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Academic Positions

December 2025 – Present	Assistant Professor of Mathematics School of Science and Engineering, The Chinese University of Hong Kong (Shenzhen), China
October 2025 – November 2025	Postdoctoral Researcher Institut für Mathematik, Universität Würzburg, Germany <i>Mentor: Prof. Dr. Christian Klingenberg</i>
October 2023 – September 2025	Humboldt Research Fellow Institut für Mathematik, Universität Würzburg, Germany <i>Host Professor: Prof. Dr. Christian Klingenberg</i>
September 2021 – September 2023	Postdoctoral Researcher MCSS, École Polytechnique Fédérale de Lausanne (EPFL), Switzerland <i>Mentor: Prof. Jan S. Hesthaven</i>

Education

September 2016 - July 2021	Ph.D. in Computational Mathematics Peking University, China <i>Entropy stable numerical methods for special relativistic (magneto)hydrodynamics</i> <i>Advisor: Prof. Huazhong Tang</i>
September 2012 - July 2016	B.Sc. in Information and Computing Science Peking University, China

Research Interests

- Numerical methods for hyperbolic conservation laws
- Computational fluid dynamics
- High-order accurate numerical methods
- Structure-preserving methods
- Moving mesh methods
- Active flux methods
- Model order reduction
- Reduced-order modeling
- AI-driven methods

Research Publications

PREPRINTS

22. **Junming Duan**, A fourth-order active flux method for parabolic problems with application to porous medium equation, submitted, 2025. *arXiv:2510.11527*.
21. **Junming Duan**, Wasilij Barsukow, and Christian Klingenberg, An asymptotic-preserving active flux scheme for the hyperbolic heat equation in the diffusive scaling, submitted, 2025. *arXiv:2508.05166*.
20. **Junming Duan**, Praveen Chandrashekar, and Christian Klingenberg, Active flux for ideal magnetohydrodynamics: A positivity-preserving scheme with the Godunov-Powell source term, submitted, 2025. *arXiv:2506.04857*.

19. **Junming Duan**, Bartul Kovacic, and Jan S. Hesthaven, Multi-GPU accelerated high-order schemes for hyperbolic conservation laws on adaptive moving meshes, *in preparation*.

