

ABIGAIL C. LUTE

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EDUCATION

- August 2021 **Ph.D. Water Resources Program, University of Idaho, USA**
Science and management track
Focus on mountain climate, hydrology, and cryosphere
National Science Foundation (NSF) Integrative Graduate Education and
Research Traineeship (IGERT) Fellow
Advisors: John Abatzoglou and Tim Link
- 2014 **M.S. Water Resources Program, University of Idaho, USA**
Science and management track
Focus on snow and climate
Advisor: John Abatzoglou
- 2010 **B.M. with honors dissertation, Music Department,
University of Otago, New Zealand**
Cello performance and ethnomusicology emphasis

PROFESSIONAL AND RESEARCH EXPERIENCE

- 2024-present Research Scientist, Physical Climate Risk Team, Woodwell Climate
Research Center, USA
Supervisor: Christopher Schwalm
- 2022-2024 Postdoctoral Researcher, Physical Climate Risk Team, Woodwell Climate
Research Center, USA
Supervisor: Christopher Schwalm
- 2021-2022 Postdoctoral Research Associate, Princeton University and National
Oceanic and Atmospheric Administration (NOAA) Geophysical Fluid
Dynamics Laboratory, USA
Supervisor: Tom Delworth
- 2017-2021 Research Assistant, University of Idaho, USA
Supervisor: John Abatzoglou
- 2017-2019 NSF IGERT Fellow, University of Idaho, USA
Supervisors: John Abatzoglou and Tim Link

- 2017 Intern, Coldwater Lab, University of Saskatchewan, Canada
Supervisor: Joe Shea
- 2015-2017 Research Fellow, Oak Ridge Institute of Science and Education and
Forest Service Rocky Mountain Research Station, USA
Supervisor: Charles Luce
- 2014 AmeriCorps Intern, Natural Resources Conservation Service Snow
Survey, USA.
Supervisor: Phil Morrissey
- 2012-2014 Research Assistant, University of Idaho, USA
Supervisor: John Abatzoglou
- 2012 Research Assistant, University of Idaho, USA
Supervisor: Vladimir Aizen

PUBLICATIONS

Peer-Refereed Publications

- In press **Lute, A.C.**, Abatzoglou, J.T., Fountain, A.G. and T.C. Bartholomaeus. “Projected loss of active rock glaciers in the contiguous Western United States with warming.” In press at the *Journal of Glaciology*.
- 2023 Powis, C. M., Byrne, D., Zobel, Z., Gassert, K. N., **Lute, A. C.**, and Schwalm, C. R. “Observational and model evidence together support wide-spread exposure to noncompensable heat under continued global warming.” *Sci. Adv.*, 9, eadg9297. <https://doi.org/10.1126/sciadv.adg9297>
- 2022 Marshall, A. M. and **A.C. Lute**. “Changing hydroclimate in the Columbia River Basin: Potential impacts on the Snake River Dams.” *Idaho Law Review*, 58. <https://digitalcommons.law.uidaho.edu/idaho-law-review/vol58/iss1/2>
- 2022 **Lute, A.C.**, Abatzoglou, J. and T. Link. “SnowClim v1.0: high-resolution snow model and data for the western United States.” *Geosci. Model Dev.*, 15, 5045–5071, <https://doi.org/10.5194/gmd-15-5045-2022>
- 2022 **Lute, A.C.** “A 21st century high-resolution glacier and ice sheet fractional area dataset.” NOAA Technical Memorandum. <https://doi.org/10.25923/hy8-sd24>
- 2022 Abatzoglou, J.T., Marshall, A.M., **Lute, A.C.**, and Safeeq, M. “Precipitation dependence of temperature trends across the contiguous United States.” *Geophysical Research Letters*, 49(4), <https://doi.org/10.1029/2021GL095414>

