

Zhiru Zhang

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RESEARCH INTERESTS

Design automation for heterogeneous computing, including high-level synthesis, architecture and compiler optimization for hardware specialization, software-defined reconfigurable systems, and approximate computing substrate.

EDUCATION

University of California, Los Angeles, Los Angeles, CA

Ph.D., Computer Science, 2007 (with Highest Distinction)

- Thesis Topic: Behavior-Level Scheduling and Planning for Nanometer IC Designs
- Advisor: Professor Jason Cong

M.S., Computer Science, 2003

Peking University, Beijing, China

B.S., Computer Science, 2001 (with Highest Distinction)

PROFESSIONAL EXPERIENCE

Cornell University, Ithaca, NY Aug. 2012–present
Assistant Professor, School of Electrical and Computer Engineering
Graduate Field Member, Computer Science

Xilinx Inc., San Jose, CA Jan. 2011–Aug. 2012
Software Development Manager

AutoESL Design Technologies Inc., Los Angeles, CA May 2006–Jan. 2011
Co-founder, Director of Research and Development

AWARDS AND HONORS

- Best Paper Award (short paper category), International Symposium on Field-Programmable Custom Computing Machines, 2018.
- Rising Professional Achievement Award, UCLA Henry Samueli School of Engineering and Applied Science, 2018.
- Best Paper Award Nomination, International Symposium on Field-Programmable Gate Arrays (4 out of 116 submissions), 2018.
- Best Paper Award Nomination, International Symposium on Field-Programmable Gate Arrays (4 out of 101 submissions), 2017.
- Michael Tien'72 Excellence in Teaching Award, College of Engineering, Cornell University, 2016.
- DARPA Young Faculty Award (YFA), 2015.
- IEEE CEDA Ernest S. Kuh Early Career Award, 2015.
- NSF CAREER Award, National Science Foundation, 2015.
- Best Paper Award, ACM Transactions on Design Automation of Electronic Systems, 2012.
- Ross Freeman Award for Technical Innovation, Xilinx, 2012.
- Best Paper Award Nomination, International Conference on Computer-Aided Design (14 out of 438 submissions), 2009.
- Outstanding Ph.D. Award, UCLA Computer Science Department, 2007.
- Phi Tau Phi Scholarship Award, Phi Tau Phi Scholastic Honor Society of America, 2005.
- Best Graduate Award, Peking University, 2001.

TEACHING
EXPERIENCE

- **ECE/ENGRD 2300** – Digital Logic and Computer Organization
Spring 2018 (76 students), Spring 2017 (92 students), Spring 2016 (62 students),
Spring 2015 (58 students), Spring 2014 (63 students)
- **ECE 5775** – High-Level Digital Design Automation
Fall 2017 (20 students), Fall 2016 (30 students), Fall 2015 (36 students), Fall 2014
(33 students), Fall 2013 (17 students)
- **ENGRG 1050** – Freshman Engineering Seminar
Fall 2017 (21 students), Fall 2013 (18 students)
- **ECE 5950** – Special Topics on High-Level Digital Design Automation
Spring 2013 (14 students)

EXTERNAL
PROFESSIONAL
ACTIVITIES

Conference Technical Program Committee Member

- International Conference on Application-specific Systems, Architectures and Processors (ASAP) 2017-present.
- Asia and South Pacific Design Automation Conference (ASP-DAC) 2013-2015, 2017-present (track chair).
- Design Automation Conference (DAC) 2016-2018.
- International Symposium on Field-Programmable Gate Arrays (FPGA) 2015-present.
- International Workshop on Logic & Synthesis (IWLS), 2018.
- International Conference on Computer-Aided Design (ICCAD) 2015-2017.
- International Conference on Hardware/Software Codesign and System Synthesis (CODES+ISSS) 2015-2016.
- International Conference on Computing Frontiers (CF) 2016.
- International Conference on Computer Design (ICCD) 2015.
- International Conference on Field-Programmable Logic and Applications (FPL) 2016.
- International Symposium on Low Power Electronics and Design (ISLPED) 2016.
- IEEE International Symposium on Circuits and Systems (ISCAS) 2011-2015.
- International Conference on Very Large Scale Integration (VLSI-SOC) 2011, 2015.
- Design, Automation, and Test in Europe (DATE) 2014.
- Electronic System Level Synthesis Conference (ESLSyn) 2012-2015.
- International Symposium on Application Accelerators in High Performance Computing (SAAHPC) 2009-2012.

