Yue Wu

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Education

- **Ph.D. Candidate in Applied Mathematics** 09/2023 – present
  Division of Applied Mathematics, Brown University, Providence, RI 02912, USA
  Advisor: Prof. Chi-Wang Shu
- **M.Sc. in Applied Mathematics** 09/2023 – 05/2025
  Division of Applied Mathematics, Brown University, Providence, RI 02912, USA
- **B.Sc. in Information & Computational Science** 09/2019 – 06/2023
  School of the Gifted Young, University of Science and Technology of China, Hefei, Anhui 230026, China
- Wuxi No. 1 High School, Wuxi, Jiangsu 214031, China 09/2017 – 06/2019

Research Interests

- High-order numerical methods for partial differential equations
  - Discontinuous Galerkin finite element methods
  - Finite difference Weighted Essentially Non-Oscillatory (WENO) methods
- Scientific computing
  - Parallel PDE solver development

Publications and Preprints

1. **Y. Wu** and C.-W. Shu, *Finite difference alternative WENO schemes with Riemann invariant-based local characteristic decompositions for compressible Euler equations*, J. Comput. Phys. 537 (2025), Paper No. 114104, 24pp. doi:10.1016/j.jcp.2025.114104. MR4912873.
2. **Y. Wu** and Y. Xu, *A high-order local discontinuous Galerkin method for the p-Laplace equation*, Beijing J. of Pure and Appl. Math. 2:1 (2025), pp. 373–422. doi:10.4310/BPAM.250415002006.

Research Experience

1. **Efficient alternative WENO (A-WENO) methods for compressible Euler equations**
   Brown University 09/2024 – 02/2025
   Supervisor: Prof. Chi-Wang Shu
   - Investigated the effect of different transform variables in the local characteristic decomposition on the performance of A-WENO methods.
   - Developed an A-WENO code using Riemann invariants as transform variables to save cost.
2. **Discontinuous Galerkin Methods for the p-Laplace Equation**
   Bachelor's thesis at USTC 12/2022 – 06/2023
   Supervisor: Prof. Yan Xu
   - Proved an a priori error estimate for an LDG scheme for the p-Laplace equation.
   - Developed and implemented an efficient preconditioned gradient descent method.
3. **Positivity-Preserving Conservative Low Rank Methods for Vlasov Dynamics**
   Purdue University (remote) 06/2022 – 08/2022
   Supervisor: Prof. Xiangxiong Zhang
   - Developed a low-rank correction algorithm with positivity preservation and orthogonality constraints via optimization, which can post-process data from a dynamic low-rank solver.

4. **Numerical Simulation of Plasma Equilibrium Evolution in Nuclear Fusion**
   USTC undergraduate research project 06/2021 – 05/2022
   Supervisor: Prof. Mengping Zhang
   - Developed a parallel hybrid finite difference-pseudo spectral code for resistive MHD in toroidal geometry, and performed long-time simulation of resistive tearing mode instability in tokamaks.
   - Checked the results with researchers from the Institute of Plasma Physics, CAS, and against those from existing open-source codes.

Teaching Experience

1. TA: *Introduction to Scientific Computing* (by Dr. Rami Masri), Brown Fall 2025
2. TA: *Statistical Inference I* (by Prof. Sarah Brauner), Brown Spring 2025
3. TA: *Operations Research: Deterministic Models* (by Prof. Amalia Culiuc), Brown Fall 2024
4. TA: *Computational Methods B* (by Prof. Jingrun Chen), USTC Spring 2022

Presentations and Workshops

1. Poster session, the 2024 International Congress of Basic Science (ICBS), Beijing, China 07/2024

Professional Services

1. Reviewer for *J. Comput. Phys.* and *J. Sci. Comput.* since 2025

Honors and Awards

- New Lotus Award, the 2023 SGY Rose Scholarship 06/2024
- USTC Outstanding Undergraduate Award 06/2023
- "Chia-Chiao Lin" Gold Medal in Applied and Computational track & Team Silver Medal & Excellence Prize in Analysis and PDEs track, the 14th S.-T. Yau College Student Mathematics Contest 06/2023
- Gold Prize, USTC Outstanding Student Scholarship 10/2022
- Excellence Prize in Analysis and PDEs track, the 13th S.-T. Yau College Student Mathematics Contest 08/2022
- China National Scholarship 12/2021
- Second Prize, the 13th Chinese Mathematics Competitions 12/2021
- China National Scholarship 12/2020
- Third Prize, USTC Freshman Scholarship 09/2019

Professional Skills

- Programming: MATLAB, C++, Fortran, Python, MPI, OpenMP
- Software: LaTeX, Mathematica, NGSolve, FEniCS, MFEM
- Language: Mandarin Chinese, English

Extracurricular Activities

- USTC road cycling team member, USTC 09/2019 – 06/2023
- Monitor of class 2019-3 for math-majored students, SGY, USTC 03/2022 – 06/2023

last update: September 25, 2025