

# Zachary M. Labe

## CONTACT INFORMATION

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## RESEARCH INTERESTS

large-scale climate variability • teleconnections • explainable AI • Arctic sea ice • data science methods • large ensembles • decadal prediction • extremes

## EDUCATION

**University of California, Irvine**, Irvine, CA

Ph.D. in Earth System Science, June 2020

**University of California, Irvine**, Irvine, CA

M.Sc. in Earth System Science, December 2017

**Cornell University**, Ithaca, NY

B.Sc. in Atmospheric Science, May 2015, *Distinction in Research*

Minor: Dyson Business Minor for Life Sciences

## RESEARCH EMPLOYMENT

|              |                                                                                                                                                                   |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2025-Present | <b>Climate Scientist</b><br>Climate Central, Inc.                                                                                                                 |
| 2024-2025    | <b>Research Physical Scientist (NOAA Federal)</b><br>Geophysical Fluid Dynamics Laboratory (GFDL),<br>Seasonal-to-Decadal Variability and Predictability Division |
| 2024         | <b>Associate Research Scholar</b><br>Princeton University AOS/CIMES and NOAA GFDL                                                                                 |
| 2022-2024    | <b>Postdoctoral Research Associate</b><br>Advisors: Drs. Thomas Delworth and Nathaniel Johnson,<br>Princeton University AOS/CIMES and NOAA GFDL                   |
| 2020-2022    | <b>Postdoctoral Researcher</b><br>Advisor: Dr. Elizabeth Barnes, Atmospheric Science,<br>Colorado State University                                                |
| 2015-2020    | <b>Graduate Research Assistant</b><br>Advisor: Dr. Gudrun Magnusdottir, Earth System Science,<br>University of California, Irvine                                 |
| 2014-2015    | <b>Undergraduate Research Assistant</b><br>Advisor: Dr. Toby Ault, Earth and Atmospheric Science,<br>Cornell University                                           |

## PUBLICATIONS

### Refereed/Peer-Reviewed

- [37] Timmermans, M.-L. and **Z.M. Labe** (2025). Sea surface temperature [in "Arctic Report Card 2025"], NOAA, DOI:10.25923/pz7y-3b10. [\[Article\]](#)
- [36] Eayrs, C. and **Z.M. Labe** (2025). The future of sea ice. *Comprehensive Cryospheric Science and Environmental Change*, DOI:10.1016/B978-0-323-85242-5.00050-6. [\[Chapter\]](#)
- [35] Kalashnikov, D.A., J.T. Abatzoglou, F.V. Davenport, **Z.M. Labe**, P.C. Loikith, D. Touma, and D. Singh (2025). Projections of Lightning-Ignited Wildfire Risk in the Western United States. *Earth's Future*, DOI:10.1029/2025EF006108. [\[Article\]](#)
- [34] Timmermans, M.-L. and **Z.M. Labe** (2025). [The Arctic] Sea surface temperature [in "State of the Climate in 2024"]. *Bulletin of the American Meteorological Society*, DOI:10.1175/BAMS-D-25-0104.1. [\[Article\]](#)
- [33] Timmermans, M.-L. and **Z.M. Labe** (2024). Sea surface temperature [in "Arctic Report Card 2024"], NOAA, DOI:10.25923/9z96-aq19. [\[Article\]](#)
- [32] Kalashnikov, D.A., F.V. Davenport, **Z.M. Labe**, P.C. Loikith, J.T. Abatzoglou, and D. Singh (2024). Predicting cloud-to-ground lightning in the Western United States from the large-scale environment using explainable neural networks. *Journal of Geophysical Research: Atmospheres*, DOI:10.1029/2024JD042147. [\[Article\]](#)
- [31] Vanek S.B., **Z.M. Labe**, O. Lauter, K. Shionalyn, M.A. Shadab, E. Adasheva, A. Margevich, M.N. Schaberg, L. Ashokkumar, and J.N. Naoukin (2024). Exploring the past, present, and future of USAPECS: Lessons from a decade of supporting early career research across national and international polar networks. *Arctic Yearbook*, ISSN 2298-2418. [\[Article\]](#)
- [30] **Labe, Z.M.**, T.L. Delworth, N.C. Johnson, and W.F. Cooke (2024). Exploring a data-driven approach to identify regions of change associated with future climate scenarios. *Journal of Geophysical Research: Machine Learning and Computation*, DOI:10.1029/2024JH000327. [\[Article\]](#)
- [29] Schreck III, C.M., D.R. Easterling, J.J. Barsugli, D.A. Coates, A. Hoell, N.C. Johnson, K.E. Kunkel, **Z.M. Labe**, J. Uehling, R.S. Vose, and X. Zhang (2024). A rapid response process for evaluating causes of extreme temperature events in the United States: the 2023 Texas/Louisiana heat wave as a prototype. *Environmental Research: Climate*, DOI:10.1088/2752-5295/ad8028. [\[Article\]](#)
- [28] Kretschmer, M., A. Jézéquel, **Z.M. Labe**, and D. Touma (2024). A shifting climate: new paradigms and challenges for (early career) scientists in extreme weather research. *Atmospheric Science Letters*, DOI:10.1002/asl.1268. [\[Article\]](#)
- [27] Timmermans, M.-L. and **Z.M. Labe** (2024). [The Arctic] Sea surface temperature [in "State of the Climate in 2023"]. *Bulletin of the American Meteorological Society*, DOI:10.1175/BAMS-D-24-0101.1. [\[Article\]](#)
- [26] Bushuk, M., S. Ali, D. Bailey, Q. Bao, L. Batte, U.S. Bhatt, E. Blanchard-Wrigglesworth, E. Blockley, G. Cawley, J. Chi, F. Counillon, P. Goulet Coulombe, R. Cullather, F.X. Diebold, A. Dirkson, E. Exarchou, M. Gobel, W. Gregory, V. Guemas, L. Hamilton, B. He, S. Horvath, M. Ionita, J. E. Kay, E. Kim, N. Kimura, D. Kondrashov, **Z.M. Labe**, W. Lee, Y.J. Lee, C. Li, X. Li, Y. Lin, Y. Liu, W. Maslowski, F. Massonnet, W.N. Meier, W.J. Merryfield, H. Myint, J.C. Acosta Navarro, A. Petty, F. Qiao, D. Schroder, A. Schweiger, Q. Shu, M. Sigmond, M. Steele, J. Stroeve, N. Sun, S. Tietsche, M. Tsamados, K. Wang, J. Wang, W. Wang, Y. Wang, Y. Wang, J. Williams, Q. Yang, X. Yuan, J. Zhang, and Y. Zhang (2024). Predicting September Arctic sea ice: A multi-model seasonal skill comparison. *Bulletin of the American Meteorological Society*, DOI:10.1175/BAMS-D-23-0163.1. [\[Article\]](#)
- [25] Zhang, Y., B.M. Ayyub, J.F. Fung, and **Z.M. Labe** (2024). Incorporating extreme event attribution into climate change adaptation for civil infrastructure: Meth-

- ods, benefits, and research needs. *Resilient Cities and Structures*, DOI:10.1016/j.rcns.2024.03.002. [\[Article\]](#)
- [24] **Labe, Z.M.**, N.C. Johnson, and T.L. Delworth (2024). Changes in United States summer temperatures revealed by explainable neural networks. *Earth's Future*, DOI:10.1029/2023EF003981. [\[Article\]](#) [\[GFDL Bulletin: Research Highlights\]](#)
- [23] Timmermans, M.-L. and **Z.M. Labe** (2023). Sea surface temperature [in "Arctic Report Card 2023"], NOAA, DOI:10.25923/e8jc-f342. [\[Article\]](#)
- [22] Timmermans, M.-L. and **Z.M. Labe** (2023), [The Arctic] Sea surface temperature [in "State of the Climate in 2022"]. *Bulletin of the American Meteorological Society*, DOI:10.1175/BAMS-D-23-0079.1. [\[Article\]](#)
- [21] Eischeid, J.K., M.P. Hoerling, X.-W. Quan, A. Kumar, J. Barsugli, **Z.M. Labe**, K.E. Kunkel, C.J. Schreck III, D.R. Easterling, T. Zhang, J. Uehling, and X. Zhang (2023). Why has the summertime central U.S. warming hole not disappeared? *Journal of Climate*, DOI:10.1175/JCLI-D-22-0716.1. [\[Article\]](#)
- [20] Witt, J.K., **Z.M. Labe**, A.C. Warden, and B.A. Clegg (2023). Visualizing Uncertainty in Hurricane Forecasts with Animated Risk Trajectories. *Weather, Climate, and Society*, DOI:10.1175/WCAS-D-21-0173.1. [\[Article\]](#)
- [19] **Labe, Z.M.**, E.A. Barnes, and J.W. Hurrell (2023). Identifying the regional emergence of climate patterns in the ARISE-SAI-1.5 simulations. *Environmental Research Letters*, DOI:10.1088/1748-9326/acc81a. [\[Article\]](#)
- [18] Timmermans, M.-L. and **Z.M. Labe** (2022). Sea surface temperature [in "Arctic Report Card 2022"], NOAA, DOI:10.25923/p493-2548. [\[Article\]](#)
- [17] Po-Chedley, S., J.T. Fasullo, N. Siler, **Z.M. Labe**, E.A. Barnes, C.J.W. Bonfils, and B.D. Santer (2022). Internal variability and forcing influence model-satellite differences in the rate of tropical tropospheric warming. *Proceedings of the National Academy of Sciences*, DOI:10.1073/pnas.2209431119. [\[Article\]](#)
- [16] Witt, J.K., **Z.M. Labe**, and B.A. Clegg (2022). Comparisons of perceptions of risk for visualizations using animated risk trajectories versus cones of uncertainty. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting*, DOI:10.1177/1071181322661308. [\[Article\]](#)
- [15] Timmermans, M.-L. and **Z.M. Labe** (2022), [The Arctic] Sea surface temperature [in "State of the Climate in 2021"]. *Bulletin of the American Meteorological Society*, DOI:10.1175/BAMS-D-22-0082.1. [\[Article\]](#)
- [14] **Labe, Z.M.** and E.A. Barnes (2022), Comparison of climate model large ensembles with observations in the Arctic using simple neural networks. *Earth and Space Science*, DOI:10.1029/2022EA002348. [\[Article\]](#)
- [13] **Labe, Z.M.** and E.A. Barnes (2022), Predicting slowdowns in decadal climate warming trends with explainable neural networks. *Geophysical Research Letters*, DOI:10.1029/2022GL098173. [\[Article\]](#) [\[DOE Research Highlight\]](#)
- [12] Timmermans, M.-L. and **Z.M. Labe** (2021). Sea surface temperature [in "Arctic Report Card 2021"], NOAA, DOI:10.25923/2y8r-Oe49. [\[Article\]](#)
- [11] Timmermans, M.-L. and **Z.M. Labe** (2021), [The Arctic] Sea surface temperature [in "State of the Climate in 2020"]. *Bulletin of the American Meteorological Society*, DOI:10.1175/BAMS-D-21-0086.1. [\[Article\]](#)
- [10] **Labe, Z.M.** and E.A. Barnes (2021), Detecting climate signals using explainable AI with single-forcing large ensembles. *Journal of Advances in Modeling Earth Systems*, DOI:10.1029/2021MS002464. [\[Article\]](#)
- [9] Peings, Y., **Z.M. Labe**, and G. Magnusdottir (2021), Are 100 ensemble members enough to capture the remote atmospheric response to +2°C Arctic sea ice loss? *Journal of Climate*, DOI:10.1175/JCLI-D-20-0613.1. [\[Article\]](#) [\[CLIVAR\]](#)

