# Zeyang Sun, Ph.D.

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## Research Interests

I am deeply interested in a range of scientific disciplines, including clumped isotopes, paleoclimate, mass extinction mechanisms, terrestrial environments, and carbonate preservation and diagenesis. My long-term research goal is to examine geochemical proxies and the co-evolution of environment and ecology throughout Earth's history.

## Education

**Ph.D.** **Department of Geology and Geophysics, Texas A&M University** 2024
Geology
Dissertation: Carbonate Clumped Isotope Reordering from an Atomic Approach: Heating Experiment, Kinetic Modeling, and Application
Advisor: Ethan Grossman

**B.S.** **School of Earth Sciences and Engineering, Nanjing University** 2017
Geology (Hons)
Thesis: Geochemical Features of Carbonates from Gaoyuzhuang Formation and Tieling Formation of North China: Implications for the Redox Conditions of Paleo-Ocean
Advisor: Hong-Fei Lin

## Professional Experience

**Graduate Assistant Researcher in Clumped Isotope Geochemistry** 2017 – 2024
Department of Geology and Geophysics, Texas A&M University
Advisors: Ethan Grossman, William Defliese (Co-advisor, 2017 – 2019)

**Research Internship in Metal Isotope Geochemistry** Jun – Sep 2016
Department of Earth and Planetary Sciences, Yale University
Advisors: Noah Planavsky, Xiangli Wang (Co-advisor)

## Publications (*Denotes Equal Contribution)

**Accepted & Published**

[3] **Sun, Z.***, Perez-Beltran, S.*, Zaheer, W.*, Defliese, W. F., Banerjee, S., and Grossman, E. L.: Clumped isotope reordering kinetics in strontianite and witherite: experiments and first-principles simulations, *Earth and Planetry Science Letters* 624, p. 118467, 2023. DOI: 10.1016/j.epsl.2023.118467.

[2] Perez-Beltran, S.*, Zaheer, W.*, **Sun, Z.***, Defliese, W. F., Banerjee, S., and Grossman, E. L.: Density functional theory and ab initio molecular dynamics reveal atomistic mechanisms for carbonate clumped isotope reordering, *Science Advances* 9, eadf1701, 2023. DOI: 10.1126/sciadv.adf1701.

[1] **Sun, Z.**, Wang, X., and Planavsky, N.: Cr isotope systematics in the Connecticut River estuary, *Chemical Geology* 506, pp. 29–39, 2019. DOI: 10.1016/j.chemgeo.2018.12.034.

## Presentations

**Conference Submissions**

[7] **Sun, Z.**, Perez-Beltran, S., Defliese, W. F., Banerjee, S., and Grossman, E. L.: Reassessment of calcite clumped isotope preservation using water-facilitated clumped isotope resetting, Oral, in: *Goldschmidt*, Chicago, IL, USA, Aug. 2024.

[6] **Sun, Z.**, Perez-Beltran, S., Defliese, W. F., Banerjee, S., and Grossman, E. L.: Revisiting clumped isotope resetting in calcites with internal water and organic matter, Oral, in: *International Clumped Isotope Workshop*, Long Island, NY, USA, Aug. 2024.

[5] **Sun, Z.**, Maupin, C. R., Perez-Beltran, S., Zaheer, W., Defliese, W. F., Banerjee, S., and Grossman, E. L.: The role of internal water in carbonate clumped isotope resetting, Oral, in: *GSA Connects 2023 Meeting*, Pittsburgh, PA, USA, Oct. 2023.

[4] **Sun, Z.**, Defliese, W. F., and Grossman, E. L.: The kinetics of clumped isotope reordering of synthetic inorganic carbonates, Poster, in: *AGU Fall Meeting*, New Orleans LA, USA, Dec. 2021.

[3] **Sun, Z.**, Defliese, W. F., and Grossman, E. L.: The kinetics of clumped isotope reordering of synthetic inorganic carbonates, Poster, in: *GSA Connects 2021 Meeting*, Portland, OR, USA, Oct. 2021.

[2] **Sun, Z.**, Defliese, W. F., and Grossman, E. L.: The kinetics of clumped isotope reordering of synthetic inorganic carbonates, Flash Talk, in: *Goldschmidt*, Lyon, France (Virtual), July 2021.

