Siyuan **Liu**

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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 in cohort).
- 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.

Professional Experience

Jump Trading — *Singapore*

Systems Administrator — *Jan. 2020 - Current*

National Supercomputing Centre (NSCC) Singapore — *Singapore*

Research Engineer — *Jul. 2018 - Dec. 2019*

- 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.

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.) as a member in 2016, as the leader in 2017, and as an advisor since 2018.
- 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 hosted by students and tech companies 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
Singapore

Speaker for <NTUOSS TGIFHacks #55> *Oct. 2016*

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

RESTful API Design
Singapore

Speaker for <NTUOSS TGIFHacks #44> *Jan. 2016*

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

Raspberry Pi Server
Singapore

Speaker for <NTUOSS TGIFHacks #26> *Jan. 2015*

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

Processor Design
Singapore

Co-speaker for <NTUOSS TGIFHacks #23> *Oct. 2014*

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

Services

2019 **Mentor**, GPU Hackathon @ Pawsey Supercomputing Centre — *Perth, Australia*

2018 **Mentor**, GPU Hackathon @ Pawsey Supercomputing Centre — *Fremantle, Australia*

Publications

Conference Proceedings

NEURON: Query Execution Plan Meets Natural Language Processing For Augmenting DB Education
Siyuan Liu, Sourav S. Bhowmick, Wanlu Zhang, Shu Wang, Wanyi Huang, Shafiq Joty
Proceedings of the 2019 International Conference on Management of Data, 2019, Amsterdam, Netherlands

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.Supplement C (2017) pp. 11–17. 2017