S. McKenzie Skiles, PhD
Associate Professor & Director of Snow Hydro Lab
Department of Geography
University of Utah
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Education

2014 PhD, Geography, University of California - Los Angeles
Dissertation: Dust and Black Carbon Radiative Forcing Controls on Snowmelt in the Colorado River Basin

2010 MS, Geography, University of Utah
Thesis: Interannual Variability in Radiative Forcing by Desert Dust in Snowcover in the Colorado River Basin

2008 BS, Geography & BS, Environmental Studies, University of Utah

2008 GIS Certificate, University of Utah

Appointments

University of Utah, Associate Professor, Department of Geography, July 2023 - current
University of Utah, Assistant Professor, Department of Geography, Jul 2017- July 2023
Utah Valley University, Assistant Professor, Department of Earth Science, Aug 2016-Jul 2017
California Institute of Technology, Postdoctoral Scholar, Mar 2015-Aug 2016

Research Interest

Remote sensing of snow/ice, snow optical properties + radiative forcing by light absorbing particles, snow energy balance observations + process-based modeling, dust, cryosphere-climate interaction

Publications

**indicates advising of graduate student lead author*

2023 **Skiles, S.M.,** C. Donahue, A. Hunsaker, J. Jacobs. UAV Hyperspectral Imaging for Multiscale Assessment of Landsat 9 Snow Grain Size and Albedo. *Frontiers in Remote Sensing*. doi: 10.3389/frsen.2022.1038287

2023 Donahue, C.P., B. Menounos, N. Viner, **S. M. Skiles**, S. Beffort, T. Denouden, S. Gonzalez Arriola, R. White, D. Heathfield. Bridging the gap between airborne and spaceborne imaging spectroscopy for mountain glacier surface property retrievals. *Remote Sensing of Environment*. doi: 10.1016/j.rse.2023.113849

2023 Raiho, A., K. Cawse-Nicholson, A. Chlus, J. Dozier, M.M. Gierach, K. Miner, S.P. Serbin, D. Schimel, F. Schneider, A.N Shiklomanov, **S.M. Skiles,** P. Poulter. Exploring mission design for imaging spectroscopy retrievals for land and aquatic ecosystems. *Journal of Geophysical Research – Biogeosciences*. doi: 10.1029/2022JG006833

2023 Lang, O., D. Malia, **S.M. Skiles***. The shrinking Great Salt Lake contributes to record high dust-on-snow deposition in the Wasatch Mountains during the 2022 snowmelt season. *Environmental Research Letters*. doi: *10.1088/1748-9326/acd409*

2023 Meyer, J., J. Horel, P. Kormos, A. Hedrick, E. Trujillo, **S.M. Skiles***. Operational water forecast ability of the iSnobal-HRRR coupling; an evaluation to adapt into production environments. *Geoscientific Model Development*. doi: 10.5194/gmd-16-233-2023

2023 Feldman, D., Aiken A.C., **S.M, Skiles**, and others. The Surface Atmosphere Integrated Field Laboratory (SAIL) Campaign. *Bulletin of American Meteorological Society*. doi: 10.1175/BAMS-D-22-0049.1

2023 Leidman, S.Z., A.K. Rennermalm, A. Getraer, R. Muthyala, **S.M. Skiles**. Intra-Seasonal Variability in Supraglacial Stream Sediment on the Greenland Ice Sheet. *Frontiers in Earth Science – Cryospheric Sciences*. doi: 10.3389/feart.2023.969629

2022 **Skiles, S.M.**, D. Ragar, S. Clark. Hourly Snow Energy and Mass Balance at Atwater Study Plot, Alta, UT. *Hydrologic Processes*. doi: 10.1002/hyp.14558

2022 Meyer, J., J.S. Deems, K.J. Bormann, D. Shean, **S.M. Skiles***. Mapping snow depth and volume at the alpine watershed scale from aerial imagery using Structure from Motion. *Frontiers in Earth Science - Environmental Informatics and Remote Sensing*. doi: 10.3389/feart.2022.989792

2022 Fair, Z., M. Flanner, A. Schneider, **S.M. Skiles**. Sensitivity of modeled snow grain size retrievals to solar geometry, snow particle asphericity, and snowpack impurities. *The Cryosphere*. doi: 10.5194/egusphere-2022-266

