

Daniel L. Swain

Climate Scientist, Institute of the Environment & Sustainability
University of California, Los Angeles, CA

Research Fellow, Capacity Center for Climate and Weather Extremes
National Center for Atmospheric Research, Boulder, CO

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Blog: www.weatherwest.com
Twitter/X: @Weather_West
YouTube: @weatherwest

Research interests

Dynamics & impacts of regional climate change, hydroclimate extremes, wildfires & climate change, extreme event detection & attribution, natural hazard & disaster risk, climate adaptation, science communication

Education

- Ph.D., Earth System Science, Stanford University** 2016
Dissertation: “Character and causes of changing North Pacific climate extremes”
Advisor: Dr. Noah Diffenbaugh
- B.S., Atmospheric Science, University of California, Davis (Highest Honors)** 2011

Professional experience

Scientific Research Appointments

- Climate Scientist (Associate Researcher)** Nov. 1 2024-Present
California Institute for Water Resources, University of California Agriculture and Natural Resources (UCANR)
- Climate Scientist (Associate Researcher)** Jul. 2024-Present
Climate Scientist (Assistant Researcher) Sep. 2018-Jun. 2024
Institute of Environment & Sustainability, University of California, Los Angeles
- Research Fellow** 2018-Present
Center for Weather & Climate Extremes, NSF National Center for Atmospheric Research
- California Climate Fellow** 2018-2024
The Nature Conservancy, Sacramento, CA
- NatureNet Postdoctoral Fellow** 2016-2018
Institute of Environment & Sustainability, University of California, Los Angeles
- Graduate Research Assistant** 2011-2016
Climate and Earth System Dynamics Group, Stanford University
- Private Sector Engagement
- Climate Advisor, ReAsk** 2022-Present
Offer expert guidance on various topics related to assessment of global tropical cyclone, extreme precipitation, and wildfire risk in a warming climate.
- Climate Advisor, ClimateCheck** 2021-Present

Offer expert guidance on various topics related to extreme weather and climate data analysis, downscaling, processing, and public-facing communication & visualization.

Meteorological Advisor, Bloomsy

2014-2021

Offer expert guidance on various topics related to meteorological instrumentation, including sensor design and validation, as well as general advice regarding weather-associated processes.

Selected honors and awards

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| “Future Perfect 50” List, Vox Media | 2024 |
| DesignSafe Dataset Award (co-recipient with Xingying Huang), NSF/Univ. of Texas, Austin | 2023 |
| Deseret Magazine “Most Important Changemaker in the West” | 2022 |
| Vice Magazine “Human of the Year” | 2020 |
| National Academy of Sciences Kavli Fellow | 2019 |
| NatureNet Postdoctoral Fellowship, The Nature Conservancy/University of California | 2016-2018 |
| ARCS Fellowship, Achievement Rewards for College Scientists Foundation | 2015-2016 |
| Switzer Environmental Fellowship, Robert and Patricia Switzer Foundation | 2015-2016 |
| Graduate Student Award for Scholarly & Research Achievement, Stanford University | 2015 |
| Centennial Teaching Assistant Award, School of Earth Sciences, Stanford University | 2013 |
| College Medal, College of Agricultural & Environmental Sciences, Univ. of California, Davis | 2011 |
| Departmental Citation, Atmospheric Science, University of California, Davis | 2011 |

Grants and external funding

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| Co-Investigator, Aon Reinsurance Solutions grant, “Future Fire Weather Scenarios,” Award total: \$20,000 (UCLA portion) | 2023-2025 |
| Co-Principal Investigator, The Nature Conservancy of California grant, “Climate Science and Managing Nature to Minimize the Damage of Extreme Events,” Award total: \$450,410 | 2018-2025 |
| Co-Principal Investigator, National Science Foundation Prediction of and Resilience against Extreme Events (NSF PREEVENTS) Program, Track 2: “COEXIST: COnnected EXtremes In Space and Time,” Award ID: 1854761, Award total: \$345,446 (UCLA portion) | 2019-2024 |
| Principal Investigator, California Department of Water Resources grant: “Developing plausible extreme storm and flood scenarios for disaster resilience planning and emergency response exercises in California,” Award total: \$140,000 | 2021-2023 |
| Principal Investigator, Yuba Water Agency grant: “Developing California Megastorm Scenarios for ARkStorm 2.0,” Award total: \$60,000 | 2021-2022 |

