

**HIGH-ORDER NUMERICAL METHODS FOR HYPERBOLIC AND
CONVECTION-DOMINATED PROBLEMS: IN HONOR OF PROF.
CHI-WANG SHU ON THE OCCASION OF HIS 70TH BIRTHDAY**

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ABSTRACT

High-order accurate and nonlinearly stable numerical methods are especially efficient for hyperbolic or convection-dominated partial differential equation models, which contain both singularities and complex smooth solution structures. This minisymposium focuses on recent developments and applications of high-order methods, especially weighted essentially non-oscillatory (WENO) finite difference and finite volume methods, and discontinuous Galerkin (DG) finite element methods, for hyperbolic and convection-dominated problems. Topics include algorithmic efficiency for high-order accurate methods and high-dimensional problems; theoretical analysis of high-order schemes; positivity-preserving, well-balanced, and other structure-preserving approaches; novel time-discretization methods; effective methods for ensuring the nonlinear stability of high-order schemes; etc. This minisymposium is also dedicated to Professor Chi-Wang Shu on the occasion of his 70th birthday, recognizing the profound impact of his work and celebrating his achievements.

SPEAKERS

1. Chi-Wang Shu (Brown Univ.): On cell entropy inequality for RKDG methods.
2. Sigal Gottlieb (UMass. Dartmouth): Mixed accuracy two derivative RK methods.
3. Juan Cheng (CNU-Beijing): Lax-Wendroff theorem of doubly conservative schemes.
4. Yan Xu (USTC): Well-balanced nodal finite volume WENO scheme.

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5. Yan Jiang (USTC): High-order fully-discrete entropy stable explicit DG schemes.
 6. Jennifer Ryan (KTH Royal Institute of Technology): TBD.
 7. Jie Du (E. China Normal): Well-balanced positivity-preserving non-oscillatory DG.
 8. Xinghui Zhong (Zhejiang U.): Entropy stable Galerkin methods with random inputs.
 9. Fengyan Li (RPI): Reduced order modeling for some transport equations.
 10. Yingda Cheng (Virginia Tech): TBD.
 11. Jingmei Qiu (U. Delaware): Sampling based high order adaptive rank methods.
 12. Yang Yang (Michigan Tech): The reinterpreted discrete fracture model.
 13. Yuan Liu (Wichita State): Implicit Newton-type WENO fast sweeping methods.
 14. Haijin Wang (Nanjing Posts & Telecom.): IMEX LDG for triple phase lag equations.
 15. Ying Li (Shanghai Univ.): TBD.
 16. Ziyao Xu (Binghamton U.): TVD- and TVB-RKDG with generic RK time schemes.
 17. Zhengfu Xu (Michigan Tech): Local bound preserving high order finite difference.
 18. Yinhua Xia (USTC): A globally divergence-free and PP DG scheme with jump filter.
 19. Xiangxiong Zhang (Purdue Univ.): Efficient optimization-based limiters.
 20. Jianfang Lu (S. China Appl. Math Center): Oscillation control approach for DG.
 21. Qiang Zhang (Nanjing Univ.): Analysis of Adams-Bashforth DG methods.
 22. Will Pazner (Portland State): GPU-accelerated structure-preserving DG methods.
 23. Juntao Huang (U. Delaware): An efficient filter for the sparse grid DG method.
 24. Yong Liu (Chinese Acad. Sci.): Essentially oscillation-free DG methods.
 25. Jianxian Qiu (Xiamen Univ.): Direct Arbitrary-Lagrangian-Eulerian Hermite WENO.
 26. Yulong Xing (Ohio State): Mesh-based filtering for time-step restrictions in RKDG.
 27. Tao Xiong (USTC): Structure preserving DLRA methods for kinetic equations.
 28. Yong-Tao Zhang (Notre Dame): Hybrid WENO based on artificial neural networks.
 29. Zheng Sun (U. Alabama): Structure-preserving RKDG with compact stencils.
 30. Yanlai Chen, (UMass. Dartmouth): RBM-inspired model order reduction.