



WESTERN SNOW CONFERENCE



Preliminary Agenda

March 6, 2025

92nd Annual Western Snow Conference
May 19 - 22, 2025

"From Research into Practice"

Emerson Center for the Arts and Culture
Bozeman, Montana

<http://westernsnowconference.org>
westernsnowconference@gmail.com

Monday, May 19

9:00 – 3:00 Short Course: (includes lunch)

Please join us for a special needs assessment meeting and presentation by members of NASA's Western Water Applications Office (WWAO).

1:00 – 5:00 Vendors Setup, Poster Paper Setup

3:00 – 5:00 WSC Executive Committee Meeting

5:30 – 7:00 Registration and Hospitality – Emerson Ballroom

Please join us for a special hospitality event in the Emerson Ballroom. Refreshments will be served, and we will be treated to a special presentation of aerial arts and contemporary dance by the Mountain Air Dance Troupe.

Tuesday, May 20

7:00 – 8:00 Author's Breakfast - Emerson Center

All oral presentation authors are asked to attend this complimentary breakfast, meet your session chair, and finalize details about your presentation.

7:00 – 8:30 Conference Registration, Vendor Setup, Poster Setup

CONFERENCE OPENING SESSION

8:30 – 8:45 Opening Remarks and Welcome: Jolyne Lea, WSC General Chair & Lucas Zukiewicz, Conference Chair

8:45 – 9:15 Keynote Address

9:15 – 10:15 **ORAL SESSION I**
Climate Change & Forest Treatment (Chair TBD)

9:15 – 9:35 **Adrienne Marshall:** High-Resolution Mountain Topography Can Inform Global Snow Vulnerability Estimates

9:35 – 9:55 **Kyla Bazlen:** Hydrograph Spread Increases as Peak Snow Declines in the Western U.S.

9:55 – 10:15 **Sydney Carr:** Investigating the Emergence of Climate Change Signals in the Upper Colorado River Basin

10:15 – 10:35 **Break**

10:35 - 11:55 **ORAL SESSION I (Continued)**
Climate Change & Forest Treatment (Chair TBD)

10:35 – 10:55 **Courtney Weeks:** Characteristics of Current and Future Precipitation in the Yakima Basin

10:55 – 11:15 **Colin Gilbert:** Quantifying the Impact of Snow to Rain Transition on River Temperature and Discharge across Southeast Alaska

11:15 – 11:35 **Sarah Newcomb:** Modeling the Effects of Forest Change on Seasonal Snowpacks in the Greater Yellowstone Ecosystem

11:35 – 11:55 **Joel Biederman:** Towards Forest Management Prescriptions to Improve Wildfire Resilience and Snowmelt Water Availability for Forest Health, Fuels Moisture, and Water Resources

11:55 – 1:30 **Lunch (on your own)**

1:30 - 2:30 **Student Showcase I (Chair TBD)**

- 1:30 – 1:40 **Albane Challamel:** Assessing the Shifting Nature of Large Runoff Events and the Relative Contributions of Rain, Snowmelt, and Rain-on-Snow in Alaska
- 1:40 – 1:50 **Arielle Koshkin:** Modeling Post-Fire Snowpack Dynamics: Evaluating the Role of Cold Content and Climate Variability in Post-Fire Snowpack Changes with SUMMA
- 1:50 – 2:00 **Kyla Christopher-Moody:** Effects of Forest Treatment on Snow Accumulation and Ablation in a Mountain Watershed near Bozeman, Montana; USA
- 2:00 – 2:10 **Andrea Bruckmeier:** Evaluating Snow Cover Simulations Run Using Reanalysis Dataset Against Field Measurements for Improving Avalanche Hazard Assessment
- 2:10 – 2:20 **Hanna Steele:** Where is the Snow? A User-Informed Framework for Identifying Potential Snowpack Measurement Locations in Eastern Oregon
- 2:20 – 2:30 **Daniel Hogan:** Synoptic-Scale Systems Control Winter Sublimation Totals at a Colorado Alpine Site
- 2:30 – 3:00 **Break**
- 3:00 – 3:30 **Vendor Introductions**
- 3:30 – 5:30 **Poster Session I and Vendor Displays**

Poster Session I: Remote Sensing & Long-Term Perspectives

1. Matthew Rybecky Deuterium and Triple Oxygen Isotope Analysis of an Evolving Snowpack in the Southern Sangre de Cristo Mountains during the 2024 to 2025 Winter Season
2. Belen Roof How Does Winter Outdoor Recreational Traffic Impact Concentrations of Microplastics in Colorado's Snowpacks?
3. Jerry Toupin The Battle of Winter in Alberta, Canada. A comparison between Edmonton and Calgary.
4. Mayesha Samiha Khan Analysis of road surface condition data with Teconer sensor along I-80 Wyoming
5. Hassan Mosaid Dam Siltation in the Mediterranean Region Under Climate Change: A Case Study of Ahmed El Hansali Dam, Morocco
6. Bjoern Bingham Analysis of Spatial and Temporal Rain/Snow Line Variations using Crowd Sourced Data

