

# 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
  - Active flux / Point-Average-Moment Polynomial-interpreted (PAMPA) 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: L<sup>A</sup>T<sub>E</sub>X, 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