

Daniel L. Swain

NatureNet Postdoctoral Fellow, University of California, Los Angeles
 Institute of the Environment & Sustainability; Center for Climate Science
 LaKretz Hall, Suite 300, 619 Charles E Young Drive South
 Los Angeles, CA 90024

Phone: (415) 686-1349
 Email: dlswain@ucla.edu
 ORCID: 0000-0003-4276-3092
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Research Interests

Dynamics & impacts of regional climate change, hydrological extremes, extreme event detection/attribution, ocean/sea ice teleconnections, natural hazard risk, science writing & communication

Education

Ph.D., Earth System Science, Stanford University 2016
 Dissertation Title: “Character and causes of changing North Pacific climate extremes”
 Advisor: Dr. Noah Diffenbaugh

B.S., Atmospheric Science, University of California, Davis (Highest Honors) 2011

Peer-Reviewed Publications

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, doi:10.1002/2017JD026575, 2017.

Diffenbaugh, N.S., Singh, D., Mankin, J.S., Charland, A., Horton, D.E., Haugen, M., **Swain, D.L.**, Rajaratnam, B., 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.

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, doi:10.1002/2016JD025116, 2016.

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, doi: 10.1126/sciadv.1501344, 2016.

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 observations, *Monthly Weather Review*, 143, 3556-3569, doi: 10.1175/MWR-D-15-0079.1, 2015.

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.

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.

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 2014

change [in "Explaining Extremes of 2013 from a Climate Perspective"], *Bulletin of the American Meteorological Society*, 95 (9), S3–S7, 2014.

Publications Submitted/in Preparation

- Swain, D.L.**, B. Langenbrunner, J.D. Neelin, and A. Hall, “Increasing weather whiplash in 21st century California” (*submitted, Nature Climate Change*) 2017
- Touma, D., Michalak, A. M., **Swain, D.L.**, and N. Diffenbaugh, “Spatial characteristics of extreme precipitation over the United States” (*in prep*) 2017
- Gonzales, K.R., **Swain, D.L.**, Barnes, E.A., and N.S. Diffenbaugh, “Observed Trends in West Coast Atmospheric River Temperatures” (*in prep*) 2017
- Swain, D.L.**, B. Langenbrunner, J.D. Neelin, K. Gonzales, and A. Hall, “Shifting constraints on Pacific Coast precipitation extremes under 21st century warming” (*in prep*) 2017

Published Perspectives and Commentaries

- 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 Review Letters*, 10.1002/2015GL066628, 2015.

Selected Honors and Awards

- NatureNet Postdoctoral Fellowship, Nature Conservancy/University of California 2016-2018
- Finalist, AAAS Early Career Award for Public Engagement with Science 2017
- 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
- “Ten under 30: Young leaders changing the American West,” *High Country News* 2015
- Fellow, Rising Environmental Leaders Program, Stanford Woods Inst. for the Environment 2013
- 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
- Winner, Prized Writing Competition, Scientific & Technical Writing, Univ. of California, Davis 2010, 2008
- Guillermo Salazar Rodriguez Undergraduate Scholarship, American Meteorological Society 2010
- Regents Scholarship, University of California, Davis 2009-2011
- American Meteorological Society Undergraduate Scholar 2007-2009
- Henry A. Jastro Recruitment Scholarship, University of California, Davis 2007-2009
- NASA Ames/AIAA Galileo Memorial Scholarship 2007

Invited Scientific Presentations

- Swain, D.L.**, “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
- Swain, D.L.**, and N.S. Diffenbaugh, “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
- Swain, D.L.**, “Drought causes,” *American Geophysical Union Chapman Conf. on California Drought: Causes, Impacts, & Policy*, Univ. of California, Irvine (*invited panelist*) Apr. 2015
- Swain, D.L.**, “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
- Swain, D.L.**, “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
- Swain, D.L.**, Touma, D., Singh, D., Tsiang, M., Haugen, M., Charland, A., Rajaratnam, B., and N. S. Diffenbaugh, “The extraordinary California drought of 2012-2015: Historical context and the role of climate change,” *Pacific Climate Workshop 2015*, Pacific Grove, CA (*invited speaker*) Mar. 2015
- Swain, D.L.**, Touma, D., Singh, D., Tsiang, M., Haugen, M., Charland, A., Rajaratnam, B., and N. S. Diffenbaugh, “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

Professional Experience

Scientific Research

Postdoctoral Fellow, Center for Climate Science; Inst. of Environment & Sustainability 2016-Present
University of California, Los Angeles

Investigate the character and causes of changes in hydrological cycle extremes in California.