Publications

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| 37. †Swain, D.L. On the Job: Daniel Swain, Climate Scientist. <i>Weatherwise</i> , 77 :1, 53-55, doi: 10.1080/00431672.2024.2284612, 2024. | 2024 |
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36. †Swain, D.L. Support climate scientists in engaging the public. *Nature*, **624**, 9, 2023
doi: 10.1038/d41586-023-03436-1, 2023.
35. Swain, D.L., J.T. Abatzoglou, C. Kolden, K. Shive, D. A. Kalashnikov, D. Singh, and E. Smith. 2023
“Climate change is narrowing and shifting prescribed fire windows in western United States.”
Communications Earth and Environment, **4**, 340, doi: 10.1038/s43247-023-00993-1, 2023.
34. Gonzales, K.R., Swain, D.L., Roop, H.A., and N.S. Diffenbaugh. Quantifying the Relationship 2022
Between Atmospheric River Origin Conditions and Landfall Temperature. *Geophysical
Research Letters*, 127, e2022JD037284, doi: 10.1029/2022JD037284, 2022.
33. * ++Huang, X.Y. and D.L. Swain. Climate change is increasing the risk of a California 2022
Megaflood. *Science Advances*, 8, 32, doi: 10.1126/sciadv.abq0995, 2022.
(Equal Contributions / Co-first authors)
32. Kalashnikov, D.A., Abatzoglou, J.T., Nauslar, N.J., Swain, D.L., Touma, D., & D. Singh. 2022
Meteorological factors and elevation dependence of dry lightning in central and northern
California. *Environmental Research: Climate*, 1, 025001, doi: 10.1088/2752-5295/ac84a0, 2022.
31. *Touma, D., Stevenson, S., Swain, D.L., Singh, D., Kalashnikov, D., and X.Y. Huang. 2022
Climate change increases risk of extreme rainfall following wildfire in the western United States.
Science Advances, 8, eabm0320, doi: 10.1126/sciadv.abm0320, 2022.
30. Fish, M.A., Done, J., Swain, D.L., Wilson, A.M., Michaelis, A.C., Gibson, P.B., and F. 2022
Martin Ralph. Large-scale environments of successive atmospheric river events leading to
compound precipitation extremes in California. *Journal of Climate*, 35, 1515–1536,
doi: 10.1175/JCLI-D-21-0168.1, 2022.
29. Kalashnikov, D., Schnell, J.L., Abatzoglou, J.T., Swain, D.L. and D. Singh. Increasing 2022
co-occurrence of fine particulate matter and ground-level ozone extremes in the western
United States. *Science Advances*, 8, eabi9386, doi: 10.1126/sciadv.abi9386, 2022.
28. Brunner, M.I., Swain, D.L., Wood, R.R., Willkofer, F., Done, J.M., Gilleland, E., and 2021
R. Ludwig. An extremeness threshold determines the regional response of floods to changes in
rainfall extremes. *Communications Earth and Environment*, 2, doi: 10.1038/s43247-021-00248-x, 2021.
27. Goldenson, N., Thackeray, C.W., Hall, A., Swain, D.L., and N. Berg. Using large 2021
ensembles to identify regions of systematic biases in moderate to heavy daily precipitation.
Geophysical Research Letters, 48, e2020GL092026, doi: 10.1029/2020GL092026, 2021.
26. †Swain, D.L. A shorter, sharper rainy season amplifies California wildfire risk. 2021
Geophysical Research Letters, 48, e2021GL092843, doi: 10.1029/2021GL092843, 2021.
25. Brunner, M.I., Swain, D.L., Gilleland, E., and A. Wood. Increasing importance of 2021
temperature as a driver of streamflow drought spatial extent. *Environmental Research Letters*,
16, 024038, doi: 10.1088/1748-9326/abd2f0, 2021.
24. Gonzales, K.R., Swain, D.L., Barnes, E.A., and N.S. Diffenbaugh. Moisture vs. Wind- 2020
Dominated Flavors of Atmospheric Rivers. *Geophysical Research Letters*, 47, e2020GL090042,
doi: 10.1029/2020GL090042, 2020.
23. Swain, D.L., Wing, O.E.J., Bates, P.D., Done, J.M., Johnson, K.A., and D.R. Cameron. 2020

Increased flood exposure due to climate change and population growth in the United States. *Earth's Future*, 8, e2020EF001777, doi: 10.1029/2020EF001778, 2020.

22. Persad, G.G., **Swain, D.L.**, Kouba, C., and J.P.O. Partida. Inter-Model Agreement on Projected Shifts in California Hydroclimate Characteristics Critical to Water Management. *Climatic Change*, 162, 1493–1513, doi: 10.1007/s10584-020-02882-4, 2020. 2020

21. Abatzoglou, J., Smith, C., **Swain, D.L.**, Ptak, T., and C. Kolden. Population exposure to pre-emptive de-energization aimed at averting wildfires in Northern California. *Environmental Research Letters*, 15, 094046, doi: 10.1088/1748-9326/aba135, 2020. 2020

20. *Goss, M., **Swain, D.L.**, Sarhadi, A., Kolden, C.A., Abatzoglou, J.T., Williams, A.P., and N.S. Diffenbaugh. Climate change is increasing the risk of extreme autumn wildfire conditions across California. *Environmental Research Letters*, 15 (9), 094016, doi: 10.1088/1748-9326/ab83a7, 2020. 2020
[Named “Best Article of 2020” by *Environmental Research Letters* Editorial Board (2020); IOP Publishing Top Cited Paper Award (2023)]

19. Huang, X., **Swain, D.L.**, and A. Hall. Large ensemble downscaling of extreme atmospheric River storms in California reveals large increase in fine-scale precipitation. *Science Advances*, 6, eaba1323, doi: 10.1126/sciadv.aba1323, 2020. 2020

18. Brunner, M.I., Gilleland, E., Wood, A., **Swain, D.L.**, and M. Clark. Spatial dependence of floods shaped by spatiotemporal variations in meteorological and land-surface processes. *Geophysical Research Letters*, 47, e2020GL088000, doi: 10.1029/2020GL088000, 2020. 2020

17. †**Swain, D.L.**, Singh, D., Touma, D., and N.S. Diffenbaugh. Attributing extreme events to climate change: A new frontier in a warming world. *One Earth*, 2, 522-527, doi: 10.1016/j.oneear.2020.05.011, 2020. 2020

16. Huang, X., **Swain, D.L.**, Walton, D.B., Berg, N., Stevenson, S., and A. Hall, Simulating and Evaluating Atmospheric River-Induced Precipitation Extremes along the U.S. Pacific Coast: Case Studies from 1980-2017. *Journal of Geophysical Research: Atmospheres*, 125, e2019JD031554, doi: 10.1029/2019JD031554, 2020. 2020

15. Gibson, P.B., Waliser, D.E., Guan, B., DeFlorio, M.J., and **D.L. Swain**. Ridging associated with drought in western and southwestern United States: characteristics, trends and predictability. *Journal of Climate*, 33, 2485-2408, doi: 10.1175/JCLI-D-19-0439.1, 2020. 2020

14. Gonzales, K.R., **Swain, D.L.**, Barnes, E.A., K. Nardi, and N.S. Diffenbaugh. Recent warming of landfalling atmospheric rivers along the West Coast of the United States. *Journal of Geophysical Research: Atmospheres*, 124, 6810-6826, doi: 10.1029/2018JD029860, 2019. 2019

13. †**Swain, D.L.**, 2019. Is society ready for precipitation whiplash?, In: “Toward a Resilient Global Society: Air, Sea Level, Earthquakes, and Weather.” *Earth's Future*, 7, 854-864, doi: 10.1029/2019EF001242, 2019. 2019

12. Thackeray, C.W., A.M. DeAngelis, A. Hall, **D.L. Swain**, and X. Qu. On the Connection Between Global Hydrologic Sensitivity and Regional Wet Extremes. *Geophysical Review Letters*, 45, doi: 10.1029/2018GL079698, 2018. 2018

11. Touma, D., A. M. Michalak, **D.L. Swain**, and N.S. Diffenbaugh. Characterizing the spatial characteristics of extreme precipitation over the United States. *Journal of Climate*, 31, 8023-8037, 2018. 2018

doi: 10.1175/JCLI-D-18-0019.1, 2018.

