



WESTERN SNOW CONFERENCE



89th Annual Western Snow Conference
*Drought, Fire, and Precipitation Extremes:
Operational Challenges for Snow Water Resources*
April 18 - 21, 2022

University Guest House
University of Utah, Salt Lake City, UT

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

Monday, April 18

- 9:00 – 1:00 Short Course: Introduction to Colorado River Basin Forecast Center Forecasting Methods and Products (includes lunch)
- 1:00 – 5:00 Vendors Setup, Poster Paper Setup
- 2:00 – 5:00 WSC Executive Committee Meeting
- 5:30 – 7:00 Registration and Hospitality – TF Brewing Company, 936 South 300 West, SLC (Hospitality Beverage Tickets Provided)

Tuesday, April 19

- 7:30 – 8:30 Author's Breakfast
- 7:30 – 8:30 Conference Registration, Vendor Setup, Poster Setup

CONFERENCE OPENING SESSION

- 8:30 – 8:45 Opening Remarks (Guest Speaker)
- 8:45 – 9:00 Welcome from Planning Committee: Noah Molotch, WSC General Chair & McKenzie Skiles, Conference Chair

9:00 – 9:20 WSC Historical Archives ‘Still Studying The Same Ol’ Snow 90 Years Later’ – Anne Heggli

ORAL SESSION I: *Impacts from Climate Warming and Variability*

Chair: Ryan Webb

9:20 – 9:40 Changing Snow Water Storage in our Montane Seasonal Snow Reservoirs – Nina Aragon

9:40 – 10:00 Changes in Snow Water Storage across Western North America – Kate Hale

10:00 – 10:20 Is Snow Intermittence Increasing or Decreasing? Competing Effects of Warming – Adrienne Marshall

10:20 – 10:40 **Break**

10:40 – 11:00 Controls on Large Rain-On-Snow Events across the Sierra Nevada Mountains – Gabriel Lewis

11:00 – 11:20 Future Changes in Winter Snowstorms – Rachel McCrary

11:20 – 11:40 Climate Driven Changes in Watershed Classifications: What does it mean for Rain-on-Snow in US River Basins? – Molly Tedesche

11:40 – 1:00 **Lunch (on your own)**

1:00 – 1:20 WSC Diversity, Equity, and Inclusion (DEI) Committee: Goals and Progress – Abby Lute

ORAL SESSION II: *Forest Fires and Snow*

Chair: Emile Elias

1:20 – 1:40 Synthesis of Hydroclimate and Fire Paleorecords across the Southern Rockies and Colorado Plateau over the Common Era – Natalie Kehrwald

1:40 – 2:00 Wildfire Impacts on Snowpack Phenology in a Changing Climate within the Western U.S. - Jeremy Giovando

2:00 – 2:20 Forest Fires Reduce Snow-Water Storage and Advance the Timing of Snowmelt across the Western U.S. – Kelly Gleason

2:20 – 2:50 **Break**

2:50 – 3:10 **Vendor Introductions**

3:10 – 3:30 **Lightning Talks (Virtual Posters)**

Comparing L-band UAVSAR Phase Change in Snow with Ground-Penetrating Radar and In Situ Observations at Cameron Pass, Colorado - Randall Bonnell

Winter and the Canadian Federal Government - Jerry Toupin

Forecasting the Evolution and Growth of Glacial Lakes - Aniruddha Saha

Hydrological Modeling of Snow Bound Catchment of Bhagirathi River at Harshil - Shrishti Sharma

3:30 – 5:30 Posters and Vendor Displays

Poster Presentations:

Forest Shading and Spring Storms Control Snowmelt Partitioning - Maggi Kraft

How is Snowpack Changing in Utah? - Jake Serago

Snowpack Aerosol Loading in an Upper Colorado River Basin Watershed: Identifying Dust Sources via Geochemical Analysis - Curtis Beutler & Alex Newman

Analyzing 20 years of Snow Darkening and Dust Radiative Forcing from MODIS in the Headwaters of the Colorado River - Patrick Naple

Brooks Range Perennial Snowfields: Extent Detection via Satellite and from the Field in Alaska - Molly E. Tedesche

Post-fire Hydrologic Recovery in Snow-Dominated Watersheds – Hannah Van Dusen

Response of Snow and Land Surface Albedo to Fire Disturbance in the Sierra Nevada over the MODIS Record - Jillian Gayler

Where'd the Snow Go? Physical Processes Driving Accumulation and Ablation Patterns in Wildfire Burn Areas - Wyatt Reis

Investigations of Light Absorbing Impurities in a Rural Minnesota Snowpack – Meghan Krieg and Peter Larson