- [8] Timmermans, M.-L. and **Z.M. Labe** (2020). Sea surface temperature [in "Arctic Report Card 2020"], NOAA, DOI:10.25923/v0fs-m920. [\[Article\]](#)
- [7] Timmermans, M.-L., **Z.M. Labe**, and C. Ladd (2020), [The Arctic] Sea surface temperature [in "State of the Climate in 2019"]. *Bulletin of the American Meteorological Society*, DOI:10.1175/BAMS-D-20-0086.1. [\[Article\]](#)
- [6] **Labe, Z.M.**, Y. Peings, and G. Magnusdottir (2020), Warm Arctic, cold Siberia pattern: role of full Arctic amplification versus sea ice loss alone, *Geophysical Research Letters*, DOI:10.1029/2020GL088583. [\[Article\]](#)
- [5] Thoman, R.L., U. Bhatt, P. Bieniek, B. Brettschneider, M. Brubaker, S. Danielson, **Z.M. Labe**, R. Lader, W. Meier, G. Sheffield, and J. Walsh (2020), The record low Bering Sea ice extent in 2018: Context, impacts and an assessment of the role of anthropogenic climate change [in "Explaining Extreme Events of 2018 from a Climate Perspective"]. *Bulletin of the American Meteorological Society*, DOI:10.1175/BAMS-D-19-0175.1 [\[Article\]](#)
- [4] **Labe, Z.M.**, Y. Peings, and G. Magnusdottir (2019), The effect of QBO phase on the atmospheric response to projected Arctic sea ice loss in early winter, *Geophysical Research Letters*, DOI:10.1029/2019GL083095. [\[Article\]](#)
- [3] **Labe, Z.M.**, Y. Peings, and G. Magnusdottir (2018), Contributions of ice thickness to the atmospheric response from projected Arctic sea ice loss, *Geophysical Research Letters*, DOI:10.1029/2018GL078158. [\[Article\]](#)
- [2] **Labe, Z.M.**, G. Magnusdottir, and H.S. Stern (2018), Variability of Arctic sea ice thickness using PIOMAS and the CESM Large Ensemble, *Journal of Climate*, DOI:10.1175/JCLI-D-17-0436.1. [\[Article\]](#)
- [1] **Labe, Z.M.**, T.R. Ault, and R. Zurita-Milla (2016), Identifying Anomalously Early Spring Onsets in the CESM Large Ensemble Project, *Climate Dynamics*, DOI:10.1007/s00382-016-3313-2. [\[Article\]](#)

#### **Publications Submitted**

- [6] Jong, B.-T., **Z.M. Labe**, T.L. Delworth, and W.F. Cooke. Reversal of extreme precipitation trend over the Northeast US in response to aggressive climate mitigation in GFDL SPEAR, *EarthArXiv*, DOI:10.31223/X59443 (submitted) [\[Preprint\]](#)
- [5] **Labe Z.M.**, T.L. Delworth, N.C. Johnson, B.-T. Jong, C.E. McHugh, W.F. Cooke, and L. Jia (2025). Large reductions in United States heat extremes found in overshoot simulations with SPEAR, *EarthArXiv*, DOI:10.31223/X5TX4P (submitted) [\[Preprint\]](#)
- [4] Joh, Y., S.-W. Yeh, T.L. Delworth, **Z.M. Labe**, A.T. Wittenberg, W.F. Cooke, J. Lou, and Y.-G. Park (2025). Evolving synchronization of Gulf Stream and Kuroshio-Oyashio Extension in a changing climate. (accepted)
- [3] Zhang, Y. and **Z.M. Labe** (2025). Adapting Infrastructure to a Changing Climate with Extreme Event Attribution Assessments. (accepted)
- [2] Zhang, Y. and **Z.M. Labe** (2025). Drivers of CO<sub>2</sub> Emissions and Climate Extremes. (submitted)
- [1] Witt, J.K., **Z.M. Labe**, and B.A. Clegg (2025). An Alternative to the "Cone of Uncertainty" that is Flexible, Intuitive, and Desirable for Communicating Hurricane Forecasts. (submitted)

#### **Non-refereed/Other**

- [7] **Labe, Z.M.**, May 2023: Pan-Arctic Ice Ocean Modeling and Assimilation System (PIOMAS). Expert Contributor. NCAR Climate Data Guide. [\[Article\]](#)
- [6] **Labe, Z.M.**, August 2021: Sharing data-driven stories of Arctic climate change. WMO/WWRP Year of Polar Prediction, PolarPredictNews. [\[Article\]](#)

- [5] Peings, Y., **Z.M. Labe**, and G. Magnusdottir, August 2021: How reproducible is the response to +2°C Arctic sea-ice loss in a large ensemble of simulations? CLIVAR Research Highlight. [\[Article\]](#)
- [4] **Labe, Z.M.**, May 2020: The effects of Arctic sea-ice thickness loss and stratospheric variability on mid-latitude cold spells. University of California, Irvine. Doctoral dissertation. [\[PDF\]](#)
- [3] **Labe, Z.M.**, November 2019: Understanding Our Changing Arctic. Polar Bears International. Annual Magazine. [\[Article\]](#)
- [2] **Labe, Z.M.**, August 2017: Sea Ice Thickness Data Sets: Overview & Comparison Table. Expert Contributor. NCAR Climate Data Guide. [\[Article\]](#)
- [1] **Labe, Z.M.**, April 2015: Anomalously Early Onset of Spring in the CESM Large Ensemble. Cornell University. Undergraduate Honors Thesis. [\[PDF\]](#)

## ORAL PRESENTATIONS

- [55] **Labe, Z.M.** Visualizing our changing climate in real-time, *Terra.do*, Remote Presentation (July 2025). **(Invited-Keynote)**
- [54] **Labe, Z.M.** Monitoring our changing climate through data-driven stories, *8th C3S General Assembly*, Valencia, Spain (June 2025). **(Invited-Remote)**
- [53] **Labe, Z.M.** Utility of explainable machine learning for scenarios of climate change, Session III: AI Explainability and Climate Science Innovation, *Broadening Access to Climate AI Innovation Workshop*, University of Virginia, VA, USA (May 2025). **(Invited-Remote)**
- [52] **Labe, Z.M.** Using machine learning for understanding changes in U.S. summer-time temperatures, *NOAA Booth, 105th AMS Annual Meeting*, New Orleans, LA, USA (Jan 2025).
- [51] **Labe, Z.M.** XAI for detecting scenarios of future climate change, Climate & Global Dynamics Machine Learning Group, NSF NCAR, Boulder, CO, USA (Nov 2024). **(Invited-Remote)**
- [50] **Labe, Z.M.** Timing of emergence of U.S. summer temperatures with explainable AI, Building AI-Ready workforce for heat resilience, 6th NOAA AI Workshop, USA (Sep 2024). **(Invited-Remote)**
- [49] **Labe, Z.M.** Machine learning for climate prediction at decadal and longer timescales, *Predictability, Predictions, and Applications Interface (PPAI) Panel*, US CLIVAR, Boulder, CO, USA (Aug 2024). **(Invited-Remote)**
- [48] **Labe, Z.M.** Reexamining future projections of Arctic climate linkages, *Atmospheric and Oceanic Sciences Student/Postdoc Seminar*, Princeton University, NJ, USA (May 2024).
- [47] **Labe, Z.M.**, T.L. Delworth, N.C. Johnson, and W.F. Cooke. Explainable AI for distinguishing future climate change scenarios, *EGU General Assembly 2024*, Vienna, Austria (Apr 2024). [\[Abstract\]](#).
- [46] **Labe, Z.M.** Explainable AI approach for evaluating climate models in the Arctic. *Modelers' Community of Practice Webinar*, IARPC Collaborations (Mar 2024). **(Invited-Remote)**
- [45] **Labe, Z.M.** Explainable neural networks for evaluating patterns of climate change and variability. *Sharing Science - North American Webinar*, Young Earth System Scientists (YESS) Community (Mar 2024). **(Remote)**
- [44] **Labe, Z.M.** Applications of machine learning for climate change and variability. *Department of Environmental Sciences Seminar*, Rutgers University, New Brunswick, NJ (Feb 2024). **(Invited)**
- [43] **Labe, Z.M.**, T.L. Delworth, N.C. Johnson, and W.F. Cooke. A data-driven approach to identifying key regions of change associated with future climate scenarios,



*23rd Conference on Artificial Intelligence for Environmental Science*, Baltimore, MD (Jan 2024). [\[Abstract\]](#)

