

Jiawei Da

POSTDOCTORAL SCHOLAR

Department of Geosciences, The Pennsylvania State University

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Research Interests

Isotope geochemistry; surface processes; biogeochemical cycles

Education

Nanjing University

Nanjing, China

DOCTOR OF PHILOSOPHY

09/2013-06/2020

- Dissertation: Quantitative reconstruction of paleoatmospheric CO₂ levels using pedogenic carbonates from the Chinese Loess Plateau
- Supervisor: Dr. Junfeng Ji

Jilin University

Changchun, China

BACHELOR OF SCIENCE, GEOLOGY

09/2008-07/2012

Research Experience

The Pennsylvania State University

State College, PA

NASA POSTDOCTORAL SCHOLAR

09/2025-Present

- Advisor: Dr. Max Lloyd
- Exploring the potential of methyl clumping as a biosignature of extraterrestrial life

The University of Texas at Austin

Austin, TX

NSF POSTDOCTORAL FELLOW

08/2022-08/2025

- Advisor: Dr. Dan Breecker
- Modernizing paleosol-CO₂ reconstructions via clumped isotope and trace-amount organic carbon isotope analyses
- Reconstructing Rainfall seasonality over East Asia via clumped isotope and triple oxygen isotope of pedogenic carbonates
- Development of a Bayesian inversion framework of the paleosol proxy system model
- Understanding pedogenic carbonate formation in Vertisols through soil gas monitoring and modeling
- Identified dew uptake by land snails via Bayesian modeling

Nanjing University

Nanjing, China

POSTDOCTORAL RESEARCH FELLOW

08/2020-07/2022

- Advisor: Dr. Xiancai Lu
- Unraveled pedogenic carbonate formation on the Chinese Loess Plateau using forward and numerical modeling
- Traced subsoil organic carbon turnover via radiocarbon fingerprinting

Nanjing University

Nanjing, China

RESEARCH ASSISTANT

09/2015-07/2020

- Maintained the daily operation of FTIR and UV/VIS/NIR spectrometer

Journal Articles

1. Okafor, B., **Da, J.**, Beverly, E. J., Driese, S., Nordt, L., & Breecker, D. O. (2025). A component of atmospheric vapor in the water of a floodplain Vertisol. *Journal of Hydrology*, 661, 133538. <https://doi.org/10.1016/j.jhydro1.2025.133538>
2. Mu, J., **Da, J.**, Yang, H., Ji, J., Liu, L., & Li, W. (2025). An abrupt change in source materials for Chinese loess deposits at the Pliocene-Pleistocene boundary: Insights from K isotopes and modeling. *Earth and Planetary Science Letters*, 668, 119543. <https://doi.org/10.1016/j.epsl.2025.119543>
3. **Da, J.** (2025). Isotopic evidence for dew uptake by land snails from Bayesian modeling of body water δD and $\delta^{18}O$. *Chemical Geology*, 692, 122953. <https://doi.org/10.1016/j.chemgeo.2025.122953>
4. **Da, J.**, Zhang, Y. G., Liu, X., Breecker, D. O., Li, G. K., Chen, T., & Ji, J. (2025). No apparent state-dependency of equilibrium climate sensitivity between the Pleistocene glacial and interglacial climate states. *Nature Communications*, 16(1), 6608. <https://doi.org/10.1038/s41467-025-61941-5>