7. Sean O'Neil A Climatology and Future Projections of Rain on Snow to Improve Structural Snow Load Estimates
8. Clinton Alden The impact of warming temperatures on snowpack structure
9. Logan Hastings Improved postfire hydrologic modeling in the western Oregon Cascades
10. Marin MacDonald Impacts of High Elevation Post-Fire Landscapes on Seasonal Snowpack Accumulation and Melt in Colorado
11. Blake Butler "Deserves a kindly thought each time a water tap is turned on": William Taylor, Vancouver's First Snow Surveyor
12. Bruce McGurk Early WSC Proceedings: Basis of Current Snow Surveys, Analysis, and Forecasting
13. Markus Allgaier How Accurate Is Diffuse Laser Reflectometry of Snow?
14. Anton Avchyan Multi-Scale Assessment of Remotely Sensed Snow Surface Properties in Complex Terrain
15. Mathis Leemann Western US snow properties and albedo derived from the SPIReS algorithm over the MODIS record
16. Anthony Maue Improving ground classification of RPAS LiDAR point clouds for snow depth mapping in a forested watershed on Vancouver Island
17. Will McDermott Monitoring Snow Depth with Uncrewed Aircraft System Based Lidar Systems in the Colorado Rocky Mountains
18. Nolan Morrow Leveraging Time-Series UAV LiDAR to Uncover Microtopographic Drivers of Snow Accumulation and Melt
19. Mark Raleigh Extending the value of airborne lidar snow depth data
20. Lindsay Stark Finding Signals of Sublimation with LiDAR: A case study of Grand Mesa, CO
21. Ross Palomaki Recent developments in remote sensing of SWE using L-band InSAR
22. Stephanie Saal Snow persistence mapping in the Yukon River Headwaters using Google Earth Engine

7:30 - 9:00

Performance: "A No-Winters Night"

Please join us for a short play called "*No Winter's Tale*". This modern-language adaptation of Shakespeare's "The Winter's Tale" takes place at a ski resort in the Rocky Mountain West. It reimagines Shakespeare's tale of jealousy and loss against the backdrop of a changing climate, as a snow scientist and a resort owner struggle to find common ground.

Wednesday, May 21

8:30 – 9:50

**ORAL SESSION II
Remote Sensing (Chair TBD)**

8:30 – 8:50

Karl Rittger: Snow Today: a Multi-Decadal Operational Snow Surface Property Suite and Analysis for Water Supply Forecasting

8:50 – 9:10

Noah Molotch: SWE-Fusion: Real-time Snow Water Equivalent Mapping Over the Western US to Support Water Resource Management

9:10 – 9:30

Randall Bonnell: Evaluating Sentinel-1 InSAR for Alpine Snowpack Monitoring in the Western USA

9:30 – 9:50

William Floyd: The Transition from a Research Focused Four Year LiDAR Acquisition and Field Campaign to Operational Snow Surveys on Vancouver Island and the South Coast of British Columbia, Canada

9:50 – 10:15

Break

9:30 - 5:00

Guest Tour

Guests of Conference Attendees are invited to take part in a day of leaning, hot spring soaking, and hospitality in the beautiful Gallatin River Valley.

10:15 – 11:35

**ORAL SESSION III
Snow Modeling & Monitoring (Chair TBD)**

10:15 – 10:35

Theodore Barnhart: Evaluating Distributed Snow Model Resolution and Meteorology Parameterizations Against Streamflow Observations: Finer is Not Always Better

10:35 – 10:55

Anna Pfohl: What Resolution Snow Model is Needed for Accurate Streamflow Timing and Volume Simulation?

10:55 – 11:15

Alvaro Robledano: Updating the Longwave Radiation Scheme of the iSnobal Model: Assessing Improvements in Complex Terrain in the Upper Colorado River Basin

- 11:15 – 11:35 **Yijing Liu:** Representing Canopy Interception in a Distributed Snow Model to Improve Snow Accumulation and Melt Timing
- 11:35 – 1:00 **Lunch (on your own)**
- 1:00 – 2:00 **ORAL SESSION III (Continued)
Snow Modeling & Monitoring (Chair TBD)**
- 1:00 – 1:20 **Andrew Schwartz:** HydrOMETPi: Implementing Cost-Effective and User-Friendly Technology for Data Collection
- 1:20 – 1:40 **Anne Heggli:** Mountain Rain or Snow: Participatory (citizen) Science to Improve Precipitation Phase Estimates in Mountain Environments
- 1:40 – 2:00 **Megan Mason:** Towards State-wide Snowpack Temperature Monitoring - California Cold Content Initiative
- 2:00 – 2:30 **Break**
- 2:30 - 3:10 **Student Showcase II (Chair TBD)**
- 2:30 – 2:40 **George Brencher:** Improving Snow Depth Retrievals from Spaceborne Remote Sensing Data over the Western United States with a Convolutional Neural Network
- 2:40 – 2:50 **Eric Gagliano:** A Decade of Global Snowmelt Runoff Onset from Sentinel-1 SAR
- 2:50 – 3:00 **Bareera Mirza:** Exploring Snow Accumulation and Melt Dynamics using Satellite-Derived Timing across Mountainous Regions
- 3:00 – 3:10 **Patrick Naple:** Radiative Forcing by Light Absorbing Particles in Snow over Fractionally Covered MODIS Pixels
- 3:10 – 3:30 **Western Snow Conference Annual Business Meeting
(All Attendees)**
- 3:30 – 5:30 **Poster Session II**