- [42] **Labe, Z.M.**, N.C. Johnson, and T.L. Delworth. Distinguishing the regional emergence of United States summer temperatures between observations and climate model large ensembles, *23rd Conference on Artificial Intelligence for Environmental Science*, Baltimore, MD (Jan 2024). [\[Abstract\]](#)
- [41] **Labe, Z.M.** Revisiting projections of Arctic climate change linkages. *College of Surveying and Geo-informatics Seminar*, Tongji University, Shanghai, China (Nov 2023). **(Invited-Remote)**
- [40] **Labe, Z.M.** Using explainable machine learning to evaluate climate change projections. *Atmosphere and Ocean Climate Dynamics Seminar*, Yale University, CT (Oct 2023). **(Invited-Remote)**
- [39] **Labe, Z.M.** Creative machine learning approaches for climate change detection, *Resnick Young Investigators Symposium*, Caltech, NJ, USA (Apr 2023). **(Invited)**
- [38] **Labe, Z.M.** Using explainable AI to identify key regions of climate change in GFDL SPEAR large ensembles, *Lunchtime Seminar*, GFDL, Princeton, NJ, USA (Mar 2023).
- [37] **Labe, Z.M.** Using explainable machine learning for evaluating patterns of climate change, *Natural Sciences Group Seminar*, Washington State University Vancouver, WA, USA (Feb 2023). **(Invited-Remote)**
- [36] **Labe, Z.M.** Evaluating and communicating Arctic climate change projections, *Climate Change and Agriculture Guest Seminar*, Kansas State University, KS, USA (Feb 2023). **(Invited-Remote)**
- [35] **Labe, Z.M.** Exploring explainable machine learning for detecting changes in climate, *Department of Earth, Ocean, and Atmospheric Science Colloquium*, Florida State University, FL, USA (Feb 2023). **(Invited-Remote)**
- [34] **Labe, Z.M.** Forced climate signals with explainable AI and large ensembles, *Atmospheric and Oceanic Sciences Student/Postdoc Seminar*, Princeton University, NJ, USA (Feb 2023).
- [33] **Labe, Z.M.** Explainable AI for identifying regional climate change patterns, *Scientific Machine Learning Community*, University of Leeds, UK (Jan 2023). **(Invited-Remote)**
- [32] **Labe, Z.M.** and E.A. Barnes. Using artificial neural networks to predict temporary slowdowns in global warming trends, *22nd Conference on Artificial Intelligence for Environmental Science*, Denver, CO (Jan 2023). (Remote) [\[Abstract\]](#)
- [31] **Labe, Z.M.**, N.C. Johnson, and T.L. Delworth. Climate drivers of the recent spring-time cooling pattern in northern North America, *36th Conference on Climate Variability and Change*, Denver, CO (Jan 2023). (Remote) [\[Abstract\]](#)
- [30] **Labe, Z.M.** Machine learning for evaluating climate model projections, *Tech-Talks 2.0, IEEE-Student Branch - IIT Indore*, India (Dec 2022). **(Invited-Remote)**
- [29] **Labe, Z.M.** and E.A. Barnes. Using neural networks to predict temporary slowdowns in decadal climate warming trends, *27th Annual CESM Workshop*, Boulder, CO (Jun 2022). (Remote)
- [28] **Labe, Z.M.** Communicating Arctic climate change through data-driven stories, *Guest lecture for "Applications in Climate & Society"*, Columbia University, New York City, NY (Feb 2022). **(Invited-Remote)**
- [27] **Labe, Z.M.** Arctic climate change through the lens of data visualization, *Guest lecture for "Adaptation to Climate Change"*, North Carolina State University, Raleigh, NC (Jan 2022). **(Invited-Remote)**

- [26] **Labe, Z.M.** and E.A. Barnes. Using explainable neural networks for comparing climate model projections, *27th Conference on Probability and Statistics*, Virtual Attendance (Jan 2022). (Remote) [\[Abstract\]](#)
- [25] **Labe, Z.M.** and E.A. Barnes. Using neural networks to explore regional climate patterns in single-forcing large ensembles, *2021 AGU Annual Meeting*, New Orleans, LA (Dec 2021). (**Invited-Remote**) [\[Abstract\]](#)
- [24] **Labe, Z.M.** and E.A. Barnes. Evaluating global climate models using simple, explainable neural networks, *2021 AGU Annual Meeting*, New Orleans, LA (Dec 2021) (**Invited-Remote**) [\[Abstract\]](#)
- [23] **Labe, Z.M.** Exploring climate change signals with explainable AI. *Carbon Club*, NASA JPL, Pasadena, CA (Dec 2021). (**Invited-Remote**)
- [22] **Labe, Z.M.** and E.A. Barnes. Decadal warming slowdown predictions by an artificial neural network, *2021 Young Scientist Symposium on Atmospheric Research (YSSAR)*, Colorado State University, CO (Oct 2021).
- [21] **Labe, Z.M.** Assessing climate variability and change with explainable neural networks. *Lunchtime Seminar*, GFDL, Princeton University, NJ (Oct 2021). (**Invited-Remote**)
- [20] **Labe, Z.M.** and E.A. Barnes. Exploring climate model large ensembles with explainable neural networks, *WCRP workshop on attribution of multi-annual to decadal changes in the climate system*, Virtual Workshop (Sep 2021). (Remote)
- [19] **Labe, Z.M.** Learning new climate science by opening the machine learning black box. *Cognitive Brownbag Series*, Department of Psychology, Colorado State University, CO (Sep 2021). (**Invited**)
- [18] **Labe, Z.M.** and E.A. Barnes. Climate signals in CESM1 single-forcing large ensembles revealed by explainable neural networks, *26th Annual CESM Workshop*, Boulder, CO (Jun 2021). (Remote)
- [17] **Labe, Z.M.** Revealing climate change signals with explainable AI. *Spring Postdoctoral Research Symposium*, Colorado State University, CO (Mar 2021). (Remote)
- [16] **Labe, Z.M.** Communicating Arctic climate change through data-driven stories. *Arctic Science Summit Week 2021*, Lisbon, Portugal (Mar 2021). (**Invited-Remote**)
- [15] **Labe, Z.M.** The pan-Arctic impacts of thinning sea ice. Local Environmental Observer (LEO) Network, Anchorage, AK (Jan 2021). (**Invited-Remote**)
- [14] **Labe, Z.M.** and E.A. Barnes. Disentangling Climate Forcing in Multi-Model Large Ensembles Using Neural Networks. *20th Conference on Artificial Intelligence for Environmental Science*, Virtual Conference (Jan 2021). [\[Abstract\]](#)
- [13] **Labe, Z.M.** Why is it difficult to resolve future projections of Arctic-midlatitude linkages? *Atmospheric Dynamics Seminar*, Colorado State University, CO (Dec 2020). (Remote)
- [12] **Labe, Z.M.** Trends and regional variability of observed Arctic sea ice thickness. *ACCAP's Virtual Alaska Weather Symposia webinar series*, University of Alaska, Fairbanks, AK (Oct 2020). (**Invited-Remote**)
- [11] **Labe, Z.M.** Refining projections of the 'warm Arctic, cold Siberia' pattern in climate model simulations. *Atmosphere and Ocean Climate Dynamics Seminar*, Yale University, CT (Sep 2020). (**Invited-Remote**)
- [10] **Labe, Z.M.** Observations and climate model projections of Arctic climate change. Geography Department, Irvine Valley College, CA (May 2020). (**Invited-Remote**)
- [9] **Labe, Z.M.**, Y. Peings, and G. Magnusdottir. Detection of Signal in the Large-Scale Circulation Response to Arctic Sea-Ice Decline. *33rd Conference on Climate Variability and Change*, Boston, MA (Jan 2020). [\[Abstract\]](#)

- [8] **Labe, Z.M.** Melting Ice: Context, Causes, and Consequences of Polar Amplification. *Kavli Frontiers of Science, National Academy of Sciences*, Jerusalem, Israel (Sep 2019). **(Invited)**
- [7] **Labe, Z.M.** Projections of a future Arctic climate. Geography Department, Irvine Valley College, CA (May 2019). **(Invited)**
- [6] **Labe, Z.M.**, G. Magnusdottir, and Y. Peings. Linking the Quasi-Biennial Oscillation and projected Arctic sea-ice loss to stratospheric variability in early winter. *20th Conference on Middle Atmosphere*, Phoenix, AZ (Jan 2019). [\[Abstract\]](#)
- [5] **Labe, Z.M.**, Y. Peings, H.S. Stern, and G. Magnusdottir. Arctic sea ice thickness variability and its influence on the atmospheric response to projected sea ice loss. *Machine Learning and Physical Sciences (MAPS) Symposium*, University of California, Irvine (May 2018).
- [4] **Labe, Z.M.** Disentangling Arctic climate change and variability. Geography Department, Irvine Valley College, CA (Apr 2018). **(Invited)**
- [3] **Labe, Z.M.**, G. Magnusdottir, and H.S. Stern. Variability and future projections of Arctic sea ice thickness. *Understanding the Causes and Consequences of Polar Amplification Workshop*, Aspen Global Change Institute, Aspen, CO (Jun 2017).
- [2] **Labe, Z.M.** Communicating the future of Arctic climate change. Natural Sciences Division, Fullerton College, CA (Nov 2016). **(Invited)**
- [1] **Labe, Z.M.** Anomalously early onset of spring in the CESM Large Ensemble Project. *Earth and Atmospheric Science Undergraduate Research Symposium*, Cornell University, NY (May 2015).

## POSTER PRESENTATIONS

- [12] **Labe, Z.M.**, and Y. Zhang. Designing Climate-Resilient Infrastructure with Extreme Event Attribution and Decadal Climate Prediction Systems, *21st Symposium on Societal Applications: Policy, Research and Practice*, Houston, TX (Jan 2026). [\[Abstract\]](#)
- [11] **Labe, Z.M.**, T.L. Delworth, N.C. Johnson, L. Jia, W.F. Cooke, B.-T. Jong, and C.E. McHugh. Greater reduction in U.S. heat extreme days in overshoot simulations with GFDL SPEAR, *38th Conference on Climate Variability and Change*, New Orleans, LA (Jan 2025). [\[Abstract\]](#)
- [10] **Labe, Z.M.**, L. Jia, N.C. Johnson, C.E. McHugh, T.L. Delworth, and W.F. Cooke. Prediction, projection, and detection of U.S. heat extremes using data-driven approaches with the GFDL SPEAR modeling system, *Extreme Heat Workshop: Emerging Risks from Concurrent, Compounding and Record-breaking Extreme Heat across Sectors*, Columbia University, New York City, NY (Jul 2024). [\[Poster\]](#)
- [9] **Labe, Z.M.**, N.C. Johnson, and T.L. Delworth. Identifying the drivers of the observed springtime cooling trend in northern North America with large ensemble simulations, *2022 AGU Annual Meeting*, Chicago, IL (Dec 2022). [\[Abstract\]](#) [\[Poster\]](#)
- [8] **Labe, Z.M.**, E.A. Barnes, and J. Hurrell. Detecting the regional emergence of climate signals with machine learning in a set of stratospheric aerosol injection simulations, *2022 AGU Annual Meeting*, Chicago, IL (Dec 2022). [\[Abstract\]](#) [\[Poster\]](#)
- [7] **Labe, Z.M.** and E.A. Barnes. Temporary slowdowns in decadal warming predictions by a neural network, *CLIVAR Climate Dynamics Panel (CDP) annual workshop: External versus internal variability on decadal and longer time scales*, Virtual Workshop (Oct 2022). [\[Poster\]](#)
- [6] **Labe, Z.M.** and E.A. Barnes. Climate model evaluation with explainable neural networks, *3rd NOAA Workshop on Leveraging AI in Environmental Sciences*, Virtual Workshop (Sep 2021). [\[Poster\]](#)



- [5] **Labe, Z.M.** and E.A. Barnes. Using explainable neural networks for comparing historical climate model simulations, *2nd Workshop on Knowledge Guided Machine Learning (KGML2021)*, Virtual Workshop (Aug 2021). [\[Poster\]](#)
- [4] **Labe, Z.M.** Loss of Arctic sea ice thickness affects the large-scale atmosphere, *Arctic System Change Workshop* at NCAR, Boulder, CO (Apr 2018). [\[Poster\]](#)
- [3] **Labe, Z.M.**, G. Magnusdottir, and H.S. Stern. Arctic Sea Ice Thickness Variability and the Large-scale Atmospheric Circulation Using Satellite Observations, PIOMAS, and the CESM Large Ensemble, *14th Conference on Polar Meteorology and Oceanography*, Seattle, WA (Jan 2017). [\[Abstract\]](#) [\[Poster\]](#)
- [2] **Labe, Z.M.**, G. Magnusdottir, and H.S. Stern. Making the most of Arctic sea ice thickness observations, *Symposium on Recent Advances in Data Science*, University of California, Irvine (Oct 2016). [\[Poster\]](#)
- [1] **Labe, Z.M.** and T.R. Ault. Anomalous Early Onset of Spring in the CESM Large Ensemble Project, *14th Annual AMS Student Conference*, Phoenix, AZ (Jan 2015). [\[Poster\]](#)

