

Chuanfei Dong

Assistant Professor, Department of Astronomy (primary appointment)
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Research Profile

My research interests include, but are not limited to, star–terrestrial planet interactions in the Solar System and beyond; magnetic reconnection, turbulence, collisionless shocks, and wave–particle interactions; physics-informed machine learning and AI for science; and laboratory astrophysics and high-intensity laser–plasma interactions.

Scholarly record: 154 peer-reviewed journal articles; 31 manuscripts submitted or under review; more than 6,800 citations; h-index 44; i10-index 122. 469 conference presentations, including 23 invited conference talks; 27 invited colloquia and seminars.

Academic Appointments

2026.01–2026.07	IBM Einstein Fellow and Member , School of Natural Sciences, Institute for Advanced Study, Princeton, NJ (on leave from Boston University)
2023.10–present	Assistant Professor , Department of Electrical and Computer Engineering, Boston University
2023.01–present	Assistant Professor , Center for Space Physics and Department of Astronomy, Boston University
2023.01–present	Long-Term Visitor , Princeton Plasma Physics Laboratory (DOE National Laboratory)
2021.04–2022.12	Staff Scientist , Princeton Plasma Physics Laboratory (DOE National Laboratory)
2018.01–2021.03	Associate Research Scholar , Department of Astrophysical Sciences, Princeton University
2016.01–2017.12	NASA Jack Eddy Postdoctoral Fellow , Princeton University
2015.09–2015.12	Postdoctoral Scholar , Space Sciences Laboratory, University of California, Berkeley

Education

2015	Ph.D., Space and Planetary Science and Scientific Computing, University of Michigan
2014	M.S.E., Nuclear Engineering (Plasma Physics), University of Michigan
2012	M.S., Space and Planetary Science, University of Michigan
2010	M.S., Space and Planetary Science, Georgia Institute of Technology
2009	B.S., Space Physics, University of Science and Technology of China

Selected Honors and Awards

- **IBM Einstein Fellowship**, Institute for Advanced Study (2026)
- **Alfred P. Sloan Research Fellowship in Physics** (2024)
- **HPC Innovation Excellence Award** (2023)
- **U.S. Department of Energy Early Career Research Award** (2023)
- **New Leaders in Space Science**, National Academies of Sciences, Engineering, and Medicine (2019)
- **European Space Agency Young Researcher Award** (2018)
- **NASA Group Achievement Awards**, MAVEN Science Team (2016, 2018)
- **Robert H. Goddard Exceptional Achievement for Science**, MAVEN Science Team (2016)
- **NASA Jack Eddy Postdoctoral Fellowship** (2015)
- **NASA Earth and Space Science Fellowship** (2013 – 2015).

Research Group and Mentorship

Currently mentors six postdoctoral researchers and research scientists, six graduate students, and seven undergraduate researchers at Boston University.

Postdoctoral researchers and research scientists: Jiawei Gao, Xinmin Li, Liang Wang, Zikang Xie, Chi Zhang, and Hongyang Zhou.

Graduate students: Laura Chin, Tom Lassmann, Yilan Qin, Sujay Shankar, Abigail Tadlock, and Zhanyi Zhu.

Undergraduate researchers: Evelyn DiNovi-McDonald, Zoey Jestude, Xinyu Lu, Emmett Shei-House, Barton Yang, Jingxuan Zhang, and Langrui Zhang.

Selected trainee recognition and outcomes:

- Sujay Shankar received a DoD National Defense Science and Engineering Graduate Fellowship (2026–2029); Laura Chin received a Clare Boothe Luce Graduate Fellowship (2024–2026).
- Zhihao Cheng received the 2026 Boston University College Prize.
- Undergraduate and graduate researchers have received support from the Massachusetts Space Grant Consortium and Boston University’s Undergraduate Research Opportunities Program.

Selected Publications

Selected First-Author Papers

1. **C. Dong**, L. Wang, Y.-M. Huang, L. Comisso, T. A. Sandstrom, and A. Bhattacharjee, “Reconnection-driven energy cascade in magnetohydrodynamic turbulence,” *Sci. Adv.* **8**, eabn7627 (2022).
2. **C. Dong**, L. Wang, A. Hakim, A. Bhattacharjee, J. A. Slavin, G. A. DiBaccio, and K. Germaschewski, “Global Ten-Moment Multifluid Simulations of the Solar Wind Interaction with Mercury: From the Planetary Conducting Core to the Dynamic Magnetosphere,” *Geophys. Res. Lett.* **46**, 11584–11596 (2019).
3. **C. Dong**, M. Jin, M. Lingam, V. S. Airapetian, Y. J. Ma, and B. van der Holst, “Atmospheric escape from the TRAPPIST-1 planets and implications for habitability,” *Proc. Natl. Acad. Sci.* **115**, 260–265 (2018).
4. **C. Dong**, L. Wang, Y.-M. Huang, L. Comisso, and A. Bhattacharjee, “Role of the Plasmoid Instability in Magnetohydrodynamic Turbulence,” *Phys. Rev. Lett.* **121**, 165101 (2018).
5. **C. Dong**, Y. Lee, Y. J. Ma, M. Lingam, S. W. Bougher, J. G. Luhmann, S. M. Curry, G. Toth, A. F. Nagy, V. Tenishev, X. H. Fang, D. Mitchell, D. Brain, and B. Jakosky, “Modeling Martian Atmospheric Losses over Time: Implications for Exoplanetary Climate Evolution and Habitability,” *Astrophys. J. Lett.* **859**, L14 (2018).