Poster Session II: Modeling & Monitoring

1. Christina Chow Snow Water Equivalent Monitoring Capabilities Using a Cosmic Ray Neutron Rover in the San Juan Mountains
2. Briana Whitehead Emerging Technologies for Estimating Snow Water Equivalent
3. Stijn Wielandt Low-Cost 60 GHz FMCW Radar for Snowpack Monitoring and Characterization

4. William Roe
Prototype of a snow energy and mass balance monitoring system to support distributed observations and modeling in headwater catchments
5. Gracie Knudson
Laboratory and Field Observations of Blade Penetration Resistance During Diurnal Freeze-Thaw Cycles
6. Mary Connelly
Improving Accessibility to the SnowPilot Database through the Development of an Open-Source Python Library and Jupyter Notebooks
7. Camela Carstarphen
Long-term Data Sets: How They Can Produce More Accurate Assessments for Development Questions: Crystal Lake, Lincoln County, Montana
8. Jacob Miller
Building a long term observation record of dust on snow processes and impacts in the Wasatch Mountains, UT
9. Griffin Shelor
Evaluating the Representativeness of Snow Sampling Sites in the Western US and Alaska
10. Eli Boardman
Mapping Kilometer-Scale Snow Transport with Lidar and Neural Networks
11. Michelle Harold
Using Large-Eddy Simulations (LES) to understand microenvironments over Idaho's Camas Prairie region
12. Mary O'Flaherty
Employing Machine Learning Algorithms for SWE Estimation and Snowpack Monitoring in the Absaroka-Beartooth Wilderness, Montana
13. Emma Tyrrell
A Deep Learning Approach to Fill Spatial Gaps in High-Resolution Snow Water Equivalent Data
14. Stanley Akor
Deep Learning Approach to predict Snow Water Equivalent from Atmospheric Forcings
15. Baxter Vieux
SNOFO Update on SWE Monitoring Advances Using Weather Radar and Machine Learning
16. Dane Liljestrand
Leveraging Snow-Probe Measurements, LiDAR, and Machine Learning for Modeling Snow Distribution in Complex Terrain
17. William Currier
Combining Hydrometeorological Datasets to Improve Snow Derived Water Supply Forecasts within M4.
18. Madison Muxworthy
Snow to Flow: Coupling iSnobal-HRRR and Sac-SMA in the Upper Colorado River Basin
19. Wyatt Reis
Snow Model Complexity Evaluation for Real-time Streamflow Forecasting

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| 20. | Siwei He | Performance of Rain-on-Snow Flood Forecasts from Two Operational Hydrologic Models During the 2022 Montana Floods |
| 21. | Michelle Hu | Evaluating 9 Years of Simulated Snowmelt Dynamics from a Process-based Model informed by Remotely Sensed Snow Albedo across Colorado River Headwater Basins |
| 22. | William Rudisill | Snow Albedo Dependence of Cloud Radiative Forcing in the Upper Colorado River Basin |
| 23. | Hayden Libby | Using SNOTEL supersite data to run the the SNOWPACK model |
| 24. | Steven Fassnacht | Consequences of Snow Surface Roughness Variability for Different Melting Conditions |

CONFERENCE BANQUET & AWARDS

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| 6:00 – 7:00 | Hospitality |
| 7:00 – 9:00 | Banquet and Awards |

Please join us for a marvelous buffet banquet, presentation of awards, and a presentation by Phil Farnes, the “second father of snow surveys.”

Thursday, May 22

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| 9:00 – 1:00 | Technical Tour |
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Please join us for an informative tour of Montana State University’s Subzero Lab - A world-class suite of lab facilities for research on cold regions and cold materials.

The half-day Technical Tour will take place on Montana State University’s campus. It will be comprised of three separate components that highlight new technologies in snow science and how these technologies can help bring new snowy insights for researchers and practitioners.

Component A: A guided walkthrough of the state-of-the-science laboratories of Montana State’s Sub Zero Research Lab. This includes temperature-controlled chambers, specialized equipment for snow mechanics, and field-deployable instrumentation.

Component B: Field demonstrations of new sensors that are deployed on Uncrewed Aerial Vehicles (UAVs or drones) and the novel, high-resolution measurements of snow that they can provide. This includes LiDAR, Hyperspectral, and Gamma-Ray sensors. There will also be an introduction to field deployed Cosmic- and Gamma-Ray sensors, and the measurements they produce. However, the sensors will still be in the field! There may even be an opportunity for participants to fly a smaller, non-instrumented drone.

Component C: A round table discussion and lunch on integrating these technologies from the more research-oriented research into practice! Lunch is included in the registration.