



# Curriculum Vitae of Junming Duan


MATH-MCSS, School of Basic Sciences, École Polytechnique Fédérale de Lausanne (EPFL)  
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## Employment






Sep, 2021 – present     **Postdoc**, MCSS, École Polytechnique Fédérale de Lausanne (EPFL)

## Education

Sep, 2016 – Jul, 2021     **Ph.D. in Computational Mathematics**, Peking University  
Thesis title: *Entropy stable numerical methods for special relativistic (magneto)hydrodynamics*  
Advisor: Prof. Huazhong Tang

Sep, 2012 – Jul, 2016     **B.Sc. in Information and Computing Science**, Peking University

## Research Interests

-  Numerical methods for hyperbolic conservation laws
-  Computational fluid dynamics
-  High-order accurate numerical methods
-  Structure-preserving methods
-  Moving mesh methods

## Research Publications

### Journal Articles (Appeared or Accepted)

- 1 **J.M. Duan** and H.Z. Tang, High-order accurate entropy stable finite difference schemes for the shallow water magnetohydrodynamics, *J. Comput. Phys.*, 431(Apr 15): 110136, 2021. *arXiv:2003.10081*.
- 2 **J.M. Duan** and H.Z. Tang, Entropy stable adaptive moving mesh schemes for 2D and 3D special relativistic hydrodynamics, *J. Comput. Phys.*, 426(Feb 1): 109949, 2021. *arXiv:2007.12884*.
- 3 **J.M. Duan** and H.Z. Tang, High-order accurate entropy stable nodal discontinuous Galerkin schemes for the ideal special relativistic magnetohydrodynamics, *J. Comput. Phys.*, 421(Nov 15): 109731, 2020. *arXiv:1911.03825*.
- 4 **J.M. Duan** and H.Z. Tang, High-order accurate entropy stable finite difference schemes for one- and two-dimensional special relativistic hydrodynamics, *Adv. Appl. Math. Mech.*, 12(1): 1-29, 2020. *arXiv:1905.06092*.
- 5 **J.M. Duan** and H.Z. Tang, An efficient ADER discontinuous Galerkin scheme for directly solving Hamilton-Jacobi equation, *J. Comput. Math.*, 38(1): 58-83, 2020. *arXiv:1901.10228*.
- 6 D. Ling, **J.M. Duan** and H.Z. Tang, Physical-constraints-preserving Lagrangian finite volume schemes for one- and two-dimensional special relativistic hydrodynamics, *J. Comput. Phys.*, 396(Nov 1): 507-543, 2019. *arXiv:1901.10625*.
- 7 **J.M. Duan** and H.Z. Tang, A second-order accurate scheme for a kinetic equation of two-dimensional Vicsek swarming model, *Nat. Sci. J. Xiangtan Univ.*, 41(1): 1-14, 2019. (in Chinese)

- 8 **J.M. Duan**, Y.Y. Kuang and H.Z. Tang, Model reduction of a kinetic swarming model by operator projection, *East Asian J. Appl. Math.*, 8(1): 151-180, 2018. *arXiv:1701.02888*.










## Preprints

- 9 **J.M. Duan** and H.Z. Tang, An analytical solution of the isentropic vortex problem in the special relativistic magnetohydrodynamics, submitted to *J. Comput. Phys.*, *arXiv:2107.01966*.
- 10 **J.M. Duan** and H.Z. Tang, High-order accurate entropy stable adaptive moving mesh finite difference schemes for special relativistic (magneto)hydrodynamics, *arXiv:2107.12027*.

## Awards & Honors

- Jul 2021  **Outstanding Graduate of Peking University**, Peking University
- Dec 2020  **National Scholarship for Graduate Student**, Chinese Ministry of Education
- Oct 2020  **Merit Student of Peking University**, Peking University
- Aug 2020  **The First Prize in Outstanding Youth Paper Award of Beijing Society of Computational Mathematics**, Beijing Society of Computational Mathematics
- 2019–2020  **BICMR Scholarship for Graduate Student**, Beijing International Center for Mathematical Research (BICMR), Peking University
- 2018–2020  **President Scholarship for PhD Student**, Peking University
- Sep 2019  **Founder Scholarship**, Peking University
- Sep 2017  **DTZ Cushman & Wakefield Scholarship**, Peking University
- Jul 2016  **Outstanding Undergraduate of Peking University**, Peking University