## OTHER PRESENTATIONS

- [45] Joh, Y., S-W. Yeh, T.L. Delworth, **Z.M. Labe**, A.T. Wittenberg, W.F. Cooke, J. Lou, and Y-G. Park. Evolving synchronization of the Gulf Stream and Kuroshio-Oyashio Extension in a changing climate, *Ocean Sciences Meeting 2026*, Glasgow, Scotland (Feb 2026). [\[Abstract\]](#)
- [44] Mecray, E., **Z.M. Labe**, A. Smith, and J. Brady. Climate Central Science and Services to Support Information Needs Across Sectors, Hazards and Geographies, *30th Conference on Applied Climatology*, Houston, TX (Jan 2026). [\[Abstract\]](#)
- [43] Giguere, J., **Z.M. Labe**, D.M. Gilford, and K. Dahl. A Method for Rapid, Global Precipitation Attribution, *39th Conference on Climate Variability and Change*, Houston, TX (Jan 2026). [\[Abstract\]](#)
- [42] Ishraque, F., M.A. Shadab, O. Lauter, N. Narayanan, K. Shionalyn, M.N. Schaberg, **Z.M. Labe**, S.S. Gaikwad, M. Nicewonger, and R. Narayanan. Assessing challenges for polar early career scientists during science policy upheaval, 2025 AGU Annual Meeting, New Orleans, LA (Dec 2025). [\[Abstract\]](#)
- [41] Kalashnikov, D.A., J. Abatzoglou, F.V. Davenport, **Z.M. Labe**, P.C. Loikith, D. Touma, and D. Signh. Projections of Lightning-Ignited Wildfire Risk in the Western United States, *15th Fire and Forest Meteorology Symposium*, Denver, CO (May 2025). [\[Abstract\]](#)
- [40] Jong, B.-T., T.L. Delworth, **Z.M. Labe**, W.F. Cooke, and H. Murakami. Attributing changes in extreme precipitation across the Northeast U.S. under different climate scenarios, *EGU General Assembly*, Vienna, Austria (Apr 2025). [\[Abstract\]](#)
- [39] Schreck, C.J., **Z.M. Labe**, D.R. Easterling, R. Vose, J.E. Uehling, X. Zhang, D.A. Coates, N.C. Johnson, and J.J. Barsugli. Updates on NOAA's rapid attribution capability: The July 2024 California heat wave, *38th Conference on Climate Variability and Change*, New Orleans, LA (Jan 2025). [\[Abstract\]](#)
- [38] Kalashnikov, D.A., J. Abatzoglou, F.V. Davenport, **Z.M. Labe**, P.C. Loikith, D. Touma, and D. Signh. Projecting cloud-to-ground lightning and wildfire ignition risk in the western United States, *12th Conference on the Meteorological Application of Lightning Data*, New Orleans, LA (Jan 2025). [\[Abstract\]](#)
- [37] Jong, B.-T., T.L. Delworth, **Z.M. Labe**, and W.F. Cooke. Reversal of extreme precipitation trend over the Northeast U.S. in response to rapid reductions in greenhouse gas concentrations, *38th Conference on Climate Variability and Change*, New Orleans, LA (Jan 2025). [\[Abstract\]](#)
- [36] Kalashnikov, D.A., J.T. Abatzoglou, F.V. Davenport, **Z.M. Labe**, P.C. Loikith, D.E. Touma, and D. Singh. Projecting cloud-to-ground lightning and wildfire ignition

- risk in the western United States, *2024 AGU Annual Meeting*, Washington, DC (Dec 2024). [\[Abstract\]](#)
- [35] Bushuk, M., et al. (including **Z.M. Labe**). Predicting September Arctic Sea Ice: A Multi-Model Seasonal Skill Comparison, *2024 AGU Annual Meeting*, Washington, DC (Dec 2024). [\[Abstract\]](#)
- [34] Schaberg, M.N., **Z.M. Labe**, M.A. Shadab, L. Ashokkumar, S. Vanek, O. Lauter, and K. Shionalyn. Empowering the Polar Science Community: A Decade of USAPECS in Supporting Early Career Researchers Globally, *2024 AGU Annual Meeting*, Washington, DC (Dec 2024). [\[Abstract\]](#)
- [33] Johnson, N.C., M. Park, J. Clark, T.L. Delworth, L. Jia, F. Lu, W. Cooke, C. McHugh, and **Z.M. Labe**. Progress in the seasonal prediction of extreme weather in GFDL's SPEAR, *2024 AGU Annual Meeting*, Washington, DC (Dec 2024). [\[Abstract\]](#)
- [32] Park, M., N.C. Johnson, J. Clark, D. Yoon, **Z.M. Labe**, C. McHugh, and L. Jia. A Linkage between atmospheric rivers, blocking and North American heatwaves in high resolution climate model simulations, *2024 AGU Annual Meeting*, Washington, DC (Dec 2024). [\[Abstract\]](#)
- [31] Johnson, N.C., L. Jia, **Z.M. Labe**, C.E. McHugh, F. Lu, X. Yang, and T.L. Delworth. Diagnosing the predictability and simulation errors of seasonal extreme heat in the GFDL Seamless System for Prediction and EArth System Research (SPEAR), *NOAA's Subseasonal and Seasonal Applications Workshop*, College Park, MD, USA (Sep 2024). [\[Abstract\]](#)
- [30] Vanek, S., E. Adasheva, L. Ashokkumar, M.N. Helmberger, **Z.M. Labe**, O. Lauter, and M.A. Shadab. Exploring the past, present, and future of USAPECS: Lessons from a decade of supporting early career research across national and international polar networks, *Arctic Congress 2024*, Bodø, Norway (Jun 2024). [\[Abstract\]](#)
- [29] Kalashnikov, D.A., F.V. Davenport, **Z.M. Labe**, P.C. Loikith, J. Abatzoglou, and D. Singh. Using deep learning to predict cloud-to-ground lightning in the western United States, *23rd Conference on Artificial Intelligence for Environmental Science*, Baltimore, MD (Jan 2024). [\[Abstract\]](#)
- [28] Schreck, C.J., J. Barsugli, D.A. Coates, D.R. Easterling, K.E. Kunkel, **Z.M. Labe**, J.E. Uehling, R. Vose, and X. Zhang. Comparing the causes and unusualness of the Texas heatwaves in 2022 and 2023, *37th Conference on Climate Variability and Change*, Baltimore, MD (Jan 2024). [\[Abstract\]](#)
- [27] Ashokkumar, L., **Z.M. Labe**, M.A. Shadab, O. Lauter and E.P. Schreiber. Advancing inclusion, diversity, equity, and accessibility (IDEA) in the polar sciences by USAPECS, *2023 AGU Annual Meeting*, San Francisco, CA (Dec 2023). [\[Abstract\]](#)
- [26] Meem, T.J., **Z.M. Labe**, W.F. Cooke, T.L. Delworth, and V. Ramaswamy. Role of anthropogenic aerosols on the South Asian summer monsoon in a high-resolution large ensemble, *2023 AGU Annual Meeting*, San Francisco, CA (Dec 2023). [\[Abstract\]](#)
- [25] Kalashnikov, D.A., F.V. Davenport, **Z.M. Labe**, P.C. Loikith, J. Abatzoglou, and D. Singh. Using deep learning to predict cloud-to-ground lightning in the western United States, *2023 AGU Annual Meeting*, San Francisco, CA (Dec 2023). [\[Abstract\]](#)
- [24] Johnson, N.C., L. Jia, **Z.M. Labe**, T.L. Delworth, F. Lu, and C.E. McHugh. Sources of seasonal extreme heat predictability diagnosed from the GFDL seamless System for Prediction and EArth System Research (SPEAR), *2023 AGU Annual Meeting*, San Francisco, CA (Dec 2023). [\[Abstract\]](#)
- [23] J.J. Barsugli, **Z.M. Labe**, N.C. Johnson, K.E. Kunkel, T. Zhang, D.E. Easterling, J.E. Uehling, J. Eischeid, M. Hoerling, A. Kumar, D. Coates, R. Vose, D. Arndt, C.J. Schreck, and T.L. Delworth. The Texas heat wave of 2022: La Niña, drought,