5. Sakthivel, T., Ghosh, P., Nair, N., & **Da, J.** (2024). Wildfire-enhanced Plio-Pleistocene CO₂ drawdown through terrestrial organic carbon burial. *Quaternary Science Reviews*, 338, 108825. <https://doi.org/10.1016/j.quascirev.2024.108825>
6. **Da, J.**, Li, G. K., Breecker, D. O., & Ji, J. (2024). Particle-Size-Specific Radiocarbon Constraints Imply an Active Subsoil Organic Carbon Pool. *Journal of Geophysical Research: Biogeosciences*, 129(5), e2024JG008102. <https://doi.org/10.1029/2024JG008102>
7. THE CENOZOIC CO₂ PROXY INTEGRATION PROJECT (CENCO2PIP) CONSORTIUM. (2023). Toward a Cenozoic history of atmospheric CO₂. *Science*, 382(6675), eadi5177. <https://doi.org/10.1126/science.adi5177>
8. **Da, J.**, Li, G. K., & Ji, J. (2023). Seasonal changes in the formation time of pedogenic carbonates on the Chinese Loess Plateau during Quaternary glacial cycles. *Quaternary Science Reviews*, 305, 108008. <https://doi.org/10.1016/j.quascirev.2023.108008>
9. **Da, J.**, Breecker, D. O., Li, T., Li, G., Lu, H., & Ji, J. (2023). A Humid East Asia During the Early Pliocene Indicated by Calcite Nodules From the Chinese Loess Plateau. *Paleoceanography and Paleoclimatology*, 38(7), e2023PA004615. <https://doi.org/10.1029/2023PA004615>
10. Bao, R., Sheng, X., Meng, X., Li, T., Li, C., Shen, H., **Da, J.**, Ji, J., & Chen, J. (2022). 100 k.y. Pacing of the East Asian summer monsoon over the past five glacial cycles inferred from land snails. *Geology*. <https://doi.org/10.1130/G50243.1>
11. Meng, X., Li, G. K., Liu, L., Long, X., Zhao, W., **Da, J.**, & Ji, J. (2022). Decoupled paleosol-based proxies in Chinese loess deposits: Role of leaching and illuviation processes. *Quaternary Science Reviews*, 298, 107847. <https://doi.org/10.1016/j.quascirev.2022.107847>
12. **Da, J.**, Li, G. K., & Ji, J. (2021). Overestimate of C₄ Plant Abundance Caused by Soil Degradation-Induced Carbon Isotope Fractionation. *Geophysical Research Letters*, 48(24), e2021GL093407. <https://doi.org/10.1029/2021GL093407>
13. **Da, J.**, Zhang, Y. G., Li, G., & Ji, J. (2020). Aridity-driven decoupling of $\delta^{13}\text{C}$ between pedogenic carbonate and soil organic matter. *Geology*. <https://doi.org/10.1130/G47241.1>
14. **Da, J.**, Zhang, Y. G., Li, G., Meng, X., & Ji, J. (2019). Low CO₂ levels of the entire Pleistocene epoch. *Nature Communications*, 10(1), 4342. <https://doi.org/10.1038/s41467-019-12357-5>
15. **Da, J.**, Zhang, Y. G., Wang, H., Balsam, W., & Ji, J. (2015). An Early Pleistocene atmospheric CO₂ record based on pedogenic carbonate from the Chinese loess deposits. *Earth and Planetary Science Letters*, 426, 69–75. <https://doi.org/10.1016/j.epsl.2015.05.053>

Under Review

1. Chen, Z., **Da, J.**, Li, C., Xue, L., Liu, G., Sheng, X., Huang, J., & Ji, J. (2025). Crystallization fractionation in anthropogenic carbonate: Geochemical constraints on dead carbon. *SCIENCE CHINA Earth Sciences*.
2. Czwakiel, N., Gallagher, T., Serach, L., Ludvigson, G., Gao, P., Nie, J., Suc, J.-P., **Da, J.**, & Breecker, D. (2025). The onset of summer drying on the iberian peninsula during pliocene global cooling. *Paleoceanography and Paleoclimatology*.
3. **Da, J.**, Bowen, G., Harper, D., & Huntington, K. (2025). Improving paleosol-based atmospheric CO₂ reconstruction via joint proxy inversion. *Paleoceanography; Paleoclimatology*.
4. Li, C., Bao, R., **Da, J.**, & Sheng, X. (2025). Formation processes control on $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$ between biogenic vs. Non-biogenic carbonates in loess-paleosol sections. *Journal of Asian Earth Sciences*.

In Preparation

1. **Da, J.**, Beverly, E., Driese, S., & Breecker, D. (2025). Elevated soil respiration with depth in vertisols regulated by soil porosity. In prep for *Geochimica et Cosmochimica Acta*.
2. **Da, J.**, Serach, L., Sun, C., Gallagher, T., Lu, H., Zhang, H., Wang, H., Ji, S., Huntington, K., Sharp, Z., Feng, R., Ji, J., & Breecker, D. (2025). Jet-induced rainfall seasonality and C₄ expansion over east asia. In prep for *Nature*.

Invited Talks

Isotopic evidence of dew uptake by land snails

THE UNIVERSITY OF TEXAS AT AUSTIN

2025

Isotopic evidence of dew uptake by land snails

INSTITUTE OF GEOLOGY AND GEOPHYSICS, CHINESE ACADEMY OF SCIENCES

2025

Late Miocene-Pliocene rainfall seasonality over East Asia through the lens of the westerly jet

UNIVERSITY OF NEVADA, LAS VEGAS

2025

Miocene-Pliocene rainfall seasonality over East Asia recorded by soil carbonates

SOUTHERN METHODIST UNIVERSITY

2025

How to make the paleosol-CO₂ proxy more useful?