Conference Technical Program Chair

- International Conference on Application-specific Systems, Architectures and Processors (ASAP), TPC Co-Chair, 2018.
- Electronic System Level Synthesis Conference (ESLSyn), TPC Chair, 2015.

Journal Editor

- Springer Journal of Signal Processing Systems (JSPS), *Associate Editor*, 2017-present.
- Springer Journal on Design Automation for Embedded Systems (DAEM), *Associate Editor*, 2016-present.
- Journal of Electrical and Computer Engineering, Special Issue on ESL Design Methodology (JECE), *Guest Editor*, 2011-2012.

Journal Reviewer

- ACM Transactions on Design Automation of Electronic Systems (TODAES)
- ACM Transactions on Architecture and Code Optimization (TACO)
- ACM Transactions on Reconfigurable Technology and Systems (TRETTS)
- IEEE Transactions on Computers (TC)
- IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD)
- IEEE Transactions on Signal Processing (T-SP)
- IEEE Computer Architecture Letters (CAL)
- IEEE Transactions on Very Large Scale Integration Systems (TVLSI)

- IET Computers & Digital Techniques (IET-CDT)
- IEEE Design & Test Magazine
- Journal of Parallel and Distributed Computing (JPDC)

Grant Proposal Review Panelist

- NSF, CISE Directorate (2015, 2016)

Professional Society Memberships

- ACM Member, 2015-present
- ACM SIGDA Member, 2012-present
- IEEE Member, 2011-present
- IEEE CAS/CEDA CANDE (Computer Aided Network DEsign) Technical Committee, *Publicity Chair*, 2012-present.

