STANFORD UNIVERSITY · Department of Geophysics

Da Yang

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Biographical Sketch

Dr. Da Yang's research focuses on atmospheric and climate dynamics, with an emphasis on the fundamental mechanisms governing atmospheric convection and rainstorms across a wide range of temporal and spatial scales. He developed a multi-scale model explaining key features of the Madden–Julian Oscillation, established a boundary-layer framework to understand the spontaneous formation of convective aggregation, and identified the buoyancy effect of water vapor as a mechanism that can produce a cooler rising branch of the Hadley circulation relative to its surroundings. He also introduced the concept of vapor kinetic energy and derived its governing equation to diagnose the development of atmospheric rivers. More recently, he developed a linear model that accurately explains the response of ENSO to climate warming. Dr. Yang serves as an Associate Editor for the *Journal of Climate* and is a member of the World Climate Research Programme (WCRP) MJO Task Force.

Education

2014: Ph.D. in Environmental Science and Engineering
California Institute of Technology *Advisor: Prof. Andrew Ingersoll*

2010: M.S. in Environmental Science and Engineering
California Institute of Technology

2008: B.S. in Physics & Atmospheric Science
Peking University

Academic Appointments

2025–present: **Assistant Professor of Geophysics**
Stanford University

2023–2025: Assistant Professor of Geophysical Sciences
University of Chicago

2017–2023: Associate Professor of Atmospheric Science (**tenured** 2023)
Assistant Professor of Atmospheric Science (paternity leave, fall 2022)
University of California, Davis

2017–2023: Faculty Scientist, Earth & Environmental Sciences
Lawrence Berkeley National Laboratory

2014–2017: Miller Research Fellow
University of California, Berkeley

Selected Awards and Honors

2026: Full Member, Sigma Xi, The Scientific Research Honor Society
2025: **Frederick E. Terman Faculty Fellow**, Stanford University
(Awarded to promising young faculty in science and engineering)
2021: NSF CAREER Award
2019: **Packard Fellowship for Science and Engineering**
(Awarded to "the nation's most promising early-career scientists and engineers"; $875,000 over five years; 20 fellows selected annually nationwide)
2020, 2022: Three papers selected as *University Research Highlight*
Office of Science, U.S. Department of Energy
2020: Outstanding Reviewer Award, *Journal of Meteorological Research*, Springer
2014–2017: Miller Research Fellow, UC Berkeley
2012: Chinese Government Award for Outstanding Self-Financed Students Abroad
China Scholarship Council

Advisee Awards and Honors

2026: PJ Tuckman (postdoc) — NOAA Climate & Global Change Fellowship
2025: Pengcheng Zhang (postdoc) — Climate System Engineering Fellowship, UChicago
2025: Lin Yao (student) — Woods Hole Geophysical Fluid Dynamics Fellowship
2024: Lin Yao (student) — Outstanding Student Oral Presentation Award, AMS
2023: Hao Fu (postdoc) — T.C. Chamberlin Postdoctoral Fellowship, UChicago
2023: Seth Seidel (student) — NASA Postdoctoral (NPP) Fellow

Selected Publications (group members in **bold**)

High-impact journals: Nature Geoscience (1), Nature Climate Change (2), Nature Communications (1), Science Advances (1), Annual Review of Fluid Mechanics (1), Review of Geophysics (1)

1. **Tuckman, P. J.**, and **Yang, D.** 2026: The Rise and Fall of ENSO in a Warming World: Insights from a Lag-Linear Model. *Nature*, Under Review.
Preprint: arXiv:2603.03458
2. **Zhang, A.**, **D. Yang**, H. Ong, and Z. Tan 2026: Understanding the Evolution of Global Atmospheric Rivers with Vapor Kinetic Energy Framework. *Geophysical Research Letters*. doi.org/10.1029/2025GL119841
3. **Fu, H.** and **D. Yang** 2026: Cloud Sync in Response to Wave-Like Large-Scale Forcings. *Journal of the Atmospheric Sciences.*
doi: 10.1175/JAS-D-24-0256.1
4. **Yao, L.**, **D. Yang**, et al. 2025: Deep Learning the Sources of MJO Predictability: a Spectral View of Learned Features. *PNAS Nexus*. In revision.
Preprint: arXiv:2510.03582
5. **Ong, H.**, and **D. Yang** 2024: One Stone, Two Birds: Using Vapor Kinetic Energy to Detect and Understand Atmospheric Rivers. ***Nature Communications***.
doi: 10.1038/s41467-024-53369-0 UChicago News
6. **Yang, D.**, D. Abbot, and **S. Seidel** 2024: Predator and Prey: A Minimum Recipe for the Transition from Steady to Oscillating Precipitation in Hothouse Climates. Submitted to *JAMES*. doi: arXiv:2408.11350