SOUTHERN METHODIST UNIVERSITY

2025

East Asian hydroclimate during the Pliocene: new isotopic evidence from soil carbonate

UNIVERSITY OF WASHINGTON

2024

Continual glacial CO₂ drawdown recorded by paleosols from the Chinese Loess Plateau

THE UNIVERSITY OF NEW MEXICO

2023

Reconstructing past atmospheric CO₂ levels with pedogenic carbonates from the Chinese loess deposits

THE UNIVERSITY OF TEXAS AT AUSTIN

2022

Conference Presentations

1. **Da, J.**, Serach, L., Gallagher, T., Sun, C., Lu, H., Zhang, H., Wang, H., Ji, S., Huntington, K., Sharp, Z., Feng, R., Ji, J., & Breecker, D. (2024, December). *Pliocene hydroclimate changes over eastern china through the lens of the westerlies*. [Poster]. AGU fall meeting. Washington DC, DC, USA.
2. **Da, J.**, Serach, L., Gallagher, T., Sun, C., Lu, H., Zhang, H., Wang, H., Ji, S., Huntington, K., Sharp, Z., Feng, R., Ji, J., & Breecker, D. (2024, August). *Summer drought over east asia during the warm pliocene: Evidence from clumped isotope and triple oxygen isotope compositions of soil carbonate*. [Talk]. 2024 goldschmidt conference. Chicago, IL, USA.
3. **Da, J.**, Serach, L., Gallagher, T., Sun, C., Lu, H., Zhang, H., Wang, H., Ji, S., Huntington, K., Sharp, Z., Feng, R., Ji, J., & Breecker, D. (2024, April). *Enhanced summer drought over east asia across the miocene-pliocene boundary*. [Poster]. Miocene climate workshop. Tucson, AZ, USA.
4. **Da, J.**, Zhang, Y. G., Liu, X., Li, G., Breecker, D., & Ji, J. (2023, December). *Pleistocene global cooling driven by declining glacial CO₂ levels*. [Invited talk]. AGU fall meeting. San francisco, CA, USA.
5. Bowen, G., Harper, D., **Da, J.**, Hönisch, B., & Montañez, I. (2023, October). *Toward an omni-proxy reconstruction of cenozoic CO₂*. [Talk]. The geological science of america meeting. Pittsburgh, PA, USA.
6. **Da, J.**, Breecker, D., Lu, H., & Ji, J. (2023, October). *A humid east asia during the early pliocene indicated by calcite nodules from the chinese loess plateau*. [Invited talk]. The geological science of america meeting. Pittsburgh, PA, USA.
7. **Da, J.**, Li, G., & Ji, J. (2023, July). *Seasonal changes in the formation time of pedogenic carbonates on the chinese loess plateau during quaternary glacial cycles*. [Talk]. 2024 goldschmidt conference. Leon, france.
8. **Da, J.**, Zhang, Y. G., Li, G., & Ji, J. (2022, November). *Reconstructing pleistocene atmospheric CO₂ levels using pedogenic carbonates from the chinese loess plateau*. [Talk]. INQUA LoessFest. Virtual conference.
9. **Da, J.**, Li, G., & Ji, J. (2021, November). *Carbon isotope fractionation during the burial and decomposition of soil organic matter – evidence from the paleosols on the chinese loess plateau*. [Talk]. 8th biology and organic geochemistry conference. Xiamen, china.
10. **Da, J.**, Zhang, Y. G., Li, G., & Ji, J. (2021, August). *Quantitative constraint of the effect of atmospheric CO₂ on the isotopic compositions of pedogenic carbonates on the chinese loess plateau*. [Talk]. The 6th conference on earth system science. Shanghai, china.

11. **Da, J.**, Zhang, Y. G., Li, G., & Ji, J. (2020, August). *Refining the paleosol-CO₂ proxy and the reconstruction of early-pleistocene CO₂ levels*. [Talk]. 2020 goldschmidt conference. Virtual conference.
12. **Da, J.**, & Ji, J. (2016, July). *Reconstructing past atmospheric CO₂ levels with pedogenic carbonates from the chinese loess deposits*. [Poster]. 2016 goldschmidt conference. Yokohama, japan.

Awards

NASA Postdoctoral Fellowship	2025
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION	\$198060
NSF CO2PIP Project Postdoctoral Fellowship	2022
NATIONAL SCIENCE FOUNDATION	\$156000
NSF-China Earth Sciences Postdoctoral Fellowship	2021
NATIONAL SCIENCE FOUNDATION OF CHINA	\$15000
Best Doctoral Dissertation Award	2021
JIANGSU PROVINCIAL DEPARTMENT OF EDUCATION	
Best Doctoral Dissertation Award	2021
NANJING UNIVERSITY	
Yuxiu Young Scholar Program Postdoctoral Fellowship	2020
NANJING UNIVERSITY	\$86000
Li Siguang Outstanding PhD Candidate Award	2020
LI SIGUANG GEOLOGICAL SCIENCE AWARD FOUNDATION	\$4300
• National award to five selective Ph.D. candidates majored in Geology per year in recognition of high academic achievements	
Outstanding PhD student	2020
NANJING UNIVERSITY	
Program A for outstanding Ph.D. students, Nanjing University	2018
NANJING UNIVERSITY	\$17000
First Prize of National Scholarship	2015
MINISTRY OF EDUCATION	\$4200