Selected Papers Led by Students, Postdoctoral Researchers, and Research Scientists

* student; ** postdoctoral researcher or research scientist

1. A. Tadlock*, **C. Dong**, C. Zhang**, S. Raptis, H. Zhou**, X. Li**, and J. Gao**, “Widespread plasma jets in the Martian magnetosheath revealed by dual-spacecraft observations,” *Proc. Natl. Acad. Sci.* (in press, 2026).
2. C. Zhang**, **C. Dong**, G. Poh, J. Halekas, X. Ma, R. Suranga, K. G. Hanley, H.-W. Shen, H. Zhou**, X. Li**, L. Wang**, J. Gao**, S. Curry, and C. Mazelle, “Simultaneous Mars-orbit observations reveal Kelvin–Helmholtz instability-driven bulk atmospheric ion escape,” *Sci. Adv.* **12**, eed9072 (2026).
3. L. Wang**, **C. Dong**, Y.-M. Huang, Y. Yuan*, X. Li**, and Y. Zhang**, “Transition of Magnetic Reconnection Regimes in Partially Ionized Plasmas,” *Astrophys. J.* **1008**, 123 (2026).
4. X. Li**, **C. Dong**, L. Z. Hadid, S. Aizawa, C. Zhang**, H. Zhou**, L. Wang**, J. Gao**, and J. A. Slavin, “Properties and Radial Evolution of Solar Wind Turbulence Near Mercury’s Orbit,” *Astrophys. J. Lett.* **1005**, L1 (2026).
5. J. Gao**, **C. Dong**, C. Zhang**, Y. Qin*, S. Shekarpaz**, X. Li**, L. Wang**, H. Zhou**, and A. Tadlock*, “Physics-Informed Neural Networks for Modeling the Martian Induced Magnetosphere,” *Geophys. Res. Lett.* **53**, e2025GL121532 (2026).
6. H. Zhou**, **C. Dong**, Y. Chen, C. Zhang**, B. M. Walsh, Y. Zou, and X. Li**, “Cross-Scale Coupling in Earth’s Dayside Magnetosphere 2D Semi-Implicit PIC Simulation: From Global Geometry to Multi-Scale Kinetic Dynamics,” *J. Geophys. Res. Space Physics* **131**, e2026JA035230 (2026).
7. S. Shekarpaz**, **C. Dong**, and Z. Huang**, “Surrogate Modeling of Landau Damping with Deep Operator Networks,” *Astrophys. J.* **990**, 161 (2025).
8. Z. Huang**, **C. Dong**, and L. Wang**, “Machine-learning heat flux closure for multi-moment fluid modeling of nonlinear Landau damping,” *Proc. Natl. Acad. Sci.* **122**, e2419073122 (2025).
9. Y. Chen**, **C. Dong**, and W. Sun, “Transport and Distribution of Sodium Ions in Mercury’s Magnetosphere: Results From Multi-Fluid MHD Simulations,” *Geophys. Res. Lett.* **51**, e2024GL110301 (2024).
10. L. Chin*, **C. Dong**, and M. Lingam, “Role of Planetary Radius on Atmospheric Escape of Rocky Exoplanets,” *Astrophys. J. Lett.* **963**, L20 (2024).

Teaching

- AS 101, *The Solar System* — Spring 2023, Spring 2024, Fall 2024
- AS 311, *Planetary Physics* — Fall 2023, Fall 2025, Fall 2026 (in progress)
- AS 708, *Cosmic Plasma Physics* — Spring 2025; Spring 2027 (scheduled)

Selected Leadership and Service

- Co-Investigator, NASA MAVEN mission (2016–present); Co-Investigator, SERENA instrument suite aboard the ESA–JAXA BepiColombo mission (2019–present); Institutional Principal Investigator, Mauve ultraviolet space telescope (2024–present).
- Executive Committee, NASA Exoplanet Exploration Program Analysis Group (2024–present) and NASA Living With a Star Program Analysis Group (2020–present); Steering Committee, NASA Nexus for Exoplanet System Science (2018–present) and NASA Venus Exploration Analysis Group (VEXAG; 2022–2024).
- NASA Jack Eddy Postdoctoral Fellowship Steering and Selection Committees (2023–present); JWST Cycle 4 Time Allocation Committee (2024–2025); Program Committees: APS Division of Plasma Physics (2022–2023) and IEEE International Conference on Plasma Science (2023–2024); conference-session convener; proposal reviewer for U.S. and international agencies.
- Associate Editor, *npj Space Exploration* (2025–present) and *Frontiers in Astronomy and Space Sciences* (2023–present).
- Boston University Natural Sciences Curriculum Committee, Astronomy Department Graduate Admissions Committee; undergraduate research and academic advisor; organizer, Boston University Upward Bound plasma workshop (2024).
- Scientific Advisor, Tacite.ai (2026–present); Scientific Committee, Earth and Space Agent Skills (2026–present).