- 10. *Swain, D.L.**, B. Langenbrunner, J.D. Neelin, and A. Hall. Increasing precipitation volatility in twenty-first-century California. *Nature Climate Change*, 8, 427-433, doi: 10.1038/s41558-018-0140-y., 2018.
- 9. Swain, D.L.**, D. Singh, D.E. Horton, J.S. Mankin, T. Ballard, and N.S. Diffenbaugh. Remote linkages to anomalous winter atmospheric ridging over the northeastern Pacific. *Journal of Geophysical Research: Atmospheres*, 122, 12,194-12,209, doi: 10.1002/2017JD026575, 2017.
- 8. *Diffenbaugh, N.S.**, Singh, D., Mankin, J.S., Charland, A., Horton, D.E., Haugen, M., **Swain, D.L.**, Rajaratnam, B., and Touma, D. Quantifying the influence of global warming on unprecedented extreme climate events. *Proceedings of the National Academy of Sciences*, 114, 4881-4886, doi: 10.1073/pnas.1618082114, 2017.
- 7. Singh, D., D. L. Swain**, J.S. Mankin, D.E. Horton, L.N. Thomas, B. Rajaratnam, and N.S. Diffenbaugh. Recent amplification of the North American winter temperature dipole. *Journal of Geophysical Research: Atmospheres*, 121, 9911-9928, doi: 10.1002/2016JD025116, 2016.
- 6. Swain, D. L.**, Horton, D.E., Singh, D., and N.S. Diffenbaugh. Trends in atmospheric patterns conducive to seasonal precipitation and temperature extremes in California. *Science Advances*, 2, e1501344, doi: 10.1126/sciadv.1501344, 2016.
- 5. Swain, D.L.**, Lebassi-Habtezion, B., and N.S. Diffenbaugh. Evaluation of non-hydrostatic simulations of Northeast Pacific atmospheric rivers and comparison to in-situ observation. *Monthly Weather Review*, 143, 3556-3569, doi: 10.1175/MWR-D-15-0079.1, 2015.
- 4. *Horton, D.E.**, N.C. Johnson, D. Singh, **D.L. Swain**, B. Rajaratnam and N.S. Diffenbaugh. Contribution of changes in atmospheric circulation patterns to extreme temperature trends. *Nature*, 522, 465-469, doi: 10.1038/nature14550, 2015.
- 3. *Diffenbaugh, N.S.**, **D.L. Swain** and D. Touma. Anthropogenic warming has increased drought risk in California. 112, 3931-3936, *Proceedings of the National Academy of Sciences*, doi: 10.1073/pnas.1422385112, 2015.
- 2. †Swain, D.L.** A tale of two California droughts: Lessons amidst record warmth and dryness in a region of complex physical and human geography. *Geophysical Research Letters*, doi:10.1002/2015GL066628, 2015.
- 1. *Swain, D.L.**, M. Tsiang, M. Haugen, D. Singh, A. Charland, B. Rajaratnam and N.S. Diffenbaugh. The extraordinary California drought of 2013-2014: character, context, and the role of climate change [in "Explaining Extremes of 2013 from a Climate Perspective"]. *Bulletin of the American Meteorological Society*, 95 (9), S3-S7, 2014.

* = Essential Science Indicators (ISI) Highly Cited Paper

++ = Equal contributions/co-first authorship

† = Perspective, commentary, opinion piece, or subject matter primer

Publications in progress

Swain, D.L., A. Prein, J.T. Abatzoglou, C. Albano, M. Brunner, N. Diffenbaugh, D. Singh, C.B. Skinner, and D. Touma. “Hydroclimate volatility on a warming Earth,” *Nature Reviews Earth and Environment* (invited review, accepted for publication)

Lee, P.S., Johnson, R., and **D.L. Swain**. “Climate Change and Coccidioidomycosis.” *Journal of the American Medical Association*. (Accepted for publication)

Camponuri, S.K., A.K. Heaney, G.S. Cooksey, D.J. Vugia, **D.L. Swain**, J. Balmes, J.V. Remais, and J.R. Head. “Recent and forecasted increases in coccidioidomycosis incidence in California linked to swings in precipitation extremes” (in review)

Science communication and public-facing science engagement

Author & founder, Weather West blog (www.weatherwest.com) 2006-Present

Write regular articles focusing on a wide range of California/western North America weather and climate topics; answer questions from public, decision-makers, and scientists regarding meteorology/climatology/general science/science policy. Strong emphasis on making scientific and technical topics accessible to a broad audience (>1 million visitors each year).

Climate, weather, wildfire, and Earth science engagement via social media 2014-Present

Weather, climate, Earth science, and public policy discussion and outreach via Twitter as @Weather_West (>10 million views each year) and on YouTube (@WeatherWest) as well as Bluesky, Threads, & Mastodon. Daily direct engagement with public, scientists, wildland firefighters, water managers, local & regional government, and local to international policymakers.

