Junjie Dong

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(Updated as of October 31, 2026)

RESEARCH INTERESTS

Materials at extreme pressures and temperatures; phase equilibria and equations of state; mantle petrology and volatiles; early Earth and planetary habitability; structure and evolution of planetary interiors; exoplanet mass–radius relations; high-pressure experiments (multi-anvil press, diamond anvil cell), atomistic simulations (density functional theory, machine-learning interatomic potentials), and thermodynamic modeling; statistical learning; history of geophysics.

EDUCATION

2017–2023	**Harvard University**, Cambridge, MA Ph.D. & M.A. in Earth and Planetary Sciences Secondary field in the History of Science Dissertation: *Water and Phase Transitions in Rocky Planetary Interiors* Advisor: Rebecca A. Fischer
2014–2017	**University of Michigan**, Ann Arbor, MI B.S. in Earth and Environmental Sciences (High Honors) Minor in Environmental History

APPOINTMENTS

2026–	Assistant Professor, Department of Geosciences, Stony Brook University
2026–	Faculty Member, Mineral Physics Institute, Stony Brook University
2023–2026	Stanback Postdoctoral Fellow, Division of Geological and Planetary Sciences, Caltech
2023–2026	Visiting Postdoctoral Researcher, Department of Earth, Planetary, and Space Sciences, UCLA
2023 Summer	Postdoctoral Researcher, Department of Earth and Planetary Sciences, Harvard University

HONORS AND AWARDS

2023	Study of the Earth's Deep Interior Section Award for Graduate Research, AGU
2023	Mineral and Rock Physics Graduate Research Award, AGU
2023	Foster and Coco Stanback Postdoctoral Fellowship in Comparative Planetary Evolution, Caltech GPS
2021 & 2022	Distinction in Teaching, Harvard College
2017	James M. Peirce Graduate Fellowship, Harvard GSAS

TALKS

Colloquia and Seminars

2026	MINERALS Seminar, Columbia University & Lamont-Doherty Earth Observatory
2026	Excalibur Seminar, NASA Jet Propulsion Laboratory
2025	Smith Lecture, Michigan Earth
2025	DIX Planetary Science Seminar, Caltech GPS
2025	Special Seminar, ASU School of Molecular Sciences & FORCE
2025	Departmental Colloquium, Stony Brook Geosciences
2025	Special Seminar, University of Washington ESS
2025	Geochemistry Lunch Brunch, Brown DEEPS

2024 Seismo Lab Seminar, Caltech GPS
2024 Geocheminar, UCLA EPSS
2023 CMAP Seminar, University of Rochester
2023 Seismology, Tectonics and Earth's Interior Seminar, UCLA EPSS
2022 Petrology Seminar, ANU Research School of Earth Sciences, Australia
2022 Solid Earth Brown Bag Seminar, Princeton GEO
2022 COG^3 Seminar, MIT EAPS
2021 Departmental Colloquium, Harvard EPS

Conference Talks

2026 AGU Fall Meeting, San Francisco, CA (invited)
2026 ExPet26, Carnegie Institution for Science, Washington, DC
2026 AAS Topical Conference Series 11: Exoplanet Atmospheres, Denver, CO
2026 Inner Solar System Workshop, Houston, TX
2025 AGU Fall Meeting, New Orleans, LA
2025 Workshop on Macro- and Microphysics, &HPS 10, Pasadena, CA
2025 APS Topical Conference on Shock Compression of Condensed Matter, Washington, DC
2024 AGU Fall Meeting, Washington, DC
2024 AAS Division for Planetary Sciences Annual Meeting, Boise, ID
2024 GSA Connects, Anaheim, CA
2024 Goldschmidt Conference, Chicago, IL
2022 AGU Fall Meeting, Chicago, IL
2022 Goldschmidt Conference, Honolulu, HI
2022 COMPRES Annual Meeting, Online
2021 COMPRES Annual Meeting, Online
2019 Goldschmidt Conference, Barcelona, Spain
2018 AGU Fall Meeting, Washington, DC
2018 Goldschmidt Conference, Boston, MA
2018 COMPRES Annual Meeting, Albuquerque, NM

FIRST-AUTHOR PUBLICATIONS

(**mentee*)

Forthcoming

(9) **J. Dong**, L. P. Stixrude (Submitted). Radius Inflation of Lava Planets by a Vaporized Silicate Atmosphere. *The Astrophysical Journal*.