## Conferences

- Jun 05-07, 2021  Symposium on High-Fidelity Numerical Simulation of Fluid Problems, Peking University, Beijing, China. (Talk: *Entropy stable schemes for RHD*)
- Dec 11-13, 2020  Forum of Numerical Methods and Applications in Fluids, Xiangtan University, Xiangtan, China. (Talk: *Entropy stable adaptive moving mesh schemes for RHD*)
- Nov 14-15, 2020  Student Forum of Chinese Society of Industrial and Applied Mathematics, online. (Talk: *Entropy stable adaptive moving mesh schemes for RHD*)
- Nov 06-08, 2020  The National Mechanics Graduate Student Forum, Peking University, Beijing, China. (Talk: *High-order entropy stable DG schemes for RMHD*)
- Aug 30, 2020  Selection of Excellent Young Scholar's paper of Beijing Society of Computational Mathematics, online. (Talk: *PCP Lagrangian scheme for RHD. The first prize.*)
- Jan 10-13, 2020  Trends of High-Order Numerical Methods for Computational Fluid Dynamics and Their Applications, Beijing, China. (Attended)
- Nov 29-Dec 01, 2019  Annual Meeting on High Resolution Method for Multi-Material Hydrodynamics of Science Challenge Project, Xiamen University, Xiamen, China. (Talk: *PCP Lagrangian scheme for RHD*)
- Sep 25-27, 2019  Sino-German Workshop on Advanced Numerical Methods for Hyperbolic Balance Laws, Beijing Institute of Applied Physics and Computational Mathematics, Beijing, China. (Attended)
- Aug 28-30, 2019  Workshop on Numerical Methods for Complex Physical Problems, Nanjing University of Aeronautics and Astronautics, Nanjing, China. (Talk: *High-order entropy stable finite difference schemes for RHD*)

## Conferences (continued)

- Jul 31-Aug 04, 2019    ■ The 12th National Annual Meeting of Computational Mathematics, Harbin, China. (Talk: *High-order entropy stable finite difference schemes for RHD*)
- Jun 22, 2019    ■ Graduate Student Forum of Chinese Society of Industrial and Applied Mathematics, Academy of Mathematics and System Science, Chinese Academy of Science, Beijing, China. (Talk: *PCP Lagrangian scheme for RHD*)
- Dec 13, 2018    ■ Annual Meeting of Center for Applied Physics and Technology, Peking University, Beijing, China. (Talk: *PCP Lagrangian scheme for RHD*)
- Nov 17-19, 2018    ■ Annual Meeting of Science Challenge Project, Jilin University, Changchun, China. (Poster: *PCP Lagrangian scheme for RHD* (with Dan Ling), selected as one of the five best posters)
- Nov 11, 2018    ■ Beijing Seminar on Computational Fluid Dynamics, Beijing Institute of Applied Physics and Computational Mathematics, Beijing, China. (Talk: *PCP Lagrangian scheme for RHD*)
- Sep 13-16, 2018    ■ The 16th Annual Meeting of Chinese Industrial and Applied Mathematics, Chengdu, China. (Attended)
- Apr 27-30, 2018    ■ The 2nd Workshop on Simulation and Algorithm for Complex Physical Problems, Xiangtan University, Xiangtan, China. (Attended)
- Nov 10-12, 2017    ■ Annual Meeting of Science Challenge Project, Xiamen University, Xiamen, China. (Attended)
- Jul 21-23, 2017    ■ The 11th National Annual Meeting of Computational Mathematics, Xian, China. (Attended)
- Jul 03-07, 2017    ■ The 5th International Conference on Numerical Simulation for Multi-material and Multi-physics Flows, Beijing Institute of Applied Physics and Computational Mathematics, Beijing, China. (Attended)

## Teaching (as teaching assistant)

- Fall 2019    ■ Numerical Methods of Partial Differential Equations (undergraduate and graduate), Peking University
- Fall 2018    ■ Linear Algebra B (undergraduate), Peking University
- Spring 2018    ■ Advanced Algebra II (undergraduate), Peking University
- Fall 2017    ■ Linear Algebra B (undergraduate), Peking University
- Spring 2017    ■ Mathematical Modeling (undergraduate), Peking University
- Fall 2016    ■ Partial Differential Equations (undergraduate), Peking University

## Research Project (As participator)

- 2019-2020    ■ Research in computational methods for the interface and elastoplastic fracture in fluid mechanics, supported by Science Challenge Project. (Designing, coding and verifying moving mesh schemes for multi-component flows)
- 2016-2018    ■ Research and verification of high-order accurate robust numerical schemes for multi-material implosion hydrodynamics, supported by Science Challenge Project. (Coding and verifying high-order accurate Lagrangian schemes for compressible hydrodynamics)

## Referee for Journals

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📖 Journal of Computational Physics

## Other Information

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Be familiar with C, C++, Matlab, Linux shell, Fortran, Python,  $\LaTeX$ , ...