

Yu Hao

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EDUCATION

Tsinghua University

Ph.D of Ecology, advised by Dr. Li Liu

September 2018 - present

Department of Earth System and Science

Interests: High Performance Computing

Course: Parallel Computing, Advanced Operating System, Advanced Computer Architecture, etc.

Ocean University of China

Bachelor of Computer Science and Technology

September 2014 - June 2018

Department of Computer Science and Technology

Course: Data Structure and Algorithm, Operating System, Computer Architecture, Linear Algebra, Probability and Statistic, etc.

SKILLS AND INTERESTS

Interests Parallel Computing, Parallel Algorithm Design and Analysis,
Parallelizing Geometry Algorithms, Large-scale Scientific Software Analysis.

Skill C++/Fortran programming with MPI/OpenMP under Linux, program debugging with GDB,
Python, Linux script, etc.
Familiar with MPI/OpenMP and have experience in MPI application optimization

PROJECTS

Distributed implementation for improving routing network generation in model coupling

October 2019 - December 2020

Published on Geoscientific Model Development, IF=6.135

- The distributed implementation of the routing network generation is designed to avoid large-scale global AllGather.
- This algorithm is based on distributed merge sort, the time complexity reduced from $O(N\log K)$ to $O((N/K)\log K)$.
- The algorithm significantly outperforms the original algorithm and also has better scalability on Tianhe-2.

Design and implementation of multi-layer communication

March 2021 - January 2022

Ready to be used in C-Coupler3

- Design a multi-layer communication to avoid network congestion caused by too large MPI communication depth.
- Generate routing tables within the process group and finish MPI communication in each layer.
- The communication time is more stable and faster on Tianhe-2, and the output file is bitwise consistency with original algorithm.

Parallel triangulation and voronoi diagram generation

April 2019 - January 2021

Ready to be used in C-Coupler3

- Triangulate the grid based on the Delaunay algorithm and generate its dual voronoi diagram.
- Achieved the bit-wise consistency of triangulation results and voronoi diagrams under different number of process.

Analysis, Modification and Coupling of Large-scale Weather Software

January 2018 - August 2019

Published Several SCI papers

- Coupling of weather software with C-Coupler2, such as WRF, MITgcm, CFS, etc.
- Have experience in using and modifying large scientific software.

PUBLICATION AND PATENT

Yu, H., Liu, L., Sun, C., Li, R., Yu, X., Zhang, C., Zhang, Z., and Wang, B.: DiRong1.0: a distributed implementation for improving routing network generation in model coupling, *Geosci. Model Dev.*, 13, 6253–6263, <https://doi.org/10.5194/gmd-13-6253-2020>, 2020.

Yang, H., Liu, L., Zhang, C., Li, R., Sun, C., Yu, X., **Yu, H.**, Zhang, Z., and Wang, B.: PatCC1: an efficient parallel triangulation algorithm for spherical and planar grids with commonality and parallel consistency, *Geosci. Model Dev.*, 12, 3311–3328, <https://doi.org/10.5194/gmd-12-3311-2019>, 2019.

Ren, S., Liang, X., Sun, Q., **Yu, H.**, Tremblay, L. B., Lin, B., Mai, X., Zhao, F., Li, M., Liu, N., Chen, Z., and Zhang, Y.: A fully coupled Arctic sea-ice–ocean–atmosphere model (ArcIOAM v1.0) based on C-Coupler2: model description and preliminary results, *Geosci. Model Dev.*, 14, 1101–1124, <https://doi.org/10.5194/gmd-14-1101-2021>

Liu, L., Yu, X., Zhang, Z., Sun, C., **Yu, H.**, Data processing system for numerical program, China, CN:202110567380:A

Liu, L., **Yu, H.**, Yu, X., Sun, C., Grid data distributed storage service system, method, device, equipment and medium, China, CN:202110417353:A

Liu, L., **Yu, H.**, Sun, C., Li, R., Yu, X., Parallel communication route establishing method and system, China, CN:202010127096:A

ACHIEVEMENTS

National Scholarship

autumn 2015

National Scholarship

autumn 2016

Second scholarship

autumn 2021