(8) **J. Dong**, L. P. Stixrude, P. D. Asimow, J. Li (In revision). Metal Saturation and a Metallic Reservoir for Hydrogen in Earth's Mantle. *Earth and Planetary Science Letters*. [arXiv]

Published

(7) **J. Dong**, G.-D. Mardaru*, P. D. Asimow, L. P. Stixrude, R. A. Fischer (2025). Structure and Melting of Fe, MgO, SiO_2, and $MgSiO_3$ in Planets: Database, Inversion, and Phase Diagram. *The Planetary Science Journal*, 6, 103. [DOI] [arXiv]

(6) **J. Dong**, R. A. Fischer, L. P. Stixrude, M. C. Brennan, K. Daviau, T.-A. Suer, K. M. Turner, Y. Meng, V. B. Prakapenka (2025). Nonlinearity of the Post-spinel Transition and Its Expression in Slabs and Plumes Worldwide. *Nature Communications*, 16, 1039. [DOI] [arXiv]

(5) **J. Dong** (2023). A Data Science Approach to Water Storage Capacity in Rocky Planet Mantles: Earth, Mars, and Exoplanets. *Bulletin of Mineralogy, Petrology and Geochemistry* (矿物岩石地球化学通报), 42. [DOI] [arXiv]

(4) **J. Dong**, R. A. Fischer, L. P. Stixrude, C. R. Lithgow-Bertelloni, Z. T. Eriksen, M. C. Brennan (2022). Water Storage Capacity of the Martian Mantle through Time. *Icarus*, 385, 115113. [DOI] [arXiv]

(3) **J. Dong**, R. A. Fischer, L. P. Stixrude, C. R. Lithgow-Bertelloni (2021). Constraining the Volume of Earth's Early Oceans with a Temperature-Dependent Mantle Water Storage Capacity Model. *AGU Advances*, 2, e2020AV000323. [DOI] [Editors' Highlight in *Eos*] (Wiley Top Cited Article, 2021–2022)

(2) **J. Dong**, J. Li, F. Zhu (2019). Wetting Behavior of Iron-Carbon Melt in Silicates at Mid-Mantle Pressures with Implications for the Earth's Deep Carbon Cycle. *Frontiers in Earth Science*, 7, 268. [DOI]

(1) **J. Dong**, J. Li, F. Zhu, Z. Li, R. Farawi (2019). Melting Curve Minimum of Barium Carbonate $BaCO_3$ near 5 GPa. *American Mineralogist*, 104, 671–678. [DOI]

CO-AUTHORED PUBLICATIONS

(**mentee*)

Forthcoming

(10) J. T. Gu, T.-A. Suer, E. S. Bullock, K. K. M. Lee, F. Nimmo, S. Mukhopadhyay, **J. Dong**, M. J. Walter, R. A. Fischer (Submitted). Multi-Chronometer Constraints on the Timing of Volatile Loss from Earth and Its Precursors.

(9) L. Li, **J. Dong** (Submitted). Do Damaging Earthquakes Worldwide Respond to Lake Storage Changes?

(8) J. D. Hernández-Montenegro, A. Sáez-Uribe, **J. Dong**, P. D. Asimow (Submitted). No Liquid Water on Mars without Active Magmatism.

(7) R. A. Fischer, T.-A. Suer, J. T. Gu, E. S. Bullock, A. J. Akey, K. K. M. Lee, J. Sheehan, M. J. Walter, **J. Dong** (Submitted). Palladium Partitioning at Earth's Core Formation Conditions Reveals Late Accretion Paradox.

(6) R. Iizuka-Oku, R. A. Fischer, J. T. Gu, **J. Dong**, J. Sheehan, G.-D. Mardaru*, S. Chariton, V. B. Prakapenka, H. Sumino, Y. Takahashi (In revision). Incorporation of Heavy Noble Gases into Potassium-Rich Silicate under Lower Mantle Conditions.

Published

(5) Q. Yuan, P. D. Asimow, M. Gurnis, P. M. Antoshechkina, **J. Dong** (2026). IGyTheM: Integrating Geodynamics with Thermodynamics Using Machine Learning. *Journal of Geophysical Research: Machine Learning and Computation*. [DOI]

(4) K. Daviau, R. A. Fischer, M. C. Brennan, **J. Dong**, T.-A. Suer, S. Couper, Y. Meng, V. B. Prakapenka (2021). Equation of State of TiN at High Pressures and Temperatures: A Possible Host for Nitrogen in Planetary Mantles. *Journal of Geophysical Research: Solid Earth*, 126, e2020JB020074. [DOI]

(3) J. Li, F. Zhu, J. Liu, **J. Dong** (2020). Reactive Preservation of Carbonate in Earth's Mantle Transition Zone. *Carbon in Earth's Interior* (AGU Geophysical Monograph 249, Chapter 15). [DOI]

(2) D. Zhou, **J. Dong**, Y. Si, F. Zhu, J. Li (2020). Melting Curve of Potassium Chloride from In Situ Ionic Conduction Measurements. *Minerals*, 10, 250. [DOI]