Impacts of Snow Grain Size and Liquid Water Content on Albedo: Laboratory and Field Studies in Minnesota - Josh Cameron and Jazline Rebollar

Presence and Structure of Rain-on-Snow Events in and between Western US Mountain Ranges -Kayden Haleakala

Snow-Wildland Fire Feedbacks in the Sierra Nevada - Marianne Cowherd

Sensitivity of Forest Productivity to Trends in Snowmelt at Niwot Ridge, Colorado - Eric Kennedy

The Impact of Forest-Controlled Snow Variability on Late-Season Streamflow Varies by Climatic Region and Forest Structure - William Currier

A Two-Decade Analysis of MODIS-derived Snow Albedo Reduction and Snow Coverage in the Great Salt Lake Basin - Otto Lang

Improving Snow Distribution Estimates to Increase Drought Resilience - Shad Oneel

Using Cosmic Rays to Measure Snow Properties at Niwot Ridge, CO - Beth Mason

Forest Fires Potential to Increase Water Retention in the Western Oregon Cascades - Megan Guinn

Modeling the Effects of Post-Wildfire Impacts on Snow Over Broad Spatial and Temporal Scales - Anton Surunis

Wednesday, April 20

ORALSESSION II: *Forest Fires and Snow (Continued)*

9:00 – 9:20 Changes in Snow Hydrology after a Large Wildfire in a Snow-Dominated Watershed: A Case Study of the Upper San Joaquin Watershed – Arielle Koshkin

9:20 – 9:40 Using Lidar to Investigate Disturbance on Forest and Snowpack Resilience in the Sierra Nevada – Cara Piske

ORAL SESSION III: *Observing, Characterizing, and Modeling Snow Processes*

Chair: Ryan Currier

9:45 – 10:00 Trends in Cold-Season Precipitation Phase and its Relationship to Atmospheric Thermodynamic Profile at The Central Sierra Snow Lab – Andrew Schwartz

- 10:00 – 10:15 Extending the Vadose Zone: Characterizing the Role of Snow for Liquid Water Storage and Transmission in Streamflow Generation – Ryan Webb
- 10:15 – 10:45 **Break**
- 10:45 – 11:00 A Smartphone-based Sensor for Measuring the Optical Properties and Black Carbon Content of Snow - Markus Allgaier
- 11:00 – 11:15 Community Snow Observations: From Concept to Operations – David Hill
- 11:15 – 11:30 Modeling Runoff Forecast Uncertainty Using SWE Maps to Condition Error Propagation – Eli Boardman
- 11:30 – 12:45 **Lunch (on your own)**
- 12:45 – 1:00 Changes in Snow Water Equivalent on Streamflow Volume and Climate in the Colorado River Basin – Zachariah Butler

ORAL SESSION IV: *Remote Sensing of Snow*

Chair: Katherine Hale

- 1:00 – 1:15 An Integrated Approach to SWE Estimation in a Mountain Meadow Environment – Madeline Beck
- 1:15 – 1:30 Mapping Mountain Snow Cover using High-resolution Planet Imagery in Meadow Areas – Kehan Yang
- 1:30 – 2:00 **Break**
- 2:00 – 2:15 Correcting Lidar Intensity for Snow Albedo Retrieval in Mountain Watersheds – Chelsea Ackroyd
- 2:15 – 2:30 Evaluating ICE Sat-2 Spaceborne Lidar for Snow Depth Measurements in the Western US – Hannah Besso
- 2:30 – 2:45 SnowEx 2020-21 InSAR Time Series – HP Marshall
- 2:45 – 3:15 **Break**
- 3:15 – 3:30 SWE retrievals from L-band InSAR: A Case Study from SnowEx 2020 in the Jemez River Basin – Jack Tarricone

- 3:30 – 3:45 Toward Operationalizing Radar Observations of Snow Water Equivalent for Large Area Snow Water Resource Assessments – Eli Deeb
- 3:45 – 4:00 Using Satellite Radar Data for Avalanche Studies in the San Juan Region of Colorado – Kyle Rasmussen
- 4:00 – 4:30 **Western Snow Conference Annual Business Meeting (All Attendees)**

CONFERENCE BANQUET & AWARDS

- 5:00 – 6:00 Hospitality
- 6:00 – 8:00 Banquet and Awards.
Guest Speaker: Steven Clark, Utah Department of Transportation
Avalanche Program Manager

Thursday, April 21

- 9:00 – 1:00 Technical Tour: Please join us for a visit to the Brighton SNOTEL site at the top of Big Cottonwood Canyon at Brighton Ski Resort. The tour will be led by the Utah Snow Survey, and will include an explanation of the SNOTEL sensors, and an opportunity to practice snow depth and water equivalent sampling.