PUBLICATIONS

Conference Publications

- W. Hua, Z. Zhang, and G.E. Suh. Reverse Engineering Convolutional Neural Networks Through Side-channel Information Leaks, to appear in *Design Automation Conference (DAC)*, Jun. 2018.
- S. Dai, Y. Zhou, H. Zhang, E. Ustun, E. F.Y. Young, and Z. Zhang. Fast and Accurate Estimation of Quality of Results in High-Level Synthesis with Machine Learning, *International Symposium on Field-Programmable Custom Computing Machines (FCCM)*, May 2018. (**Best Paper Award**, short paper category)
- S. Dai, G. Liu, and Z. Zhang. A Scalable Approach to Exact Resource-Constrained Scheduling Based on a Joint SDC and SAT Formulation, *International Symposium on Field-Programmable Gate Arrays (FPGA)*, Feb. 2018. (**Best Paper Nominee**)
- Y. Zhou, U. Gupta, S. Dai, R. Zhao, N. Srivastava, H. Jin, J. Featherston, Y.-H. Lai, G. Liu, G. Velasquez, W. Wang, and Z. Zhang. Rosetta: A Realistic High-Level Synthesis Benchmark Suite for Software Programmable FPGAs, *International Symposium on Field-Programmable Gate Arrays (FPGA)*, Feb. 2018.
- G. Liu and Z. Zhang. Statistically Certified Approximate Logic Synthesis, *International Conference on Computer-Aided Design (ICCAD)*, Nov. 2017.
- S. Dai, G. Liu, R. Zhao, and Z. Zhang. Enabling Adaptive Loop Pipelining in High-Level Synthesis, *52nd Annual Asilomar Conference on Signals, Systems, and Computers*, Oct. 2017. (Invited Paper)
- T. Ajayi, K. Al-Hawaj, A. Amarnath, S. Dai, S. Davidson, P. Gao, G. Liu, A. Rao, A. Rovinski, N. Sun, C. Torng, L. Vega, B. Veluri, S. Xie, C. Zhao, R. Zhao, C. Batten, R. Dreslinski, R. Gupta, M. Taylor, and Z. Zhang, Experiences Using the RISC-V Ecosystem to Design an Accelerator-Centric SoC in TSMC 16nm, *the First Workshop on Computer Architecture Research with RISC-V (CARRV)*, Oct. 2017.
- T. Ajayi, K. Al-Hawaj, A. Amarnath, S. Dai, S. Davidson, P. Gao, G. Liu, A. Lotfi, J. Puscar, A. Rao, A. Rovinski, L. Salem, N. Sun, C. Torng, L. Vega, B. Veluri, X. Wang, S. Xie, C. Zhao, R. Zhao, C. Batten, R. Dreslinski, I. Galton, R. Gupta, P. Mercier, M. Srivastava, M. Taylor, and Z. Zhang. Celerity: An Open-Source RISC-V Tiered Accelerator Fabric, *ACM/IEEE Symposium on High-Performance Chips (HOTCHIPS)*, Aug. 2017.
- J.H. Lin, T. Xing, R. Zhao, Z. Zhang, M. Srivastava, Z. Tu, and R. Gupta. Binarized Neural Networks with Separable Filters for Efficient Hardware Acceleration. *IEEE Conference on Computer Vision and Pattern Recognition Workshops (CVPRW)*, Jul. 2017.
- E. Bartz, J. Chaves, Y. Gershtein, E. Halkiadakis, M. Hildreth, S. Kyriacou, K. Lannon, A. Lefeld, A. Ryd, L. Skinnari, R. Stone, C. Strohmman, Z. Tao, B. Winer, P. Wittich, Z. Zhang, and M. Zientek. FPGA-based Real-time Charged Particle Trajectory Reconstruction at the Large Hadron Collider. *International Symposium on Field-Programmable Custom Computing Machines (FCCM)*, May 2017.
- G. Liu and Z. Zhang. A Parallelized Iterative Improvement Approach to Area Opti-

