

HUSILE BAI

Assistant Professor of the Practice
Earth & Environmental Sciences, Vanderbilt University
husile.bai@vanderbilt.edu | <https://husilebai.github.io>

RESEARCH INTERESTS

Atmospheric dynamics, climate dynamics and variability, regional and global climate modeling, Earth system modeling, surface-atmosphere interactions, cloud microphysics, hydroclimate, cryosphere

PROFESSIONAL EXPERIENCE

- 2024 - **Assistant Professor of the Practice**, Vanderbilt University
Department of Earth and Environmental Sciences
- 2023-2024 **Postdoctoral Research Fellow**, University of Utah
Department of Geography

EDUCATION BACKGROUND

- 2018-2022 **Ph.D. University of Utah, Department of Atmospheric Sciences**
Advisor: Dr. Courtenay Strong
Dissertation project: *Teleconnection mechanisms associated with ecologically-relevant climate dipoles*
- 2015-2018 **M.S. University of Chinese Academy of Sciences, Institute of Earth Environment**
Advisors: Dr. Guohui Li and Dr. Yu Liu
Thesis project: *Impact of the ice nuclei on the development of the cumulus clouds over the North China Plain*
- 2011-2015 **B.S. Lanzhou University, College of Atmospheric Sciences**
Advisor: Dr. Yi Yang
Capstone project: *Numerical weather simulation and analysis of a heavy rainstorm*

PUBLICATIONS

1. **Husile Bai**, Olivia Mondlock, Courtenay Strong, Jalene M. LaMontagne, and Benjamin Zuckerberg. Probabilistic theory for episodic ecological events. (*accepted*)
2. **Husile Bai**, Summer Rupper, and Courtenay Strong. Glaciers matter for getting the weather and climate right. (*submitted*)
3. **Husile Bai**, Courtenay Strong, Jalene M. LaMontagne, Ivy V. Widick, and Benjamin Zuckerberg. A North American climate-masting-irruption teleconnection and its change under global warming, *Science of The Total Environment*, 948, 174473, <https://doi.org/10.1016/j.scitotenv.2024.174473>
4. Jalene M. LaMontagne, Courtenay Strong, **Husile Bai**, Jessie J. Forest, Andrew Hacket-Pain, Mark Schulze, and Benjamin Zuckerberg, Atmospheric waves synchronize and desynchronize mast seeding at a hemispheric scale, (*submitted*)
5. Luke Stone, Courtenay Strong, **Husile Bai**, Thomas Reichler, Greg McCabe, and Paul D. Brooks (2023). Atlantic Ocean influence on western U.S. hydroclimate and water resources, *npj Climate and Atmospheric Science*, 6, 139, <https://doi.org/10.1038/s41612-023-00471-7>

6. **Husile Bai** and Courtenay Strong (2023). Atmospheric modeling study on convection-triggered teleconnections driving the summer North American dipole, *Journal of Climate*, 36, 6991–7003, <https://doi.org/10.1175/JCLI-D-23-0015.1>
7. **Husile Bai**, Courtenay Strong, and Benjamin Zuckerberg (2023). Drivers of an ecologically relevant summer North American dipole, *Journal of Climate*, 36, 2387-2399, <https://doi.org/10.1175/JCLI-D-22-0542.1>
8. **Husile (胡思乐)**, Liu Yu, Li Guohui (2019). Impact of ice nuclei on the development of cumulus clouds over the North China Plain, *Journal of Earth Environment*, 10(3):257-266 (in Chinese) <https://doi.org/10.7515/JEE182078>
9. **Husile (胡思乐)**, Li Yan, Fang Congxi, Chen Zhihong (2018). The relationship between Ural blocking, Siberian high, and East Asian winter monsoon, *Journal of Lanzhou University (natural sciences)*, 54(4):440-452 (in Chinese) <https://doi.org/10.13885/j.issn.0455-2059.2018.04.003>
10. Yu Liu, Weiyuan Ta, Qiang Li, Huiming Song, Changfeng Sun, Qiufang Cai, Han Liu, Lu Wang, **Hu Sile**, Junyan Sun, Wenbiao Zhang, Wenzhu Li (2018). Tree-ring stable carbon isotope-based April-June relative humidity reconstruction since AD 1648 in Mt. Tianmu, China, *Climate Dynamics*, 50, 1733–1745, <https://doi.org/10.1007/s00382-017-3718-6>
11. Yu Liu, Han Liu, Huiming Song, Qiang Li, George S. Burr, Lu Wang, and **Hu Sile** (2017). A monsoon-related 174-year relative humidity record from tree-ring $\delta^{18}O$ in the Yaoshan region, eastern central China, *Science of the Total Environment*, 593: 523-534, <https://doi.org/10.1016/j.scitotenv.2017.03.198>

PUBLICATIONS IN PREPARATION

1. **Husile Bai**, Jonathan Maurer, Summer Rupper, and Daniel Shapero. Modeling study of the dynamic and momentum balance of mountain glaciers.