2022 Abolafia-Rosenzweig, R., C. He, **S.M. Skiles**, F. Chen, D. Gochis. Evaluation and optimization of snow albedo scheme in Noah-MP land surface model using in-situ spectral observations in the Colorado Rockies. *Journal of Advances in Modeling Earth Systems*. doi: 10.1029/2022MS003141

2022 Donahue, C., **S.M. Skiles**, K. Hammonds. Mapping liquid water content in snow: An intercomparison of mixed-phase optical property models using hyperspectral imaging and in situ measurements. *The Cryosphere,* doi: 10.5194/tc-2021-247

2022 Lund, J., R.R. Forster, E.J. Deeb, G.E. Liston, **S.M. Skiles**, H.P. Marshall. Interpreting Sentinel-1 SAR backscatter signals of snowpack surface melt/freeze, warming, and ripening, through field measurements and physically based SnowModel. *Remote Sensing*. doi: 10.3390/rs14164002

2021 Ackroyd, C., **S.M. Skiles***, K. Rittger, J. Meyer. Trends in Snow Cover Duration Across River Basins in High Mountain Asia from Daily Gap-filled MODIS Fractional Snow Covered Area. *Frontiers in Earth Science*. doi: 10.3389/feart.2021.713145

2021 Donahue, C., **S.M. Skiles**, K. Hammonds. In situ effective snow grainsize mapping using a compact hyperspectral imager. *Journal of Glaciology*. doi: 10.1017/jog.2020.68

2021 Bair, N.E., K. Rittger, T. Stillinger, **S.M. Skiles.** COVID-19 Lockdown Show Reduced Pollution on Snow and Ice in the Indus River Basin. *PNAS.* doi: 10.1073/pnas.2101174118

2021 Hotaling, S, S. Lutz, R.J. Dial, A.M. Anesio, L.G. Benning, A.G. Fountain, J.L. Kelley, J. McCutcheon, **S.M. Skiles**, N. Takeuchi, and T.L. Hamilton. Biological Albedo Reduction on Ice Sheets, Glaciers, and Snowfields. *Earth-Science Reviews*. doi: 10.1016/j.earscirev.2021.103728

2021 Shah, J., R. Bares, B. Bowen, G. Bowen, D. Eiriksson, A. G. Hallar, J. Horel, S. Hinners, L. Jamison, J. Lin, D. Pataki, **S.M. Skiles**, R. Smith, M. Wolf, P. Brooks. The Wasatch Environmental Observatory: A mountain to urban research network in the semi-arid Western US. *Hydrologic Processes*. doi: 10.1002/hyp.14352

2021 Flanner, M.G., J. Arnheim, J.M. Cook, C. Dang, C. He, X. Huang, D. Singh, **S.M. Skiles,** C.A. Whicker, C.S. Zender. SNICAR-AD v3: A community tool for modeling spectral snow albedo. *Geoscientific Model Development*. doi: 10.5194/gmd-2021-182

2020 Cook, J. M., Tedstone, A. J., Williamson, C., McCutcheon, J., Hodson, A. J., Dayal, A., **Skiles, S.M.,** and others. Glacier algae accelerate melt rates on the western Greenland Ice Sheet. *The Cryosphere*. doi: 10.5194/tc-2019-58

2020 Uecker, T., S. Kaspari, K. Musselman, **S.M. Skiles**. The post-wildfire impact of burn severity and age on black carbon snow deposition and implications for snow water resources, Cascade Range, Washington, USA. *Journal of Hydrometeorology*. doi: 10.1175/JHM-D-20-0010.1

2019 **Skiles, S.M.**, T.H. Painter. Toward understanding direct absorption and grain size feedbacks by dust radiative forcing in snow with coupled snow physical and radiative transfer modeling. *Water Resources Research*. doi: 10.1029/2018WR024573

2019 Meyer, J., **S.M. Skiles***. Assessing the ability of Structure from Motion to map high resolution snow surface elevations in complex terrain: A case study from Senator Beck Basin, CO. *Water Resources Research*. doi: 10.1029/2018WR024518

2019 Bair, N.E., K. Rittger, **S.M. Skiles**, J. Dozier. An examination of snow albedo estimates from MODIS and their impact on snow water equivalent reconstruction. *Water Resources Research*. doi: 10.1029/2019WR024810

2019 Nagorski, S., S. Kaspari, E. Hood, J. Fellman, **S.M. Skiles**. Radiative Forcing by Dust and Black Carbon on the Juneau Icefield, Alaska. *Journal of Geophysical Research-Atmospheres*. doi: 10.1029/2018JD029411

