Jiarui Fang

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Education

- **Tsinghua University**   Beijing, China
  Ph.D. Computer Science   *2014 - current*

  – Institute of High Performance Computing (IHPC), Department of Computer Science

  – Advised by Prof. Guanwen Yang, who is also the director of the National Supercomputer Center in Wuxi (NSCCWX), and Associate Prof. Haohuan Fu

- **Beijing University of Posts and Telecommunications**   Beijing, China
  B.S. Computer Science   *2010 - 2014*

  – Department of Computer Science and Technology

  – Ranking: 6th among 300 students

  – Honored with Beijing Excellence Graduate

Research Experience

- **National Supercomputer Center in Wuxi**   Wuxi City, Jiangsu Province, China
  R&D Software Engineer   *April 2016 - current*

  – Design the SWCaffe – a deep learning framework on the Sunway TaihuLight, which takes **No.1 ranking on the 48th and 49th Top500 Supercomputer lists**. The framework is only dependent on BLAS and can be used on a variety of embedded systems. .We compare the performance in one CG (742.4 GFlops) with intel 12-core E52680 V3 CPU (1280 GFlops). Our framework beats intel-Caffe with a speedup of 1.50x on VGG-16 network with single-precision floating-point data.

  – Design the swDNN– a highly-efficient library for deep neural networks based on Sunway TaihuLight supercomputer. The swDNN achieves over 1.6 Tflops performance of convolutional layers on single SW20160 processor and is 2x−9x faster than cuDNN on K40c.

- **China National Petroleum Corporation**   Beijing, China
  Software Engineer of HPC department   *Nov. 2014 - Nov. 2015*

  – Propose a generalized cache-friendly design for complex spatially-variable (CSVC) stencils on NVIDIA GPUs and Intel Xeon Phis, which can largely reduce cache miss times and cache space consumption. Around 4x speedup is gained compared with traditional methods.

  – Integrate GPU-based CSVC stencil implementations with our cache-friendly design into the GeoEast-Lightning seismic exploration software.

- **Jiangnan Institute of Computing Technology**   Wuxi City, Jiangsu Province, China
  Research Assistant   *July. 2015 - Oct. 2015*

  – Help to design a loop transformation tool with *Rose Compiler* to identify and expose the most suitable level of loop body for the parallelization on the Sunway TaihuLight.

  – Help to refactor and optimize the 10000+ lines Community Atmosphere Model (CAM) code on the Sunway TaihuLight supercomputer. Scale the refactored CAM model to 24,000 MPEs and achieve a simulation speed of 2.81 modeling years per day for the 25km resolution.

Lab. for Earth System Modeling, Tsinghua University Beijing, China

Research Assistant *March 2014 - Oct. 2014*

- – Design a parallel finite-difference time-domain (FETD) method that uses Massage Passing Interface (MPI) to accelerate the key steps for solving a large sparse matrix, including the construction of a customized incomplete Cholesky preconditioner and matrix-vector multiplication. Using 8 multi-core CPUs, the method cuts execution time of FETD by a factor of 4.

First-Author Publications

- [**IPDPS'17**] **Jiarui Fang**, Haohuan Fu, et al.: swDNN: A Library for Accelerating Deep Learning Applications on Sunway TaihuLight Supercomputer, 31st IEEE International Parallel & Distributed Processing Symposium, Orlando, USA, 2017 [pdf][Headline][News]

- [**HiPC'16**] **Jiarui Fang**, Haohuan Fu and Guangwen Yang: Cache-friendly Design for Complex Spatially-variable Coefficient Stencils on Many-core Architectures. IEEE 23rd International Conference on High Performance Computing, Data, and Analytics,p222-p231, Hyderabad, India, 2016. [pdf]

- [**ICPADS'15**] **Jiarui Fang**, Haohuan Fu, He Zhang, et al.: Optimizing Complex Spatially-Variant Coefficient Stencils for Seismic Modeling on GPU. IEEE 21st International Conference on Parallel and Distributed Systems, p641-p648 Melbourne, Australia, 2015. [pdf]

- [**SEG'15**] **Jiarui Fang**, Haohuan Fu, Guangwen Yang, et al.: GPU-based explicit time evolution method. The 84th Society of Exploration Geophysicists Technical Program Expanded Abstracts, p3549-p3553, New Orleans, USA, 2015 [pdf]

Co-Author Publications

- Li, W., Fu, H., You, Y. Yu, L. **Fang, J.**. Parallel Multi-class Support Vector Machine for Remote Sensing Data Classification on Multi-Core and Many-Core Architectures, IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, 10.1109/JSTARS.2017.2713126 [pdf]

- Fu, H., Wang, Y., Um, E. S., **Fang, J.**, et al.. A parallel finite-element time-domain method for transient electromagnetic simulation. Geophysics, 80(4), E213-E224, (2015) [pdf]

- [**SC'16**] Fu, H., et al: Refactoring and optimizing the community atmosphere model (CAM) on the sunway taihulight supercomputer. Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis, 2016 [pdf]

Awards Selected

The IEEE Technical Committee on Parallel Processing grant for IPDPS 2017 . (400 USD) 2017
The Scholarship of Schlumberger . . . . (10,000 RMB) 2017
The Scholarship of Tung Oocl . . . . (5,000 RMB) 2016
2nd Prize of Freescale Cup National Intelligent Car Competition in Northern China 2013
The Honorable Mentioned of the Interdisciplinary Contest in Modeling 2013
2nd Prize of Beijng City undergraduate electronic design contest 2013
The scholarship of Nandu Trade Co., Ltd. . . . . (5,000 RMB, 4/300) 2012-2013
The National Scholarship of the Ministry of Education . . . . (8,000 RMB, 2/300) 2011-2012

Skills

- **English:** GRE 322 (Verbal 153, Quantity 169, 2012)
- **Platforms:** Multi-Core Intel CPU, NVIDIA GPU, Intel Xeon Phi, the Sunway Supercomputer
- **Development:** C/C++, CUDA, fortran, Scala, OpenMp, MPI, Python, Matlab, LaTeX, etc.