- mization for LUT-Based Technology Mapping. *International Symposium on Field-Programmable Gate Arrays (FPGA)*, Feb. 2017. (**Best Paper Nominee**)
- Y. Zhou, K. Al-Hawaj, and Z. Zhang. A New Approach to Automatic Memory Banking using Trace-Based Address Mining, *International Symposium on Field-Programmable Gate Arrays (FPGA)*, Feb. 2017.
 - R. Zhao, W. Song, W. Zhang, T. Xing, J.-H. Lin, M. Srivastava, R. Gupta, and Z. Zhang. Accelerating Binarized Convolutional Neural Networks with Software-Programmable FPGAs, *International Symposium on Field-Programmable Gate Arrays (FPGA)*, Feb. 2017.
 - C. Xu, G. Liu, R. Zhao, S. Yang, G. Luo, and Z. Zhang. A Parallel Bandit-Based Approach for Autotuning FPGA Compilation, *International Symposium on Field-Programmable Gate Arrays (FPGA)*, Feb. 2017.
 - S. Dai, R. Zhao, G. Liu, S. Srinath, U. Gupta, C. Batten, and Z. Zhang. Dynamic Hazard Resolution for Pipelining Irregular Loops in High-Level Synthesis, *International Symposium on Field-Programmable Gate Arrays (FPGA)*, Feb. 2017.
 - N. Srivastava, S. Dai, R. Manohar, and Z. Zhang. Accelerating Face Detection on Programmable SoC Using C-Based Synthesis, *International Symposium on Field-Programmable Gate Arrays (FPGA)*, Feb. 2017.
 - R. Zhao, G. Liu, S. Srinath, C. Batten, and Z. Zhang. Improving High-Level Synthesis with Decoupled Data Structure Optimization. *Design Automation Conference (DAC)*, Jun. 2016.
 - A. Majumdar, Z. Zhang, and D. Albonesi. Characterizing the Benefits and Limitations of Smart Building Meeting Room Scheduling. *International Conference on Cyber-Physical Systems (ICCPS)*, Apr. 2016.
 - D. Chen, J. Cong, S. Gurumani, W.-M. Hwu, K. Rupnow, and Z. Zhang. System Synthesis and Automated Verification: Design Demands for IoT Devices. *Sensors to Cloud Architectures Workshop (SCAW)*, Mar. 2016.
 - F. Koushanfar, A. Mirhoseini, G. Qu, and Z. Zhang. DA Systemization of Knowledge: A Catalog of Prior Forward-Looking Initiatives. *International Conference on Computer-Aided Design (ICCAD)*, Nov. 2015. (Invited Paper)
 - M. Tan, G. Liu, R. Zhao, S. Dai, and Z. Zhang. ElasticFlow: A Complexity-Effective Approach for Pipelining Irregular Loop Nests. *International Conference on Computer-Aided Design (ICCAD)*, Nov. 2015.
 - G. Liu and Z. Zhang. A Reconfigurable Analog Substrate for Highly Efficient Maximum Flow Computation. *Design Automation Conference (DAC)*, Jun. 2015.
 - R. Zhao, M. Tan, S. Dai, and Z. Zhang. Area-Efficient Pipelining for FPGA-Targeted High-Level Synthesis. *Design Automation Conference (DAC)*, Jun. 2015.
 - M. Tan, S. Dai, U. Gupta, and Z. Zhang. Mapping-Aware Constrained Scheduling for LUT-Based FPGAs. *International Symposium on Field-Programmable Gate Arrays (FPGA)*, Feb. 2015.
 - S. Srinath, B. Ilbeyi, M. Tan, G. Liu, Z. Zhang, and C. Batten. Architectural Specialization for Inter-Iteration Loop Dependence Patterns. *International Symposium on Microarchitecture (MICRO)*, Dec. 2014.
 - M. Tan, B. Liu, S. Dai, and Z. Zhang. Multithreaded Pipeline Synthesis for Data-Parallel Kernels. *International Conference on Computer-Aided Design (ICCAD)*, Nov. 2014.
 - G. Liu, Y. Tao, M. Tan, and Z. Zhang. CASA: Correlation-Aware Speculative Adders. *International Symposium on Low Power Electronics and Design (ISLPED)*, Aug. 2014.
 - S. Dai, M. Tan, K. Hao, and Z. Zhang. Flushing-Enabled Loop Pipelining for High-Level Synthesis. *Design Automation Conference (DAC)*, Jun. 2014.
 - Z. Zhang and B. Liu. SDC-Based Modulo Scheduling for Pipeline Synthesis. *International Conference on Computer-Aided Design (ICCAD)*, Nov. 2013.
 - Z. Zhang and D. Chen. Challenges and Opportunities of ESL Design Automation.