2018 Painter, T.H., **S.M. Skiles,** J.S. Deems, J. Dozier, T. Brandt. Variation in rising limb of Colorado River snowmelt runoff hydrograph controlled by dust radiative forcing in snow. *Geophysical Research Letters*. doi: 10.1002/2017GL075826

2018 Dial, R.J., G.Q. Ganey, **S.M. Skiles**. What color should glacier algae be? An ecological role for red carbon in the cryosphere. *FEMS Microbiology Ecology*. doi: 10.1093/femsec/fiy007

2018 **Skiles, S.M.**, T.H. Painter. Assessment of Radiative Forcing by Light-Absorbing Particles in Snow from In Situ Observations with Radiative Transfer Modeling. *Journal of Hydrometeorology*. doi: 10.1175/JHM-D-18-0072.1

2018 **Skiles, S.M.,** M. Flanner, M. Dumont, J. Cook, T.H. Painter. Radiative Forcing by Light Absorbing Particles in Snow. *Nature Climate Change*. doi: 10.1038/s41558-018-0296-5 ***(Invited Review)***

2018 **Skiles, S.M.**, D. Mallia, A.G. Hallar, J.C. Lin, A. Lambert, R. Petersen, S. Clark. Implications of a shrinking Great Salt Lake for dust on snow deposition in the Wasatch Mountains, UT, as informed by a source to sink case study from the April 13th, 2017 dust event. *Environmental Research Letters*. doi: 10.1088/1748-9326/aaefd8

2017 **Skiles, S.M.,** & T.H. Painter. Daily evolution in dust and black carbon content, snow grain size, and snow albedo during snowmelt, Rocky Mountains, Colorado, *Journal of Glaciology*. doi: 10.1017/jog.2016.125

2017 **Skiles, S.M.,** T.H. Painter, G.S. Okin. A method to retrieve the spectral complex refractive index and single scattering optical properties of dust deposited in mountain snow, *Journal of Glaciology*. doi: 10.1017/jog.2016.126

2017 Casey, K.A., S.D. Kaspari, **S.M. Skiles,** K. Kreutz, M.J. Handley. Light absorbing particulates on snow: the spectral and chemical measurements of pollutant impacts on snow near South Pole, Antarctica, *Journal of Geophysical Research: Atmospheres*. doi: 10.1002/2016JD026418

2016 Miller, S., F. Wang, A. Burgess, **S.M. Skiles**, T.H. Painter, M. Rogers. Satellite-Based Estimation of Temporally Resolved Dust Radiative Forcing in Snow Cover, *Journal of Hydrometeorology*. doi: 10.1175/JHM-D-15-0150.1

2016 Painter, T.H., **S.M. Skiles**, and others. The Airborne Snow Observatory: scanning lidar and imaging spectrometer fusion for mapping snow water equivalent and snow albedo, *Remote Sensing of Environment*. doi: 10.1016/j.rse.2016.06.018

2016 Seidel, F., K. Rittger, **S.M. Skiles**, T.H. Painter. Case study of spatial and temporal variability of snow cover, grain size, albedo and radiative forcing in the Sierra Nevada and Rocky Mountain snowpack derived from imaging spectroscopy, *The Cryosphere*. doi: 10.5194/tc-10-1229-2016

2016 Minder, J.R., T.W. Lechter, **S.M. Skiles**. An evaluation of high-resolution regional climate model simulations of snow cover and albedo over the Rocky Mountains, with implications for the simulated snow-albedo feedback, *Journal of Geophysical Research: Atmospheres*. doi: 10.1002/2016JD024995

2015 Oaida, C., Y. Xue, M. Flanner, **S.M. Skiles**, F. De Sales, T.H. Painter. Investigating Physical Snow Processes Including Aerosols Using an Enhanced WRF/SSiB Model. *Journal of Geophysical Research – Atmospheres*. doi: 10.1002/2014JD022444

2015 Kaspari, S., **S.M. Skiles**, I. Delaney, D. Dixon, T.H. Painter. Accelerated Glacier Melt on Snow Dome, Mt. Olympus, Washington, USA due to Deposition of Black Carbon and Mineral Dust from Wildfire. *Journal of Geophysical Research- Atmospheres*. doi: 10.1002/2014JD022676

