



WESTERN SNOW CONFERENCE



91st Annual Western Snow Conference
April 22–25, 2024

“Watersheds to Estuaries”
Oregon State University, Corvallis, Oregon

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

Monday, April 22

- 9:00 - 1:00 Short Course (includes lunch) – Burt Hall Room 193
“Rivers Running: Dam Removal Methods, Developments, and Results in the Pacific Northwest.”

Liam Schenk, Oregon Water Science Center
Suman Jumani, Nature Conservancy
Scott Wright, Oregon State University and River Design Group
Kim Sager, Wildlife Program Manager for Elwha Tribe
- 2:00 - 5:00 WSC Executive Committee Meeting – Strand Hall Room 340
- 5:30 - 7:00 Registration and Hospitality – McMenamins on Monroe
2001 NW Monroe Avenue, Corvallis

Tuesday, April 23

- 7:30 - 8:30 Authors’ Breakfast – Memorial Union Ballroom
- 7:30 - 9:00 Conference Registration, Vendor Setup, Poster Setup
Memorial Union Ballroom

CONFERENCE OPENING SESSION – Memorial Union Ballroom

- 9:00 - 9:15 Opening Remarks: Teri Smyly, WSC General Chair & Daniel Fisher, Conference Chair

9:15 - 9:30 Welcome: Tuba Ozkan-Haller, Dean of the OSU College of Earth, Ocean, and Atmospheric Sciences

9:30 - 10:00 Keynote: Phil Mote, Vice Provost and Dean of the OSU Graduate School, "Should I Teach my Grandkids to Ski? An Examination of Climate Change and Snow in the Western US."

10:00 - 10:30 **Vendor Introductions**

Alpine Hydromet:	Matt Heggli
Campbell Scientific:	Tyler Laudenklos
ETI Instrument Sensors:	Andrew Ehlers
Geonor:	Jim Brylawski
Kisters, North America:	Elizabeth McGoldrick
Mountain Hydrology:	Eli Boardman
OTT Hydromet:	Steve Eagen

ORAL SESSION I – *Snow Properties – Lab to Field*
Session Moderator: Scott Pattee, NRCS

10:30 - 10:45 A Laboratory-based Field Spectrometer Inter-comparison for the Measurement of Snow Spectra - Ben Roberts-Pierel

10:45 - 11:00 Comparing Snow Albedo Measurements to Models in Complex Terrain When Upwelling Shortwave Fluxes Exceeds Downwelling Shortwave Fluxes - Daniel Feldman

11:00 - 11:15 Aspect Controls on Snow Properties Through Time in a Subalpine Forest Using GPR - Kori Mooney

11:15 - 11:30 The Future of Hoar-frost: Observations from the SAIL Field Campaign - William Rudisill

11:30 - 11:45 How Strong is Snow? Snowpack Micromechanics across Grand Mesa, Colorado using NASA SnowEx SnowMicroPen Data—Tate Meehan

11:45 - 1:15 **Lunch (on your own)**

ORAL SESSION II – *Snow Properties – Field to Space*

Session Moderator: Matt Brunengo, PSU

- 1:15 - 1:30 Retrieval of Snow Surface Properties from Optical Satellite Data by Snow Surface Spectrum Radiative Transfer Modeling - Rune Solberg
- 1:30 - 1:45 NASA SnowEx Snow Albedo Field Campaign 2023: A Collaborative Effort to Improve Observations of Snow Albedo in the Boreal Forest Over Scales of Space and Time - Anton Surunis
- 1:45 - 2:00 Enhancing Snow Albedo Process in Noah-MP Land Surface Model - Cenlin He
- 2:00 - 2:15 NASA WWAO Refining SWE Measurement - Mark Davidson
- 2:15 - 2:30 Addressing the Largest Source of Uncertainty in Snow Modeling - Micah Sandusky
- 2:30 - 3:30 **Break– Vendor Exhibits and Poster Sessions**

Poster Presentations

Snow Properties

1. Evaluating Snow Depth Measurement Accuracy in the Boreal Forest: Comparing Ground-Penetrating Radar, Probes, and Trench Data - Kajsa Holland-Goon
2. Simulating the Effect of Liquid Water Content on Spectral Albedo Through a Photon Tracking Snowpack Model - Marianna Marquardt
3. Profiles of Observed Snow Temperature and Derived Snow Density from a Thermistor String in the 2022-2023 Colorado Snowpack - Janet Intrieri
4. Meltwater Storage in a High Accumulation, Modest Melt Climate: A Comparison of SNOWPACK and Observations on Mount Waddington, British Columbia -Lucy Waghorn
5. Developing a Cooperative Snow Temperature Survey - Anne Heggli
6. Mapping Grain Size from Helicopter-Borne Lidar Reflectance - Brent Wilder
7. Spatial and Temporal Variability of Temperate Snowpack Properties in Southeast Alaska and Northern Maine, USA - Keegan Bellamy
8. Exploring the Effects of Liquid Water Content on Snow Albedo Through Field Measurements in Southeastern Minnesota - Joseph Becker