- IEEE International Conference on Solid-State and Integrated Circuit Technology*, Oct. 2012. (Invited Paper)
- J. Zhang, Z. Zhang, S. Zhou, M. Tan, X. Liu, X. Cheng, and J. Cong. Bit-Level Optimization for High-Level Synthesis and FPGA-Based Acceleration. *International Symposium on FPGAs (FPGA)*, Feb. 2010.
 - J. Cong, B. Liu, and Z. Zhang. Scheduling with Soft Constraints. *International Conference on Computer-Aided Design (ICCAD)*, Nov. 2009. (**Best Paper Nominee**)
 - J. Cong, B. Liu, and Z. Zhang. Behavior-Level Observability Don't-Cares and Application to Low-Power Behavioral Synthesis. *International Symposium on Low Power Electronics and Design (ISLPED)*, Aug. 2009.
 - J. Cong, K. Gururaj, B. Liu, C. Liu, Z. Zhang, S. Zhou, and Y. Zou. Evaluation of Static Analysis Techniques for Fixed-Point Precision Optimization. *IEEE Symposium on Field-Programmable Custom Computing Machines (FCCM)*, Apr. 2009.
 - W. Jiang, Z. Zhang, M. Potkonjak, and J. Cong. Scheduling with Integer Time Budgeting for Low-Power Optimization. *Asia and South Pacific Design Automation Conference (ASP-DAC)*, Jan. 2008.
 - C.T. Hsieh, J. Cong, S.C. Chang, and Z. Zhang. Behavioral Synthesis with Activating Unused Flip-Flops for Reducing Glitch Power in FPGA. *Asia and South Pacific Design Automation Conference (ASP-DAC)*, Jan. 2008.
 - D. Chen, J. Cong, Y. Fan, and Z. Zhang. High-Level Power Estimation and Low-Power Design Space Exploration for FPGAs. *Asia and South Pacific Design Automation Conference (ASP-DAC)*, Jan. 2007.
 - J. Cong, Y. Fan, G. Han, W. Jiang, and Z. Zhang. Platform-Based Behavior-Level and System-Level Synthesis. *IEEE International SOC Conference (SOCC)*, Sept. 2006. (Invited Paper)
 - J. Cong and Z. Zhang. An Efficient and Versatile Scheduling Algorithm Based on SDC Formulation. *Design Automation Conference (DAC)*, Jul. 2006.
 - J. Cong, Y. Fan, G. Han, W. Jiang, and Z. Zhang. Behavior and Communication Co-Optimization for Systems with Sequential Communication Media. *Design Automation Conference (DAC)*, Jul. 2006.
 - J. Cong, G. Han, and Z. Zhang. Architecture and Compilation for Data Bandwidth Improvement in Configurable Embedded Processors. *International Conference on Computer-Aided Design (ICCAD)*, Nov. 2005.
 - J. Cong, Y. Fan, G. Han, A. Jagannathan, G. Reinman, and Z. Zhang. Instruction Set Extension with Shadow Registers for Configurable Processors. *International Symposium on FPGAs (FPGA)*, Feb. 2005.
 - J. Cong, Y. Fan, G. Han, Y. Lin, J. Xu, Z. Zhang, and X. Cheng. Bitwidth-Aware Scheduling and Binding in High-Level Synthesis. *Asia and South Pacific Design Automation Conference (ASP-DAC)*, Jan. 2005.
 - J. Cong, Y. Fan, and Z. Zhang. Architecture-Level Synthesis for Automatic Interconnect Pipelining. *Design Automation Conference (DAC)*, Jun. 2004.
 - J. Cong, Y. Fan, G. Han, and Z. Zhang. Application-Specific Instruction Generation for Configurable Processor Architectures. *International Symposium on FPGAs (FPGA)*, Feb. 2004.
 - J. Cong, Y. Fan, G. Han, X. Yang, and Z. Zhang. Architectural Synthesis Integrated with Global Placement for Multi-Cycle Communication. *International Conference on Computer-Aided Design (ICCAD)*, Nov. 2003.
 - Z. Zhang, Y. Fan, M. Potkonjak, and J. Cong. Gradual Relaxation Technique with Application to Behavioral Synthesis. *International Conference on Computer-Aided Design (ICCAD)*, Nov. 2003.
 - J. Cong, Y. Fan, X. Yang, and Z. Zhang. Architecture and Synthesis for Multi-Cycle Communication. *International Symposium on Physical Design (ISPD)*, Apr. 2003. (Invited Paper)