7. **Yang, D.**, **W. Zhou**, and **S. Seidel** 2022: Substantial influence of vapor buoyancy on tropospheric air temperature and subtropical cloud. ***Nature Geoscience***.
   doi: 10.1038/s41561-022-01033-x
8. Muller, C., **D. Yang**, G. Craig, T. Cronin, B. Fildier, J. Haerter, C. Hohenegger, B. Mapes, D. Randall, S. Shamekh, and S. C. Sherwood, 2022: Spontaneous Aggregation of Convective Storms. ***Annual Review of Fluid Mechanics***.
   doi: 10.1146/annurev-fluid-022421-011319
9. **Yang, D.** 2021: A Shallow Water Model for Convective Self-Aggregation. *Journal of the Atmospheric Sciences*.
   doi: 10.1175/JAS-D-20-0031.1
10. **Seidel, S.** and **Yang, D.** 2020: The Lightness of Water Vapor Helps to Stabilize Tropical Climate. ***Science Advances***.
    doi: 10.1126/sciadv.aba1951
11. **Yang, D.** and **S. Seidel** 2020: The Incredible Lightness of Water Vapor. *Journal of Climate*.
    doi: 10.1175/JCLI-D-19-0260.1
12. **Yang, D.** 2018: Boundary-layer diabatic processes, the virtual effect, and convective self-aggregation. *Journal of Advances in Modeling Earth Systems*.
    doi: 10.1029/2017MS001261
13. **Yang, D.** 2018: Boundary layer height and buoyancy determine the horizontal scale of convective self-aggregation. *Journal of the Atmospheric Sciences*, 75, 469–478.
    doi: 10.1175/JAS-D-17-0150.1
14. **Yang, D.** and A. P. Ingersoll 2014: A Theory of the MJO Horizontal Wavelength. *Geophysical Research Letters*, 41.
    doi: 10.1002/2013GL058542
15. **Yang, D.** and A. P. Ingersoll 2013: Triggered Convection, Gravity Waves, and the MJO: A Shallow-Water Model. *Journal of the Atmospheric Sciences*, 70, 2476–2486.

Selected Invited Seminars and Presentations (since 2021)

2026: New York University; Boston College; Rossbypalooza Summer School (UChicago); Institut Henri Poincaré (Paris, France)

2025: Banff International Research Station (Canada); Mathematisches Forschungsinstitut Oberwolfach (Germany); Stanford University

2024: Max-Planck-Institute for Meteorology; ETH Zürich; UC Berkeley; University of Michigan; UIUC; Rossbypalooza Summer School; Packard Foundation Annual Meeting; ICTS (India)

2023: MIT; University of Notre Dame; UW Madison; UCLA; WHOI GFD Summer School

2022: Fudan University (China); AOGS Annual Meeting (Singapore); Rossbypalooza Summer School; Stanford University; c3.ai DTI Annual Symposium; University of Chicago

2021: Google; Florida State University; University of Virginia; Niels Bohr Institute (Denmark)

Selected Professional Service

2026–present: Member, MJO Task Force, World Climate Research Programme (WCRP)

2026: Co-Organizer, 2nd Workshop on Organisation and Maintenance of Tropical Convection and the MJO, ICTP, Trieste, Italy

2026: Session Co-Convener, JpGU-AGU Joint Meeting, Chiba City, Japan

2019–present: Associate Editor, *Journal of Climate*

2025: UCAR Representative, UChicago

2021–2023: Co-lead, URG2: Undergraduate Research in Geosciences for Underrepresented Groups (seven-institution project; activities included online sessions, a field trip to Mount Rainier, and research internships)

2023–2024: Lead PI, four-institution ML project on the Madden-Julian Oscillation (funded by c3.ai DTI)

2016–present: Organizer/chair/convener of conference sessions: JpGU-AGU, AMS AOFD, AMS Annual Meeting, AMS Tropical Conference, CFMIP

2016, 2020: Member, Max Eaton Award Committee, American Meteorological Society

2016–present: Proposal reviewer: DOE, NSF, NOAA, French National Research Agency (ANR), Research Grants Council of Hong Kong (RGC)