- 2021 **Lute, A.C.** and Abatzoglou, J.T. “Best practices for estimating near-surface air temperature lapse rates.” *Int J Climatology*, 1-16. <https://doi.org/10.1002/joc.6668>
- 2019 Leasure D. R., Wenger, S. J., Chelgren, N. D., Neville, H. M., Dauwalter, D. C., Bjork, R., Fesenmyer, K. A., Dunham, J. B., Peacock, M. M., Luce, C. H., **Lute, A. C.**, and Isaak, D. J. “Hierarchical multi-population viability analysis.” *Ecology*, 100(1):e02538. <https://doi.org/10.1002/ecy.2538>
- 2017 **Lute, A.C.** and Luce, C.H. “Are model transferability and complexity antithetical? Insights from validation of a variable-complexity empirical snow model in space and time.” *Water Resources Research*, 53, 8825-8850. <https://doi.org/10.1002/2017WR020752>
- 2015 **Lute, A.C.**, Abatzoglou, J.T., and Hegewisch, K.C. “Projected changes in snowfall extremes and interannual variability of snowfall in the Western United States.” *Water Resources Research*, 51, 960-972. <https://doi.org/10.1002/2014WR016267>
- 2014 **Lute, A.C.** and Abatzoglou, J.T. “Role of extreme snowfall events in interannual variability of snowfall accumulation in the western United States.” *Water Resources Research*, 50, 2874-2888. <https://doi.org/10.1002/2013WR014465>

Other Publications

- 2024 Naegele, A.C., **Lute, A.C.**, and Gassert, K.N. “Heat Analysis for Kerala, India.” <https://woodwellclimate.org/assessments/kerala>.
- 2019 Luce, Charles H., Gritzner, Jason, Grant, Gordon E., Crotteau, Michael J., Day, Kate T., Lewis, Sarah L., **Lute, Abigail C.**, Halofsky, Jessica E., and Stabb, Brian P. “Climate Change, Water, and Roads in South Central Oregon” in J.E. Halofsky, D.L. Peterson, and J.J. Ho (Eds.), *Climate Change Vulnerability and Adaptation in South Central Oregon*. General Technical Report PNW-GTR-974. USDA Forest Service, Pacific Northwest Research Station, Portland Oregon. <https://doi.org/10.2737/PNW-GTR-974>
- 2018 Abatzoglou, John and **A.C. Lute**. “Projections of climate and drought for selected sub-basins in Idaho.” Unpublished manuscript.
- 2017 **Lute, A.C.** and Luce, Charles. “Are model complexity and transferability antithetical? Insights from validation of a variable-complexity snow model on new conditions.” In the Proceedings of the 85th Annual Western Snow Conference, Boise, Idaho, B. McGurk (Ed.). <https://westernsnowconference.org/node/1821>
- 2016 **Lute, A.C.** and Luce, Charles. “Spatial analog models of snow.” In the Proceedings of the 84th Annual Western Snow Conference, Seattle, Washington, B. McGurk (Ed.). <https://westernsnowconference.org/node/1799>

- 2015 **Lute, A.C.** and Abatzoglou, John T. “Spatiotemporal SWE variability of the Columbia River Basin.” In Proceedings of the 83rd Annual Western Snow Conference, Grass Valley, California, B. McGurk (Ed.).
<https://westernsnowconference.org/node/1783>
- 2014 **Lute, Abigail C.**, “Extreme Snowfall Events in the Western United States: Variability, change, and implications for water resource management.” Master’s thesis. University of Idaho, Moscow, Idaho.
https://abbylute.files.wordpress.com/2016/04/lute_msthesis.pdf
- 2014 **Lute, A.C.** and Abatzoglou, J.T. “Projected changes in snowfall extremes and interannual snowfall variability in the Western United States.” In Proceedings of the 82nd Annual Western Snow Conference, Durango, Colorado, B. McGurk (Ed.).
<https://westernsnowconference.org/node/1738>
- 2013 **Lute, Abby**, Hegewisch, Katherine, and Abatzoglou, John. “Characteristics and interannual variability of extreme snowfall events.” In Proceedings of the 81st Annual Western Snow Conference, Jackson Hole, Wyoming, B. McGurk (Ed.).
<https://westernsnowconference.org/node/1649>

