Kun Li

Personal Information

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Biography

Dr. Kun Li is currently a Researcher in Systems Research Group, Microsoft Research Asia (MSRA) since Jul. 2022. His research interests include large-scale parallel computing, high performance deep learning systems, and heterogeneous computing. He has authored featured publications at prestigious international conferences and journals (SC, IPDPS, ICPP, IEEE TPDS, etc.)

He received the Ph.D. degree with the State Key Laboratory of Computer Architecture, Institute of Computing Technology, Chinese Academy of Sciences (ICT, CAS) in 2022. The thesis was titled with Reserarch and Application on Multi-level Discontinuous and Nonlinear Scalability for Massively Parallelism, and the viva-voce vote was unanimous with excellence by all committee members.

Education

Institute of Computing Technology (ICT), Chinese Academy of Sciences — Beijing
Ph.D. candidate in State Key Lab. of Computer Architecture — *Jul. 2016 – Jul. 2022*

Shandong University — Jinan, Shandong
B.E. in Computer Science and Technology (Elite Class) — *Sep. 2012 – Jul. 2016*

Internship

Microsoft Research Asia — Beijing
Intern in System Research Group — *Aug. 2021 – Feb. 2022*

Projects

Research of Distributed Scientific Computing on CPU+GPU — *Aug 2021 – Feb. 2022*
Microsoft Research Asia Internship Program
- Deploy WRF model on Tianhe-2 and Sunway Taihulight with standard cases.
- Explore auto-tuning distributed design on heterogenous architectures.

Research of Large-Scale Clustering and Regression — *Nov 2020 – Jul 2021*
Natural Science Foundation of Beijing
- Accurate, fast, and parameter-free clustering.
- Explore efficient parallel regression through clustering.

Vectorization for Stencils — *Dec 2019 – Oct 2020*
National High Technology Research and Development Program of China (863)
- Explore high performance vectorization for stencil computation in atmospheric simulation.

Research and Development of Prototype System for Numerical Reactor — *Nov 2018 – Nov 2019*
National Key Research and Development Program
- Develop open-source kinetic Monte Carlo software OpenKMC with a good scalability over 5.2 million cores.
- It has been used for research by China institute of atomic energy (CIAE).

Reasearch of Large-scale Molecular Dynamics Simulation — *Dec 2017 – Oct 2018*
National Key Research and Development Program, Peking University Joint Key Program
- Design efficient FastNBL algorithm and Vectorization on Intel Xeon/ARM-v8/SW26010 over 266,240 cores.

The Science Data Process in Square Kilometre Array (SKA) *Oct 2016 – Nov 2017*
The National Natural Science Foundation, National Key Research and Development Program
• Develop high performance FFT library by using many-core architecture on Sunway Taihulight supercomputer.
• Noise reduction processing of pulsar signal with optimized FFT algorithm on TH-1 and TH-2.

Publications

- **[IPDPS'22, CCF-B] Kun Li**, Liang Yuan, Yunquan Zhang, Yue Yue, and Hang Cao. An Efficient Vectorization Scheme for Stencil Computation, 2022.

- **[IEEE TPDS, CCF-A] Kun Li**, Liang Yuan, Yunquan Zhang, and Gongwei Chen. An Accurate and Efficient Large-scale Regression Method through Best Friend Clustering. IEEE Transactions on Parallel and Distributed Systems, 2022.

- **[SC'21, CCF-A] Kun Li**, Liang Yuan, Yunquan Zhang, and Yue Yue. Reducing Redundancy in Data Organization and Arithmetic Calculation for Stencil Computations. Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis, 2021.

- **[SC'21, CCF-A]** Liang Yuan, Hang Cao, Yunquan Zhang, **Kun Li**, Pengqi Lu, and Yue Yue. Temporal Vectorization for Stencils. Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis, 2021.

- **[SC'19, CCF-A] Kun Li**, Honghui Shang, Yunquan Zhang, Shigang Li, Baodong Wu, Dong Wang, Libo Zhang, Fang Li, Dexun Chen, and Zhiqiang Wei. OpenKMC : a KMC design for hundred-billion-atom simulation using millions of cores on Sunway Taihulight. Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis, 2019.

- **[CS'19, CCF-B]** Dong Wang, Honghui Shang, Yunquan Zhang, **Kun Li**, Xinfu He, and Lixia Jia. Application of Atomic Dynamics Monte Carlo Program MISA-KMC in the Study of Irradiation Damage of Reactor Pressure Vessel Steel. Computer Science, 2019

- **[TJSC, CCF-B] Kun Li**, Shigang Li, Shan Huang, Yifeng Chen, and Yunquan Zhang. FastNBL : fast neighbor lists establishment for molecular dynamics simulation based on bitwise operations. The Journal of Supercomputing, 2019.

- **[ISPA'19, CCF-C] Kun Li**, Shigang Li, Bei Wang, Yifeng Chen, and Yunquan Zhang. swMD : Performance Optimizations for MolecularDynamics Simulation on Sunway Taihulight. International Conference on Parallel & Distributed Processing with Applications, 2019.

- **[ICPP'18, CCF-B]** Junmin Xiao, Shigang Li, Baodong Wu, He Zhang, **Kun Li**, Erlin Yao, Yunquan Zhang, and Guangming Tan. Communication-Avoiding for Dynamical Core of Atmospheric General Circulation Model. Proceedings of the 47th International Conference on Parallel Processing, 2018.

- **[JCST'17, CCF-B] Kun Li**, Haipeng Jia, Ting Cao, and Yunquan Zhang. The Implementation and Optimization of Multidimensional FFT Algorithm on Large-scale Clusters. The Journal of Frontiers of Computer Science and Technology, 2017.

- **[HPCChina'16] Kun Li**, Yan Li, Ting Cao, Haipeng Jia, and Yunquan Zhang. An MPI-based 3D FFT Implementation on CPUGPU Heterogeneous Clusters. National Annual Conference on High Performance Computing 2016.

Scholarships

CAS President Award.
ICT President Award (Special Prize) .
National Scholarship for Graduate Students.
CAS-BHBT Joint Scholarship.
UCAS Sugon Scholarship.
UCAS Outstanding Ph.D. Students Scholarship (First Prize).

UCAS Academic Scholarship (First Prize).
CAS Outstanding Undergraduate Scholarship.
ICT CARCH Outstanding Student Scholarship (First Prize).
Huawei Outstanding Cooperation Scholarship.

Selected Awards

Microsoft Star of Tomorrow.
CAS Outstanding League Member.
UCAS Outstanding Communist Member.
UCAS Merit Student.
UCAS Excellent Student Cadre.
ICT Outstanding Volunteer.
ICT CARCH Excellent Student.

Service

2020&2021 Reviewer of the Journal of Supercomputing.
2021 Reviewer of International Conference on High Performance Big Data and Intelligent Systems.
2018&2019 Reviewer of National Annual Conference on High Performance Computing.
2018 Volunteer of International Conference on Supercomputing.

Activities

2017-present Youth League Committee Member of Institute of Computing Technology.
2018 Chairman of Student Union in Institute of Computing Technology.
2018 President of Career Development Association in Institute of Computing Technology.
Volunteer for 130+ hours so far.