JOURNAL ARTICLES

18. Jie Wang, Yao Zhou, **Junming Duan**, Zhiwei Ma, and Wei Zhang, CLT-fx: Non-axisymmetric flexible mesh finite difference scheme for stellarator MHD simulations, *Computer Physics Communications*, 316: 109776, 2025.
17. **Junming Duan**^{*}, Wasilij Barsukow, and Christian Klingenberg, Active flux methods for hyperbolic conservation laws – flux vector splitting and bound-preservation, *SIAM Journal on Scientific Computing*, 47(2): A811-A837, 2025. *arXiv:2411.00065*.
16. Zhihao Zhang, Huazhong Tang, and **Junming Duan**^{*}, High-order accurate well-balanced energy stable finite difference schemes for multi-layer shallow water equations on fixed and adaptive moving meshes, *Journal of Computational Physics*, 517: 113301, 2024. *arXiv:2311.08124*.
15. **Junming Duan**, Qian Wang, and Jan S. Hesthaven, Machine-learning-enhanced aerodynamic forces prediction based on sparse pressure sensor inputs, *AIAA Journal*, 62(7): 2601-2621, 2024. *arXiv:2305.09199*.
14. **Junming Duan**^{*} and Jan S. Hesthaven, Non-intrusive data-driven reduced-order modeling for time-dependent parametrized problems, *Journal of Computational Physics*, 497: 112621, 2024. *arXiv:2303.02986*.
13. Jie Wang, **Junming Duan**, Zhiwei Ma, and Wei Zhang, An adaptive moving mesh finite difference scheme for tokamak magneto-hydrodynamic simulations, *Computer Physics Communications*, 294: 108951, 2024.
12. Zhihao Zhang, **Junming Duan**^{*}, and Huazhong Tang, High-order accurate well-balanced energy stable adaptive moving mesh finite difference schemes for the shallow water equations with non-flat bottom topography, *Journal of Computational Physics*, 492: 112451, 2023. *arXiv:2303.06924*.
11. Shangting Li, **Junming Duan**, and Huazhong Tang, High-order accurate entropy stable adaptive moving mesh finite difference schemes for (multi-component) compressible Euler equations with the stiffened equation of state, *Computer Methods in Applied Mechanics and Engineering*, 399: 115311, 2022. *arXiv:2202.07989*.
10. **Junming Duan** and Huazhong Tang, High-order accurate entropy stable adaptive moving mesh finite difference schemes for special relativistic (magneto)hydrodynamics, *Journal of Computational Physics*, 456: 111038, 2022. *arXiv:2107.12027*.
9. **Junming Duan** and Huazhong Tang, An analytical solution of the isentropic vortex problem in the special relativistic magnetohydrodynamics, *Journal of Computational Physics*, 456: 110903, 2022. *arXiv:2107.01966*.
8. **Junming Duan** and Huazhong Tang, High-order accurate entropy stable finite difference schemes for the shallow water magnetohydrodynamics, *Journal of Computational Physics*, 431: 110136, 2021. *arXiv:2003.10081*.
7. **Junming Duan** and Huazhong Tang, Entropy stable adaptive moving mesh schemes for 2D and 3D special relativistic hydrodynamics, *Journal of Computational Physics*, 426: 109949, 2021. *arXiv:2007.12884*.
6. **Junming Duan** and Huazhong Tang, High-order accurate entropy stable nodal discontinuous Galerkin schemes for the ideal special relativistic magnetohydrodynamics, *Journal of Computational Physics*, 421: 109731, 2020. *arXiv:1911.03825*.
5. **Junming Duan** and Huazhong Tang, High-order accurate entropy stable finite difference schemes for one- and two-dimensional special relativistic hydrodynamics, *Advances in Applied Mathematics and Mechanics*, 12(1): 1-29, 2020. *arXiv:1905.06092*.
4. **Junming Duan** and Huazhong Tang, An efficient ADER discontinuous Galerkin scheme for directly solving Hamilton-Jacobi equation, *Journal of Computational Mathematics*, 38(1): 58-83, 2020. *arXiv:1901.10228*.
3. Dan Ling, **Junming Duan**, and Huazhong Tang, Physical-constraints-preserving Lagrangian finite volume schemes for one- and two-dimensional special relativistic hydrodynamics, *Journal of Computational Physics*, 396: 507-543, 2019. *arXiv:1901.10625*.
2. **Junming Duan** and Huazhong Tang, A second-order accurate scheme for a kinetic equation of two-dimensional Vicsek swarming model, *Natural Science Journal Xiangtan University*, 41(1): 1-14, 2019. (in Chinese)
1. **Junming Duan**, Yangyu Kuang, and Huazhong Tang, Model reduction of a two-dimensional kinetic swarming model by operator projections, *East Asian Journal on Applied Mathematics*, 8(1): 151-180, 2018. *arXiv:1701.02888*.

Major Awards & Honors

Excellent Young Scientists Fund (Overseas) NSFC	Jan 2026
Humboldt Research Fellowship Alexander von Humboldt Foundation	July 2023
Outstanding Graduate of Peking University Peking University	July 2021
National Scholarship for Graduate Student Ministry of Education of P.R. China	December 2020
The First Prize in Outstanding Youth Paper Award Beijing Society of Computational Mathematics	August 2020
BICMR Scholarship for Graduate Student Beijing International Center for Mathematical Research (2 times)	2019–2020
President Scholarship for PhD Student Peking University (3 times)	2018–2020
Founder Scholarship Peking University	September 2019
DTZ Cushman & Wakefield Scholarship Peking University	September 2017
Outstanding Undergraduate of Peking University Peking University	July 2016