PRODUCTS

- 2024 **Warming levels-** python code for calculating global warming levels from CMIP6 data using a variety of approaches and creating climate summaries based on warming levels. https://github.com/WoodwellRisk/Warming_levels. Role: primary developer
- 2021 **An energy balance snow model-** a computationally efficient energy balance snow model that can be parameterized for new conditions and run at variable time steps. Model is written in MATLAB and can be run in the cloud or downloaded here: <https://www.hydroshare.org/resource/dc3a40e067bf416d82d87c664d2edcc7/>. Role: primary developer.
- 2021 **High-resolution pre-industrial, historical, and future snow and climate data for the Western United States-** ~200 m resolution snow and climate data for the Western U.S. from an energy balance snow model forced with downscaled outputs of the Weather Research and Forecasting (WRF) model.
<https://www.hydroshare.org/resource/acc4f39ad6924a78811750043d59e5d0/>. Role: primary developer.
- 2017 **National Forest Climate Change Maps-** provides spatial data and maps of historical and future temperature, precipitation, snow, and streamflow variables for each U.S. National Forest.
<https://www.fs.usda.gov/research/rmrs/projects/climatechangemap>. Role: primary developer.

- 2017 **Modeled historical streamflow metrics for the contiguous United States and National Forest Lands-** streamflow metrics describing annual and summer flow, as well as the percent of streamflow in each stream segment that is sourced from National Forests. <https://doi.org/10.2737/RDS-2017-0046>. Role: co-developer.
- 2015 **Western U.S. Stream Flow Metrics-** modeled flow metrics for streams in major river basins of the Western U.S. (later expanded to the contiguous U.S.) for historical and future climate change scenarios. https://www.fs.usda.gov/rm/boise/AWAE/projects/modeled_stream_flow_metrics.shtml. Role: contributor.
- 2015 **The snowfall and extreme event probabilistic analysis tool-** provides probabilistic information for watersheds in Idaho regarding annual snowfall totals and extreme snowfall events based on major modes of climate variability and historical patterns. <https://climate.northwestknowledge.net/SFETOOL/>. Role: primary developer.

PRESENTATIONS

- 2024 **Lute, A.C.** and Naegele, A. “Heat Projections for Kerala State.” Presented virtually at a workshop for the Kerala State Disaster Management Authority. 3 March.
- 2022 **Lute, A.C.**, Abatzoglou, John, and Link, Timothy. “SnowClim: high-resolution model and dataset for the western United States.” Presented at the 3rd International Conference on Snow Hydrology, virtual conference, 1-4 February.
- 2021 **Lute, A.C.**, Abatzoglou, John, and Link, Timothy. “SnowClim: high resolution model and dataset for the western United States.” Presented at the Western Snow Conference, virtual conference, 12-15 April.
- 2020 Luce, Charles and **Lute, Abigail**. “Applying non-random block cross-validation to improve reliability of model selection and evaluation in hydrology: an illustration using an algorithmic model of seasonal snowpack.” Presented at the European Geosciences Union General Assembly, virtual conference, 4-8 May.
- 2019 **Lute, A.C.**, Abatzoglou, John T., Fountain, Andrew G., and Bartholomaeus, Timothy C. “Environmental niche models elucidate controls on the distribution of rock glaciers.” Presented at Northwest Glaciologists Conference, Corvallis, Oregon, 4-5 October.
- 2019 **Lute, A.C.**, Abatzoglou, John T., Fountain, Andrew G., and Bartholomaeus, Timothy C. “Environmental niche models elucidate controls on the distribution of rock glaciers.” Presented at the International Union of Geodesy and Geophysics, Montreal, Canada, 8-18 July.