(1) F. Zhu, J. Li, J. Liu, **J. Dong**, Z. Liu (2019). Metallic Iron Limits Silicate Hydration of Earth's Transition Zone. *Proceedings of the National Academy of Sciences*, 116, 22526–22530. [DOI]

OTHER PUBLICATIONS

(2) M. Hofstadter, R. Helled, D. Stevenson, B. Ehlmann (with contributions from **J. Dong**) (2024). The Mysterious Interior of Uranus. *Keck Institute for Space Studies*. [DOI] [arXiv]

(1) **J. Dong** (2024). Modeling the Early Earth: Idealization and Its Aims. *EGU GeoLog*. [Part I] [Part II]

TEACHING AND MENTORING

Instructor

2027 Spring	GEO 122: Physical Geology, Stony Brook Geosciences
2026 Fall	GEO 604: Topics in Planetary Science (Water & Planetary Habitability), Stony Brook Geosciences

Teaching Fellow

2022 Fall	E-PSCI 120/220: Introduction to Planetary Sciences (Roger Fu), Harvard EPS
2022 Spring	E-PSCI 54: Minerals and Rocks of the Earth and Planets (Rebecca Fischer), Harvard EPS
2021 Fall	E-PSCI 10: A Brief History of the Earth (Jerry Mitrovica & Rebecca Fischer), Harvard EPS
2021 J-term	E-PSCI 101: Global Warming Science (Eli Tziperman), Harvard EPS
2019 Spring	SCIPHUNV 30: Life as a Planetary Phenomenon (Dimitar Sasselov), Harvard EPS & Astronomy

Field Trips

2025 Spring	Field trip assistant, Ge 1: Earth and Environment (3 days), Caltech GPS (active faulting at the 1872 Lone Pine scarp, Sierra Nevada granites, caldera volcanism of the Bishop Tuff and Long Valley, and Mono Lake tufa, eastern California)
2022 Fall	Field trip co-leader, E-PSCI 120/220: Introduction to Planetary Sciences (2 days), Harvard EPS (Central Atlantic Magmatic Province flood basalts, pillow lavas, and orbitally paced lake sediments of the Hartford and Deerfield Basins, Massachusetts and Connecticut)
2022 Spring	Field trip co-leader, E-PSCI 54: Minerals and Rocks of the Earth and Planets (1 day), Harvard EPS (tourmaline-bearing pegmatite at Havey Quarry, Maine)

Graduate Students

2026	Eashan Das, Stony Brook (Ph.D. committee member)

Undergraduate Students

2026–	Lanxun Zhao, Stony Brook (Martian mantle redox; senior research, GEO 487)
2024 Summer	Alana Nisperos and Pearl Oyewole, Caltech (ice phase diagrams for Uranus; talk and poster, FSRI Summer Symposium 2024)
2023 Summer	Larom Segev and Pierce Cousins, Harvard College (ice phase diagrams for Uranus; co-authors on Uranus Flagship 2023 workshop poster)
2021–	Darius Mardaru, Harvard College (since high school; machine-learning inversion of phase equilibria; Herchel Smith Fellowship, Harvard College 2022; co-author, *The Planetary Science Journal* 2025; first-author posters, Gordon Research Conference 2023 and AGU Fall Meeting 2022)
2021 Summer	Robert Greene and Rafid Quayum, Harvard College (Martian mantle petrology)

High School Students

2023 Summer	Sylvie Wurmser, Montclair High School, NJ (ice phase diagrams for Uranus; co-authors on Uranus Flagship 2023 workshop poster)
2021–2022	James Wreh, Marin Manoach, and Andre Wante, Cambridge Rindge and Latin School, MA

PROFESSIONAL SERVICE

Leadership and Committees

2023–2024	Student & Early Career Representative, Executive Committee, AGU Science and Society Section
2018–2020	Chair (2019–2020) and Member, Student and Postdoc Committee, COMPRES
2020	Member, Meeting Planning Committee, COMPRES

Workshops Organized

2025 *Workshop on the Historical and Conceptual Relationship between Macro- and Microphysics*, in conjunction with the 10th Conference for Integrated History and Philosophy of Science (&HPS 10), Caltech

Conference Sessions Convened

2026 Delivery and Global Cycling of Volatiles in Rocky Planets, *AGU Fall Meeting*, San Francisco, CA

2025 Science and Society: Social and Behavioral Sciences, *AGU Fall Meeting*, New Orleans, LA

2024 Empowering Change: The Role of Student and Early-Career Scientists in Shaping the Future of Research at the Intersection of Science and Society, *AGU Fall Meeting*, Washington, DC

2024 Science and Society: Social and Behavioral Sciences, *AGU Fall Meeting*, Washington, DC

2024 Exoplanets & Giant Planets: Atmospheric and Interior Modeling, *56th Annual Meeting of the AAS Division for Planetary Sciences*, Boise, ID