PRESENTATIONS

Invited talks

2024

- Global radiative heat balance, *Earth and Environmental Sciences*, **Vanderbilt University**
- Unexpected control of hydroclimate variability, *Civil and Environmental Engineering Graduate Seminar*, **Rutgers University**
- Unexpected control on climate variability. *Geography Research of the Week*, University of Utah

2023

- Dynamics of mountain glaciers in the changing climate. MAGIC workshop, Lamont-Doherty Earth Observatory, **Columbia University**

Poster & oral presentation

2024

- **Husile Bai**. From data to delight: exploring Earth & climate through interdisciplinary visualization and programming, *Lightning talk*, Spatial Utah Data Science Lightning Talk Series, Salt Lake City
- **Husile Bai**, Courtenay Strong, Jalene M. LaMontagne, Ivy V. Widick, and Benjamin Zuckerberge. A North American climate-masting-irruption teleconnection and its change under global warming. *Poster*, Macrosystems PI Annual Meeting, Virtual

2023

- **Husile Bai**, Summer Rupper, Courtenay Strong. Effect of glaciers on orographic and synoptic-scale atmospheric circulations. *Poster*, AGU Fall Meeting, San Francisco

- **Husile Bai**, Summer Rupper, and Courtenay strong. Downscaling with glacier-adjusted WRF in the Karakoram region. *Oral presentation*, NASA HiMAT workshop, Salt Lake City

2022

- **Husile Bai**, Courtenay Strong, Jalene M. LaMontagne, and Benjamin Zuckerberg. Summer North American dipole driven by stationary Rossby waves associated with tropical and monsoonal convection. *Poster*, AGU Fall Meeting, Chicago

2021

- **Husile Bai**, Courtenay Strong, Benjamin Zuckerberg, and Jalene M. LaMontagne. Continental-scale climate dipoles driven by pan-Pacific waves. *Poster*, AGU Fall Meeting, New Orleans
- **Husile Bai**, Courtenay Strong, Benjamin Zuckerberg, and Jalene M. LaMontagne. Global teleconnections of west-east pine siskin irruption mode. *Poster*, at Macrosystems PI Annual Meeting, Virtual

2017

- **Husile**, Liu-Yu, Li-Guohui. Impact of ice nuclei on the development of cumulus clouds over the North China Plain. *Oral presentation*, AGU Fall Meeting, New Orleans

Contributed presentations

2024

- Jalene M. LaMontagne, Courtenay Strong, **Husile Bai**, Jessie J. Forest, Andrew Hackett-Pain, Mark Schulze, and Benjamin Zuckerberg, Atmospheric waves synchronize and desynchronize mast seeding at a hemispheric scale. *Poster*, Macrosystems PI Annual Meeting, Virtual
- Zoe Exelbert, Courtenay Strong, **Husile Bai**. Climate Vulnerability Assessment of the Great Salt Lake on Migration Patterns. *Poster*, Research Day on the Hill, Salt Lake City

2023

- Zoe Exelbert, Courtenay Strong, **Husile Bai**. Hydroclimate Variability Assessment of the Great Salt Lake on Bird Migratory Patterns. *Poster*, Wilkes Climate Summit, Salt Lake City

2022

- Ivy Widick, **Husile Bai**, Courtenay Strong, Jalene M. LaMontagne, and Benjamin Zuckerberg. Climate Dipoles entrain ecological dipoles: irruption dynamics of boreal finches. *Oral presentation*, AGU Fall Meeting, Chicago
- Kevin Anthony Mendoza, Alysha Armstrong, Sam Bagge, **Husile Bai**, Eric Humphrey, Chantelle Kiessner, Emily Hope Chunningham, Monique Maria Holt, Jory Lerback, Gabriela St. Pierre. "Student Resiliency and Advancement of DEI Objectives Through Leadership Change and Pandemic Uncertainties: Perspectives from Inclusive Earth". *Lighting Talk*, AGU 2022 Fall Meeting, Chicago

TRAINING AND WORKSHOPS

- DELPHI Natural Language Processing (NLP) with applications to clinical data science workshop, March 2024, University of Utah Health, Salt Lake City, UT
- MAGIC AI/ML workshop, February 2024, University of Utah, Salt Lake City, UT
- European Geosciences Union (EGU) Peer Review Training, September- October, 2023, *Virtual*
- Weather Research & Forecasting (WRF) tutorial, July 2023, NCAR Foothills Laboratory, Boulder, CO
- MAGIC workshop, June 2023, Lamont-Doherty Earth Observatory, Columbia University, New York, NY
- NASA HiMAT workshop, June 2023, University of Utah, Salt Lake City, UT

