

Zachary M. Labe

CONTACT INFORMATION

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RESEARCH INTERESTS

large-scale climate variability • atmospheric teleconnections • stratospheric coupling • Arctic sea ice • data science methods • large ensembles

EDUCATION

University of California, Irvine, Irvine, CA
Ph.D. in Earth System Science, May 2020

University of California, Irvine, Irvine, CA
M.Sc. in Earth System Science, Sep 2017

Cornell University, Ithaca, NY
B.Sc. in Atmospheric Science, May 2015, *Distinction in Research*
Minor: Dyson Business Minor for Life Sciences

ACADEMIC EMPLOYMENT

- 2020-Present **Postdoctoral Researcher**
Evaluating timing of emergence and compound climate events using machine learning methods (neural networks)
Advisor: Dr. Elizabeth Barnes, Atmospheric Science, Colorado State University
- 2015-2020 **Graduate Research Assistant**
Assessing influences of Arctic amplification and sea ice variability on the stratosphere and extreme weather in the mid-latitudes through global climate model experiments and historical observations
Advisor: Dr. Gudrun Magnusdottir, Earth System Science, University of California, Irvine
- Su. 2015 **Research Assistant**
Evaluated the magnitude, frequency, and dynamics of spring onset in the CESM Large Ensemble Project (LENS)
Advisor: Dr. Toby Ault, Earth and Atmospheric Science, Cornell University
- 2014-2015 **Undergraduate Research Assistant**
Implemented the Extended Spring Indices model forced by atmospheric reanalysis to understand early spring onset in the historical record
Advisor: Dr. Toby Ault, Earth and Atmospheric Science, Cornell University

PUBLICATIONS

Refereed/Peer-Reviewed

- [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/vOfs-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/in Preparation

- [3] Timmermans, M.-L. and **Z.M. Labe** (2022). [The Arctic] Sea surface temperature [in "State of the Climate in 2021"]. (*drafted for Bull. Amer. Meteor. Soc.*)
- [2] **Labe, Z.M.** and E.A. Barnes (2021), Predicting slowdowns in decadal climate warming trends with explainable neural networks. (*submitted*) [\[Preprint\]](#)
- [1] Witt, J.K., **Z.M. Labe**, A.C. Warden, and B.A. Clegg (2021). Visualizing Uncertainty in Hurricane Forecasts with Dynamic Ensembles. (*submitted*)

Non-refereed/Other

- [5] **Labe, Z.M.**, August 2021: Sharing data-driven stories of Arctic climate change. WMO/WWRP Year of Polar Prediction, PolarPredictNews. [\[Article\]](#)
- [4] 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. [\[Article\]](#)
- [3] **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. [\[PDF\]](#)
- [2] **Labe, Z.M.**, November 2019: Understanding Our Changing Arctic. Polar Bears International. Annual Magazine. [\[Article\]](#)
- [1] **Labe, Z.M.**, April 2015: Anomalously Early Onset of Spring in the CESM Large Ensemble. Cornell University. Undergraduate Honors Thesis. [\[PDF\]](#)

ORAL PRESENTATIONS

- [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 American Geophysical Union Annual Meeting*, Virtual Attendance (Dec 2021). (**Invited-Remote**) [\[Abstract\]](#)
- [24] **Labe, Z.M.** and E.A. Barnes. Evaluating global climate models using simple, explainable neural networks, *2021 American Geophysical Union Annual Meeting*, Virtual Attendance (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 Post-doctoral 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)** [\[Recording\]](#)
- [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). [\[Recording\]](#)
- [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

- [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. Anomalously Early Onset of Spring in the CESM Large Ensemble Project, *14th Annual AMS Student Conference*, Phoenix, AZ (Jan 2015). [\[Poster\]](#)

OTHER PRESENTATIONS

- [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 American Geophysical Union 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 amplification. *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 American Geophysical Union 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 American Geophysical Union 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 American Geophysical Union 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 American Geophysical Union Annual Meeting*, Washington, DC (Dec 2018). [\[Abstract\]](#)
- [2] Magnúsdóttir, 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 American Geophysical Union 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).

FELLOWSHIPS AND AWARDS

May 2021	Editors' Citation for Excellence in Refereeing - <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, Department of Earth System Science, University of California, Irvine
2014-2015	Fuerst Outstanding Library Student Employee Award Finalist, Cornell University

TEACHING AND OUTREACH

Mentoring Experience

Su. 2021	Hannah Myint - REU at Colorado State Univ. (Dept. of Atmos.)
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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