Weather, climate, wildfire, and Earth science media liaison 2013-present

Frequent, sustained engagement with local, national, and international news media on weather & climate-related issues. >250 interviews each year (>1,500 news media interviews cumulatively since 2018) with a wide range of outlets:

Newspaper: New York Times, Washington Post, USA Today, Wall Street Journal, Bloomberg, Los Angeles Times, San Francisco Chronicle, Sacramento Bee & dozens of local/regional papers

Long-form/magazine: Time, The Economist, Newsweek, The Atlantic, Wired, Scientific American, Popular Science, National Geographic, Rolling Stone, Vogue, Outside Magazine, Sunset Magazine, Bay Nature Magazine, Mother Jones, among many others

Radio: NPR/Science Friday (and numerous local affiliates), BBC World Service, ABC & CBS national radio (and local affiliates), plus over 100 different local stations

Television: CNN, ABC, NBC, PBS, BBC, CBC, Al Jazeera, HBO, public television in 15+ countries, Democracy Now, numerous documentaries, plus over 100 different local stations

Web outlets: Vox, Axios, Slate Magazine, Vice Magazine, BuzzFeed, Mashable, The Verge, & many others

Climate/weather-focused: The Weather Channel, Climate Central, Climate Nexus, InsideClimate News, Wunderground, The Weather Network, Fox Weather

Podcasts: American Adapts (Doug Parsons), Science+Story (Bob Lalasz), Factually (Adam Conover, 2x), Water Talk, The Flakes (OpenSnow), Growing the Valley (UC Extension), TBD (Slate Magazine, 3x), Nova (PBS), Climate Crisis (Yahoo News, 2x), What Is California? (Stu VanAirsdale), Abwaan Chronicles, Fifth and Mission (SF Chronicle, 3x), The Lookout (Zeke

Lunder), Capital Considerations (Wilmington Trust, 2x), The Civil Engineering Podcast, In the Bubble (Andy Slavitt), Against the Odds (Wondery), NPR (Short Wave), ClimateBreak (UC Berkeley), GeoTrek (Hal Needham), Across the Sky, TILclimate Podcast (MIT), The Assignment (CNN/Audie Cornish), Union of Concerned Scientists Podcast (Jess Phoenix), The Everything Story (Jillian Goodman), SnowBrains (Miles Clark), A Song Called Life (Osi Atikpoh), WebMD Health Discovered Podcast, EarthSky (Dave Adalian), Climate Chat (Dan Miller)

Science writing and film production for broad audiences

Scientific and Technical Advisor, “Climate Extremes: At The Abyss?” Documentary film; release date 10/25/2024. 2024

Swain, D.L. Extreme Weather Page-A-Day Calendar 2025: A Year of Fire Tornadoes, Atmospheric Rivers, and Other Wild Weather Events. Workman Publishing Company, ISBN-9781523525317, 6 August 2024. 2024

Swain, D.L. Extreme Weather Page-A-Day Calendar 2024: A Year of Fire Tornadoes, Atmospheric Rivers, and Other Wild Weather Events. Workman Publishing Company, ISBN-9781523520886, 8 August 2023. 2023

Swain, D.L. “The Deadly Dynamics of Colorado’s Marshall Fire,” *Outside Magazine*, 11 January 2022. Jan. 2022

Swain, D.L., Kolden, C., and J. Abatzoglou, “The era of megafires: the crisis facing California and what will happen next,” perspective in *The Guardian*, 08 August 2018. Aug. 2018

Swain, D.L., *Outside Magazine* & KQED Public Media contributor, various articles 2015-2016

Public policy engagement

Peer-reviewed works cited 278 times across 215 policy documents (per Sage PolicyProfiles) 2014-present

Member, Scientific Advisory Committee for the Delta Stewardship Council’s Delta Science Program 2021-present

Member, Public Policy Institute of California Water Policy Research Network 2018-present

Expert Testimony, Public Hearing on Climate Action, City of Hayward/Climate Protection and Restoration Initiative Public, Hayward, CA*. Aug. 2024

Invited Panelist, White House Council of Economic Advisers Roundtable on Climate Risk Modeling, The White House, Washington, D.C. Sep. 2023

Expert Testimony, Hearing on California’s Preparedness for and Response to Extreme Atmospheric River Incidents, California Assembly Joint Hearing by Committee on Emergency, Committee on Utilities and Energy, & Committee on Water, Parks, and Wildlife Feb. 2023

Invited Panelist, California Governor’s Office of Planning and Research (OPR) Roundtable On Water Management and California's 5th Climate Change Assessment Sep. 2022

Invited Expert, science briefing on extreme heat and climate change, office staff of U.S. Senator Alex Padilla Sep. 2022

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| Invited Panelist, California Senate Democratic Caucus panel on climate change | Mar. 2022 |
| Invited Panelist, Climate Change Town Hall meeting hosted by California State Senator Mike McGuire | Oct. 2021 |
| Invited Expert, science briefing on extreme atmospheric rivers, climate change, and flood risk in California, United States Representative Terrance John Cox | Jul. 2020 |
| Invited Expert, science briefing on weather extremes and climate change, United States Senator Sheldon Whitehouse | Oct. 2019 |

Invited scientific presentations

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| “Increasing Hydroclimate Whiplash on a Warming Earth,” <i>DAES/ASRC Joint Colloquium Series</i> , State University of New York, Albany (SUNY Albany) | Oct. 2024 |
| “An overview of ARkStorm 2.0 and its implications: California flood risk looms large in a warming climate,” 2024 California Extreme Precipitation Symposium (CEPSYM), University of California, Davis, Davis, CA (<i>invited speaker</i>) | Jul. 2024 |
| “Hydroclimate volatility on a warming Earth,” <i>Earth Day Speaker Series</i> , National Science Foundation, Arlington, VA* (<i>invited speaker</i>) | Apr. 2024 |
| “Increasing whiplash due to climate change: Perspectives on volatility in the hydrologic cycle (and beyond) in a warming world,” <i>NASA Global Modeling and Assimilation Office (GMAO) Seminar Series on Earth System Science</i> , NASA Goddard Space Flight Center, Greenbelt, MD (<i>invited speaker</i>) | Mar. 2024 |
| “Will increasing 'hydroclimate whiplash' in a warming climate amplify co-seismic hazards in California (and beyond)?” <i>USGS Northern California Earthquake Hazards Workshop</i> , Moffett Field, CA* (<i>invited keynote speaker</i>) | Jan. 2024 |
| “ARkStorm 2.0: An extreme multi-week winter storm and flood scenario for California reimagined for the climate change era,” <i>California Floodhub Discussion</i> , University of California Berkeley Center for Catastrophic Risk Management & California Department of Water Resources, Berkeley, CA* (<i>invited speaker</i>) | Nov. 2023 |
| “Worse droughts, but also more severe floods: Increasing hydroclimate volatility in a warming California,” <i>California Islands Climate Change Workshop, California Islands Symposium</i> , Ventura, CA* (<i>invited speaker</i>) | Nov. 2023 |
| “Thinking (critically) about the most "extreme extremes" in a warming climate,” <i>Sci Foo Camp 2023</i> , Googleplex, Mountain View, CA (<i>invited speaker and participant</i>) | Jul. 2023 |
| “Increasing hydroclimate whiplash in a warming climate: Implications for the future of California water,” <i>UC Davis Institute of the Environment Seminar</i> , University of California, Davis (<i>invited seminar speaker</i>) | Apr. 2023 |
| “Understanding extremes in a warming climate: On acknowledging uncertainty, embracing complexity, and asking societally relevant questions,” <i>American Physical Society Annual Meeting</i> , Chicago, IL* (<i>invited speaker</i>) | Mar. 2022 |
| “Rising California flood risk from stronger, wetter atmospheric rivers in a warming climate,” | June 2021 |

