

GUSHU LI

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EDUCATION

Tsinghua University

B.S. candidate in Electronic Engineering

Overall GPA: 90/100, Math GPA: 92/100

August 2011 - July 2015 (expected)

PUBLICATIONS

[1] **Gushu Li**, “A STT-RAM-based Low-Power Hybrid Register File for GPGPUs”, ACM Student Research Competition at International Conference on Computer Aided Design (**ICCAD**) 2014.

[2] **Gushu Li**, Xiaoming Chen, Guangyu Sun, Hank Hoffmann, Yongpan Liu, Yu Wang, and Huazhong Yang, “A STT-RAM-based Low-Power Hybrid Register File for GPGPUs”, ACM/IEEE Design Automation Conference (**DAC**) 2015.

RESEARCH EXPERIENCE

Energy-efficient Hardware Computing Lab

Department of Electronic Engineering, Tsinghua University

Research Assistant, Advisor: Professor Yu Wang

Mar 2012 - Present

Beijing, China

- Low-Power GPU Register File Design
 - Read the source code of GPGPU-SIM and inject my own module by modifying the source code
 - Proposed a hybrid register file with STT-RAM-based register file and SRAM-based write buffer
 - Proposed a warp-aware write strategy for the write buffer
 - Applied power gating on the write buffer by observing the utilization of the write buffer
- Probabilistic Fiber Tractography
 - Used the MCMC (Markov Chain Monte Carlo) method to estimate the dispersion direction in human brain with DT-MRI (Diffusion Tensor Magnetic Resonance Imaging) data
 - Implemented a probabilistic fiber tractography algorithm to reconstruct the nerve fibers in human brain with the dispersion directions
 - Implemented the probabilistic fiber tractography algorithm on GPU, introduce variable step size in the iteration to solve the thread load balance problem and decrease the communication overhead between CPU and GPU.
- Graph Modularity Detection
 - Reviewed several existing graph partition algorithms
 - Implemented an edge-based graph partition algorithm on multi-core CPU
 - Discovered the fine-grained parallelism in the algorithm and implement it on GPU
 - Achieved top ten in AMD Heterogeneous Computing Competition in China.

Department of Computer Science, University of Chicago

Research Intern, Advisor: Professor Hank Hoffmann

Jun 2014 - Sep 2014

Chicago, IL, USA

- Self-Aware Computing System (SEEC) on GPU
 - Learnt about energy efficiency oriented computing resource control.
 - Developed a couple of scripts for automatic simulation launch and data processing in parallel.
 - Changed the number of computing resources in the GPU simulator (GPGPU-SIM) to find the peak point of energy efficiency.

OTHER RELATED PROJECTS

Department of Electronic Engineering, Tsinghua University
Bachelor Student

Aug 2011 - Present
Beijing, China

- Designed a MIPS CPU with pipeline on FPGA (Xilinx)
- Designed a MIPS assembler with Python
- Designed a 3D player to show the game process of the 14th Team Software Development Competition
- Some C++ Projects: Student Score Management System, Library Management System
- Some MATLAB Projects: JPEG encoder and decoder, Face detection, Speech processing System

ACTIVITIES

14th Team Software Development Competition, Tsinghua University *June 2012 - June 2013*
Leader of the 3D group in the competition platform development team

15th Team Software Development Competition, Tsinghua University *June 2013 - June 2014*
Technical Guidance and Chair

Student Association of Science and Technology, Dept. of E.E.
Vice Minister of Software Ministry

June 2013 - June 2014

Student Association of Science and Technology, Dept. of E.E.
Vice President

June 2014 - Present

HONORS AND AWARDS

Gold Championship in Jiangsu Province, China Physics Olympiads *2010*

Top 4 in Tsinghua, Team Software Development Competition, Tsinghua University *2011*

Scholarship for academic excellence, Tsinghua University *2012*

Second Prize in non-physics specialties group, Beijing College Physics Competition, Beijing Physical Society *2012*

Top 10 in China, AMD Heterogeneous Computing Competition *2013*

Poster Session, Undergraduate Track, ACM Student Research Competition at ICCAD *2014*

Scholarship for academic excellence, Tsinghua University *2014*

TECHNICAL SKILLS

Programming Languages

C/C++, Python, Bash Shell, MATLAB,
SQL, MIPS Assembly, Verilog
CUDA, OpenCL, OpenGL, Qt

Simulation Tools

GPGPU-SIM, GEM5
Pspice, Multisim
Modelsim, Xilinx ISE