Selected Talks

HYP 2026 – The 20th International Conference on Hyperbolic Problems: Theory, Numerics and Applications University of Stuttgart, Germany <i>Talk: An Active Flux Method for Compressible Navier-Stokes Equations</i>	May 25-29, 2026
Active Flux Workshop Southern University of Science and Technology, Shenzhen, China <i>Talk: Active flux methods for compressible Euler equations and ideal magnetohydrodynamics</i>	Dec 06-08, 2025
Computation Webinar: Genuinely Multi-Dimensional Numerical Scheme for Conservation Laws online <i>Talk: On An Asymptotic-Preserving Active Flux Scheme</i>	Oct 28, 2025
Numerical Methods for Hyperbolic Problems, NumHyp Darmstadt, Germany <i>Poster: On An Asymptotic-Preserving Active Flux Scheme</i>	June 09-13, 2025
Mobility Innovation eXchange in Aero/Acoustics (MIXA) The Ohio State University, USA (online) <i>Keynote Speaker: Machine-learning-enhanced aerodynamic forces prediction based on sparse pressure sensor inputs</i>	May 06, 2025
High-Order Nonlinear numerical Methods for evolutionary PDEs: theory and applications, HONOM Chania, Crete Island, Greece <i>Talk: On limiting for the Active Flux methods for hyperbolic conservation laws</i>	September 08-13, 2024
Lecture Series of Modern Computational Methods Beijing Institute of Applied Physics and Computational Mathematics (online) <i>Talk: Entropy stable schemes for hyperbolic conservation laws</i>	July 27, 2024
Simultaneously used Point values, Averages and Moments and their Inter-Relation: Active Flux, Multi-Moment Method, Virtual Finite Elements and related numerical methods Maxwell Center, Cambridge, UK (online) <i>Talk: Flux-vector splitting for point value update in active flux methods and limiting</i>	March 06-08, 2024
XVII. Würzburg Workshop on Stellar Astrophysics Heidelberg Institute for Theoretical Studies (HITS), Heidelberg, Germany <i>Plenary talk: Adaptive moving mesh methods in hydrodynamics</i>	December 18-19, 2023
ECCOMAS YIC 2023: 7th Young Investigators Conference University of Porto, Porto, Portugal <i>Talk: Non-intrusive data-driven reduced-order modeling for time-dependent parametrized problems</i>	June 19-21, 2023
Swiss Numerics Day 2023 Universität Bern, Bern, Switzerland <i>Talk: Machine learning enhanced aerodynamic forces prediction based on sparse pressure sensor inputs</i>	June 07, 2023
Oberseminar hosted by Prof. Christian Klingenberg (online) <i>Talk: Data-driven reduced-order modeling for time-dependent parametrized problems</i>	November 17, 2022
MultiMat 2022: 10th International Conference on Numerical Methods for Multi-Material Fluid Flow Universität Zürich, Zürich, Switzerland <i>Talk: High-order accurate entropy stable adaptive moving mesh methods</i>	August 22-26, 2022

Selected Talks (continued)

Symposium on High-Fidelity Numerical Simulation of Fluid Problems Peking University, Beijing, China	June 05-07, 2021
<i>Talk: Entropy stable schemes for RHD</i>	
Forum of Numerical Methods and Applications in Fluids Xiangtan University, Xiangtan, China	December 11-13, 2020
<i>Talk: Entropy stable adaptive moving mesh schemes for RHD</i>	
Annual Meeting on High Resolution Method for Multi-Material Hydrodynamics of Science Challenge Project Xiamen University, Xiamen, China	November 29-December 01, 2019
<i>Talk: PCP Lagrangian scheme for RHD</i>	
Workshop on Numerical Methods for Complex Physical Problems Nanjing University of Aeronautics and Astronautics, Nanjing, China	August 28-30, 2019
<i>Talk: High-order entropy stable finite difference schemes for RHD</i>	
The 12th National Annual Meeting of Computational Mathematics Harbin, China	July 31-August 04, 2019
<i>Talk: High-order entropy stable finite difference schemes for RHD</i>	
Annual Meeting of Science Challenge Project Jilin University, Changchun, China	November 17-19, 2018
<i>Talk: PCP Lagrangian scheme for RHD (with Dan Ling), selected as one of the five best posters</i>	
Beijing Seminar on Computational Fluid Dynamics Beijing Institute of Applied Physics and Computational Mathematics, Beijing, China	November 11, 2018
<i>Talk: PCP Lagrangian scheme for RHD</i>	