California Extreme Precipitation Symposium, University of California, Davis* (*invited speaker*)

“A worsening wildfire crisis in California and the broader West: The role of climate change,” Cat Risk Management 2021 Conference, Reinsurance Association of America* (*invited speaker*) Mar. 2021

“Sharpening seasonality and shifting hydrology: implications for wildfire and flood risk in a warming California,” *Geological and Planetary Sciences Division Seminar*, California Institute of Technology, Pasadena, CA* (*invited speaker*) Mar. 2021

“Climate communication in the Twitter era: Challenges, opportunities, and some personal reflection,” *American Geophysical Union Fall Meeting*, San Francisco, CA* (*invited speaker*) Dec. 2020

“Regional downscaling of large ensemble simulations as a tool for understanding changing hydroclimatic extremes in a warming climate,” *CLIVAR Large Ensembles Workshop*, Boulder, CO (*invited speaker*) Jul. 2019

“Hydroclimatic intensification in a warming world: is society ready for increasing precipitation whiplash?” *American Geophysical Union Fall Meeting*, Washington, D.C. (*invited speaker*) Dec. 2018

“Thinking about climate risk in an era of extremes: California’s increasingly wide swings between drought and flood,” *Department of Geography Seminar*, University of California, Berkeley (*invited lecturer*) Oct. 2018

“Atmospheric rivers as a scientific (and conversational) bridge between weather and climate,” *International Atmospheric Rivers Conference*, Scripps Institute of Oceanography, La Jolla, CA (*invited speaker*) Jun. 2018

“California’s increasingly extreme climate future,” Rusch Honors Colloquium, Viterbi School of Engineering, Univ. of Southern California, Los Angeles, CA (*invited lecturer*) Nov. 2017

“Causes and impacts of climate change—a California perspective,” Climate and Law Policy Seminar, UCLA School of Law, Los Angeles, CA (*invited lecturer*) Sep. 2017

“Teleconnections and regional impacts under anthropogenic forcing” & “Global warming influence on extreme events,” *US Climate Variability and Predictability Program (CLIVAR) Summit*, Baltimore, MD (*invited speaker and panelist*) Aug. 2017

“Trends in persistent seasonal-scale atmospheric circulation patterns responsible for precipitation and temperatures extremes in California,” *American Geophysical Union Fall Meeting*, San Francisco, CA (*invited speaker*) Dec. 2015

“Drought causes,” *American Geophysical Union Chapman Conf. on California Drought: Causes, Impacts, & Policy*, Univ. of California, Irvine (*invited panelist*) Apr. 2015

“The extraordinary 2012-2015 drought in California and its context in a warming world,” *Water Scarcity in the West: Past, Present, Future Conference*, Univ. of California, Davis (*invited speaker and panelist*) Apr. 2015

“Persistent atmospheric patterns and the ongoing California drought: the role of the Ridiculously Resilient Ridge,” *NASA Earth Science Seminar*, NASA Ames, Mountain View, CA (*invited speaker*) Mar. 2015

“The extraordinary California drought of 2012-2015: Historical context and the role of climate change,” PACLIM *Pacific Climate Workshop 2015*, Pacific Grove, CA (invited speaker) Mar. 2015

“The extraordinary California drought of 2012-2015: Historical context and the role of climate change,” *Atmosphere and Energy Departmental Seminar*, Stanford University, Stanford, CA (invited speaker) Mar. 2015

Academic service activities and professional affiliations

Journal Manuscript Referee: *Geophysical Research Letters* (29 reviews), *Journal of Climate* (14 reviews), *Journal of Geophysical Research—Atmospheres* (7 reviews), *Environmental Research Letters* (5 reviews), *Science Advances* (4 reviews), *Proceedings of the National Academy of Sciences* (4 reviews), *Bulletin of the American Meteorological Society*, (3 reviews), *Climatic Change* (2 reviews), *International Journal of Climatology* (2 reviews), *Scientific Reports* (2 reviews), *Communications Earth and Environment* (4 reviews), *Advances in Water Resources* (1 review), *Earth's Future* (1 review), *Nature* (1 review), *Nature Climate Change* (1 review), *Nature Communications* (1 review), *PNAS Nexus* (1 review) 2013-present

Ad Hoc Reviewer, NSF Climate and Large-scale Dynamics (CLD) Program 2024

Expert External Reviewer, Corporation for Public Broadcasting, proposed PBSKIDS digital and broadcast content pertaining to weather/climate 2024

External Reviewer, University of California personnel advancement dossiers 2022

Associate Editor, *Frontiers in Climate*, Climate, Ecology, and People section 2021-2022

Ad Hoc Reviewer, NSF Paleo Perspectives on Climate Change (P2C2) Program 2021

Ad Hoc Reviewer, NSF Industry-University Research Partnerships 2021

AGU Outstanding Student Presentation Award Judge, AGU Fall Meeting 2024, 2019

Expert Reviewer, United Nations International Strategy for Disaster Reduction (UNISDR) Global Assessment Report on Disaster Risk Reduction (GAR) 2019 2019

Expert Reviewer, California's Fourth Climate Change Assessment 2018

President, American Meteorological Society Student Chapter, UC Davis 2009-2011

AGU Fall Meeting session co-convenor: “Hydroclimate and Extremes in the Western United States in a Changing Climate,” “Bridging the Gap from Climate to Extreme Weather: Observations, Theory and Modeling” (2019), “Tropical Cyclones in the Global Climate System” (2010) 2024, 2019, 2010

