An Zou

Ph.D. Candidate (4th year)
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Education

- **Washington University in St. Louis** — St. Louis, MO, U.S.
  Ph.D. student in Electrical Engineering; GPA: 3.9/4.0; Advisor: Prof. Xuan Zhang — *Aug. 2016 – present*
  M.S. in Electrical Engineering; Advisor: Prof. Xuan Zhang — *Aug. 2016 – May 2019*
- **Harbin Institute of Technology** — Harbin, China
  M.S. in Automation; GPA: 93/100, Rank: 1/161; Advisor: Prof. Hui Zhao — *Aug. 2013 – July 2015*
- **Harbin Institute of Technology** — Harbin, China
  B.S. in Automation; GPA: 91/100, Rank: 10/123 — *Aug. 2009 – July 2013*

Research Experience

- **Research Assistant @ XZ Group** — **Washington University in St. Louis**
  Research Area: computer architecture and embedded system — *Aug. 2016 - Present*

  - GPU Acceleration for Artificial Intelligence and Machine Learning Tasks [7] (Aug. 2018 - Present)
  – Implement and characterize AI and ML applications on both embedded NVIDIA Jetson TX2 and GTX1080TI GPUs.
  – Partition and virtualize GPU resources (streaming multi-processor and memory) for multiple tasks and users.
  – Design real-time scheduling algorithms for parallel GPU accelerated AI and ML tasks with hard deadlines.
  – Optimize GPU energy and power efficiency under performance constraints.

  - Meso Scale Cyber-Physical System Power Management (Apr. 2017 - Present)
  – Design mobile robot platforms PiCar based on a 1/18 scale RC car chassis.
  – Apply upper level intelligence algorithms like computer vision and SLAM on Raspberry Pi 3 / NVIDIA Jetson Tx2.
  – Implement lower level motion feedback control on Arduino.
  – Implement mobile robot sensing with YDLIDAR F4 lidar and Pi camera.

  - Voltage Stacked Power Delivery for Manycore (GPU) System [1,2,6] (Mar. 2017 - Aug. 2018)
  – Model voltage stacked power delivery for manycore processors like GPUs.
  – Propose hybrid circuit level (SPICE 3) charge recycling to mitigate supply voltage noise with worse case guarantee.
  – Design control theory driven architecture level (GPGPU-Sim 3.0) power managements.
  – Enable high level power managements like DVFS and power gating collaboration with voltage stacking.

  - Integrated Voltage Regulator (IVR) Modeling and Power Management [3] (May 2016 - Present)
  – Model integrated voltage regulators (IVRs) such as buck, switched capacitor and LDO.
  – Develop open source IVR-enabled power delivery system modeling and simulation platform Ivory.
  – Design static and run-time managements for efficient and secure IVR-enabled power delivery.

- **Research Assistant @ Control and Simulation Center** — **Harbin Institute of Technology**
  Research Area: high precision servo robot system — *Sep. 2012 - July 2015*

  - High Precision Angle Measurement System for Servo Robot [4,5] (Sep. 2012 - July 2015)
  – Design robot angle measuring systems on inductosyns and photoelectric encoders with 1/3600 degree resolution.
  – Design signal processing PCB boards with FPGA/DSP communicating with upper computers through ISA/PCI.
  – Program air bearing rotary stage with Delta PMCA motion control to test and compensate angle measuring errors.

Honors and Awards

DAC Best Paper Nomination — *2017*
Graduate Fellowship The Ohio State University — *2015*
China National Scholarship — *2014*
First Level Graduate Student Scholarship — *2014,2013*
People Scholarship — *2013,2012,2011,2010*
Outstanding Student — *2012*

88412 Scholarship *2011*
Individual Scholarship *2011*
Student Travel Award *DAC 2017, Micro 2018*

Competition Awards

2014 National Postgraduate Mathematic Contest in Modeling (China) *The Second Price*
2011 National College Mathematical Contest in Modeling (MCM, U.S.) *Meritorious Winner Prize*
2010 Zhejiang Undergraduate Student Physics Competition *The Third Prize*

Publications

1. **(MICRO 2018) An Zou**, Jingwen Leng, Xin He, Yazhou Zu, Christopher D. Gill, Vijay Janapa Reddi, Xuan Zhang. "Voltage-stacked GPUs: A Control Theory Driven Cross-Layer Solution for Practical Voltage Stacking in GPUs." In *2018 51st Annual IEEE/ACM International Symposium on Microarchitecture,* pp. 390-402. IEEE, 2018.
2. **(DAC 2018) An Zou**, Jingwen Leng, Xin He, Yazhou Zu, Vijay Janapa Reddi, Xuan Zhang. "Efficient and Reliable Power Delivery in Voltage-Stacked Manycore System with Hybrid Charge-Recycling Regulators." In *2018 55th ACM/ESDA/IEEE Design Automation Conference,* pp. 1-6. IEEE, 2018.
3. **(DAC 2017 Best Paper Nominations) An Zou**, Jingwen Leng, Yazhou Zu, Tao Tong, Vijay Janapa Reddi, David Brooks, Gu-Yeon Wei, Xuan Zhang. "Ivory: Early-Stage Design Space Exploration Tool for Integrated Voltage Regulator." In *Proceedings of the 54th Annual Design Automation Conference,* p. 1. ACM, 2017.
4. **(CCC 2014) An Zou**, Hui Zhao, Yehan Ma and Da Li. Analysis Calculation and Testing of Rotary Inductosyn Angle Measuring Errors." In *Proceedings of the 33rd Chinese Control Conference,* pp. 8091-8096. IEEE, 2014.
5. **(WCICA 2014)** Da Li, Hui Zhao, Honglin Xue and **An Zou**. "The Design and Implementation of Universal Interface Circuit for Photoelectric Encoder." In *Proceeding of the 11th World Congress on Intelligent Control and Automation,* pp. 6006-6011. IEEE, 2014.
6. **An Zou**, Jingwen Leng, Xin He, Yazhou Zu, Christopher D. Gill, Vijay Janapa Reddi, Xuan Zhang. "Voltage-Stacked Power Delivery Systems:Reliability, Efficiency, and Power Management." *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems 2019.* (**under review**).
7. **An Zou**, Jing Li, Christopher D. Gill, Xuan Zhang. "RTGPU: Real-Time GPU Scheduling of Parallel Hard Deadline Tasks with Fine-Grain Utilization." *IEEE Transactions on Parallel and Distributed Systems 2019.* **(in preparation)**

Professional Service Activities

DAC External Reviewer *2018,2019*

Mentored students

Master students: *Adith Jagadish Boloor, Duhong Xu, Yunshen Huang*
Undergraduate students: *Feiyang Jin, Shadi Davari, Hayden Sierra, Shuhe Tian, Chenyang Wang*

Technical Skills

Programming Languages: *C/C++; CUDA; Python; Verilog; M language; Latex*
Software: *MATLAB; Cadence tools; Synopsys tools; SPICE; CCS; Quartus2; Altium Designer*
Operating System: *Linux; Windows*