- 2nd US Ice Core Open Science Meeting, May 2023, University of Washington. Seattle, WA
- ICEPACK glacier model training, May 2023, University of Washington, Seattle, WA
- MOOC machine learning in weather and climate training, January-April, 2023, European Centre for Medium-Range Weather Forecast (ECMWF) & International Foundation Big Data Artificial Intelligence for Human Development (IFAB), *Virtual*
- Research Mentoring training, August 2022 - March 2023, Research Education (REd), University of Utah, *Virtual*
- AGU Chapman Conference Second National Conference: Justice in Geoscience, August 2022, Washington, DC
- 12th Annual Utah Snow and Avalanche Workshop (USAW), November 2019, Utah Avalanche center, Salt Lake City, UT

GRANT AND AWARDS

2024 Subaward to Vanderbilt University, Great Salt Lake Basin Integrated Plan - Division of Water Resources, State of Utah Department of Natural Resources(\$36k)

2023 Dr. Norihiko Fukuta Memorial Award Best Peer-Reviewed Publication, Department of Atmospheric Sciences, University of Utah (\$1.5K)

2023 Poster Evaluator, Office of Undergraduate Research, University of Utah (0.3K)

2022 AGU Chapman Conference Second National Conference travel grant (\$2.5K)

2022 Rockstars Student Service Award, Department of Geology & Geophysics, University of Utah

2021 University of Utah Graduate Student Travel Award (\$0.5K)

MENTORING AND TEACHING

Mentoring experience

Michael Witherspoon, undergraduate directed study in the Department of Earth & Environmental Sciences, Vanderbilt University, 2024 -

Salma Elhandaoui, undergraduate directed study in the Department of Earth & Environmental Sciences, Vanderbilt University, 2024 -

Olivia Mondlock, co-mentored Capstone project in the Department of Atmospheric Sciences, University of Utah, 2021-2022

Zoe Exelbert, co-mentored Wilkes Scholar undergraduate project in the Department of Atmospheric Sciences, University of Utah, Jan 2023 -2024

Teaching experiences

Vanderbilt University, Department of Earth & Environmental Sciences

EES 2110	Introduction to Climate Change	2024 Fall	Instructor: teach climate studies major
-------------	-----------------------------------	-----------	---

University of Utah, Department of Geography

GEOG 3020	Geographical Analysis	2024 Spring	Lab Instructor: Teach student statistics, design lab sections, programming with R/Python
--------------	--------------------------	----------------	--

GEOG 5410	Paleoclimatology	2024 Spring	Guest lecture: climate pattern analysis, Teach student EOF (PCA) analysis using reanalysis data, programming with Python
--------------	------------------	----------------	--

Salt Lake Community College, Department of Geosciences

ATMO 1020	Climate Change	2022 Summer	Adjunct: Teach student virtually, office hours, project design
--------------	----------------	----------------	---

University of Utah, Department of Atmospheric Sciences

ATMOS 5400	The Climate System	2021 Fall 2020 Fall	TA: Assisted students in homeworks, hosted exam review sessions
---------------	-----------------------	------------------------	--

ATMOS 6040	Environmental Statistics	2021 Spring	TA: Assisted students in software operation (Matlab and Python)
---------------	-----------------------------	-------------	--

SERVICE AND OUTREACH

2024 - Advisor for Vanderbilt University Mongolian Student Association (VUMoSA), Vanderbilt University

2023 - 2024 Serving as *Postdoc Success Chair* in the Utah Postdoctoral Association (UPDA), University of Utah

2022 - *Observer & Member* of Board of Higher Education for 2-year College, American Meteorological Society (AMS BHE 2YC)

Summer 2022 Volunteered to teach the Climate Change course as an *Adjunct* at the Geoscience Department in Salt Lake Community College

2020-2022 Assisted as *committee member* in the Committee for the Advancement of Inclusion and Diversity (CAID), College of Mines and Earth Sciences, University of Utah, 2020-2022

2021-2022 *Inclusive Earth officer* (social media promotion), College of Mines and Earth Sciences, University of Utah, 2021-2022

JOURNAL REVIEWER

PLOS Climate

MEMBERSHIP

American Geophysical Union (AGU) member

American Meteorological Society (AMS) member

European Geosciences Union (EGU) member

American Center for Mongolian Studies (ACMS) member

PROFESSIONAL SKILLS

Statistical and modeling techniques:

- Weather Research and Forecasting (WRF) model
- Global climate models (GCM), including Community Earth System model (CESM), Geophysical Fluid Dynamics Laboratory (GFDL) Climate Model, and Coupled Model Intercomparison Project phase 6 (CMIP6)
- Land Information System (LIS) Framework
- Fu-Liou radiative transfer model

- *ICEPACK* glacier dynamics model
- Programming languages: NCL, Matlab, Python, R, Fortran, IDL, JeKyll, CDO
- In addition, I am familiar with a wide range of techniques and programs for data analysis and simulation under Unix (Linux) and Mac OS environments.

Other:

- I am fluent in Mongolian (native), English, and Mandarin Chinese, and have given presentations and taught in all three languages.