Shangyong Shi

Postdoctoral Fellow

Johns Hopkins University, Department of Earth and Planetary Sciences, Baltimore, Maryland

✉ sshi28@jhu.edu | shangyongshi.github.io

RESEARCH INTERESTS

Hydroclimatology, **P**recipitation phase partitioning, **S**now hydrology, **R**emote sensing of precipitation, **E**xtreme precipitation, **M**achine learning, **C**limate change, **C**limate tipping points

EDUCATION

2021 - 2024	*Ph.D.*	Meteorology, **Florida State University** | Advisor: Guosheng Liu. Dissertation: On the Sensitivity of Precipitation Phase to Temperature
2018 - 2020	*M.S.*	Meteorology, **Florida State University** | Advisor: Guosheng Liu.
2014 - 2018	*B.S.*	Atmospheric Sciences, **Nanjing University**, China.

PROFESSIONAL EXPERIENCES

2026.5 - 2026.8	*Visiting Scholar*	Research Applications Lab, **NSF NCAR** | Host: Cenlin He
2024.9 - now	*Pim Postdoc Fellow*	**Johns Hopkins University** | PI: Benjamin Zaitchik
2023.6 - 2024.5	*Research Intern*	**University of Maryland**, Cooperative Institute for Satellite Earth System Studies | PI: Huan Meng, Yongzhen Fan Improving the machine learning algorithm for orographic snowfall retrieval from satellite passive microwave sensors.
2022.9 - 2023.5	*Teaching Assistant*	**Florida State University**
2016.9 - 2017.1	*Exchange Student*	**National Taiwan University**

GRANTS

2025.11	NSF NCAR Advanced Study Program **(ASP) postdoctoral fellowship top 14 candidate,** waitlisted
2024.9 - 2026.9	**$120,000 for 2 years.** Investigating the impact of snow-to-precipitation ratio on surface hydrology in the western United States.

SELECTED HONORS AND AWARDS

2026	Early Career Scientists Best Paper Award, JHU EPS
2025	AGU Precip Folks, August Highlight
2024	Glenadore and Howard L. Pim Postdoctoral **Fellowship**, JHU EPS
2023	**1st place** student oral presentation in the Hydrology section, AMS
2017	**National Scholarship** for outstanding undergraduates, $1300 (top 2% in NJU)
2016	The Liao's Scholarship, $800 (University-level, top 2% in school, NJU)

2015	The Liao's Scholarship, $800 (University-level, top 2% in school, NJU)
2015	University-level outstanding students (top 5% in NJU)
2015	School-level outstanding student leaders (5 out of 83, NJU)
2015	School-level outstanding students (5 out of 83, NJU)

PUBLICATIONS

Peer-Reviewed Journal Articles * for corresponding author

6. **Shi, S.***, He, C., Abolafia-Rosenzweig, R., & Zaitchik, B. (2026). Atmospheric Profile Information Improves Rain-Snow Partitioning Accuracy. (Submitted to **Geophysical Research Letters**)
5. **Shi, S.***, Liu, G., and Zaitchik, B. (2026). The climatology and temperature sensitivity of the snow-to-precipitation ratio based on satellite observations (***Water Resource Research***, under review).
4. **Shi, S.*** and Liu, G. (2024). Improvements on phase classification using atmospheric melting and refreezing energy based on soundings. ***Journal of Geophysical Research: Atmospheres****,* 129(10), e2023JD040030. https://doi.org/10.1029/2023JD040030.
3. Jeoung, H., **Shi, S.,** & Liu, G.* (2022). A novel approach to validate satellite snowfall retrievals by ground-based point measurements. ***Remote Sensing***, 14(3), 434. https://doi.org/10.3390/rs14030434.
2. **Shi, S.*,** & Liu, G. (2021). The latitudinal dependence in the trend of snow event to precipitation event ratio. ***Scientific Reports***, 11(1), 18112. https://doi.org/10.1038/s41598-021-97451-9.
1. **Shi, S.,** & Misra, V.*. (2020). The role of extreme rain events in Peninsular Florida's seasonal hydroclimate variations. ***Journal of Hydrology***, 589, 125182. https://doi.org/10.1016/j.jhydrol.2020.125182.

In Preparation

3. **Shi, S.,** Zhang, Y.*, & Zaitchik, B. An Energetic Classification of Regimes of Precipitation Changes (In preparation).
2. Nie, W., Zaitchik, B., **Shi, S.**, Sleeman, J. A., & Brett, J. AI-Enabled Modeling of Amazon Monsoon Tipping Behavior under Deforestation and Drought (Presented at HydroML workshop).
1. Hu, X., Miao, X.*, Guo, W., **Shi, S.,** Guo, Q., Wang, L., Li, Y. Impact of the Warming-wetting Trend on Snowfall Change over the Tibetan Plateau (To be submitted).

Open-source Software

1. **Shi, S.** (2025). ENERGYPHASE, precipitation phase partitioning method incorporated with atmospheric information. https://zenodo.org/records/15033215, GitHub link.