[1] **Sun, Z.**, Defliese, W. F., and Grossman, E. L.: Reconstructing thermal histories of the Oklahoma, Illinois and Moscow basins using clumped isotopes of mid-Carboniferous brachiopods, Poster, in: *International Clumped Isotope Workshop*, Los Angeles, CA, USA, Jan. 2019.

## Honors and Awards

[6] **Student Research Award (2nd Place)** 2024
Geology and Geophysics Graduate Society Symposium, TAMU

[5] **ConocoPhillips/HEEP Endowed Graduate Fellowship** 2022
Department of Geology and Geophysics, TAMU

[4] **Petroleum and Sedimentary Systems Scholarship**, Berg-Hughes Center, TAMU 2018

[3] **Honor of Outstanding Graduate**, Nanjing University (NJU) 2017

[2] **Pandeng Earth Sciences Scholarship** 2015
NJU and Institute of Geology and Geophysics, Chinese Academy of Sciences

[1] **Qihang Earth Sciences Scholarship**, School of Earth Sciences and Engineering, NJU 2014

## Teaching Experience

**Teaching Assistant**

[2] Prepared lab session materials, explained the principle of the IRMS and the carbonate device, and trained students to perform carbonate clumped isotope analysis.
Course: GEOL 648 Stable Isotope Geology (Spring 2024 and 2022, Fall 2018), TAMU
Project: Clumped Isotopes of Modern Benthic Foraminifera (Spring 2024)

[1] Prepared class materials, addressed questions, guided experimental design and instrument use, and tutored data analysis and visualization with Julia language.
Course: GEOL 450 Geology Senior Project & GEOS 405 Environmental Geosciences (Spring 2023), TAMU
Project: Impact of Gas Stove Usage on Indoor Air Quality and Health

## Professional Experience, Engagement and Activities

**Reviewer**

[1] *Science Advances* (1), *Chemical Geology* (1), *Palaeo3* (1) 2024

**Field Trips**

[2] Permian Reef Complex and Guadalupe Mountain, USA 2018

[1] Late Ordovician Outcrops, Cincinnati Arch Region, USA 2018

**Outreach**

[4] Geology and Geophysics Undergraduate Summer School, TAMU 2024
"*How to give an oral presentation and academic conference experiences*"

[3] Chemistry Open House for Students, Kids, and Families 2019, 2018
"*Thermometer in the shell*"

[2] Ions@WORK Mass Spectrometry Symposium 2018

[1] Mass Spectrometry for Isotopic Analysis Subunit Open House 2018

## Skills

**Instrument Techniques**

Including operation, troubleshooting, maintenance, and training

[1] Thermo Scientific™ 253Plus IRMS

[2] Thermo Scientific™ Kiel IV Carbonate Device with customized PPQ Trap

[3] Field Emission SEM, CL Microscopy, FTIR Microscopy

[4] High Temperature Conversion Elemental Analyzer

[5] Manual Glass Vacuum Line

**Programming** Julia, Python, MATLAB®

## Doctoral Program Courses

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| [9] | CHEM 648 Principles of Quantum Mechanics | Fa 2019 |
| [8] | OCNG 641 Inorganic Aquatic Geochemistry | Sp 2019 |
| [7] | GEOL 648 Stable Isotope Geology | Fa 2018 |
| [6] | CHEM 621 Chemical Kinetics | Sp 2018 |
| [5] | GEOL 658 Earth Systems Through Deep Time: Global Change, Paleoclimate, and Life | Sp 2018 |
| [4] | OCNG 689 Cenozoic Paleoclimate | Sp 2018 |
| [3] | OCNG 655 Experimental Design and Analysis in Oceanography | Fa 2017 |
| [2] | OCNG 640 Chemical Oceanography | Fa 2017 |
| [1] | GEOL 681 Stable Isotope Methods and Research: Clumped Isotope | Fa 2017 |

## Referees

**Ethan Grossman,** Professor and Michel T. Halbouty Chair
Institute: Department of Geology and Geophysics, Texas A&M University
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**Sarbajit Banerjee,** Professor and Davidson Chair in Science
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**Yige Zhang,** Professor
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