- and the emerging climate change signal, *36th Conference on Climate Variability and Change*, Denver, CO (Jan 2023). [\[Abstract\]](#)
- [22] Johnson, N.C., T.L. Delworth, **Z.M. Labe**, F. Lu, and C.E. McHugh. Accurate seasonal predictions of the 2022 Texas early summer extreme heat nine months in advance, *36th Conference on Climate Variability and Change*, Denver, CO (Jan 2023). [\[Abstract\]](#)
  - [21] Ashokkumar, L., L. Weinberg, **Z.M. Labe**, E. Schreiber, A. Taitt, and M. Dryak. Progress and challenges by early career polar scientists (USAPECS) in addressing inclusivity, diversity, equity, and accessibility, *2022 AGU Annual Meeting*, Chicago, IL (Dec 2022). [\[Abstract\]](#)
  - [20] Po-Chedley, S., E.A. Barnes, C. Bonfils, J. Fasullo, **Z.M. Labe**, B. Santer, and N. Siler. Substantial contribution of internal variability to satellite-era tropospheric warming inferred from CMIP6 large ensembles, *2022 AGU Annual Meeting*, Chicago, IL (Dec 2022). [\[Abstract\]](#)
  - [19] Lehner, F., C. Deser, J. Fasullo, E. Fischer, P. Hitchcock, **Z.M. Labe**, S. Milinski, M. Röthlisberger, I. Simpson, S. Sippel, and J. Zscheischler. Emergence of multiple feedbacks in the extreme and persistent warmth over Siberia in 2020, *2022 AGU Annual Meeting*, Chicago, IL (Dec 2022). [\[Abstract\]](#)
  - [18] Bushuk, M., et al. (including **Z.M. Labe**). A multi-model comparison of September Arctic sea ice seasonal prediction skill, *2022 AGU Annual Meeting*, Chicago, IL (Dec 2022). [\[Abstract\]](#)
  - [17] Witt, J.K., **Z.M. Labe**, and B. Clegg. Comparisons of Perceptions of Risk for Visualizations Using Animated Risk Trajectories Versus Cones of Uncertainty, *Human Factors and Ergonomics Society (HFES) 66th International Annual Meeting* (Oct 2022).
  - [16] Po-Chedley, S., E.A. Barnes, C. Bonfils, J. Fasullo, **Z.M. Labe**, B. Santer, and N. Siler. Internal Variability and Forcing Influence Model-satellite Differences in the Rate of Tropical Tropospheric Warming, *Asia Oceania Geosciences Society 19th Annual Meeting* (Aug 2022).
  - [15] Myint, H. and **Z.M. Labe**. Predicting September Arctic sea-ice using a hierarchy of statistical models, *21st Annual Student Conference: Polar Meteorology*, Virtual Attendance (Jan 2022). [\[Abstract\]](#)
  - [14] Witt, J.K., **Z.M. Labe**, B. Clegg, and A. Warden. An alternative to the "Cone of Uncertainty" that is flexible, intuitive, and desirable for communicating hurricane forecasts, *17th Symposium on Societal Applications: Policy, Research and Practice*, Virtual Attendance (Jan 2022). [\[Abstract\]](#)
  - [13] Lehner, F., E. Fischer, **Z.M. Labe**, S. Milinski, M. Röthlisberger, I. Simpson, S. Sippel, and J. Zscheischler. Evaluating large ensembles for persistent extreme events such as the 2020 temperature anomaly over Siberia, *2021 AGU Annual Meeting*, Virtual Attendance (Dec 2021). [\[Abstract\]](#)
  - [12] Peings, Y., **Z.M. Labe**, and G. Magnusdottir. Arctic-midlatitude linkages: role of sea ice loss versus full Arctic amplification. *US CLIVAR PPAI Panel Webinar Series*, Virtual Talk (Apr 2021).
  - [11] Peings, Y., **Z.M. Labe**, and G. Magnusdottir. Influence of internal variability: how to ensure results are robust? *Polar Amplification Model Intercomparison (PAMIP) Virtual Workshop*, Virtual Conference (Mar 2021).
  - [10] Peings, Y., **Z.M. Labe**, and G. Magnusdottir. Arctic-midlatitude linkages: role of sea ice loss versus full Arctic Amplification. *Arctic Science Summit Week 2021*, Virtual Conference (Mar 2021).
  - [9] Magnusdottir, G., **Z.M. Labe**, and Y. Peings. The midlatitude response to Arctic sea-ice decline, compared to the response to the full effects of Arctic amplifi-

cation. *34th Conference on Climate Variability and Change*, Virtual Conference (Jan 2021). [\[Abstract\]](#)

- [8] Peings, Y., G. Magnusdottir, and **Z.M. Labe**. Are 100 ensemble members enough to capture the remote atmospheric response to +2°C Arctic sea ice loss? *34th Conference on Climate Variability and Change*, Virtual Conference (Jan 2021). [\[Abstract\]](#)
- [7] Magnusdottir, G., **Z.M. Labe**, and Y. Peings. How does the atmospheric response to Arctic sea-ice decline compare to the full effect of the Arctic Amplification? *2020 AGU Annual Meeting*, Virtual Conference (Dec 2020). [\[Abstract\]](#)
- [6] Peings, Y., **Z.M. Labe**, and G. Magnusdottir. Are 100 ensemble members enough to capture the remote atmospheric response to +2°C Arctic sea ice loss? *2020 AGU Annual Meeting*, Virtual Conference (Dec 2020). [\[Abstract\]](#)
- [5] Magnusdottir, G., Y. Peings, and **Z.M. Labe**. Response to sea-ice loss under the Polar Amplification MIP protocol in extended ensembles of simulations. *2019 AGU Annual Meeting*, San Francisco, CA (Dec 2019). [\[Abstract\]](#)
- [4] Peings, Y., G. Magnusdottir, and **Z.M. Labe**. Impact of the QBO on the response to Arctic sea ice loss. *Polar Amplification Model Intercomparison (PAMIP) Workshop*, Devon, UK (Jun 2019).
- [3] Holman, A., R. Thoman, **Z.M. Labe**, and J.E. Walsh. Not Just Chance: Ocean and Atmospheric Factors in the Record Low Bering Sea Ice Winter of 2017-2018 and effects on health and safety, *2018 AGU Annual Meeting*, Washington, DC (Dec 2018). [\[Abstract\]](#)
- [2] Magnusdottir, G., **Z.M. Labe**, and Y. Peings. The role of the stratosphere, including the QBO, in Arctic to mid-latitude teleconnections associated with sea-ice forcing. *2018 AGU Annual Meeting*, Washington, DC (Dec 2018). [\[Abstract\]](#)
- [1] Thoman, R. and **Z.M. Labe**. 2017-18 Sea Ice in Western Alaska during the 2017-18 Season: Historical Context and Possible Drivers. *Western Alaska Interdisciplinary Science Conference and Forum*, Nome, AK (Mar 2018).

## AWARDS AND FELLOWSHIPS

|           |                                                                                                                                             |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Sep. 2025 | Outstanding Reviewer Award - <i>JGR: Machine Learning</i>                                                                                   |
| Mar. 2025 | Outstanding Reviewer Award - <i>Environmental Research: Climate</i>                                                                         |
| Sep. 2023 | Outstanding Reviewer Award - <i>Geophysical Research Letters</i>                                                                            |
| Oct. 2022 | Early Career Scientist Best Poster Award - CLIVAR CDP 2022 Workshop: External versus internal variability on decadal and longer time scales |
| May 2021  | Outstanding Reviewer Award - <i>Geophysical Research Letters</i>                                                                            |
| 2020-2021 | SoGES Sustainability Leadership Fellow, Colorado State University                                                                           |
| Sep. 2019 | Kavli Fellow, National Academy of Sciences                                                                                                  |
| Jan. 2019 | Outstanding Student Presentation Award - AMS Conference on Middle Atmosphere                                                                |
| Nov. 2018 | Travel Award - AMS Conference on Middle Atmosphere                                                                                          |
| 2016-2018 | NSF NRT-DESE in Data Science and Physical Science Fellowship                                                                                |
| Su. 2016  | Data Science Initiative Fellowship, Department of Statistics, University of California, Irvine                                              |
| Wi. 2016  | Jenkins Family Graduate Fellowship in Earth System Science,                                                                                 |

## TEACHING AND OUTREACH

Department of Earth System Science, University of California,  
Irvine  
2014-2015 Fuerst Outstanding Library Student Employee Award Finalist,  
Cornell University

### **Mentoring Experience**

Su. 2023 Tasmeem Jahan Meem - CIMES Research Internship Program  
at Princeton University  
Su. 2021 Hannah Myint - REU at Colorado State Univ. (Dept. of Atmos.)

### **University of California, Irvine**

Fa. 2019 Teaching Assistant, Terrestrial Hydrology  
Sp. 2019 Teaching Assistant, Earth System Physics  
Wi. 2019 Teaching Assistant, Weather Analysis  
Fa. 2016 Teaching Assistant, Fundamental Processes in Earth and Environmental Studies

### **Cornell University**

Su. 2015 Guest Lecturer, Severe Weather Phenomena  
Sp. 2015 Teaching Assistant, Programming and Meteorology Software (Python)  
Fa. 2014 Teaching Assistant, Basic Principles of Meteorology Lab

### **Related Educational Activities and Talks**

Dec. 2025 *Climate Central*, Climate Central's Monthly Briefing Highlights from November 2025. (**Presenter-Remote**)  
Nov. 2025 *Cooperative Atmospheric and Earth Science Assemble of Researchers*, Sharing complex research through effective communication techniques. (**Invited-Presenter-Remote**).  
Nov. 2025 *EV228: Analysis of Environmental Data*, Data visualization for trusted science communication, Colorado College, Colorado Springs, CO. (**Invited-Guest Lecture-Remote**).  
Aug. 2025 *Climate Central Lunch & Learn*, Bringing real-time climate monitoring to life. (**Presenter-Remote**).  
Jul. 2025 *COLDEX Research Experience for Undergraduates*, Earth science careers. (**Panelist-Invited-Remote**)  
Jul. 2025 *The Medical Society Consortium on Climate and Health*, Harnessing the Power of Social Media: Using Different Platforms Strategically. (**Panelist-Invited-Remote**)  
Jun. 2025 *The Weather and Climate Livestream*, Science in retreat: The consequences for the Arctic and our planet, Remote Presentation. (**Invited Keynote**)  
Apr. 2025 *EGU General Assembly 2025*, Academic activism for urgent climate action: How to get started? Vienna, Austria. (**Presenter-Invited**)  
Apr. 2025 *Pennswood Village*, Our changing climate in the Northeastern United States, Newtown, PA. (**Presenter-Invited**)



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| Feb. 2025 | <i>Rider University, Global Biogeochemistry Class Visit, The Arctic through the lens of data visualization, NOAA GFDL, Princeton, NJ. (Invited)</i>                                                                             |
| Feb. 2025 | <i>Guest lecture for "First-Year Innovation and Research Experience and Climate Computing", Using machine learning for understanding changes in the Earth system, University of Maryland, MD (Invited-Remote)</i>               |
| Feb. 2025 | <i>18th Annual Monmouth Junction Elementary School PTO Science Fair, Meet a scientist event, Dayton, NJ (Volunteer)</i>                                                                                                         |
| Jan. 2025 | <i>Canadian Meteorological and Oceanographic Society, Virtual workshop for "How are technological and climate disruptions impacting education and careers in the weather and climate enterprise?" (Panelist-Invited-Remote)</i> |
| Jan. 2025 | <i>NOAA Research, NOAA Constituent Briefing on the 2024 Arctic Report Card. (Panelist-Invited-Remote)</i>                                                                                                                       |
| Jan. 2025 | <i>NOAA Library, Two decades of the NOAA Arctic Report Card: history, reflections, and next steps. (Panelist-Invited-Remote)</i>                                                                                                |
| Jan. 2025 | <i>Joint with 38th AMS Conference on Climate Variability and Change and 34th AMS Conference on Education, Session convener for "Communicating climate change uncertainty to the public," New Orleans, LA.</i>                   |
| Oct. 2024 | <i>NOAA Climate Connections 2.0, Session convener for "Back-casting Climate Projection Services: Enhancing NOAA's Climate Services Culture," Washington, DC.</i>                                                                |
| Aug. 2024 | <i>EOS Subject Matter Expert, Earth's atmosphere illustration for AGU publications</i>                                                                                                                                          |
| Jul. 2024 | <i>GFDL/AOS Summer Internship Lecture Series, Data Visualization Workshop, Princeton University, Princeton, NJ. (Presenter)</i>                                                                                                 |
| May 2024  | <i>Arctic Congress 2024, Session chair for "Cross/Trans-Disciplinary Collaborations and Advancing Community, Equity, and Inclusion in Arctic Research."</i>                                                                     |
| May 2024  | <i>21st Annual New Jersey Ocean Fun Days, Volunteer for atmospheric and oceanic sciences outreach booth for CIMES, Island Beach State Park/Sandy Hook, NJ. (Presenter)</i>                                                      |
| Apr. 2024 | <i>United States Association of Polar Early Career Scientists (US-APECS) IDEA Training Course, Accessibility and disability in on-line spaces. (Presenter-Remote)</i>                                                           |
| Mar. 2024 | <i>GFDL Polar Climate Interest Group, Machine learning in the cryosphere, Princeton University, Princeton, NJ. (Presenter)</i>                                                                                                  |
| Mar. 2024 | <i>Temple University, Climate Communication Workshop: Learn How To Make Your Research Matter, Using accessible data to communicate global climate change, Philadelphia, PA. (Invited Keynote)</i>                               |
| Feb. 2024 | <i>17th Annual Monmouth Junction Elementary School PTO Science Fair, Meet a scientist event, Dayton, NJ (Volunteer)</i>                                                                                                         |
| Jan. 2024 | <i>AMS AI Conference - Student Competition, Poster Judge</i>                                                                                                                                                                    |
| Jan. 2024 | <i>37th AMS Conference on Climate Variability and Change, Session chair for "Frontiers in Earth System Modeling," Baltimore, MD.</i>                                                                                            |
| Jan. 2024 | <i>ACCAP - IARC, University of Alaska Fairbanks, Arctic Report Card: Background and Key Finding. (Panelist-Invited-Remote)</i>                                                                                                  |
| Dec. 2023 | <i>NOAA Research, 2023 Arctic Report Card Stakeholder Briefing. (Panelist-Invited-Remote)</i>                                                                                                                                   |