Member, American Association for the Advancement of Science (AAAS) 2017-present

Member, American Geophysical Union (AGU) 2010-present

Member, American Meteorological Society (AMS) 2007-present

Broader community engagement (including invited talks & events)

- Invited Speaker, “Climate change in California: Hotter with increasing hydroclimate whiplash,” Alameda County Beekeepers Association Meeting, Alameda, CA* Feb. 2025
- Invited Keynote Speaker, “Drier *and* wetter in 21st century California? Managing increasing hydroclimate whiplash in a warming world,” California Irrigation Institute Annual Conference (Water: What’s Your Next Move?), Sacramento, CA Jan. 2025
- Invited Opening Speaker, “The Science of Climate Change in California and beyond,” Climate Health and Action Webinar Series, San Bernardino County Medical Society/ California Medical Association* Sep. 2024
- Invited Speaker, “Atmospheric Rivers, Heat Domes, and Hydroclimate Whiplash (Oh My!): How is it Playing Out Today?”, Ursus Environmental Symposium, University of California, Los Angeles College of Social Sciences/Department of Geography* Sep. 2024
- Invited Guest and Speaker, “Recharging California - In Conversation with Dr. Daniel Swain,” Public webinar hosted by Sustainable Conservation* Sep. 2024
- Invited Speaker, “Wildfires and climate change in Northern California.” Marin Wildfire Prevention Authority Ecologically Sound Practices Partnership (ESP) Meeting, San Rafael, CA Jul. 2024
- Invited Speaker, “Climate change in California: What we know, what we don't know, and what it all means for the Golden State.” Stanford Alumni for Climate Action* Apr. 2024
- Invited Keynote Speaker, “Hydroclimate whiplash on a warming Earth.” Operation Sierra Storm Conference 2024, South Lake Tahoe, CA Jan. 2024
- Invited Speaker, “*Twister* in 35mm: A post-screening conversation.” *Beware the Elements: Natural Disasters on Film* series, Academy Museum of Motion Pictures, Los Angeles, CA Jan. 2024
- Invited Speaker, “Revisiting the ARkStorm 2.0 scenario in the context of an evolving El Niño event,” FEMA Region 9 Climate Adaptation Seminar* Sep. 2023
- Invited Panelist, “Extreme weather events and their impact on urban, rural, working, and natural lands,” TOGETHER Bay Area 2023 Spring Conference, Richmond, CA May 2023
- Invited Keynote Speaker, “California flood risk looms large as atmospheric rivers intensify in a warming climate,” California Central Valley Flood Control Association Flood Forum 2023, Sacramento, CA Apr. 2023
- Invited Speaker, “The future of precipitation in California: A tale of water scarcity (but also overabundance) amid a warming climate,” The Nature Conservancy Board Meeting, Santa Barbara, CA Feb. 2023

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| Invited Speaker, “Weather extremes in a warming climate: Thoughts from a meteorologist-turned-climate scientist,” Steamboat Weather Summit, Steamboat Springs, CO | Jan. 2023 |
| Climate Feedback expert reviewer, assessing national/international media coverage on climate change and extreme weather as member of accredited fact-checking organization | 2016-2022 |
| Invited Speaker, “ARkStorm 2.0: A new and improved extreme storm and flood scenario for California in the climate change era,” Federal Emergency Management Agency (FEMA) Region 9 Briefing* | Oct. 2022 |
| Invited Keynote Speaker, “In a warming climate, California flood risk looms large despite long-term aridification and worsening drought,” California Department of Water Resources “Drought to Flood” Climate Change Symposium, Sacramento, CA* | Oct. 2022 |
| Invited Community Speaker, “California weather in the climate change era: A tale of increasing hydroclimate whiplash,” Chan Zuckerberg Biohub Community Speaker Series, San Francisco, CA | Sep. 2022 |
| Invited Speaker, “California Weather, Climate & Its Extremes,” Sustainable Silicon Valley Water & Sustainable Life (WET) Talk* | July 2022 |
| Invited Panelist, West Coast Climate Crisis Symposium, University of California, Los Angeles* | June 2022 |
| Invited Speaker, “California Wildfire in the Climate Change Era,” Marin Wildfire Prevention Authority* | May 2022 |
| Invited Speaker, “Drought, flood, and precipitation whiplash in a warming California,” The Metropolitan Water District of Southern California Water Dialogue* | Mar. 2022 |
| Invited Panelist, “California Dystopia: Understanding Climate Change and Social Collapse through Science Fiction,” USC Visions and Voices: The Arts and Humanities Initiative, University of Southern California, Los Angeles, CA | Mar. 2022 |
| Invited Speaker and Panelist, “Hanging Ourselves Out to Dry or The Beginning of a New Beginning?” California Foundation on the Environment and the Economy Conference on California Water* | Dec. 2021 |
| Invited Speaker, California Water Action Collaboration Risk Discussion Session* | Dec. 2021 |
| Invited Keynote Speaker, “California water in an era of increasing climate complexity,” California Water Policy Conference* | Nov. 2021 |
| Invited Speaker and Panelist, “Climate extremes and prediction in a warming California,” Drought and Climate Forecasting Panel, California Legislative Staff Education Institute Virtual Meeting* | Nov. 2021 |
| Invited Panelist, “Making our water infrastructure climate-ready,” California Water Policy | Nov. 2021 |