2015 **Skiles, S.M.**, T.H. Painter, J. Belnap, L. Holland, R.L. Reynolds, H.L. Goldstein, J. Lin. Regional variability in dust-on-snow processes and impacts in the Upper Colorado River Basin. *Hydrologic Processes*. doi:10.1002/hyp.10569

2014 Kaspari, S., T.H. Painter, M. Gysel, **S.M. Skiles**, M. Schwikowski. Seasonal and elevational variations of black carbon and dust in snow an ice in the Solu-Khumbu, Nepal and estimated radiative forcings. *Atmospheric Chemistry and Physics*, doi:10.5194/acpd-13-33491-2013

2013 Painter, T. H., A. C. Bryant, **S.M. Skiles**. Radiative Forcing by light absorbing impurities in snow from MODIS surface reflectance data, *Geophysical Research Letters*. 39, doi:10.1029/2012GL052457

2013 Painter, T. H., F. Seidel, A.C. Bryant, **S.M. Skiles**, K. Rittger. Imaging Spectroscopy of albedo and radiative forcing by light-absorbing impurities in mountain snow, *Journal of Geophysical Research: Atmospheres*. doi: 10.1002/jgrd.50520

2013 Reynolds, R.L., H. L. Goldstein, B. M. Moskowitz, **S. M. Skiles**, R.F. Kokaly, C.B. Flagg, K. Yauk, T. Berquó, G. Breit, M. Ketterer, D. Fernandez, M.E. Miller, T.H. Painter. Composition of dust deposited to snow cover in the Wasatch Range (Utah, USA): Controls on radiative properties and snow cover and comparison to some dust source sediments, *Aeolian Research*. doi: 10.1016/j.aeolia.2013.08.001

2013 Li, J., G.S. Okin, **S.M. Skiles**, T.H. Painter. Relating variation of dust on snow to bare soil dynamics in the western United States, *Environmental Research Letters*. 8(4), doi: 10.1088/1748-9326/8/4/044054

2012 Painter, T.H., **S.M. Skiles**, J. Deems, C. C. Landry. Dust Radiative Forcing in snow of the Upper Colorado River Basin: Part I. A 6 year record of energy balance, radiation, and dust concentrations. *Water Resources Research*. 48, doi:10.1029/2012WR011985

2012 **Skiles, S.M.**, T. H. Painter, J. Deems, C. C. Landry. Dust Radiative Forcing in snow of the Upper Colorado River Basin: Part II. Interannual variability in radiative forcing and snowmelt rates. *Water Resources Research*. 48, doi:10.1029/2012WR011986 ***(Editors' Choice Award)***

Submitted, In Review

2023 Meyer, J., A. Hedrick, **S.M. Skiles***. A new approach to net solar radiation in a spatially distributed snow energy balance model. *Journal of Hydrology*.

2023 Gayler, J. & **S.M. Skiles***. Response of Land Surface Albedo to Fire Disturbance in the Sierra Nevada Seasonal Snow Zone over the MODIS Record. *Earth's Future*.

2023 McDowell, I. E., K. M. Keegan, **S. M. Skiles**, C.P. Donahue, E.C. Osterberg, R.L. Hawley, and H.P. Marshall. A cold laboratory hyperspectral imaging system to map grain size and ice layer distributions in firn cores. *The Cryosphere*. doi: 10.5194/egusphere-2023-2351

Peer Reviewed Reports and Book Chapters

2021 Feldman, D. (Lead author), et al., with **Skiles, S.M.** (co-author). Surface Atmosphere Integrated Field Laboratory (SAIL) Science Plan. No. DOE/SC-ARM-21-004. Oak Ridge National Lab (ORNL), Oak Ridge, TN (United States). *Atmospheric Radiation Measurement (ARM) Data Center*.

2019 Hock, R. (lead author), et al., with **Skiles, S.M.** (contributing author). Special Report on Oceans and Cryosphere in a Changing Climate, Chapter 2: High Mountain Areas. *Intergovernmental Panel on Climate Change*.

2019 Cook, J., M. Flanner, C. Williamson, **S.M. Skiles**, Bio-optical properties of Terrestrial Snow and Ice. Springer Series on Light Scattering, Volume 3: Light Scattering and Radiative Transfer. *Springer*. Series Editor: A. Kokhanovsky.