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| Dec. 2023 | <i>Mercer County Community College</i> , Career pathways and re-<br>search opportunities in the Earth sciences, West Windsor, NJ.                                                                       |
| Nov. 2023 | <i>NJ State Museum Planetarium</i> , Visualizing climate change<br>through data, Trenton, NJ. <b>(Invited)</b>                                                                                          |
| Oct. 2023 | <i>Euronews</i> , Climate Now debate: 2023 is set to be the hottest<br>year on record, so why aren't we taking action? <b>(Panelist-<br/>Invited-Remote)</b>                                            |
| Sep. 2023 | Guest lecture for "Observing and Modeling Climate Change (EES<br>3506/5506)", Contrasting polar climate change in the past,<br>present, and future, Temple University, PA. <b>(Invited-Remote)</b>      |
| Sep. 2023 | <i>Hershey Horticulture Society</i> , Climate change extremes by sea-<br>son in the United States, Hershey, PA. <b>(Presenter-Invited)</b> .                                                            |
| Aug. 2023 | Guest lecture for "Introduction to Global Climate Change (ESS 15)",<br>Our changing Arctic in the past and future, University of Califor-<br>nia, Irvine, CA. (Invited-Remote)                          |
| Jun. 2023 | <i>La Uni Climática</i> , Monitoring indicators of climate change<br>through data-driven visualization. <i>(Presenter-Invited-Remote)</i>                                                               |
| Jun. 2023 | <i>EUMET/Copernicus Earth Observation - Data Visualization Work-<br/>shop Series</i> , Climate Extremes: Heatwaves, Changes in Ice,<br>Drought, Sea Ice Anomalies. <i>(Presenter-Invited-Remote)</i>    |
| Apr. 2023 | <i>Mercer County Community College</i> , Career pathways and re-<br>search opportunities in the Earth sciences, West Windsor, NJ.                                                                       |
| Feb. 2023 | <i>Rider University</i> , <i>Global Biogeochemistry Class Visit</i> , Arctic cli-<br>mate change through the lens of data visualization, NOAA<br>GFDL, Princeton, NJ. <b>(Invited)</b> .                |
| Dec. 2022 | <i>AGU Fall Meeting 2022</i> , Outstanding student presentation<br>awards judge (OSPA)                                                                                                                  |
| Nov. 2022 | <i>GFDL Lunchtime Seminar Series</i> , Using data visualization for ac-<br>cessible science (communication), Princeton, NJ. <b>(Presenter-<br/>Remote)</b> .                                            |
| Oct. 2022 | <i>IEEEVis 2022</i> , #Viz4Climate - Workshop on High-Impact Tech-<br>niques for Visual Climate Science Communication, Oklahoma<br>City, OK. <b>(Panelist-Invited-Remote)</b>                           |
| Jul. 2022 | <i>REU Professional Development Series</i> , Making effective and ac-<br>cessible figures, Colorado State University, Fort Collins, CO.<br><b>(Presenter-Invited-Remote)</b>                            |
| Jul. 2022 | <i>Polar Bears International</i> , 'State of the Arctic 2022' - Blog Post<br><b>(Author)</b> <a href="#">[Article]</a>                                                                                  |
| Jun. 2022 | <i>GFDL/AOS Summer Internship Lecture Series</i> , Learning new cli-<br>mate science by thinking creatively with machine learning,<br>Princeton University, Princeton, NJ. <b>(Presenter)</b>           |
| Apr. 2022 | Guest lecture for "Objective Analysis in Atmospheric Sciences (ATS<br>655)", Using data visualization for effective science (communi-<br>cation), Colorado State University, Fort Collins, CO. (Remote) |
| Nov. 2021 | <i>CASSINI Hackathon</i> , Climate Change in the Arctic, Nordic<br>Startup School, Finland. <b>(Presenter-Invited)</b>                                                                                  |
| Jul. 2021 | <i>REU Professional Development Series</i> , Making effective figures,<br>Colorado State University, Fort Collins, CO. <b>(Presenter-Invited)</b>                                                       |
| Jul. 2021 | <i>Polar Bears International</i> , 'State of the Arctic' - Blog Post <b>(Author)</b><br><a href="#">[Article]</a>                                                                                       |
| Jun. 2021 | <i>US Climate Variability and Predictability</i> , 2021 June CLIVAR<br>Newsgram <b>(Featured Graphics)</b> <a href="#">[Article]</a>                                                                    |
| Jun. 2021 | <i>ABC News</i> , Climate summit for the ABC network <b>(Panelist-<br/>Invited-Remote)</b>                                                                                                              |

Zachary Labe

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| May 2021  | Guest lecture for "Objective Analysis in Atmospheric Sciences (ATS 655)", Using data visualization for effective science (communication), Colorado State University, Fort Collins, CO. (Remote) |
| Mar. 2021 | Department of Atmospheric Science, Improving science (communication) through data visualization, Colorado State University, Fort Collins, CO. ( <b>Presenter-Remote</b> )                       |
| Feb. 2021 | School of Global Environmental Sustainability - HumanNature Blog, 'Telling stories with data' - Blog Post ( <b>Author</b> ) <a href="#">[Article]</a>                                           |
| Jan. 2021 | 20th AMS Annual Student Conference, Poster Judge (Remote)                                                                                                                                       |
| Oct. 2020 | Cornell Chapter of the American Meteorological Society, Professional Series: Academic Sector ( <b>Panelist-Invited-Remote</b> )                                                                 |
| Oct. 2020 | AMS Early Career Leadership Academy, Session on Climate Change Communications ( <b>Panelist-Invited-Remote</b> )                                                                                |
| Sep. 2020 | Polar Bears International, 'A Sign of the Future: Summer 2020 in the Arctic' - Blog Post ( <b>Author</b> ) <a href="#">[Article]</a>                                                            |
| Jul. 2020 | Polar Bears International, 'State of the Arctic in 2020' - Blog Post ( <b>Author</b> ) <a href="#">[Article]</a>                                                                                |
| Mar. 2020 | Climate, Literacy, Empowerment And iNquiry (CLEAN), The Cryosphere Outreach event, MacArthur Fundamental Intermediate School, Santa Ana, CA ( <b>Presenter</b> )                                |
| Feb. 2020 | Irvine Unified School District's 39 <sup>th</sup> Annual Science Fair, Physical science project judge, Irvine, CA ( <b>Volunteer</b> )                                                          |
| Jan. 2020 | 100th American Meteorological Society Annual Meeting: Side Panel - Using Social Media to Communicate Climate Science, Boston, MA. ( <b>Chair</b> ) <a href="#">[Abstract]</a>                   |
| Nov. 2019 | Department of Earth System Science, Improving scientific graphics of climate (change) data, University of California, Irvine, CA. ( <b>Presenter</b> )                                          |
| Oct. 2019 | Irvine Unified School District, "Ask-A-Scientist/Engineer Night" at Creekside High School, Orange County, CA ( <b>Volunteer</b> )                                                               |
| Sep. 2019 | Geological Society of America Annual Meeting, Geoscience Communication in the Modern Age – "A Changing Arctic", Phoenix, AZ ( <b>Contributed Art</b> )                                          |
| Sep. 2019 | UC Irvine Graduate Orientation, Session Title – Healthy Student Life – The Current Student Perspective, Irvine, CA ( <b>Panelist-Invited</b> )                                                  |
| May 2019  | College and Career Day Experience, MacArthur Fundamental Intermediate School, Santa Ana, CA ( <b>Presenter</b> )                                                                                |
| Apr. 2019 | Vista Verde School, Weather and climate booth at an Earth Science Day fair, Irvine, CA ( <b>Presenter</b> )                                                                                     |
| Mar. 2019 | Climate, Literacy, Empowerment And iNquiry (CLEAN), Weather and Climate Outreach event, MacArthur Fundamental Intermediate School, Santa Ana, CA ( <b>Presenter</b> )                           |
| Feb. 2019 | Orange County Regional Science Olympiad, Climate Science-Meteorology exam writer and proctor, Irvine, CA ( <b>Event Supervisor</b> )                                                            |
| Feb. 2019 | Climate, Literacy, Empowerment And iNquiry (CLEAN), The Cryosphere Outreach event, MacArthur Fundamental Intermediate School, Santa Ana, CA ( <b>Presenter</b> )                                |
| Dec. 2018 | NOAA, Arctic Report Card - Update for 2018. <a href="#">[Contributed Graphics]</a>                                                                                                              |