Research Assistant, Climate and Earth System Dynamics Group
Stanford University

2011-2016

Develop and conduct scientific investigations of climate variability and change in the North Pacific/western North America region, with a focus on extreme meteorological events and persistent circulation patterns.

Intern, NASA/National Center for Suborbital Research
University of California, Irvine

2010

Obtain “ground truth” measurements for comparison to NASA overflights with hyperspectral imager as part of agricultural evapotranspiration study.

Science Communication

Author & Founder, Weather West/California Weather 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 in real-time. Extensive social media outreach (via Twitter as @Weather_West).

Atmospheric and Climate Science Media Liaison

2013-present

Frequent, sustained engagement with local, national, and international news media on weather & climate-related issues. Over 200 interviews with a wide range of outlets, including:

Newspaper: New York Times, Washington Post, USA Today, Bloomberg, Los Angeles Times, San Francisco Chronicle, Sacramento Bee, and numerous local outlets

Long-form/magazine: The Economist, The Atlantic, Scientific American, Popular Science, National Geographic, Outside Magazine, Sunset Magazine, Bay Nature Magazine

Radio: BBC World Service, National Public Radio (and numerous local affiliates), ABC national radio (and local affiliates), various local and university stations

Television: Democracy Now, ABC, NBC, PBS, Al Jazeera, Danish & German public television

Web outlets: Slate Magazine, Vice Magazine, BuzzFeed, Mashable, The Verge

Climate-focused: Climate Central, Climate Nexus, InsideClimate News, Generation Anthropocene podcast

Teaching

Teaching Assistant, Department of Earth System Science, Stanford University

2013

Course: “Atmosphere, Ocean & Climate Dynamics: The Atmospheric Circulation.” Give guest lectures, develop and implement practical laboratory sessions, hold office hours, and evaluate student performance.

Invited Guest Lecturer

University of California, Los Angeles

2016-2017

Courses: Climate Law and Policy; The Blue Planet: Introduction to Oceanography

Stanford University

2013-2016

Courses: Atmosphere, Ocean & Climate Dynamics 1 & 2; Stanford Pre-Collegiate Institutes

Public and Community Outreach

Climate Feedback expert reviewer, assessing national/international media coverage on climate change and extreme weather as member of accredited fact-checking organization Sep. 2016-present

Invited Lecturer, “California’s increasingly extreme climate future,” Rusch Honors Colloquium, Viterbi School of Engineering, Univ. of Southern California, Los Angeles, CA Nov. 2017

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

Invited Speaker, “Change in a land of extremes: what we know (and don't know) about California's climate future,” Krotana 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 Program, Stanford University, Stanford, CA	Feb. 2015
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
Active engagement with various science communication and education programs, including the Woods Institute for the Environment, the Bill Lane Center for the American West, Stanford Science Podcast, KSZU Campus Radio, and Stanford Daily Q&A sessions	2013-2016
Founder and leader, Aggie Forecasting Team at University of California, Davis	2008-2011
Co-leader, Atmospheric Profiling & Stratospheric Photography Project, Univ. of California, Davis	2009-2011

Other Awards and Recognitions

“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
“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
Invitee, NCAR Undergraduate Leadership Workshop, Boulder, CO	2010
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