Peer Reviewed Conference Proceedings

2018 **Skiles**, **S.M.,** J. Lund, T.H. Painter, Ground validation of Airborne Snow Observatory spectral and broadband albedo during SnowEx '17. *IEEE Geoscience and Remote Sensing Symposium (IGARSS)*. doi: 10.1109/IGARSS.2018.8518341

2018 Brucker, L., et al., including **S.M. Skiles**. Nasa Snowex'17 in SITU Measurements and Ground-Based Remote Sensing. *IEEE Geoscience and Remote Sensing Symposium (IGARSS)*. doi: 10.1109/IGARSS.2018.8517777

2017 Painter, T.H., **S.M. Skiles**, R.O. Green, F.C. Seidel, A. Nolin, Imaging spectroscopy to understand the controls on cryospheric melting in a changing world, *IEEE Geoscience and Remote Sensing Symposium (IGARSS)*. doi: 10.1109/IGARSS.2017.8127647

2016 **Skiles, S.M.** & T.H. Painter. A 9-yr record of dust-on-snow in the Colorado River Basin, *Proceedings of the 12th Biennial Conference of Science and Management on the Colorado Plateau*. doi*:* 10.3133/sir20155180

Open Source Data and Software

AVIRIS-NG Surface Spectral Reflectance, SnowEx21 Senator Beck Basin and Grand Mesa, CO, Version 1 [Data set]. Skiles, M. and C. M. Vuyovich. (2023). Boulder, Colorado USA. *NASA National Snow and Ice Data Center Distributed Active Archive Center*. https://doi.org/10.5067/ZAI3M64WWN5V

Landsat Operational Land Imager Dust Radiative Forcing in Snow (OLIDRFS) [Software]. *GitHub*. https://github.com/UofU-Cryosphere/DRFS

Airborne Snow Observatory Imagery Processing including Structure from Motion Workflow [Software]. *GitHub*. https://github.com/UofU-Cryosphere/snow-aso

Near real time snow remote sensing processing and analysis workflow for MODIS and AMSR-2 [Software]. *GitHub*. https://github.com/UofU-Cryosphere/servir-snow

Atwater Study Plot, Alta, UT (Version 1) [Data set]. S. M. Skiles. (2022). *Zenodo.* https://doi.org/10.5281/zenodo.5885283

Senator Beck Basin with Corrected Radiation (Water Years 2005-2014) (Version 1) [Data set]. S. M. Skiles. (2019). *Zenodo*. http://doi.org/10.5281/zenodo.2532590

Grand Mesa Study Plot (Version 1) [Data set]. S. M. Skiles. (2018). *Zenodo.* http://doi.org/10.5281/zenodo.1479859

SNOWPACK LRT (Version 1) [Data set]. S. M. Skiles. (2018). *Zenodo.* http://doi.org/10.5281/zenodo.2647633

Selected Invited Seminars and Presentations

2023 *Radiative forcing by dust on snow and implications for mountain watersheds*. Ecological Society of America Annual Meeting. Portland, OR.

Dust on Powder: Saving the Great Salt Lake and the Greatest Snow on Earth. The Nature Conservancy, Special Presentation at Snowbird Ski Resort.

2022 *Snow Darkening Impacts on Climate and Hydrology*. Kavli Frontiers of Science Israeli-American Symposium, National Academy of Sciences.

The Great Salt Lake and the Greatest Snow on Earth. Great Salt Lake Summit, Utah House of Representatives.

Monitoring the changing mountain snowpack from space. Massachusetts Institute of Technology (MIT), Program in Atmospheres, Oceans and Climate Colloquium.

2021 *From Playas to Peaks: Monitoring Patterns of Dust Deposition and Impacts on Seasonal Snow Water Resources in the Western US,* Duke University, Civil & Environmental Engineering Colloquium.

Snow Pits to Mountain Peaks: Optical Remote Sensing for Snow Hydrology from the Micro- to Macro Scale. American Geophysical Union Annual Meeting, San Francisco, CA.

2020 *Energy Balance Modeling in the Upper Colorado River Basin*. Colorado River Hydrologic Symposium.

Remote Sensing for Snow Hydrology. Snow, Ice, and Climate Talk Series. Dartmouth College.

2019 *Mapping surface elevations and snow depth with Structure from Motion photogrammetry*. Western Snow Conference Short Course, 87th Annual Western Snow Conference, Reno, NV.

Advancing Remote Sensing Methods to Constrain Physical Understanding of Accelerated Mountain Snowmelt. American Geophysical Union Annual Meeting, San Francisco, CA.