9. Estimating Vertically Resolved Density Profiles with the Lyte Probe - Micah Johnson

Snow Accumulation & Distribution

10. Modeling of Snowpack in the Northeast Using iSnobal- Christina Chow
11. A Drone-Based LiDAR Assessment of Snowpack Variations at Hogg Pass, Oregon - Kevin Jo
12. Where is the Snow? A User-Informed Framework for Identifying Potential Snowpack Measurement Locations in Eastern Oregon - Hannah Steele
13. The Northeast Snow Survey Feasibility Study - Elizabeth Burakowski
14. Assessing the Accuracy and Scalability of Using Lake Water Pressure to Estimate Snow Water Equivalent - Erich Schreier
15. Multi-Scale Assessment of Remotely Sensed Reflectance and Snow Albedo in Heterogeneous Terrain - Anton Avchyan
16. Development and Evaluation of High-Resolution Snow Depth Estimates Using Physiography, Machine Learning, and Airborne LiDAR Data - Baird Quinn
17. Evaluating 1km Sentinel-1 Snow Depth in a Cloud-based Modeling–Data Assimilation System Over the East River Basin, Colorado - Bareera Mirza

Snow Ablation & Runoff

18. The Perfect Year for Sublimation: Assessing the Impact of High Wind Events on Seasonal Sublimation in the East River Basin, CO - Daniel Hogan
19. Fusing MODDRFS and OLI-DRFS to Improve Terrain Scale Estimates of Snow Radiative Forcing - Patrick Naple
20. Identifying and Addressing Gaps in Monitoring Networks in California - Ava Cooper
21. Assessing the Value of Long-Term Spatially Distributed Snowpack Datasets Across the Western U.S. for Operational Water Supply Forecasts - Mark Raleigh
22. Classifying Contiguous United States Rain-on-Snow Flood Hazard - Wyatt Reis

23. A Physically-Based Approach to Assess Snow Heterogeneity and its Influence on Streamflow Efficiency in the Upper Colorado River Basin - Ross Mower
24. Determinants of a Headwater Catchment's Declining Multidecadal Rainfall-Runoff Ratio - Jesse Attias
25. What Resolution Snow Model is Needed for Accurate Streamflow Timing and Volume Simulation? - Anna Pfohl
26. Leveraging Over a Decade of Airborne Snow Water Equivalent Retrievals to Improve Operational Runoff Forecasts at Hetch Hetchy Reservoir - Reggie Walters

Environmental Aspects of Snow; Forests & Fire

27. Reflections on a Study for a Failed Ski Area Proposal - Clay Brandow
28. Forest Canopy Effects on Snow Depth and Density of Seasonal and Transient Mountain Snowpack in a Maritime Snow Climate - Ian Whidden
29. Analyzing Variation of Post-Fire Snow Albedo Across Spatial Scales of Observation - Ally Fitts
30. Forest Structure Controls on Canopy Snow Interception: Insights on Forest-Snow Interactions in a Colorado Watershed - Curtis Beutler
31. Quantifying the Storm Snow Deficit that is Intercepted by Ponderosa Pine Canopy – Mariah Matchopatow

Snow, Climate & Climate Change

32. Elevation Dependence of Precipitation and Snowpack in Dynamically Downscaled GCM Projections Across the Western United States - Pramod Adhikari
33. Spring Heat Waves Drive Record Western United States Snow Melt in 2021 - Dan McEvoy
34. Evaluating the Impact of Atmospheric Forcing on the Performance of a Coupled Land-Atmosphere Model in Simulating Cold Season Precipitation: A Case Study of the Boise Rockies - Stanley Akor
35. Is the Changing Climate Impacting Winter at Ski Resorts in the Pacific Northwest? - Erica Kim

ORAL SESSION II (Continued)

- 3:30 – 3:45 Integrating Sensors Across Spatial and Temporal Scales to Resolve Snow Properties in Idaho’s Boise Mountains - Siobhan Ciafone
- 3:45 - 4:00 Improved Snow Distribution Estimates Using a Rapid-Response LiDAR and Photogrammetry System - Naheem Adebisi
- 4:00 - 4:15 Machine Learning Shows Promise in Estimating Snow Water Equivalent in Sierra Nevada - Engela Sthapit
- 4:15 – 5:30 **Vendor Exhibits and Poster Sessions**

Wednesday, April 24

- 8:00 - 8:15 Announcements

ORAL SESSION III – *Snow Environments and Climate* ***Session Moderator: Daniel Fisher, NRCS***

