

Siyuan Liu

✉ me@shawnliu.me | 🏠 shawnliu.me | 🗣 koallen | 📺 liusiyuan21

Education

Nanyang Technological University

Singapore

B.ENG. IN COMPUTER SCIENCE (HONOURS WITH HIGHEST DISTINCTION)

Aug. 2014 - Jun. 2018

- Cumulative GPA: 4.91 / 5.0 (ranked 1st).
- Specialization in High Performance Computing.

National University of Singapore

Singapore

PART-TIME SEMESTER EXCHANGE

Aug. 2016 - Dec. 2016

- Focused on optimization algorithms and compiler design.

Skills

Programming C++/C/Python/Java/Scheme/Bash/Fortran

Tools Vim/Git/Tmux/CMake/Allinea/Docker/Ansible/L^AT_EX

Frameworks CUDA/MPI/OpenMP/OpenACC/Spark/Android/Django

Professional Experience

National Supercomputing Centre (NSCC) Singapore

Singapore

RESEARCH ENGINEER

Jul. 2018 - Current

- Assist in managing computing clusters including the ASPIRE1 petascale supercomputer.
- Optimize/benchmark scientific computing programs.
- Supervise the NTU student cluster competition team.

National University of Singapore

Singapore

RESEARCH INTERN

Jan. 2017 - Dec. 2017

- Added multi-GPU multi-node support with MPI for the GENIE (generic inverted index) GPU similarity search system.
- Implemented a RESTful API for interacting with GENIE.
- Performance optimization, architecture design, and code refactoring for GENIE.

Nanyang Technological University

Singapore

STUDENT RESEARCH ASSISTANT

Mar. 2015 - Mar. 2017

- Backend Web server development with Django and MySQL, and service deployment with Docker.
- Bluetooth programming on Raspberry Pi with Python.

Project Experience

Nanyang Technological University

Singapore

FINAL YEAR PROJECT

Jun. 2017 - May. 2018

- Design, implementation, benchmarking, and theoretical analysis of various distributed graph algorithms in vertex-centric, Spark, and MPI programming models.
- Compare between distributed graph algorithms and their sequential counterparts.

Nanyang Technological University

Singapore

UNDERGRADUATE RESEARCH (URECA)

Aug. 2015 - Jun. 2016

- Terrorist image classification with pre-trained convolutional neural network and fine-tuning.
- URECA paper "Terrorist Image Classification: A Convolutional Neural Network Approach" featured in URECA Yearbook 2016.

Extracurricular Activity

NTU Student Cluster Competition Team

Singapore

ADVISOR & LEADER & MEMBER

Dec. 2015 - Present

- Participates in international student cluster competitions including Asia Supercomputing Challenge (China), ISC-HPCAC Student Cluster Competition (Germany), and SC Student Cluster Competition (U.S.A).
- Organizes and hosts weekly training on competition related topics including compilers, math libraries, GPGPU, hardware, profiling, and performance optimization techniques.
- Performance optimization on miniDFT, a quantum chemistry application, on GPU for ISC-HPCAC SCC 17, best optimization among all teams.
- Performance optimization on Born, a seismic imaging application, on GPU for SC SCC 17, gained 20x speed up.
- Automated Linux HPC cluster deployment with Ansible and Kickstart.
- General hardware and software tuning for competition HPC applications.

NTU Open Source Society

Singapore

PRESIDENT & TECHNICAL DIRECTOR

Aug. 2014 - Apr. 2017

- Planned weekly workshops on various technical topics.
- Collaborated with other tech communities to host events.
- Hosted technical workshops on Raspberry Pi, processor design, RESTful API design, and static website generator.

Honors & Awards

2018	Highest LINPACK Award (team co-advisor) , SC Student Cluster Competition 2018	Dallas, U.S.A.
2018	Nanyang Award (Teamwork) , Nanyang Technological University	Singapore
2018	Lee Kuan Yew Gold Medal , Nanyang Technological University	Singapore
2018	IMDA Gold Medal , School of Computer Science and Engineering, NTU	Singapore
2018	Dean's List (AY 2017-18) , School of Computer Science and Engineering, NTU	Singapore
2018	2nd Place Overall (team co-advisor) , ISC-HPCAC Student Cluster Competition 2018	Frankfurt, Germany
2017	Overall Champion (team leader) , SC Student Cluster Competition 2017	Denver, U.S.A.
2017	Highest LINPACK Award (team leader) , SC Student Cluster Competition 2017	Denver, U.S.A.
2017	Deep Learning Excellence Award (team leader) , ISC-HPCAC Student Cluster Competition 2017	Frankfurt, Germany
2016	Application Innovation Award (team member) , Asia Supercomputing Challenge 2016	Wuhan, China
2016	First Class Award (team member) , Asia Supercomputing Challenge 2016	Wuhan, China
2016	Dean's List (AY 2015-16) , School of Computer Science and Engineering, NTU	Singapore
2015	Dean's List (AY 2014-15) , School of Computer Science and Engineering, NTU	Singapore
2013	Senior Middle 2 Scholarship (Full scholarship) , Ministry of Education, Singapore	Singapore

