Josh Welty

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Scientific Programmer, Data Analyst

Physical scientist with an academic and professional background in data analysis, atmospheric science, and hydrology. Extensive experience with multidimensional data analysis involving statistics, scientific principles, and Monte Carlo methods. Proficient in composing/running basic analysis scripts and parallel computing. Interested in novel applications of machine learning to earth science data. Technical skills and experience include:

• Python	• Shell scripting	• Data visualization	• Technical writing	• Big data analysis
• NCL	• Matlab	• ArcGIS	• Machine learning	• HTML/CSS
• R	• GitHub / SVN	• Fortran	• HPC	• SQL

Experience

Meteorologist, *Fleet Numerical Meteorology and Oceanography Center (DoD)*, 2022 – Current

Lead global atmospheric modeler at FNMOC-Monterey. Oversee major scientific model upgrades and projects requiring extensive collaboration. Facilitate operational continuity for the Navy Global Environmental Model (NAVGEM) and collaborate with the data assimilation team at Naval Research Laboratory (NRL) to perform regular software updates, enabling successful assimilation of new instrument observations. Expedite the transition of new global models, such as NEPTUNE, through DevOps cycling with R&D partners at NRL.

Research Assistant, *University of Arizona*, 2016 – 2021

Analysis of big geophysical datasets to address old research questions in new ways using statistical methods and machine learning techniques with a focus on land-atmosphere interaction. Works featured on DOE Office of Science homepage (8/21/2018), in AMS "News You Can Use" (8/20/2018, 6/6/2020), on DOE ARM website, and TV (KGUN-9)/University news (8/8/2018). Served as the Social Chair for the Hydrology and Atmospheric Sciences Student Association from 2017-2018 and the coordinator for the Land-Atmosphere-Ocean Interaction Group during 2020.

Meteorologist, *International Trip Planning Services, LLC*, 2015 - 2016

Applied weather insight in combination with operational model output to generate forecasts for pilots on international flights, including turbulence, icing, and storm risks. Learned and performed flight planning on the fly as company restructured to hybrid meteorologist/flight planner model post-hire, including eight months of overnight shift work.

Graduate Teaching Associate, *The Ohio State University*, 2014 - 2015

Laboratory TA for Geography 1900: Extreme Weather and Climate. Finished thesis involving novel application of linear discriminant analysis to the North Atlantic hurricane formation problem conditioned on El Niño / Southern Oscillation phase. Served as the Master's representative to the Graduate Studies Committee in the Geography department.

Graduate Fellow, *The Ohio State University*, 2013 - 2014

Sole recipient of the Graduate Fellowship for the academic year in the Geography department. Initiated literature review for research involving novel application of linear discriminant analysis to the North Atlantic hurricane formation problem conditioned on El Niño / Southern Oscillation phase.

Education

Ph.D. in Atmospheric Science (Hydrology minor), *University of Arizona*, December 2020

M.S. in Atmospheric Science, *The Ohio State University*, May 2015

Honors B.S. in Geography/Atmospheric Science and Spanish, *The Ohio State University*, Magna Cum Laude, June 2012

Spanish Study Abroad Program, *Fundación del Gran Rosario*, Rosario, Argentina, January - March 2012

Publications

Welty, J., & Zeng, X. (2021). Characteristics and Causes of Extreme Snowmelt over the Conterminous United States. https://journals.ametsoc.org/view/journals/bams/aop/BAMS-D-20-0182.1/BAMS-D-20-0182.1.xml

Arévalo, J., Welty, J., Fan., Y., & Zeng, X. (2021). Implementation of Snowpack Treatment in the CPC Water Balance Model and Its Impact on Drought Assessment. https://journals.ametsoc.org/view/journals/hydr/aop/JHM-D-20-0201.1/JHM-D-20-0201.1.xml

Brunke, M., Welty, J., & Zeng., X. (2020). Attribution of snowpack error sensitivities to simulated temperature and precipitation in E3SMv1 over the contiguous United States. https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2021MS002640

Wang, Y., Zeng, X., Xu, X., Welty, J., Lenschow, D. H., Zhou, M., & Zhao, Y. (2020). Why are there more summer afternoon low clouds over the Tibetan Plateau compared to eastern China? https://doi.org/10.1029/2020GL089665

Welty, J., Stillman, S., Zeng, X., & Santanello, J. (2020). Increased likelihood of appreciable afternoon rainfall over wetter or drier soils dependent upon atmospheric dynamic influence. https://doi.org/10.1029/2020GL087779

Welty, J., & Zeng, X. (2018). Does Soil Moisture Affect Warm Season Precipitation Over the Southern Great Plains? https://doi.org/10.1029/2018GL078598

Presentations

U.S. Nuclear Regulatory Commission Probabilistic Flood Hazard Assessment Workshop, February 2022: "Characteristics and Causes of Extreme Snowmelt over the Conterminous US"

101st AMS Annual Meeting, January 2021: "Characteristics and Causes of Extreme Snowmelt over the Conterminous US"

2019 AGU Fall Meeting: "Increased likelihood of appreciable afternoon rainfall over wetter or drier soils dependent upon atmospheric dynamic influence"

99th AMS Annual Meeting, January 2019: "Soil Moisture Impacts on Afternoon Precipitation: A Regional Case Study with Global Extension"

Hayes Graduate Research Forum, The Ohio State University, February 2015: "On ENSO-Modified Hurricane Formation in the North Atlantic"

Awards

Junior Civilian of the Year, Fleet Numerical Meteorology and Oceanography Center (DoD), 2022
Galileo Circle Scholarship, University of Arizona, Galileo Circle / HAS Department, 2017
Graduate Fellowship, The Ohio State University, Department of Geography, 2013 - 2014

Training

Programming for Data Science with Python, Udacity, July 2023
Introduction to AI with Julia, Stennis Space Center, April 2023