Grant-writing Experience

Reconstruction of Holocene paleoenvironmental gradients across the southern Great Plains using snailshells from archaeological collections	2024
NATIONAL SCIENCE FOUNDATION	Not Funded
• Role: Formal analysis; reviewing and editing	
Quantifying the decomposition-related carbon isotopic fractionation of soil organic matter in the eolian deposits from the Chinese Loess Plateau	2021
NATIONAL NATURAL SCIENCE FOUNDATION OF CHINA	Funded (\$41000)
• Role: Conceptualization; original draft preparation; formal analysis; reviewing and editing	
Understanding the seasonality and formation of pedogenic carbonate on the Chinese Loess Plateau	2021
CHINA POSTDOCTORAL SCIENCE FOUNDATION	Funded (\$7000)
• Role: Conceptualization; original draft preparation; formal analysis; reviewing and editing	
Reconstructing atmospheric CO₂ levels over the past eight million years using the eolian deposits from the Chinese Loess Plateau	2020
NATIONAL NATURAL SCIENCE FOUNDATION OF CHINA	Funded (\$400000)
• Role: Conceptualization; original draft preparation; formal analysis; reviewing and editing	
Evaluating atmospheric CO₂ signal in the carbon isotope composition of calcite nodules from the Chinese Loess Plateau	2018
NATIONAL NATURAL SCIENCE FOUNDATION OF CHINA	Funded (\$92000)
• Role: original draft preparation; formal analysis; reviewing and editing	

Small Grants

JSG Go Further Find

THE UNIVERSITY OF TEXAS AT AUSTIN

2024

\$1000

Miocene Climate Workshop Travel Grant

NATIONAL SCIENCE FOUNDATION

2024

\$1000

UT Staff Council Professional Development Grant

THE UNIVERSITY OF TEXAS AT AUSTIN

2023

\$1500

Goldschmidt Travel Grant

GEOCHEMICAL SOCIETY

2016

\$1000

Teaching Experience

GEO 401: Physical Geology

LECTURER

2024 Fall

- Participated in course design; Taught weekly lectures

GEO 391: Environmental Isotope Geochemistry

CO-INSTRUCTOR

2025 Spring

- Participated in course design; Taught weekly lectures

Professional Service

CONFERENCE SESSION CONVENOR

- AGU Fall Meeting, December 2023, San Francisco, CA, US

UNDERGRADUATE/HIGH SCHOOL STUDENT MENTOR

- 2016 - current, mentored undergraduate students conducting research projects.
- Mentored students: Jinjin Yang (2016-2017), Xia Wang (2018-2019), Ruiqing Ji (2021-2022), Hudson Thomas (2024)

GRADUATE MENTOR

- 2018 - current, mentored graduate students conducting research projects.
- Mentored students: Hanzhao Zhai (2018-), Jun Mu (2020-2022), Chenglong Li (2018-2025), Zhanpeng Chen (2022-), Nicole Czwakiel (2022-2025), Morgan Mellum (2024-)

JUDGE

- 2025, Longhorn Research Poster Session
- 2024, OSPA Judge, AGU Fall Meeting
- 2023, the 13th Annual Jackson School of Geoscience Student Research Symposium
- 2023, OSPA Judge, AGU Fall Meeting

AD HOC REVIEWER

- Science Advances
- Proceedings of the National Academy of Sciences (2)
- Earth Science Reviews
- Geophysical Research Letters
- Paleoclimatology and Paleoclimatology (2)
- Global and Planetary Change (2)
- Earth's Future
- Chemical Geology (2)
- Quaternary Science Reviews
- Geochemistry, Geophysics, Geosystems
- Geoderma

- Environmental Science & Technology
- Applied Geochemistry
- Atmosphere (3)
- Arabian Journal of Geosciences
- Vertebrate Paleobiology and Paleoanthropology Series
- Water
- Forests
- Soil systems

Skill Sets

LAB TECHNIQUES

- Isotope Ratio Mass Spectrometer (MAT253, Nucarb)
- Laser Spectroscopy (Picarro CRDS, Aerodyne TILDAS)
- Elemental Analyzer (EA)
- Fourier Transform Infrared Spectroscopy (FTIR)
- Scanning Electronic Microscopy (SEM)

PROGRAMMING AND SOFTWARE

- Rstudio (data analyses, visualization, modeling, mapping)
- Excel (data analyses, visualization)
- CorelDRAW (visualization)

LANGUAGES

- Chinese (Native Speaker)
- English (Professional proficiency)

References

Junfeng Ji, Ph.D.

PROFESSOR, NANJING UNIVERSITY

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Daniel Breecker, Ph.D.

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