Talks

Unified accounting and health checking with Altair PBS Professional

Singapore

SPEAKER FOR <SUPERCOMPUTING ASIA 2019 ALTAIR USER GROUP>

Mar. 2019

- Shared ideas on unified accounting and health checking with the PBS scheduler

Unified accounting and health checking with Altair PBS Professional

Dallas, U.S.A.

SPEAKER FOR <SUPERCOMPUTING 2018 ALTAIR USER PRESENTATIONS>

Nov. 2018

- Shared ideas on unified accounting and health checking with the PBS scheduler

SC17 Student Cluster Competition Experience Sharing

Singapore

SPEAKER FOR <SUPERCOMPUTING ASIA 2018 EDUCATION TRACK>

Mar. 2018

- Shared the NTU student cluster competition team's experience with a focus on the SC17 SCC competition

Fundamentals of Accelerated Computing with CUDA and OpenACC

Singapore

INSTRUCTOR FOR <SUPERCOMPUTING ASIA 2018 TUTORIAL>

Mar. 2018

- Introduced the fundamentals of CUDA programming
- Introduced the fundamentals of OpenACC programming

Supercomputing with CentOS

Singapore

SPEAKER FOR <CENTOS DOJO>

Mar. 2018

- Shared the NTU student cluster competition team's experience with CentOS

Team NTU at Student Cluster Competitions

Singapore

SPEAKER FOR <ACCELERATED COMPUTING & DEEP LEARNING WORKSHOP>

Oct. 2017

- Shared the NTU student cluster competition team's experience with a focus on the usage of GPU.

Free Blogging with GitHub

SPEAKER FOR <NTUOSS TGIFHACKS #55>

- Introduced the concept of static website generator and how to set up a blog on GitHub pages with it.

Singapore

Oct. 2016

RESTful API Design

SPEAKER FOR <NTUOSS TGIFHACKS #44>

- Introduced the basic principles and best practices for designing RESTful APIs.
- Introduced how to implement RESTful APIs with Django and django-rest-framework.

Singapore

Jan. 2016

Raspberry Pi Server

SPEAKER FOR <NTUOSS TGIFHACKS #26>

- Introduced the basics of Raspberry Pi and Linux command line.
- Introduced how to set up a Samba file sharing server on Raspberry Pi.

Singapore

Jan. 2015

Processor Design

CO-SPEAKER FOR <NTUOSS TGIFHACKS #23>

- Designed and implemented a simple Harvard-architecture processor for teaching and demonstration purposes.
- Introduced the basic concepts in processor design such as program counter, memory, register, ALU, decoder, multiplexer, etc.

Singapore

Oct. 2014

Services

2019 **Mentor**, GPU Hackathon @ Pawsey Supercomputing Centre

Perth, Australia

2018 **Mentor**, GPU Hackathon @ Pawsey Supercomputing Centre

Fremantle,
Australia

Publications

CONFERENCE PROCEEDINGS

An Empirical Analysis on Expressibility of Vertex Centric Graph Processing Paradigm

Siyuan Liu, Arijit Khan

2018 IEEE International Conference on Big Data (Big Data), 2018

A Generic Inverted Index Framework for Similarity Search on the GPU

Jingbo Zhou, Qi Guo, HV Jagadish, Lubos Krcal, Siyuan Liu, Wenhao Luan, Anthony KH Tung, Yueji Yang, Yuxin Zheng

2018 IEEE 34th International Conference on Data Engineering (ICDE), 2018

JOURNAL ARTICLES

Student Cluster Competition 2017, team Nanyang Technological University: Reproducing vectorization of the Tersoff multi-body potential on the Intel Broadwell architecture

Siyuan Liu, Meiru Hao, Bu-Sung Lee

Parallel Computing 77 (2018) pp. 118–124. 2018

Student cluster competition: ParConnect reproducibility task report

Ying Hao Tan, Yiyang Shao, Siyuan Liu, Bu-Sung Lee

Parallel Computing 70.Suppment C (2017) pp. 11–17. 2017