- 8:15 - 8:30 California’s 2023 Snow Deluge: Contextualizing an Extreme Snow Year Against Future Climate Change - Adrienne Marshall
- 8:30 - 8:45 Determining Where Annual SWE Anomalies are Correlated in the Western United States - Hannah Besso
- 8:45 - 9:00 An Evaluation of Simulated Historical and Future Snowpack Distributions for the Gallatin River Watershed, Montana and Wyoming - Aaron Heldmyer
- 9:00 - 9:15 A Decade of Global Snowmelt Runoff Onset from Sentinel-1 SAR - Eric Gagliano
- 9:15 - 9:30 Water Storage in the Firm of Cascade and Coast Range Glaciers - Erin Pettit
- 9:30 - 9:45 When it Rains on Snow it Pours, But Why? - John Selker
- 9:45 - 10:30 **Break – Vendor Exhibits and Poster Sessions**
- 10:00 - 4:00 **Guest Tour**

Guests of conference attendees are invited to join together for coffee/tea/pastries at Bodhi Bakery (500 SW 2nd St), a tour of the Corvallis Museum (411 SW 2nd St), lunch at the Brass Monkey (130

SW 1st St), a downtown riverfront stroll, and wine tasting at Corazon Wine Bar (208 SW 2nd St). (Lunch and Museum Entry Fee compliments of the Western Snow Conference.)

ORAL SESSION IV – *Snow Ablation, Runoff, and Forecasting*
Session Moderator: Scott Pattee, NRCS

- 10:30 - 10:45 Measuring Sublimation of Snow on the Valley Floor of a Colorado River Headwater Basin, Winter 2022-23 - Eli Schwat
- 10:45 - 11:00 A Two-Decade Record of Dust and Snow in the Great Salt Lake Basin - Otto Lang
- 11:00 - 11:15 Snowpack Losses Amplify the Riverine Component of Estuarine Flood Severity under Climate Warming - Matt Cooper
- 11:15 - 11:30 Weather and Snow Forecasting with OpenSnow - Implications for Snow Science - Zach Butler
- 11:30 - 11:45 Process-Based Assimilation of Remotely Sensed Snow Data into a Distributed Physical Hydrology Model - Eli Boardman
- 11:45 - 12:00 A Novel Approach to Improving Operational Flood Forecasting Across the Sierra Nevada - Gabe Lewis
- 12:00 – 1:30 **Lunch (on your own)**

WSC attendees are invited to the second annual WSC women's lunch, inclusive of trans women and nonbinary folks. The goal of this lunch is to build community among folks who have historically been gender minorities at the Conference. Please RSVP here: <https://forms.gle/uAzUJn3oHsx45Fm26>

ORAL SESSION V – *Snow, Forests, and Wildfire*
Session Moderator: Jon Lea, NRCS

- 1:30 - 1:45 Subarctic Shifts: Snow-Soil-Vegetation Interactions in Denali National Park - Johanne Albrigtsen
- 1:45 - 2:00 How Three-Dimensional Forest Structure Regulates the Amount and Timing of Snowmelt Across a Climatic Gradient of Snow Stability - Ravindra Dwivedi

- 2:00 - 2:15 The Impact of Forest Thinning on Snowpack at a Site with Multiple Thinning Strategies - Patrick Broxton
- 2:15 - 2:30 Natural Wildfire Creates Microclimates that Enhance Snowpack - Gabrielle Boisrame
- 2:30 - 2:45 Post-fire Snow Accumulation and Melt Patterns in the Caldor Fire - Marianne Cowherd
- 2:45 - 3:30 **Break – Vendor Exhibits and Poster Sessions**

ORALSESSION V (Continued)

- 3:30 - 3:45 Post-fire Hydrologic Responses in the Pacific Northwest: Monitoring, Model Development, and Training the Future Workforce - Kelly Gleason
- 3:45 - 4:00 Snow Depth Distribution Mapping in a Post-fire Landscape from UAS LiDAR - Devlin Rutherford
- 4:00 - 4:15 Forest Fires and Mid-Winter Snowmelt in the Oregon Cascades - Sage Ebel
- 4:15 - 4:30 Impacts of Wildfires on Snow Disappearance Date Across the Western United States - Arielle Koshkin
- 4:30 - 5:00 **Western Snow Conference Annual Business Meeting**
(All Attendees)

CONFERENCE BANQUET & AWARDS

- 5:30 - 7:00 Hospitality – Memorial Union Horizon Room
- 7:00 - 9:00 Banquet and Awards
Banquet Speaker – Dr. Gordon Grant, Research Hydrologist, USFS Pacific Northwest Research Station
“The Future of Water in the West (It’s Not Just About the Snow)”

Thursday, April 25

9:00 - 5:00 Technical Tour – Hatfield Marine Science Center and Oregon Coast Aquarium, Newport, Oregon. Lunch at Rogue Ales and Spirits Brewery.

Join us in April 2025 for the 92nd Annual Western Snow Conference in Bozeman, Montana!