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| Oct. 2018 | <i>Brews and Brains: TED-Style Talk</i> , Our Changing Arctic, Fireside Tavern, Costa Mesa, CA. ( <b>Presenter-Invited</b> ).                                                 |
| Oct. 2018 | <i>Irvine Unified School District</i> , "Ask-A-Scientist/Engineer Night" at Rancho San Joaquin Middle School, Orange County, CA ( <b>Volunteer</b> )                          |
| Sep. 2018 | <i>UC Irvine Graduate Orientation</i> , Session Title – Student Panel – Embracing Your New Graduate Life, Irvine, CA ( <b>Panelist-Invited</b> )                              |
| May 2018  | <i>Vista Verde School</i> , Weather and climate booth at an Earth Day fair, Irvine, CA ( <b>Presenter</b> )                                                                   |
| Feb. 2018 | <i>Irvine Unified School District's 37<sup>th</sup> Annual Science Fair</i> , Physical science project judge, Irvine, CA ( <b>Volunteer</b> )                                 |
| Feb. 2018 | <i>Climate, Literacy, Empowerment And iNquiry (CLEAN)</i> , Weather and Climate Outreach event, MacArthur Fundamental Intermediate School, Santa Ana, CA ( <b>Presenter</b> ) |
| Feb. 2018 | <i>Orange County Regional Science Olympiad</i> , Climate Science-Meteorology exam writer and proctor, Irvine, CA ( <b>Event Supervisor</b> )                                  |
| Feb. 2018 | <i>Climate, Literacy, Empowerment And iNquiry (CLEAN)</i> , The Cryosphere Outreach event, MacArthur Fundamental Intermediate School, Santa Ana, CA ( <b>Presenter</b> )      |
| Sep. 2017 | <i>Irvine Unified School District</i> , "Ask-A-Scientist/Engineer Night" at Rancho San Joaquin Middle School, Orange County, CA ( <b>Volunteer</b> )                          |
| Aug. 2017 | <i>Irvine Unified School District</i> , "Ask-A-Scientist/Engineer Night" at Rancho San Joaquin Middle School, Orange County, CA ( <b>Volunteer</b> )                          |
| Aug. 2017 | <i>NASA DIRECT-STEM Program</i> , Assessing a changing Arctic ( <b>Presenter-Invited</b> ).                                                                                   |
| Apr. 2017 | <i>Climate Data Hackathon</i> , Looking for clues to changes in Arctic sea ice, University of California, Irvine. ( <b>Presenter-Invited</b> ).                               |
| Feb. 2017 | <i>Irvine Unified School District's 36<sup>th</sup> Annual Science Fair</i> , Physical science project judge, Irvine, CA ( <b>Volunteer</b> )                                 |
| Feb. 2017 | <i>Orange County Regional Science Olympiad</i> , Severe Storms-Meteorology exam writer and proctor, Irvine, CA ( <b>Event Supervisor</b> )                                    |
| Wi. 2017  | Seminar Course – Teaching Topics in Earth System Science ( <b>Training</b> )                                                                                                  |
| Oct. 2016 | <i>Irvine Unified School District</i> , "Ask-A-Scientist/Engineer Night" at Rancho San Joaquin Middle School, Orange County, CA ( <b>Volunteer</b> )                          |
| Aug. 2016 | <i>NASA DIRECT-STEM Workshop</i> , Data and Analysis of Arctic Climate Change in CMIP5 using Python ( <b>Instructor</b> ).                                                    |

## PROFESSIONAL ACTIVITIES & SERVICE

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| Summary – | Conference Paper Referee - <i>AI4Earth NeurIPS</i> , <i>ICML ML4ESM</i><br>Hiring Committees - <i>NOAA OAR</i><br><br>Proposal Referee - <i>NOAA (CPO/MAPP)</i> , <i>NSF (GEO/AGS)</i> , <i>NSF (ANS)</i> , <i>Netherlands Organisation for Scientific Research (NWO)</i> , <i>S.C. Sea Grant Consortium</i> |
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|              | Journal Manuscript Referee [ <a href="#">Web of Science</a> ; >100 reviews] - <i>Artificial Intelligence for the Earth Systems, Atmosphere-Ocean, Atmospheric Research, Atmosphere, Bulletin of the American Meteorological Society, Climatic Change, Climate Dynamics, Communications Earth &amp; Environment, Environmental Data Science, Environmental Research: Climate, Environmental Research Letters, Geophysical Research Letters, Geosciences, IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, International Journal of Climate, International Journal of Disaster Risk Science, Journal of Climate, JGR: Atmospheres, JGR: Machine Learning and Computation, Journal of Advances in Modeling Earth Systems, Journal of Glaciology, Nature Climate Change, Nature Communications, Polar Geography, Remote Sensing, Science Advances, Scientific Data, Scientific Reports, The Cryosphere, Weather, Weather and Climate Dynamics</i> |
| 2026-Present | Board Member - AMS Committee on Climate Services                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 2025-Present | Associate Editor - <i>Atmospheric Science Letters</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 2025-Present | Task Team - WMO's World Weather Research Programme, PCAPS ORCAS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 2023-Present | Member - Fresh Eyes on CMIP (WCRP Working Group)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 2023-Present | Associate Editor - <i>Journal of Climate</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 2021-Present | Board Member - US Association of Polar Early Career Scientists                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 2020-Present | Board of Advisors for the NCAR Climate Data Guide                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 2023-2025    | Contributing Editor - Carbon Brief                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 2023-2025    | NOAA GFDL Internal Reviewer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 2024-2025    | Board Member - NOAA GFDL Employees Association (GFDLEA)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 2023-2025    | Member - Diversity, Equity, Inclusivity, and Accessibility Committee (NOAA GFDL)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 2021-2024    | Guest Editor - Special Issue for <i>Atmospheric Science Letters</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Jan. 2024    | Assessment of the Algorithm Reviewer - EUMETSAT/OSI SAF Sea Ice Index (OSI-420)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Nov. 2023    | Review Panel Member - NASA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Apr. 2023    | Review Panel Member - NOAA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Nov. 2022    | Data Requirement Review Panel Member - EUMETSAT/OSI SAF Sea Ice Index                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Oct. 2022    | Review Panel Member - NSF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 2021-2022    | Science Associate/Volunteer - Arctic Basecamp                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 2019-2021    | Student Board Member, American Meteorological Society's Board on Societal Impacts                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 2017-2020    | Vice President & Communications Chair, Student Chapter of the American Meteorological Society at the University of California, Irvine                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 2017-2020    | Student Board Member, American Meteorological Society's Committee on Climate Variability and Change                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 2017-2018    | Member, Student Communications Working Group, University of California, Irvine                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 2014-2015    | Co-President, American Meteorological Society Student Chapter, Cornell University                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |



## PROFESSIONAL TRAVEL

### ***Affiliations/Memberships***

|              |                                                                    |
|--------------|--------------------------------------------------------------------|
| 2023-Present | European Geosciences Union, Member                                 |
| 2021-Present | Interagency Arctic Research Policy Committee (IARPC), Member       |
| 2020-Present | American Association for the Advancement of Science (AAAS), Member |
| 2016-Present | Association of Polar Early Career Scientists (APECS), Member       |
| 2015-Present | American Geophysical Union (AGU), Member                           |
| 2014-Present | National Weather Association (NWA), Member                         |
| 2009-Present | American Meteorological Society (AMS), Member                      |

### ***Field Work***

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| May 2017 | INTPART Arctic Field Summer Schools: Norway–Canada–USA collaboration, University of Tromsø, Norway (Workshops); Longyearbyen, Svalbard (R/V <i>Lance</i> - sea ice) |
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### ***Workshops***

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|-----------|----------------------------------------------------------------------------------------------------------------------------------------|
| Jun. 2025 | Natural Hazard Risk Reduction: Building the Resiliency Business Case, ASCE-NOAA workshop. (Virtual)                                    |
| Jun. 2025 | AASC Climate Tools "Boot Camp," Blue Springs, MO. (Virtual)                                                                            |
| May 2025  | Broadening Access to Climate AI Innovation Workshop, University of Virginia, VA. (Virtual)                                             |
| Feb. 2025 | Arctic Report Card Planning Workshop, Seattle, WA. (Virtual)                                                                           |
| Nov. 2024 | Data-Driven Precision Health: Integrating Genomics, Climate, and the Environment Conference, Princeton, NJ                             |
| Oct. 2024 | NOAA Climate Connections 2.0, Washington, DC. (Virtual)                                                                                |
| Oct. 2024 | PAMIP Phase 2 Workshop. (Virtual)                                                                                                      |
| Jul. 2024 | Extreme Heat Workshop: Emerging Risks from Concurrent, Compounding and Record-breaking Extreme Heat across Sectors, New York City, NY  |
| Jun. 2024 | Climate Risk Reduction ASCE-NOAA Workshop: Hazards and Process. (Virtual)                                                              |
| Aug. 2023 | Princeton AOS's Paleo, present, and future: Leveraging the past to understand and predict our changing climate, Princeton, NJ          |
| Oct. 2022 | IEEE VIS 2022, Oklahoma City, OK. (Virtual)                                                                                            |
| Oct. 2022 | CLIVAR Climate Dynamics Panel (CDP) annual workshop: External versus internal variability on decadal and longer time scales. (Virtual) |
| Sep. 2022 | Leveraging Earth System Science and Modeling to Inform Civil Engineering Design: ASCE-NOAA. (Virtual)                                  |
| Aug. 2022 | Princeton AOS's Workshop on Attribution of Extreme Events to Climate Change, Princeton, NJ                                             |
| Jul. 2022 | The Reproducibility Crisis in ML-based Science, Princeton University. (Virtual)                                                        |
| Jun. 2022 | 2022 CESM Workshop, National Center for Atmospheric Research (NCAR), Boulder, CO. (Virtual)                                            |

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| Sep. 2021 | WCRP Workshop on Attribution of Multi-Annual to Decadal Changes in the Climate System. (Virtual)                                                            |
| Sep. 2021 | 3rd NOAA Workshop on Leveraging AI in Environmental Sciences. (Virtual)                                                                                     |
| Aug. 2021 | 2nd Workshop on Knowledge Guided Machine Learning (KGML2021). (Virtual)                                                                                     |
| Jun. 2021 | 2021 CESM Workshop, National Center for Atmospheric Research (NCAR), Boulder, CO. (Virtual)                                                                 |
| May 2021  | NOAA Arctic Report Card Workshop 2021. (Virtual)                                                                                                            |
| Jun. 2020 | Artificial Intelligence for Earth System Science (AI4ESS) Summer School, UCAR/NCAR. (Virtual)                                                               |
| Oct. 2019 | Transdisciplinary Research on the Changing Arctic and Its Global Impacts: Enhancing Capacity for Convergence Science, Beckman Center of the NAS, Irvine, CA |
| Apr. 2018 | Arctic System Change Workshop, Mesa Lab, National Center for Atmospheric Research (NCAR), Boulder, CO                                                       |
| Jun. 2017 | Understanding the Causes and Consequences of Polar Amplification, Aspen Global Change Institute, Aspen, CO                                                  |

## TECHNICAL SKILLS

Programming: Python, MATLAB, R, Fortran, Unix, HTML,  $\text{\TeX}$ ,  $\text{\LaTeX}$ ,  $\text{\BibTeX}$   
Software/Tools: NCL, NCO, CDO, GrADS, Git, Scikit-learn, TensorFlow/Keras  
Modeling: NCAR's Yellowstone/Cheyenne, CESM, E3SM, CMIP5/6

Visit my [GitHub](#) (>300 followers) !