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

Mar. 2019	<i>Climate, Literacy, Empowerment And iNquiry (CLEAN)</i> , Weather and Climate Outreach event, MacArthur Fundamental Intermediate School, Santa Ana, CA (Presenter)
Feb. 2019	<i>Orange County Regional Science Olympiad</i> , Climate Science-Meteorology exam writer and proctor, Irvine, CA (Event Supervisor)
Feb. 2019	<i>Climate, Literacy, Empowerment And iNquiry (CLEAN)</i> , The Cryosphere Outreach event, MacArthur Fundamental Intermediate School, Santa Ana, CA (Presenter)
Dec. 2018	NOAA, Arctic Report Card - Update for 2018. [Contributed Graphics]
Oct. 2018	<i>Brews and Brains: TED-Style Talk</i> , Our Changing Arctic, Fireside Tavern, Costa Mesa, CA. (Invited Presenter). [Recording]
Oct. 2018	<i>Irvine Unified School District</i> , "Ask-A-Scientist/Engineer Night" at Rancho San Joaquin Middle School, Orange County, CA (Volunteer)
Sep 2018	<i>UC Irvine Graduate Orientation</i> , Session Title – Student Panel – Embracing Your New Graduate Life, Irvine, CA (Panelist)
May 2018	<i>Vista Verde School</i> , Weather and climate booth at an Earth Day fair, Irvine, CA (Presenter)
Feb. 2018	<i>Irvine Unified School District's 37th Annual Science Fair</i> , Physical science project judge, Irvine, CA (Volunteer)
Feb. 2018	<i>Climate, Literacy, Empowerment And iNquiry (CLEAN)</i> , Weather and Climate Outreach event, MacArthur Fundamental Intermediate School, Santa Ana, CA (Presenter)
Feb. 2018	<i>Orange County Regional Science Olympiad</i> , Climate Science-Meteorology exam writer and proctor, Irvine, CA (Event Supervisor)
Feb. 2018	<i>Climate, Literacy, Empowerment And iNquiry (CLEAN)</i> , The Cryosphere Outreach event, MacArthur Fundamental Intermediate School, Santa Ana, CA (Presenter)
Sep. 2017	<i>Irvine Unified School District</i> , "Ask-A-Scientist/Engineer Night" at Rancho San Joaquin Middle School, Orange County, CA (Volunteer)
Aug. 2017	<i>Irvine Unified School District</i> , "Ask-A-Scientist/Engineer Night" at Rancho San Joaquin Middle School, Orange County, CA (Volunteer)
Aug. 2017	<i>NASA DIRECT-STEM Program</i> , Assessing a changing Arctic (Invited Presenter).
Apr. 2017	<i>Climate Data Hackathon</i> , Looking for clues to changes in Arctic sea ice, University of California, Irvine. (Invited Presenter). [Syllabus/GitHub]
Feb. 2017	<i>Irvine Unified School District's 36th Annual Science Fair</i> , Physical science project judge, Irvine, CA (Volunteer)
Feb. 2017	<i>Orange County Regional Science Olympiad</i> , Severe Storms-Meteorology exam writer and proctor, Irvine, CA (Event Supervisor)
Wi. 2017	Seminar Course – Teaching Topics in Earth System Science (Training)
Oct. 2016	<i>Irvine Unified School District</i> , "Ask-A-Scientist/Engineer Night" at Rancho San Joaquin Middle School, Orange County, CA (Volunteer)

Aug. 2016 NASA *DIRECT-STEM Workshop*, Data and Analysis of Arctic Climate Change in CMIP5 using Python (**Instructor**). [\[Syllabus/GitHub\]](#)

PROFESSIONAL ACTIVITIES & SERVICE

2021-Present Guest Editor - Special Issue for *Atmospheric Science Letters*
 2021-Present Board Member - US Association of Polar Early Career Scientists
 2021-Present Science Associate - Arctic Basecamp
 2020-Present Conference Paper Referee - *AI4Earth NeurIPS*
 2020-Present Board of Advisors for the NCAR/UCAR Climate Data Guide
 2020-Present Proposal Referee - *NSF (GEO/AGS)*, *Netherlands Organisation for Scientific Research (NWO)*
 2018-Present Journal Manuscript Referee [\[Publons\]](#) - *Atmosphere-Ocean*, *Atmosphere*, *Climatic Change*, *Climate Dynamics*, *Geophysical Research Letters*, *Geosciences*, *International Journal of Climate*, *Journal of Climate*, *Journal of Geophysical Research: Atmospheres*, *Journal of Glaciology*, *Nature Climate Change*, *Nature Communications*, *Polar Geography*, *Weather and Climate Dynamics*
 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
 Aug. 2017 Expert Contributor to the UCAR Climate Data Guide: "Sea Ice Thickness Data Sets: Overview & Comparison Table" [\[Website\]](#)
 2014-2015 President, American Meteorological Society Student Chapter, Cornell University

Affiliations/Memberships

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

PROFESSIONAL TRAVEL

Field Work

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

Workshops

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, Mesa Lab, 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, T_EX, L^AT_EX, B_IB_TE_X
Software/Tools: NCL, NCO, CDO, GrADS, Git
Modeling: NCAR's Yellowstone/Cheyenne, CESM, E3SM, CMIP5/6

Visit my [GitHub](#)!

NEWS AND MEDIA

Nov. 2021	<i>EnergieWinde</i> , "Zachary Labes Grafiken zum Klimawandel" (Interview). [Article]
Oct. 2021	<i>Mashable</i> , "Gaping hole opened up in 'Last Ice Area' of the Arctic, NASA images show" (Quoted). [Article]
Oct. 2021	<i>CNN</i> , "Antarctica's last 6 months were the coldest on record" (Quoted). [Article]
Sep. 2021	<i>Blasting News</i> , "From Carlos Nobre to Svein Tveitdal, 6 climate activists share ways to tackle climate change" (Interview). [Article]
Sep. 2021	<i>Carbon Brief</i> , "Arctic sea ice summer minimum in 2021 is '12th lowest' on record" (Quoted). [Article]
Sep. 2021	<i>Arctic Today</i> , "As it approaches its yearly minimum, Arctic sea ice extent its slightly greater than recent ultra-low years" (Quoted). [Article]
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PERSONAL INTERESTS

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