Conference, Public Policy Institute of California*

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| Invited Speaker and Panelist, “Climate extremes in a warming California,” California Climate Safe Policy Summit* | Aug. 2021 |
| Invited Speaker, “Warmer and wilder: Increasing water resource variability in a changing California,” California Water Efficiency Partnership Annual Conference* | Jun. 2021 |
| Invited Plenary Speaker, “Hotter, drier, and longer: Shifting seasonality and fire season in California,” The Nature Conservancy of California Leadership Meeting* | Jun. 2021 |
| Invited Speaker, “Wildfire, flood, and drought risk in a warming California,” Bay Area Climate Adaptation Network Meeting* | May 2021 |
| Invited Speaker, “Climate change in California: A drier or wetter future—or...both?” 2021 Thelma Hansen Virtual Symposium, University of California Cooperative Extension* | Apr. 2021 |
| Invited Speaker, “Climate Change Issues Affecting Water Supply, Storage and Flood Control, and Endangered Species,” California Water Law and Policy Conference 2021* | Apr. 2021 |
| Invited Speaker, “Increasing hydroclimate whiplash in California: Challenges (and opportunities) for wildfire and flood management,” ARCS Foundation webinar* | Apr. 2021 |
| Invited Speaker, “Climate Change and Extreme Events in California,” Northern California Science Writers Association virtual meeting* | Mar. 2021 |
| Invited Panelist, “Climate change in California and Nevada: Challenges and opportunities in an era of increasing variability,” Operation Sierra Storm Broadcast Meteorology Virtual Conference* | Jan. 2021 |
| Invited Panelist, “A Meteorologist, a Seismologist, a Volcanologist, and a Decision-maker Walk into a Bar: Improving our own risk and impact communication by examining experiences from outside the weather, water, and climate enterprise,” American Meteorological Society Annual Virtual Meeting* | Jan. 2021 |
| Invited Keynote Speaker, “Water woes in a warming California: Management challenges and opportunities in an era of increasing variability,” Association of California Water Agencies (ACWA) Virtual Fall Meeting* | Dec. 2020 |
| Invited Speaker, “Fanning the Flames: The Reality of Climate Change and Wildfires in California,” Nature Conservancy of California Webinar* | Nov. 2020 |
| Invited Keynote Speaker, “Climate Change in California: A Tale of Shifting Baselines, Sharpening Seasonality, and Increasing Precipitation Whiplash,” Interagency Ecological Program Annual Workshop, Folsom, CA* | Oct. 2020 |
| Invited Panelist, “Early Career Leadership Academy Panel,” American Meteorological Society* | Oct. 2020 |
| Invited Speaker, “Climate Change in California: Wetter wets, drier dries, and shifting seasonality,” San Bernardino Valley Municipal Water District Board Engineering Workshop* | Aug. 2020 |
| Invited Panelist, “The Future of Wildfire, Climate Change, and Water in the West,” California Grantmakers Association* | July 2020 |

- Invited Speaker, "Role of the scientist-communicator in an era of social media and climate change," The Nature Conservancy of California Webinar * Mar. 2020
- Invited Speaker, "Climate change in California: A tale of fire and flood," Water Education Foundation "Water Leaders" Orientation, Sacramento, CA* Jan. 2020
- Invited Speaker, "Wetter, drier, or both? Increasing hydroclimatic variability in 21st century California," University of California Agriculture & Natural Resources Water Strategic Initiative meeting, Davis, CA* May 2019
- Invited Speaker, "Is California ready for increasing precipitation whiplash?," American River Operations Work Group meeting, Folsom, CA* May 2019
- Invited Speaker, "Forces of Nature: H2-Uh-Oh," First Fridays event at Natural History Museum of Los Angeles, Los Angeles, CA May 2019
- Invited Speaker, "The Wild West of Online Science Communication," University of Washington Program on Climate Change, Seattle, WA* Apr. 2019
- Invited Panelist, "LA's New Abnormal: Megafires," UCLA Institute of the Environment and Sustainability & The Nature Conservancy, Los Angeles, CA Feb. 2019
- Invited Speaker, "Fire & Water from the 30,000-Foot Level," Water Education Foundation "Water Leaders" Orientation, Sacramento, CA* Jan. 2019
- Invited Keynote Speaker, "Drought, flood, and wildfire amidst increasing climate whiplash: the challenging road ahead for water management in the West," Water Education Foundation Water Summit, Sacramento, CA Sep. 2018
- Invited Interactive Speaker, "Climate Change Cliff Notes," A Climate Series for the Ages, hosted by UCLA Institute of Environment and Sustainability & Natural History Museum of Los Angeles, Los Angeles, CA Oct. 2017
- Invited Speaker, "Change in a land of extremes: what we know (and don't know) about California's climate future," Krotone Institute/Ojai Valley Conservancy, Ojai, California May 2017
- Featured Speaker, Stanford Connects 2016: "The Rise of the Ridiculously Resilient Ridge and the Future of California Drought," Stanford University, Stanford, CA May 2016
- Project Mentor, Stanford University course: "International Climate Negotiations (COP 21)" Dec. 2015
- Invited Speaker, "Flood in a time of drought? Effects of a powerful El Niño in the midst of California's record dry spell," Association of Bay Area Governments, Oakland, CA Sep. 2015
- Invited Speaker, "Climate Change in a Land of Extremes: Drought and Flood in California's Past, Present, and Future," U.S. National Park Service Parsons Memorial Lodge Lecture Series, Yosemite National Park, CA Aug. 2015
- Invited Speaker and Panelist, "California Drought Panel," Water in the West/Woods Institute for the Environment, Stanford University, Stanford, CA Mar. 2015
- Invited Panelist, "Earth Matters/A Matter of Degrees," Stanford Continuing Studies Feb. 2015

Program, Stanford University, Stanford, CA

Invited Science Speaker, "Stanford to the Sea" Science Hike, "The Ridiculously Resilient Ridge in Context: Climate Variability of California's Past, Present, and Future," Bill Lane Center for the American West, Stanford University, Stanford, CA May 2014

Invited Speaker and Panelist, "Current Drought: Causes, how bad is it, and will we see more?" University of California Drought Summit, California State Capitol, Sacramento, CA Apr. 2014

Invited Speaker and Panelist, "The California Drought: Causes, Context, and Response," Bill Lane Center for the American West/Woods Institute for the Environment, Stanford University, Stanford, CA Feb. 2014

Founder and leader, Aggie Forecasting Team at University of California, Davis 2008-2011

Co-leader, Atmospheric Profiling & Stratospheric Photography Project, Univ. of Calif., Davis 2009-2011