- 2019 **Lute, A.C.** and Abatzoglou, John T. “Robust approaches for estimating the near-surface temperature lapse rate.” Presented at the Western Snow Conference, Reno, Nevada, 15-18 April.
- 2018 **Lute, A.C.** and Abatzoglou, John T. “New thoughts on old methods: Best practices for estimating the near-surface lapse rate.” Presented at MtnClim, Rocky Mountain Biological Laboratory, Colorado, 17-21 September.
- 2018 Luce, Charles and **Lute, Abigail**. “Is there really a tension between parsimony and predictive power? Lessons on validation using a snow model with variation in complexity.” Presented at the European Geosciences Union General Assembly, Vienna, Austria, 8-13 April.
- 2017 Luce, C.H. and **Lute, A.** “Assessing a top-down modeling approach for seasonal scale snow sensitivity.” Presented at the American Geophysical Union Fall Meeting, New Orleans, Louisiana, 11-15 December.
- 2017 **Lute, A.C.**, Luce, Charles, Abatzoglou, John and Hegewisch, Katherine. “The National Forest Climate Change Maps Project: providing climate change projections at a scale relevant to land managers.” Presented at the Northwest Climate Conference, Tacoma, Washington, 9-11 October.
- 2017 **Lute, A.C.** and Luce, Charles. “Are model complexity and transferability antithetical?” Presented at the Coldwater Lab, University of Saskatchewan, Canmore, Alberta, Canada, 2 August.
- 2017 **Lute, Abigail** and Luce, Charles. “On the value of model parsimony: testing the transferability of a snow sensitivity model across a large snow monitoring network in the Western U.S.” Presented at the European Geosciences Union General Assembly, Vienna, Austria, 23-28 April.
- 2017 **Lute, A.C.** and Luce, Charles, “Are model complexity and transferability antithetical? Insights from validation of a variable-complexity snow model on new conditions.” Presented at Western Snow Conference, Boise, Idaho, 17-20 April.
- 2016 Luce, C.H. and **Lute, A.** “Transferability of space-for-time models of snow.” Presented at the American Geophysical Union Fall Meeting, San Francisco, California, 11-15 December.
- 2016 **Lute, A.C.** and Luce, Charles. “Assessing the transferability of space-for-time models of snow.” Presented at MtnClim, Leavenworth, Washington, 17-21 October.
- 2016 **Lute, A.C.** and Luce, Charles. “Spatial analog models of snow.” Presented at Western Snow Conference, Seattle, Washington, 18-21 April.

- 2016 **Lute, A.C.** and Luce, Charles. “Streamflow frequency analysis with a little help from Bach.” South Central Oregon Adaptation Partnership Vulnerability and Adaptation Workshop, Redmond, Oregon, 15-16 March.
- 2015 **Lute, A.C.** and Abatzoglou, John T. “Spatiotemporal SWE variability of the Columbia River Basin.” Presented at Western Snow Conference, Grass Valley, California, 20-23 April.
- 2014 **Lute, A.C.** and Abatzoglou, John T. “Projected changes in snowfall extremes and interannual snowfall variability in the Western United States.” Presented at Western Snow Conference, Durango, Colorado, 14-17 April.
- 2013 **Lute, A. C.**, Abatzoglou, John T. and Hegewisch, Katherine C. “Characteristics and interannual variability of extreme snowfall events.” Presented at Western Snow Conference, Jackson Hole, Wyoming, 15-18 April.