2023 Advanced Experimental, Computational, and Analytical Approaches in Exploring Deep Planetary Interiors, *AGU Fall Meeting*, San Francisco, CA

2023 Finding Your Place as an Early-Career Scientist Bridging Science and Society, *AGU Fall Meeting*, San Francisco, CA

2023 Widening the Geosciences: A Historical and Philosophical Perspective, *AGU Fall Meeting*, San Francisco, CA

2022 Properties of Volatiles and Metal Alloys in Rocky Planetary Interiors and Their Surface Expression, *AGU Fall Meeting*, Chicago, IL

2022 History of the Earth Sciences for the Future, *AGU Fall Meeting*, Chicago, IL

2022 Volatiles and Melting in the Earth's Interior, *Goldschmidt Conference*, Honolulu, HI

2021 Hydrogen and Carbon in the Solid Earth from Crust to Core, *AGU Fall Meeting*, New Orleans, LA

2020 A Multidisciplinary Approach to Understanding Volatiles in Earth's Mantle, *AGU Fall Meeting*, Online

Reviewer for Journals

American Mineralogist, *Astronomy & Astrophysics*, *Earth and Planetary Science Letters*, *Geophysical Research Letters*, *Nature*, *Nature Geoscience*, *Physics of the Earth and Planetary Interiors*, *Science Advances*

Reviewer for Funding Agencies

NASA Emerging Worlds (EW), NASA Exoplanets Research Program (XRP), NSF Frontier Research in Earth Sciences (FRES), Deutsche Forschungsgemeinschaft (DFG)

INSTITUTIONAL SERVICE

Leadership and Committees

2027 Spring Organizer, Department Colloquium Series, Stony Brook Geosciences

2026– Faculty Advisor, Geology Club, Stony Brook

2025 Member, Everhart Lecture Series Committee, Caltech

2023–2024 Division Representative, Caltech Postdoctoral Association

2022–2023 Chair, Working Group for Imagery, Signage, and History of Racism, Harvard EPS

2022–2023 Member, Diversity, Inclusion and Belonging Council, Harvard EPS

Panels and Working Groups

2023 Member, Admissions and Graduate Education Working Group, Harvard GSAS

OUTREACH

Public Talks

2026	"Oceans of Lava, Skies of Rock: The Hottest Planets We Know," Geology Open Night, Stony Brook Geosciences
2025	Invited talk, Science History at Caltech (SHAC)
2022	"From Blue to Red: How Mars Got and Lost Its Oceans," Harvard GSAS & Science in the News (SITN), Boston
2021	Guest speaker, Astronomy Club, Cambridge Rindge and Latin School

Selected Media Coverage

2025	*Science* — "New Picture of Mars's Interior Emerges from Lander Data" (Paul Voosen)
2025	*Science* — "A Deep Earth Layer May Have Primed the Planet for Plate Tectonics" (Hannah Richter)
2025	*Science* — "New Complexity Emerges in Earth's 'Boring' Middle Region" (Paul Voosen)
2022	*New Scientist* — "What Earth's Mysterious Infancy Tells Us About the Origins of Life" (Michael Marshall)
2022	*Eos* — "How Much Did the Moon Heat Young Earth?" (Jure Japelj)
2021	*Science* — "Ancient Earth Was a Water World" (Paul Voosen)
2021	*Harvard Gazette* — "Earth May Have Been a Water World 3 Billion Years Ago" (Juan Siliezar)
2021	*Eos* Editors' Highlight — "Watering Down the Mantle" (Vincent Salters)
2021	AGU Press Release — "Early Earth's Hot Mantle May Have Led to Archean 'Water World' "

PROFESSIONAL MEMBERSHIPS

2025–	American Physical Society
2024–	American Astronomical Society (incl. Division for Planetary Sciences)
2024–	Geological Society of America
2023–	History of Science Society
2017–	Geochemical Society
2017–	Mineralogical Society of America
2016–	American Geophysical Union

REFERENCES

Lars P. Stixrude, Professor & Leon and Joanne V. C. Knopoff Chair in Geophysics and Physics
University of California, Los Angeles; lstixrude@epss.ucla.edu
Paul D. Asimow, Eleanor and John R. McMillan Professor of Geology and Geochemistry
California Institute of Technology; asimow@caltech.edu
David J. Stevenson, Marvin L. Goldberger Professor of Planetary Science, Emeritus
California Institute of Technology; djs@caltech.edu
Rebecca A. Fischer, Associate Professor of Earth and Planetary Sciences
Harvard University; rebeccafischer@g.harvard.edu
Robin Wordsworth, Gordon McKay Professor of Environmental Science and Engineering; Professor of Earth and Planetary Sciences
Harvard University; rwordsworth@seas.harvard.edu