Journal Publications

- S. Davidson, S. Xie, C. Torng, K. Al-Hawai, A. Rovinski, T. Ajayi, L. Vega, C. Zhao, R. Zhao, S. Dai, A. Amarnath, B. Veluri, P. Gao, A. Rao, G. Liu, R. Gupta, Z. Zhang, R. Dreslinski, C. Batten, and M. Taylor. The Celerity Open-Source 511-Core RISC-V Tiered Accelerator Fabric: Fast Architectures and Design Methodologies for Fast Chips, *IEEE Micro*, Apr. 2018.
- G. Liu, M. Tan, S. Dai, R. Zhao, and Z. Zhang. Architecture and Synthesis for Area-Efficient Pipelining of Irregular Loop Nests, *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD)*, Feb. 2017.
- D. Chen, J. Cong, S. Gurumani, W-M. Hwu, K. Rupnow, and Z. Zhang. Platform Choices and Design Demands for IoT Platforms: Cost, Power and Performance Tradeoffs, *IET Cyber-Physical Systems: Theory & Applications (IET-CPS)*, Nov. 2016.
- Z. Zhang, D. Chen, S. Dai, and K. Campbell. High-Level Synthesis for Low-Power Design. in *IPSJ Transactions on System LSI Design Methodology (T-SLDM)*, Feb. 2015. (Invited Paper)
- J. Cong, B. Liu, S. Neundorffer, J. Noguera, K. Vissers, and Z. Zhang. High-Level Synthesis for FPGAs: From Prototyping to Deployment. *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD)*. 30(4):473–491. Apr. 2011. (**Keynote Paper**)
- J. Cong, B. Liu, R. Majumdar, and Z. Zhang. Behavior-Level Observability Analysis and Operation Gating in Low-Power Behavioral Synthesis. *ACM Transactions on Design Automation of Electronic Systems (TODAES)*, 16(1):1–29. Nov. 2010. (**Best Paper Award**)
- J. Cong, G. Han, and Z. Zhang. Architecture and Compiler Optimization for Data Bandwidth Improvement in Configurable Processors. *IEEE Transaction on Very Large Scale Integration Systems (TVLSI)*, 14(9):986–997. Sept. 2006.
- J. Cong, Y. Fan, G. Han, X. Yang, and Z. Zhang. Architecture and Synthesis for On-Chip Multicycle Communication. *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD)*, 23(4):550–564. Apr. 2004.

Book Chapters

- Z. Zhang, Y. Fan, W. Jiang, G. Han, C. Yang, and J. Cong. AutoPilot: A Platform-Based ESL Synthesis System. *High-Level Synthesis: From Algorithm to Digital Circuit* ed. P. Coussy and A. Morawiec, Springer Publishers, 2008.

PATENTS

- *Soft Constraints in Scheduling*. U.S. Patent 8296710, (co-invented with B. Liu and J. Cong,) issued Oct. 2012.
- *Performance Visualization System*. U.S. Patent 7784008, (co-invented with M. Hutton and D. Karchmer,) issued Aug. 2010.

INVITED TALKS

- *High-Level Synthesis for Accelerator-Rich Computing*, Pennsylvania State University, State College, PA, Mar. 2018.
- *Towards Multi-Paradigm Programming for Software-Defined FPGAs*. Center of Domain-Specific Computing Symposium (CDSC) at UCLA, Los Angeles, CA, Mar. 2018.
- *Hardware Specialization for Quantized Neural Networks*, ICCAD AMS Workshop, Irvine, CA, Nov. 2017.
- *Adaptive Loop Pipelining in High-Level Synthesis*, Asilomar Conference on Signals, Systems, and Computers, Pacific Grove, CA, Oct 2017.
- *Design Automation for Software-Programmable FPGAs*, University of Toronto, Toronto, Ontario, Canada, Oct. 2017.