TEACHING EXPERIENCE

CWatM Hydrologic Modeling Workshop (Summer 2024)

5 sessions of 1-2 hours each

Developer and instructor, virtual, hosted mostly on Google Colab

Data Wizardry for Interdisciplinary Environmental Science (Spring 2020)

Graduate level 2 credit course

Co-developer and co-instructor, University of Idaho, USA

Global Climate Change (Fall 2013)

Lower division undergraduate 3 credit course

Teaching Assistant and instructor for two lectures, University of Idaho, USA

Meteorology (Fall 2013)

Upper division undergraduate 3 credit course

Teaching Assistant, University of Idaho, USA

AWARDS AND HONORS

2024 Woodwell Climate Research Center Career Development Fund Grant. \$150.

2021 CUAHSI HydroInformatics Innovation Fellowship. \$3500.

2017 Northwest Climate Conference Registration Scholarship.

- 2017 National Science Foundation (NSF) Integrative Graduate Education and Research Traineeship (IGERT): Graduate fellowship to study interdisciplinary approaches to adapting water resources to climate change in the Columbia River Basin. ~ \$100,000.
- 2014 Avista Water of the West Scholarship. \$2500.
- 2014 Best Student Presentation and James E. Church Award, Western Snow Conference, Durango, Colorado.
- 2013 2nd Place Best Student Presentation, Western Snow Conference, Jackson, Wyoming.
- 2010 Victor Galway Medal, Department of Music, University of Otago, Dunedin, New Zealand.
- 2010 Muriel Herbert Prize, Department of Music, University of Otago, Dunedin, New Zealand.
- 2005 National Merit Scholarship, Vanderbilt University, Nashville, Tennessee. \$5000.

PROFESSIONAL DEVELOPMENT

- 2024 CWatM Hydrologic Model Level A1 Summer School, virtual summer school hosted by the International Institute of Applied Systems Analysis (IIASA), 24 June – 10 July
- 2024 Media Relations and Reporter Engagement Training, virtual workshop led by 90 West, 27 June
- 2024 PowerPlay: Bias Awareness & Intervention Lab, virtual, 13 May
- 2019 COMPASS Science Communication Workshop, Moscow, Idaho, 21-22 March.
- 2018 Preventing and Resolving Water Conflicts: A Skills Building Workshop with Aaron T. Wolf, Moscow, Idaho, 20 April.
- 2017 Resilience Assessment Workshop with Paul Ryan, Moscow, Idaho, 22-24 March.

COMMUNITY OUTREACH

- 2020 Invited speaker, “Climate Change, Media, and Policy” to Law Science and the Environment class, University of Idaho, Moscow, Idaho, 13 April.
- 2019 Invited panelist, “Columbia River Treaty Panel Event,” organized by the University of Idaho Environmental Law Society, Moscow, Idaho, 8 November.

- 2017 Creator and organizer, “Know Your Snow: Public Forum about Snow”, Western Snow Conference, Boise, Idaho, 18 April.
- 2015-2017 Volunteer with Winter Wildlands Alliance SnowSchool, Bogus Basin, Idaho.
- 2015 Invited speaker, “Conversations: Climate Change and Idaho” at the Boise Public Library, Boise, Idaho, 14 October.

PROFESSIONAL ACTIVITIES

- 2024 Consultant on North American Snowpack for AlphaSights
- 2021 - 2022 Diversity, Equity, and Inclusion Committee Chair, Western Snow Conference
- 2021 Proposal Reviewer for the Swiss National Science Foundation
- 2021 Session Chair, Western Snow Conference Annual Meeting
- 2017-2023 Reviewer for Arctic, Antarctic, and Alpine Research, Journal of Applied Meteorology and Climatology, Physical Geography, Water Resources Research, Nature Communications
- 2017, 2021 Co-organizer, Western Snow Conference Annual Meeting
- 2016 - 2022 Executive Committee Member, Western Snow Conference

MEDIA MENTIONS

- 2024 “Kerala can warm by 0.5°C by 2040, 1.5°C by mid-century, say expert projections.” The Hindu Businessline, March 6, 2024
- 2024 Mohan, Shainu. “Temperature in Kerala to rise between 1 and 1.50C by mid-century.” The New Indian Express, March 4, 2024