## SELECTED NEWS AND MEDIA

|           |                                                                                                                                                                             |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dec. 2025 | <i>Washington Post</i> , "How Trump's attacks on 'climate alarmism' have already transformed U.S. science" ( <b>Quoted</b> ). <a href="#">[Article]</a>                     |
| Dec. 2025 | <i>Geographical Magazine</i> , "How are scientists and health workers coping with Trump 2.0?" ( <b>Interview</b> ). <a href="#">[Article]</a>                               |
| Dec. 2025 | <i>The Guardian</i> , "Arctic endured year of record heat as climate scientists warn of 'winter being redefined'" ( <b>Quoted</b> ). <a href="#">[Article]</a>              |
| Dec. 2025 | <i>Science Talk</i> , "Arctic Warming Too Fast   Extreme Climate Risks   Sea Level Rise   Climate Projections beyond 2100?" ( <b>Interview</b> ). <a href="#">[Podcast]</a> |
| Oct. 2025 | <i>VernonReporter</i> , "A tool tracking billion dollar disasters is active again after being retired by Trump administration" ( <b>Quoted</b> ). <a href="#">[Article]</a> |
| Oct. 2025 | <i>UCI Physical Sciences</i> , "How one Earth system scientist mastered climate science communication" ( <b>Interview</b> ). <a href="#">[Article]</a>                      |
| Oct. 2025 | <i>Carbon Brief</i> , "Antarctic sea ice winter peak in 2025 is third smallest on record" ( <b>Quoted</b> ). <a href="#">[Article]</a>                                      |
| Sep. 2025 | <i>Quanta Magazine</i> , "How Climate Scientists Saw the Future Before It Arrived" ( <b>Quoted</b> ). <a href="#">[Article]</a>                                             |
| Aug. 2025 | <i>Grist</i> , "Antarctica is in extreme peril" ( <b>Quoted</b> ). <a href="#">[Article]</a>                                                                                |
| Aug. 2025 | <i>CNN</i> , "The strange divide in how Americans experience summer temperatures" ( <b>Quoted</b> ). <a href="#">[Article]</a>                                              |

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| Aug. 2025 | <i>Harvest Public Media</i> , "The Midwest is getting warmer, even though summer highs are dropping. Here's why" ( <b>Quoted</b> ). [ <a href="#">Article</a> ]                       |
| Aug. 2025 | <i>Three Degrees Podcast</i> , "Climate Trends, Data, and the Fight Against Disinformation" ( <b>Interview</b> ). [ <a href="#">Podcast</a> ]                                         |
| Aug. 2025 | <i>The Weather Channel</i> , "Phoenix Is Facing A Heat Crisis. Here's A Glimpse of Our Climate Future" ( <b>Quoted</b> ). [ <a href="#">Article</a> ]                                 |
| Jul. 2025 | <i>New York Times</i> , "In a Reversal, Key Hurricane-Monitoring Data Will Stay Online" ( <b>Quoted</b> ). [ <a href="#">Article</a> ]                                                |
| Jul. 2025 | <i>Context</i> , "U.S. hurricane forecasters losing critical access to government data" ( <b>Quoted</b> ). [ <a href="#">Article</a> ]                                                |
| Jul. 2025 | <i>NJ Spotlight News</i> , "Weather forecasting, storm preparedness at risk" ( <b>Interview</b> ). [ <a href="#">Video</a> ]                                                          |
| Jun. 2025 | <i>Bloomberg</i> , "This Heat Wave Is Just a Taste of What's to Come" ( <b>Quoted</b> ). [ <a href="#">Article</a> ]                                                                  |
| Jun. 2025 | <i>Perspectives on Sustainable Development Podcast</i> , "We Live in Systems Not Silos: How Changes in the Arctic Impact the World" ( <b>Interview</b> ). [ <a href="#">Podcast</a> ] |
| Jun. 2025 | <i>Trouw</i> , "This scientist lost his job in the US. Now he's bringing climate change to the public" ( <b>Interview</b> ). [ <a href="#">Article</a> ]                              |
| Jun. 2025 | <i>ClimateGenn Podcast</i> , "Zack Labe: Science Is being Silenced!" ( <b>Interview</b> ). [ <a href="#">Podcast</a> ]                                                                |
| May 2025  | <i>High North News</i> , "US Climate Researcher: 'We Are at a Tipping Point'" ( <b>Interview</b> ). [ <a href="#">Article</a> ]                                                       |
| May 2025  | <i>StudyFinds</i> , "'Rapid Response System' Can Tell When Heat Waves Are Fueled By Climate Change" ( <b>Featured Study</b> ). [ <a href="#">Article</a> ]                            |
| Mar. 2025 | <i>Silenced Science Stories</i> , "Dr. Zachary Labe, Climate Scientist" ( <b>Interview</b> ). [ <a href="#">Article</a> ]                                                             |
| Mar. 2025 | <i>DW</i> , "Is climate science threatened as US slashes jobs, funding?" ( <b>Quoted</b> ). [ <a href="#">Article</a> ]                                                               |
| Jan. 2025 | <i>Yorkshire Bylines</i> , "Time to exit this climate 'road to ruin', warns UN secretary general" ( <b>Quoted</b> ). [ <a href="#">Article</a> ]                                      |
| Oct. 2024 | <i>News Decoder</i> , "Extreme weather makes climate change a reality now" ( <b>Quoted</b> ). [ <a href="#">Article</a> ]                                                             |
| Oct. 2024 | <i>Carbon Brief</i> , "Antarctic sea ice maximum in 2024 is 'second lowest' on record" ( <b>Quoted</b> ). [ <a href="#">Article</a> ]                                                 |
| Aug. 2024 | <i>Carbon Brief</i> , "IPCC meeting in Sofia fails to agree timeline for seventh assessment report" ( <b>Quoted</b> ). [ <a href="#">Article</a> ]                                    |
| Jul. 2024 | <i>Axios</i> , "The seas are not alright: 'Unusual warmth' hits nearly all of world's oceans" ( <b>Quoted</b> ). [ <a href="#">Article</a> ]                                          |
| Jun. 2024 | <i>USA Today</i> , "Earth marks 12 straight months of record heat, a bewildering climate change milestone" ( <b>Quoted</b> ). [ <a href="#">Article</a> ]                             |
| May 2024  | <i>Yorkshire Bylines</i> , "Global levels of CO2 for 2023-24 break all records in human history" ( <b>Quoted</b> ). [ <a href="#">Article</a> ]                                       |
| Apr. 2024 | <i>Climate Quandaries Podcast</i> , "S2E4: Zack Labe" ( <b>Interview</b> ). [ <a href="#">Podcast</a> ]                                                                               |
| Mar. 2024 | <i>Temple Sustainability Blog</i> , "Making Your Research Matter: Communicating for the Climate" ( <b>Quoted</b> ). [ <a href="#">Article</a> ]                                       |
| Mar. 2024 | <i>Carbon Brief</i> , "Antarctic sea ice 'behaving strangely' as Arctic reaches 'below-average' winter peak" ( <b>Quoted</b> ). [ <a href="#">Article</a> ]                           |
| Mar. 2024 | <i>Yorkshire Bylines</i> , "The Arctic: The first ice-free summer could arrive in the next decade" ( <b>Quoted</b> ). [ <a href="#">Article</a> ]                                     |

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| Mar. 2024 | <i>The Washington Post</i> , <i>Capital Weather Gang</i> , "The groundhog was right: Spring is here ahead of schedule" ( <b>Quoted</b> ). <a href="#">[Article]</a>                  |
| Feb. 2024 | <i>Planet NOAA Podcast</i> , "Welcome to Planet NOAA!" ( <b>Interview</b> ). <a href="#">[Podcast]</a>                                                                               |
| Nov. 2023 | <i>Carbon Brief</i> , "Q&A: Warming of 2°C would trigger 'catastrophic' loss of world's ice, new report says" ( <b>Quoted</b> ). <a href="#">[Article]</a>                           |
| Oct. 2023 | <i>NBC News</i> , "'Gobsmackingly bananas' September of extreme warmth alarms climate scientists" ( <b>Quoted</b> ). <a href="#">[Article]</a>                                       |
| Sep. 2023 | <i>Carbon Brief</i> , "'Exceptional' Antarctic melt drives months of record-low global sea ice cover" ( <b>Quoted</b> ). <a href="#">[Article]</a>                                   |
| Sep. 2023 | <i>Wired</i> , "The Mysterious 'Warming Hole' in the Middle of the US" ( <b>Quoted</b> ). <a href="#">[Article]</a>                                                                  |
| Aug. 2023 | <i>Wired</i> , "This Brutal Summer in 10 Alarming Maps and Graphs" ( <b>Quoted</b> ). <a href="#">[Article]</a>                                                                      |
| Jul. 2023 | <i>USA Today</i> , "The oceans are unusually hot and on track to get hotter. That's not good." ( <b>Quoted</b> ). <a href="#">[Article]</a>                                          |
| Jun. 2023 | <i>CNET</i> , "The Arctic Sea Could Be 'Ice-Free' Within Decades. What That Means for Us" ( <b>Quoted</b> ). <a href="#">[Article]</a>                                               |
| Jun. 2023 | <i>Bulletin of the Atomic Scientists</i> , "'Uncharted territory': Warming oceans and disappearing sea ice alarm scientists" ( <b>Quoted</b> ). <a href="#">[Article]</a>            |
| May 2023  | <i>Wired</i> , "Antarctic Sea Ice Is at Record Lows. Is It an Alarming Shift?" ( <b>Quoted</b> ). <a href="#">[Article]</a>                                                          |
| May 2023  | <i>Carbon Brief</i> , "Montreal Protocol has slowed loss of Arctic sea ice, say scientists" ( <b>Quoted</b> ). <a href="#">[Article]</a>                                             |
| Mar. 2023 | <i>Carbon Brief</i> , "Arctic sea ice winter peak in 2023 is fifth lowest on record" ( <b>Quoted</b> ). <a href="#">[Article]</a>                                                    |
| Feb. 2023 | <i>WFLA Tampa</i> , "How certain is science that humans are warming the climate?" ( <b>Featured Graphics</b> ). <a href="#">[Article]</a>                                            |
| Nov. 2022 | <i>Princeton AOS &amp; CIMES Newsletter</i> , "Zack Labe in Conversation" ( <b>Interview</b> ). <a href="#">[Article]</a>                                                            |
| Nov. 2022 | <i>Lawrence Livermore National Laboratory</i> , "New analysis helps reconcile differences between satellites and climate models" ( <b>Press Release</b> ). <a href="#">[Article]</a> |
| Nov. 2022 | <i>The Daily Beast</i> , "What Happens When Even Scientists Get Doom-Pilled?" ( <b>Quoted</b> ). <a href="#">[Article]</a>                                                           |
| Sep. 2022 | <i>Mongabay</i> , "2022: Another consequential year for the melting Arctic" ( <b>Quoted</b> ). <a href="#">[Article]</a>                                                             |
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Zachary Labe

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## PERSONAL INTERESTS

Vegetable gardening, travel, cooking, hiking, fishing, lighthouses, trains, winter synoptic storms, long-range and seasonal weather forecasting