*Denotes remote participation via teleconference

Additional awards and recognitions

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| IOP Publishing Top Cited Paper Award (Goss et al. 2020) | 2023 |
| <i>Environmental Research Letters</i> Editorial Board "Best Article of 2020" (Goss et al. 2020) | 2021 |
| Finalist, AAAS Early Career Award for Public Engagement with Science | 2018 |
| "Must Follow" Social Media Meteorologist/Climatologist, Forbes Magazine | 2016 |
| Best Talk Award, Environmental Science, SES Research Review, Stanford University | 2016 |
| Oakland Museum of California "Agent of Change" | 2015 |
| "Ten under 30: Young leaders changing the American West," <i>High Country News</i> | 2015 |
| Fellow, Rising Environmental Leaders Program, Stanford Woods Inst. for the Environment | 2013 |
| "Research as Art" competition winner, School of Earth Sciences, Stanford University | 2015, 2012 |
| ThinkSwiss Award, Swiss National Science Foundation, "NCCR Climate Summer School," Grindelwald, Switzerland | 2013 |
| Winner, Prized Writing Competition, Scientific & Technical Writing, Univ. of California, Davis | 2010, 2008 |
| Guillermo Salazar Rodriguez Undergraduate Scholarship, American Meteorological Society | 2010 |
| Invitee, NCAR Undergraduate Leadership Workshop, Boulder, CO | 2010 |
| Regents Scholarship, University of California, Davis | 2009-2011 |
| UC Davis Integrated Studies Honors Program International Education Award | 2008 |
| UC Davis International Relations Study Abroad Award | 2008 |
| Edward Kraft Prize, University of California, Davis | 2008 |
| American Meteorological Society Undergraduate Scholarship | 2007-2009 |
| Henry A. Jastro Recruitment Scholarship, University of California, Davis | 2007-2009 |
| NASA Ames/AIAA Galileo Memorial Scholarship | 2007 |

Additional professional experience

Teaching

Teaching Assistant, Department of Earth System Science, Stanford University 2013
Course: “Atmosphere, Ocean & Climate Dynamics: The Atmospheric Circulation.”

Invited Guest Lecturer

University of California, Los Angeles 2016-2020
Courses: Advanced Topics in Environment and Sustainability; Climate Law and Policy;
The Blue Planet: Introduction to Oceanography

Stanford University 2013-2023
Courses: Atmosphere, Ocean & Climate Dynamics I & II (ESS 246A & ESS 246B);
Forecasting for Innovators (ME297); Stanford Pre-Collegiate Institutes

Academic Advisees

Eduardo Muñoz-Castro, Doctoral Student, Swiss Institute for Snow and Avalanche Research 2024-Present
/ETH Zurich (Co-advised with Drs. Manuela Brunner & Bailey Anderson, ETH Zurich)

Dr. Jennifer Bukowski, Postdoctoral Researcher, Inst. Of Environ. & Sustainability, UCLA 2021-2023
(Co-advised with Dr. James Done, NSF National Center for Atmospheric Research)

Additional publications

Non-peer reviewed reports

Persad, G.G., Partida, J.P.O., and **Swain, D.L.**, “Troubled Waters: Preparing for Climate Threats to California’s Water System,” *Union of Concerned Scientists*, 2020. 2020

Mount, J., **Swain, D.L.**, and P. Ullrich, “Just the Facts: Climate Change and California’s Water,” *Public Policy Institute of California*, 2019. 2019

Hanak, E. et al., “California’s Water,” *Public Policy Institute of California*, 2018. 2018

Mount, J. et al., “Managing Drought in a Changing Climate: Four Essential Reforms,” *Public Policy Institute of California*, 2018. 2018

Additional scientific presentations

Oral presentations

“Hydroclimate Volatility on a Warming Earth,” *American Geophysical Union Fall Meeting, San Francisco, CA* Dec. 2023

“Climate change is narrowing and shifting windows favorable for prescribed fire in western United States,” *American Geophysical Union Fall Meeting, Chicago, IL.** Dec. 2022

“ARkStorm 2.0: Developing a new extreme atmospheric river storm scenario for 21st century California,” *International Atmospheric Rivers Conference (virtual meeting)** Oct. 2020

“Dynamics of and precursors to California megafloods, present and future,” *American* Jan. 2019

Meteorological Society Annual Meeting, Phoenix, AZ

“Increasing climate whiplash in 21st century California,” *American Geophysical Union Fall Meeting*, New Orleans, LA Dec. 2017

“California precipitation extremes in a warming world,” *Sustainable LA Water Research Grand Challenge Research Symposium*, Los Angeles, CA Nov. 2017

Poster presentations

“Is society ready for increasing climate whiplash?” *2019 Israeli-American Kavli Frontiers of Science Symposium*, Jerusalem, Israel Sep. 2019

“Connections between the tropical Pacific Ocean, Arctic sea ice, and anomalous northeastern Pacific ridging,” *American Geophysical Union Fall Meeting*, San Francisco, CA Dec. 2016

“Character and causes of changing Pacific climate extremes: Special focus on the extraordinary 2012-2015 California drought,” *Young Environmental Scholars Conference*, Stanford, CA Dec. 2015

“The Extraordinary California Drought of 2013-2014: Character, Context, and the Role of Climate Change,” *American Geophysical Union Fall Meeting*, San Francisco, CA Dec. 2014

“The Extraordinary California Drought of 2013-2014: Character, Context, and the Role of Climate Change,” *Graduate Climate Conference*, Seattle, WA Nov. 2014

“The Extraordinary California Drought of 2013-2014: Character, Context, and the Role of Climate Change,” *Fourth Workshop on understanding Climate Change from Data*, National Center for Atmospheric Research, Boulder, CO Jun. 2014

“Evaluation of high-resolution simulations of Northeast Pacific atmospheric rivers,” *American Geophysical Union Fall Meeting*, San Francisco, CA Dec. 2013

“Mid-Latitude Precipitation Extremes: Latitudinal Linkages and Climate Change,” *Swiss National Center for Competence in Research (NCCR Climate)*, Grindelwald, Switzerland Sep. 2013

“High-resolution seasonal simulations of Northeast Pacific atmospheric rivers and comparison to in-situ observations,” *American Geophysical Union Fall Meeting*, San Francisco, CA Dec. 2012