2018 *Ground validation of Airborne Snow Observatory spectral and broadband albedo during SnowEx '17*. IEEE Geoscience and Remote Sensing Symposium (IGARSS), Valencia, Spain.

Keynote: Climate and hydrology studies leveraging ASD VNIR spectral snow albedo measurements. Malvern Panalytical Webinar Series.

Externally Funded Projects

Active

NOAA Cooperative Institute for Research to Operations in Hydrology (CIROH)

Improve representation of snow accumulation and melting processes in the NextGen NWM in support of seasonal to sub-seasonal water supply forecasts

Role: Principal Investigator
Start/End Date: 8/1/2022 – 8/1/2025

Advancing CONUS-scale Operational Snow Modeling Capabilities
Role: Principal Investigator
Start/End Date: 6/1/2023 – 5/30/2026

Advancing Snow Observation Systems to Improve Operational Streamflow Prediction Capabilities
Role: Principal Investigator
Start/End Date: 6/1/2023 – 5/30/2026

NASA Earth Science Applications: Water Resources
Advancing domestic and international water management capabilities with a global daily snow cover and albedo product
Role: Institutional Principal Investigator
Start/End Date: 1/1/2022 – 12/31/2024

NASA Terrestrial Hydrology
Bridging MODIS to SBG: Improving the historical remotely sensed snow albedo record and preparing for satellite imaging spectroscopy via multi-sensor fusion
Role: Principal Investigator
Start/End Date: 2/1/2022 – 1/31/2025

NSF Critical Zone Collaborative Network
Dust in the Critical Zone from the Great Basin to the Rocky Mountains
Role: Co-Principal Investigator
Start/End date: 8/01/2020-8/01/2026

NSF CNH-2 Dynamics of Integrated Socio-Environmental Systems
The coupled, co-evolving roles of drought and electricity systems in humans' exposure to air pollution
Role: Co-Principal Investigator
Start/End date: 8/01/2020-8/01/2024

NASA Interdisciplinary Research in Earth Science
The role of dust in the life cycle of snow: Coupling remote sensing with models to link land-use, climate, and water resources
Role: Principal Investigator
Start/End date: 9/01/2020-9/01/2024

Department of Defense Broad Area Announcement
Cold Region Science and Technology: Cold Climate Sensing
Role: Co-Investigator/Task Lead
Start/End date: 5/01/2021-5/01/2024

Completed
NASA Earth Science Applications: Water Resources
Developing an operational framework for incorporating remote sensing and snow energy balance modeling into runoff forecasting in snow dominated watersheds in the Colorado River Basin
Role: Principal Investigator

NASA The Science of Terra, Aqua, and Suomi-NPP

Fusion of MODIS, VIIRS, and Landsat snow cover data to create high spatial and temporal resolution estimates of snow water equivalent in a well-instrumented and austere basin
Role: Team Member

NASA Terrestrial Hydrology
Snow Albedo Test Bed Scoping Studies
Role: Co-Principal Investigator

NASA Surface Biology and Geology (SBG)
SBG Imaging Spectrometer Satellite Mission Pathfinder Study (SISTER)
Role: Snow Algorithms Lead

DOE Office of Science
Constraining physical understanding of aerosol loading, biogeochemistry, and snowmelt hydrology from hillslope to watershed scale in the East River Special Focus Area
Role: Principal Investigator

NASA Cryosphere: High Mountain Asia
Precipitation and glacier mass balance in High Mountain Asia over the modern era
Role: Team Member

NASA SERVIR Applied Sciences
Managing the Changing Water Resources South of the Himalayas
Role: Co-Investigator

Awards

2023 Early Career Award, Cryosphere Section, American Geophysical Union
2022 Kavli Fellow, National Academy of Science – Kavli Frontiers of Science
2022 Superior Research Award Junior Tenure Track, University of Utah
2021 Junior Faculty Research Leave Award, University of Utah
2019 Outstanding Mentor/Advisor, U of U Department of Geography
2013 Outstanding Graduate Student Publication, UCLA Department of Geography
2013 Editors' Choice Award, Water Resources Research
2012 Outstanding Student Paper Award, Cryosphere Section, American Geophysical Union