OPEN-SOURCE SCIENTIFIC SOFTWARE

ENERGYPHASE github.com/ShangyongShi/PhaseClassification Zenodo 2022-2025

EnergyPhase is an improved novel precipitation phase partitioning method based on atmospheric melting and freezing energies, which can be applied to satellite retrievals or hydrological modeling,

where the precipitation phase is not directly inferred. The EnergyPhase method shows improved performance over most weather stations in North America compared to previous phase partitioning methods, particularly for precipitation with an inversion layer.

PRESENTATIONS

11. **Shi. S**., C. He and B. Zaitchik (2026). Assessing Impacts of Incorporating Atmospheric Profile Information in Rain–Snow Partitioning Parameterizations with Implications for Snowpack Modeling. 2026 Eastern and Western Joint Snow Conference (**Oral**).
10. **Shi. S.** (2026). Rain or Snow? Overcoming Limits in Precipitation Phase Partitioning with Atmospheric Profiles (Oral). JHU EPS Research Day.
9. **Shi. S**., G. Liu and B. Zaitchik (2026). The Climatology and Temperature Sensitivity of the Snow-to-Precipitation Ratio Based on Satellite Observations. 27th Conference on Satellite Meteorology, Oceanography, and Climatology at the 106th AMS Annual Meeting (**Oral**).
8. **Shi. S**., C. He and B. Zaitchik (2026). Assessing Impacts of Incorporating Atmospheric Profile Information in Rain–Snow Partitioning Parameterizations with Implications for Snowpack Modeling. 40th Conference on Hydrology at the 106th AMS Annual Meeting (**Oral**).
7. **Shi. S**., C. He and B. Zaitchik (2025). Assessing Impacts of Incorporating Atmospheric Profile Information in Rain–Snow Partitioning Parameterizations with Implications for Snowpack Modeling. *2025 AGU Annual Meeting* (**Oral**).
6. **Shi. S.** and G. Liu (Dec. 2024). Satellite observed non-linear sensitivity of snow-to-precipitation ratio to temperature warming. *2024 AGU Annual Meeting* (Poster).
5. **(Invited) Shi, S.** (Oct. 2024).On the sensitivity of precipitation phase to temperature, A&O Meetings, JHU EPS (**Oral**).
4. **(Invited) Shi, S** (Feb. 2024). Investigating the impact of changes in snow-to-precipitation ratio on streamflow, JHU EPS (**Oral**).
3. **Shi, S.**, H. Meng, Y. Fan and J. Dong (Jan. 2024). Improving the machine learning algorithm for orographic snowfall retrieval from satellite passive microwave sensors. JPSS Hydrology Initiative Telecon (Online **Oral**).
2. **Shi, S.** and G. Liu (Dec. 2023). Improvements on phase classification using atmospheric melting and refreezing energy based on soundings. *2023 AGU Annual Meeting* (Poster).
1. **Shi, S.** and G. Liu (Jan. 2023). Classifying precipitation phase with atmospheric soundings. *2023 AMS Annual Meeting* (**1st Place Student Oral Presentation**).

SERVICE

Academic

2026.4	JHU EPS Research Day Coordinator
2026 - now	AGU Precipitation Technical Committee, Seminar Coordinator
2025 - now	Newsletter Editor, Chinese-American Oceanic and Atmospheric Association
2019 - now	Reviewer of *Journal of Hydrometeorology, Climate Dynamics, Journal of Hydrology, Asia-Pacific Journal of Atmospheric Sciences*
2022.8	Webinar host: Discussion on IPCC AR6 Chap12: Snow and Ice
2015 - 2016	Group leader of undergraduate student innovative research: Simulating the Double Vortices' Fujiwara Effect in a Rotating Water Tank

Leadership and Public Service

2016.7 - 2016.8	International volunteer for the AIESEC internship program "Eco World"
2016.3	Volunteer for the open house event of Jiangsu Meteorological Bureau on the World Meteorological Day
2015.3	Organizing science communication events for World Meteorological Day
2016.1 - 2017.6	President/Vice President of the Volleyball Association, NJU
2014.9 - 2015.6	Core member of the School Student Union

SKILLS

- **Coding**: Python (Scikit-learn, XGBoost), MATLAB, Fortran, C
- **Modeling**: **Noah-MP** Land surface model, High-Resolution Land Data Assimilation System (**HRLDAS**), NASA Land Information System Framework (**LISF**).
- **Lab:** Rotating water tank experiments; Snow field measurement school (2026)

TEACHING

Spring 2023	Teaching Assistant | Climate Dynamics II
Fall 2022	Teaching Assistant | Climate Dynamics I
	• Assisted syllabus design, guided recitation, office hours.
	• Conducted rotating water tank experiments.
2021.9-2022.4	Student Mentoring | Honor Thesis
	• Jessica Kirk: On parameters to better determine whether precipitation will fall as snow or rain.

REFERENCES

Dr. Guosheng Liu

Dr. Benjamin Zaitchik

Professor
Florida State University
✉ gliu@fsu.edu

Morton K. Blaustein Chair and Professor
Johns Hopkins University
✉ zaitchik@jhu.edu

Dr. Cenlin He
Project Scientist
National Center for Atmospheric Research
✉ cenlinhe@ucar.edu

Dr. Huan Meng
Research Scientist
NOAA/NESDIS/STAR
✉ Huan.Meng@noaa.gov