Other Publications and Science Writing

Swain, D.L. and V. Carranza, “The science behind ‘An Inconvenient Sequel,’” article for UCLA Institute of the Environment & Sustainability blog, 08 August 2017. Available online at: https://www.ioes.ucla.edu/article/science-behind-inconvenient-sequel	2017
Swain, D.L. , <i>Outside Magazine</i> contributor, various articles	2015-2016
Swain, D.L. , <i>KQED Public Media</i> contributor, various articles	2015-2016
Diffenbaugh, N.S. and D.L. Swain , “Climate Change and the California Drought,” article for Brookings Institution <i>PlanetPolicy</i> blog, 06 October 2014. Available online at: http://www.brookings.edu/blogs/planetpolicy/posts/2014/10/06-climate-change-california-drought-diffenbaugh-swain	2014
Swain, D.L. , and N.S. Diffenbaugh, “Viewpoints: Climate change is increasing the chances of drought,” <i>Sacramento Bee</i> Op-Ed, 30 September 2014. Available online at: http://www.sacbee.com/opinion/op-ed/article2615493.html	2014
Swain, D.L. , 2010, “Ongoing Changes in Arctic Sea Ice and Impacts on Northern Hemisphere Atmospheric Circulation,” <i>Prized Writing 2009-2010</i> , P. Demory, Ed., Univ. of California, Davis, 202-209.	2010
Swain, D.L. , 2010, “Of Ice and Men: How changes in Arctic sea ice affect our climate, our weather, and our ways of life,” <i>Prized Writing 2009-2010</i> , P. Demory, Ed., Univ. of California, Davis, 210-217.	2010

Other Scientific Presentations

Oral Presentations

Swain, D.L. , B. Langenbrunner, J.D. Neelin, A. Hall, “Increasing climate whiplash in 21st century California,” <i>American Geophysical Union Fall Meeting</i> , New Orleans, LA	Dec. 2017
Swain, D.L. , A. Hall, D. Neelin, “California precipitation extremes in a warming world,” <i>Sustainable LA Water Research Grand Challenge Research Symposium</i> , Los Angeles, CA	Nov. 2017

Poster Presentations

Swain, D.L. , D. Singh, D.E. Horton, J.S. Mankin, T. Ballard, and N.S. Diffenbaugh, “Connections between the tropical Pacific Ocean, Arctic sea ice, and anomalous northeastern Pacific ridging,” <i>American Geophysical Union Fall Meeting</i> , San Francisco, CA	Dec. 2016
Swain, D.L. , Horton, D.E., Singh, D., and N.S. Diffenbaugh, “Character and causes of changing Pacific climate extremes: Special focus on the extraordinary 2012-2015 California drought,” <i>Young Environmental Scholars Conference</i> , Stanford, CA	Dec. 2015
Swain, D.L. , Tsiang, M. Haugen, M., Singh, D., Charland, A., Rajaratnam, B., and N.S. Diffenbaugh, “The Extraordinary California Drought of 2013-2014: Character, Context, and	Dec. 2014

the Role of Climate Change,” *American Geophysical Union Fall Meeting*, San Francisco, CA

Swain, D.L., Tsiang, M. Haugen, M., Singh, D., Charland, A., Rajaratnam, B., and N.S. Diffenbaugh, “The Extraordinary California Drought of 2013-2014: Character, Context, and the Role of Climate Change,” *Graduate Climate Conference*, University of Washington (Pack Forest), Eatonville, WA Nov. 2014

Swain, D.L., Tsiang, M. Haugen, M., Singh, D., Charland, A., Rajaratnam, B., and N.S. Diffenbaugh, “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

Swain, D.L., Lebassi-Habtezion, B., and N.S. Diffenbaugh, “Evaluation of high-resolution simulations of Northeast Pacific atmospheric rivers,” *American Geophysical Union Fall Meeting*, San Francisco, CA Dec. 2013

Swain, D.L., Lebassi-Habtezion, B., and N.S. Diffenbaugh, “Mid-Latitude Precipitation Extremes: Latitudinal Linkages and Climate Change,” *Swiss National Center for Competence in Research (NCCR Climate)*, Grindelwald, Switzerland Sep. 2013

Swain, D.L., Lebassi-Habtezion, B., and N.S. Diffenbaugh, “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

Professional Affiliations and Activities

Journal Manuscript Referee (*Nature*, *Geophysical Research Letters*, *Journal of Climate*, *Bulletin of the American Meteorological Society*, *Nature Scientific Reports*, *Nature Climate Change*, *Advances in Water Resources*) 2013-present

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

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