- *High-Level Synthesis for Accelerator-Rich Computing*, Columbia University, New York City, NY, Oct. 2017.
- *High-Level Synthesis for Accelerator-Rich Computing*, Massachusetts Institute of Technology, Cambridge, MA, Oct. 2017.
- *Mapping-aware Logic Synthesis with Parallelized Stochastic Optimization*, EPFL Workshop on Logic Synthesis and Emerging Technologies, EPFL, Lausanne, Switzerland, Sep. 2017.
- *Accelerating Deep Neural Networks on FPGAs*, Summer School on Deep Learning On-Chip, Politecnico di Torino, Torino, Italy, Sep. 2017.
- *Design Automation for Software-Programmable FPGAs*, University of Illinois at Urbana-Champaign, Champaign, IL, Aug. 2017.
- *Design Automation for Software-Programmable FPGAs*, University of Texas at Austin, TX, Jun. 2017.
- *Design Automation for Software-Programmable FPGAs*, Imperial College London, London, UK, May. 2017.
- *Design Automation for Software-Programmable FPGAs*, Princeton University, Princeton, NJ, May. 2017.
- *Design Automation for Software-Programmable FPGAs*, UC Berkeley, Berkeley, CA, Apr. 2017.
- *Design Automation for Software-Programmable FPGAs*, Stanford University, Stanford, CA, Apr. 2017.
- *Enabling Software-Defined Reconfigurable Computing*, ICC Distinguished Lecturer Series, Michigan Technological University, Houghton, MI, Dec. 2016.
- *Productive High-Level Programming for Deep Learning Acceleration on FPGAs*, Machine Learning on FPGAs Summit, Intel, San Jose, CA, Oct. 2016.
- *Rapid Hardware Specialization with HLS: Glass Half Full*, International Symposium on Microarchitecture (MICRO), Taipei, Taiwan, Oct. 2016.
- *Design Automation for SoftwareDefined Reconfigurable Computing*, National Taiwan University, Taipei, Taiwan, Oct. 2016.
- *Complexity-Effective Loop Specialization*. Institute of Microelectronics, Tsinghua University, Beijing, China, Dec. 2015.
- *Intelligent High-Level Synthesis for Effort-Less Hardware Specialization*. ICCAD'15 Workshop on "Towards Efficient Computing in the Dark Silicon Era", Austin, TX, Nov. 2015.
- *DA Systemization of Knowledge: A Catalog of Prior Forward-Looking Initiatives*. ICCAD'15 Special Session on "From EDA to DA: Can We Evolve Beyond Our E-Roots?", Austin, TX, Nov. 2015.
- *Programming Software-Defined FPGAs: Progress and Roadblocks*. SEAK 2015: DAC Workshop on Suite of Embedded Applications and Kernels, San Francisco, CA, Jun. 2015.
- *Synthesis with Higher Abstractions for Effort-Less FPGA Programming*. CALCM Seminars, Carnegie Mellon University, Pittsburgh, PA, Feb. 2015.
- *Towards Reconfigurable Computing for Software Programmers*. Institute of Microelectronics, Tsinghua University, Beijing, China, Dec. 2014.
- *Architecture and Synthesis for Effort-Less Hardware Specialization*. Center for Energy-Efficient Computing and Applications, Peking University, Beijing, China, Dec. 2014.
- *Mapping-Aware Scheduling for LUT-Based FPGAs*. Research Seminar, Xilinx, San Jose, CA, Nov. 2014.
- *Synthesis with Higher Abstractions for Software Programmable FPGAs*. Distinguished Lecturer Series, USC Information Sciences Institute (ISI), Arlington, VA, Aug. 2014.
- *High-Level Synthesis for FPGAs: From Prototyping to Deployment*. The Third Workshop on the Intersections of Computer Architecture and Reconfigurable Logic (CARL 2013), Davis, CA, Dec. 2013.

- *Intelligent Modulo Scheduling for Pipeline Synthesis*. Research Seminar, Xilinx, San Jose, CA, Nov. 2013.
- *Scheduling Algorithms for High-Quality High-Level Synthesis*. Research seminar, Electronic Engineering Department, Tsinghua University, Beijing, China, Dec. 2012.
- *Scheduling Algorithms for High-Quality High-Level Synthesis*. DA PIC seminar, IBM T.J. Watson Research Center, Yorktown Heights, NY, Dec. 2012.
- *C-Based Hardware Synthesis with AutoPilot*. Center of Domain-Specific Computing Symposium (CDSC) at UCLA, Los Angeles, CA, Feb. 2010.
- *Domain-Specific Reconfigurable Computing with C-Based Synthesis*. Invited Tutorial at IEEE International SOC Conference (SOCC), New Port Beach, CA, Sept. 2008.
- *C/C++/SystemC to RTL Synthesis for FPGA*. Invited Tutorial at Reconfigurable System Summer Institute (RSSI) at UIUC, Champaign, IL, Jul. 2008.