

Yilin Wang (王艺霖)

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EDUCATION

Stanford University, Department of Geophysics

Incoming Ph.D. student in Geophysics; Faculty Advisor: Prof. Da Yang

Fall 2026

Stanford, CA, USA

Peking University, School of Physics

Bachelor of Science in Physics; GPA: 3.795/4.0

Sept. 2022 – June 2026

Beijing, China

RESEARCH INTERESTS

Climate dynamics, atmospheric dynamics, radiative transfer, and planetary climates

RESEARCH EXPERIENCE

Analytical Climate Response to Orbital Eccentricity Variations

June 2026 – Present

Advisor: Prof. Jun Yang, Peking University

- Derived analytical solutions for the global-mean surface temperature response to time-varying orbital eccentricity in a linear energy-balance climate model.
- Expanded the orbital forcing in a Fourier series to fifth order in eccentricity and incorporated long-term eccentricity evolution into the seasonal forcing.
- Currently comparing the analytical solutions with numerical integrations to evaluate their accuracy and characterize the amplitude and phase lag of the climate response.

Radiative Effects of Dust on the Climate of Early Mars

June 2025 – June 2026

Undergraduate Thesis; Advisor: Prof. Robin Wordsworth, Harvard University

- Developed and validated a numerical framework combining Mie scattering calculations, spectral reflectance models, and the PCM_LBL one-dimensional radiative-convective climate model.
- Quantified how dust composition, optical depth, and atmospheric pressure affect surface temperatures on early Mars, finding that basaltic dust representative of reducing conditions produces net cooling over physically plausible optical depths.
- Evaluated uncertainties in surface albedo arising from particle size, mineral composition, and mixing geometry, and showed that dust radiative effects alone are insufficient to resolve the faint young Sun paradox.

Gravito-Inertial Instability and Vortex Depth in Giant-Planet Atmospheres

June 2024 – Present

Advisors: Prof. Tao Cai, Macau University of Science and Technology; Prof. Jun Yang, Peking University

- Conducted three-dimensional numerical simulations of idealized vortices in stably stratified rotating atmospheres and mapped their stability regimes in Rossby–Froude parameter space.
- Performed a linear stability analysis that confirmed a distinct gravito-inertial instability emerging when rotational and buoyancy effects are comparable.
- Applied the resulting stability criterion to estimate polar vortex depths of approximately 200 km on Jupiter and 300 km on Saturn, and to explain why larger vortices may extend deeper into giant-planet atmospheres.

PUBLICATIONS AND MANUSCRIPTS

1. **Wang, Y.**, Cai, T., and Yang, J. (2026). “Gravito-inertial instability constrains vortex depth in giant planets.” Manuscript under review at *Geophysical Research Letters*.
2. Adams, D., Wordsworth, R., **Wang, Y.**, Cmiel, J., Keutsch, F., and Sossi, P. (2026). “Chemistry and climate impact of sulfuric acid hazes on early Venus.” Manuscript submitted to *Science Advances*.

TEACHING EXPERIENCE

Peking University, School of Earth and Space Sciences

Teaching Assistant, Fundamentals of Planetary Science

Fall 2024

Beijing, China

- Graded weekly assignments and led problem-solving sessions for undergraduate students.

TECHNICAL SKILLS

Programming: Python, Fortran, C, MATLAB, Mathematica, and $\LaTeX$

Climate and Radiative Modeling: PCM_LBL, Mie scattering calculations, and spectral reflectance modeling

SELECTED HONORS AND AWARDS

- Outstanding Graduate of Beijing Higher Education Institutions, 2026
- Outstanding Graduate of Peking University, 2026
- Outstanding Undergraduate Thesis, Department of Atmospheric and Oceanic Sciences, School of Physics, Peking University, 2026
- Outstanding Student Presentation Award, National Conference on Planetary Science, 2024
- May 4th Scholarship, Peking University (Top 3% among 260 students), 2023
- National Second Prize, China Undergraduate Physics Tournament, 2023
- Gold Medal, 38th Chinese Physics Olympiad Finals, 2021