 2016), Zhuofu Deng (MS, 2016), Shuheng Li (MS, 2015), Priyanka Khire (MS, 2015), Chi-Wei Huang (MS, 2015), Zhonghua Zhou (MS, 2014); Hyunjong Choi, Di Chen, Bryan Glenn Marsh, Calvin Phung; David Zhu (undergraduate), Patrick Smith (undergraduate), Andrew Olguin (undergraduate), Ellison Zhu (undergraduate), Gavin Huang (undergraduate), Jason Terrado (undergraduate), Mark Asfour (undergraduate), Stanley Chang (undergraduate).

Full Publication List (reverse chronological order)

Journal Articles:

1. Bowen Zheng, Chung-Wei Lin, Shinichi Shiraishi and Qi Zhu, “Design and Analysis of Delay-Tolerant Intelligent Intersection Management”, ACM Transactions on Cyber-Physical Systems (TCPS), Vol. 4, No. 1, November, 2019.
2. Tianshu Wei, Shaolei Ren and Qi Zhu, “Deep Reinforcement Learning for Joint Datacenter and HVAC Load Control in Distributed Mixed-Use Buildings”, IEEE Transactions on Sustainable Computing, 2019.
3. Zaid Al-bayati, Youcheng Sun, Haibo Zeng, Marco Di Natale, Qi Zhu and Brett H. Meyer, “Partitioning and Selection of Data Consistency Mechanisms for Multicore Real-Time Systems”, ACM Transactions on Embedded Computing Systems (TECS), Vol. 18, No. 4, August, 2019.
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