Teaching

MAT2240 Applied Mathematics for AI The Chinese University of Hong Kong, Shenzhen <i>Instructor</i>	Spring 2026
Analysis III École Polytechnique Fédérale de Lausanne <i>Assistant</i>	Fall 2022
Advanced Analysis I École Polytechnique Fédérale de Lausanne <i>Assistant</i>	Fall 2021
Numerical Methods of Partial Differential Equations Peking University <i>Assistant</i>	Fall 2019
Linear Algebra B Peking University <i>Assistant</i>	Fall 2018
Advanced Algebra II Peking University <i>Assistant</i>	Spring 2018
Linear Algebra B Peking University <i>Assistant</i>	Fall 2017
Mathematical Modeling Peking University <i>Assistant</i>	Spring 2017
Partial Differential Equations Peking University <i>Assistant</i>	Fall 2016

Supervision

Master thesis: Reduced order modeling for time dependent parametrized problems coupled with uncertainty quantification Andrea Lörke, University of Wuerzburg, with Prof. Christian Klingenberg	Fall, 2023 - Fall, 2024
Master thesis: GPU-accelerated numerical simulations of hyperbolic conservation laws using entropy stable schemes and adaptive moving mesh method Bartul Kovacic, EPFL, with Prof. Jan S. Hesthaven	Fall, 2023
Semester project: Scalable implementation of high-order entropy stable finite difference schemes Bartul Kovacic, EPFL, with Prof. Jan S. Hesthaven	Fall, 2022
Master thesis: High-order entropy stable discontinuous Galerkin schemes using artificial viscosity Louis Vincent Marie Jaugey, EPFL, with Prof. Jan S. Hesthaven	Fall, 2022
Master thesis: Investigation of the aerosol evolution and delivery into the upper airway under transient conditions Filippo Zacchei, EPFL, with Prof. Jan S. Hesthaven	Fall, 2022

Research Grants

Excellent Young Scientists Fund (Overseas) NSFC <i>PI</i>	2026-2028
Collaborative Double Major Programme Research and Innovation Scheme (CRIS) CUHK-SZ <i>PI</i>	2026
University Development Fund (UDF) CUHK-SZ <i>PI</i>	2026-2028

Professional Services

■ Reviewer/Referee for: AMS Mathematical Reviews, Journal of Computational Physics, Journal of Computational and Applied Mathematics, Communications in Nonlinear Science and Numerical Simulation, International Journal for Numerical Methods in Engineering, East Asian Journal on Applied Mathematics, Communications in Computational Physics, Journal of Scientific Computing, International Journal of Computational Methods, Computational Geosciences, Numerical Methods for Partial Differential Equations, AIAA Journal, Computer Methods in Applied Mechanics and Engineering, SIAM Journal on Scientific Computing, Nature Communications Engineering, Computers & Fluids, Computer Physics Communications, Aerospace Science and Technology

Other Information

■ Programming skills: C, C++, Python, Julia, MATLAB, Fortran, MPI, PyTorch, OpenFOAM, PETSc, Linux shell, \LaTeX , . . .
■ Languages: Chinese (native), English (proficient)

References

Prof. Dr. Huazhong Tang

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