Professional Roles, Leadership, and Service

President, NASA Snow International Working Group (SINTER) Executive Committee
Vice President, International Commission on Snow and Ice Hydrology
Council of Fellows, Cooperative Institute for Research to Operations in Hydrology (CIROH)
Associate Editor, Remote Sensing of the Environment
Chair, South Continental Committee, Western Snow Conference
Aerosol Science Team, Surface Atmosphere Integrated Field Laboratory (DOE SAIL)
Snow Field Measurement School Lead Instructor (2019 – current), CUAHSI
Campus Representative, CUAHSI
Ambassador, Community Snow Observations
Science Alliance, Protect Our Winters
Conference Sessions Convened
American Geophysical Union
Dust and Black Carbon in Cryosphere (2013-2020)
Remote Sensing of the Cryosphere: Seasonal Snow (2018-current)
International Union of Geodesy and Geophysics

Observations and modeling of impacts to snow and glaciers due to deposition of light-absorbing particles (2019, 2023)
Snow in the Critical Zone (2023)

Teaching

Introduction to GIS (Fall 2017-2019)
Introduction to Remote Sensing (Fall 2020-2022)
Geospatial Field Methods: GPS and Drones (Spring 2019-2021, Fall 2020-2022, Spring 2023)
Remote Sensing of Mountain Snow and Ice (Graduate Seminar, Spring 2018)
Snow and Ice (Spring 2019)
Snow Dynamics and Avalanche Mechanics (Spring 2020, 2022)
Advanced Snow Measurement Methods (Graduate Seminar, Spring 2022)

Student Advising *(*defended)*

Primary Advisor: Pat Naple (PhD), Otto Lang (PhD), Anton Avchyan (MS), Joachim Meyer (MS*, PhD*), Chelsea Ackroyd (MS*, PhD*), Jillian Gayler (MS*), Dillon Ragar (MS*), Jon Wagner (MS*), Hannah Peterson (MS*)
Co-Advisor: Matt Olson (PhD*)
Committee Member: Luis Garcia (MS*), Kate Baustian (MS*), Mickey Campbell (PhD*), Jewell Lund (PhD*), Dianne Pablo (MSGIS*), Troy Hagenmeyer (MSGIS*), Elizabeth Cotter (MS*), Baylee Olds (PhD), Jiaxuan Cai (Duke University, PhD)

Selected Media

- Dust is melting snow – and current models can't keep up. AGU Eos. 10/25/23
- I ski for miles in the wilderness to measure dust atop snow. Nature. 9/4/23
- Dust from a shrinking Great Salt Lake may be accelerating Utah's snowmelt. Science News. 07/03/2023
- Dust From the Drying Great Salt Lake Is Wreaking Havoc on Utah's Snow. The Smithsonian. 07/06/2023
- Utah's snow melted 17 days early because of Great Salt Lake dust. The Salt Lake Tribune. 6/16/23
- The Last Chair Podcast: Dr. McKenzie Skiles, The Science of Snowmelt. 03/08/2023
- Avalanches have become deadlier. Experts explain why. ABC National News. 02/18/2023
- The Dirtbag Diaries: Endangered Spaces - Colorado River, USA. 02/10/2023
- In this World Cup ski season, climate change in winning. Washington Post. 11/18/2022
- The Future of Utah's Water. RadioWest. 4/28/2022.
- Climate Scientist Katharine Hayhoe and educator McKenzie Skiles on climate change. KCPW. 4/22/22.
- Researchers developing new snowpack forecast model to better understand water conservation. KUTV. 4/12/22.
- This $7M effort in Utah will help us understand droughts, floods. Deseret News. 4/6/22.
- How climate change could affect snow at the Winter Olympics by 2080. Business Insider. 2/10/2022
- Dust Clouds are killing people out West- and the dangers could spread. Popular Science. 2/24/22
- Can the Great Salt Lake be saved? KPCW. 1/13/22.
- Wildlife, Air Quality at Risk as Great Salt Lake Nears Low. Associated Press. 6/6/2021
- Our Changing Mountain Snowpack. The Avalanche Review. 4/1/2020
- Save our Winters. Utah Business. 4/19/2019.

- Fire & Ice Podcast: What's Killing the Great Salt Lake? 3/5/2019.
- This Green Earth Podcast. 1/22/2019.
- Dust Is Speeding Up Snow Melt, Threatening Utah's Greatest Snow On Earth. Utah Public Radio. 01/07/2019.
- Tribune editorial: Can the Great Salt Lake be great again? Salt Lake Tribune. 12/29/2018.
- Dust is causing Utah's snowpack to melt faster, new U. study says. KSL. 12/21/2018.