18th Annual Colorado Snow and Avalanche Workshop
October 4, 2019
Breckenridge, CO

Schedule:

Time	Speaker	Topic
8:30 - 8:45 AM	Ethan Greene	**Opening Remarks**
8:45 - 9:20 AM	Brian Lazar	March 2019 Avalanche Cycle Overview
9:20 - 9:45 AM	Art Mears	Big Avalanches of March 2019: Release, Motion, and Destructive Effects
9:45 - 10:10 AM	Drew Petersen	Managing the Community Effects of a Historic Avalanche Cycle
10:10 – 10:20 AM	Kelly Elder	Overview of the Colorado Big Avalanche Project
10:20 – 10:40 AM		**Break**
10:40 – 11:05 AM	Anne St. Clair	Could the Avalanche Bulletin be More Effective? Exploring Patterns of Use and Comprehension Among Backcountry Recreationalists
11:05 - 11:30 AM	Frank Techel	On Using Local Danger Level Estimates for Regional Forecast Verification
11:30 - 11: 55 AM	Laura McGladrey	Stress Injuries and Innovations in Mountain Rescue
11:55 – 1:15 PM		**Lunch Break**
1:15 – 1:40 PM	Trevor Alcott	Tools to Improve Your Operational Weather Forecast
1:40 – 2:05 PM	Kris Sanders	2019-2020 Winter Weather Outlook
2:05 – 2:25 PM		**Break**

2:25 – 2:45 PM	Jamie Yount	Update on CDOT Installations and Overview of the Transportation Avalanche Research Pooled Fund Program (TARP)
2:45 – 3:10 PM	Jeffrey Johnson, Hans-Peter Marshall	Infrasound for Snow Avalanche Monitoring; Capabilities, Current Limitations, and Next Steps
3:10 – 3:30 PM		**Break**
3:30 – 3:55 PM	Jeff Deems	Do You Know What Your Map Knows? Understanding Digital Elevation Models for Better Trip Planning
3:55 - 4:20 PM	Frank Techel	Level 5 Avalanche Danger in the Swiss Alps
4:10 - 4:25 PM	Ethan Greene	**Closing Remarks**

ABOUT THE SPEAKERS

Brian Lazar
Brian has been working in the field of snow and avalanches for the last couple decades. He has worked as a mountain guide in locations throughout the globe, an avalanche educator, curriculum developer, and as former Executive Director with the American Institute for Avalanche Research and Education (AIARE). He earned his MS in Engineering at CU, studying snow and ice mechanics in Alaska's Chugach, and conducting research at the Institute of Arctic and Alpine Research. He also worked for many years as a consultant to the ski industry, investigating snowpack runoff and potential changes to seasonal snowpacks as a result of climate change. Brian has been the Deputy Director of the CAIC since 2010, and is an instructor in the Avalanche Science Program at Colorado Mountain College, Leadville

Art Mears
Art received his engineering and geology degrees in 1969 and 1972 from the University of Colorado. He has worked with snow-avalanche analysis and mitigation on a worldwide basis ever since. In many projects he estimated and computed the extreme avalanche events (the "design" case) by indirect methods involving history, vegetation indicators, terrain analysis and physical/statistical models. Fortunately (depending on your perspective), The March, 2019 cycle in Colorado provided many excellent examples about what could happen when terrain, storm and snowpack conditions combine in just the "right way." His CSAW talk provides his observations and speculations about the March event.

Drew Petersen
Drew is a Field Manager for the Colorado Office of Emergency Management. He supports Delta, Gunnison, Hinsdale, Montrose, Ouray, and San Miguel Counties. Drew works to assist jurisdictions in planning for and responding to complex emergencies and disasters. He has over 22 years of experience and has developed a broad knowledge of emergency services and planning. Some of his areas of expertise include complex incident management, search and rescue operations and planning, geospatial technologies, wildland fire management, exercise design and implementation, communications/notification/warning systems, and computer engineering. Drew lives in Crested Butte and is an avid skier and hiker.

Kelly Elder
Kelly grew up on Snow King and Teton Pass in the rope tow days. His interest in snow became the major driver in his life when Rod Newcomb showed him it could also be a career. He currently works in many areas of snow research including hydrology, climatology and avalanchology. His study areas include snowy regions around the world, but recent projects keep him busy in the central Rockies, Alaska, and Baffin Island. A hand lens, shovel, and skis are still his favorite tools. Kelly works for the US Forest Service at the Rocky Mountain Research Station in Colorado, and is an instructor in the Avalanche Science Program at Colorado Mountain College, Leadville

Anne St. Clair
Anne has a broad range of research interests at the intersection of human behavior and natural hazards. She earned master's degree in Resource and Environmental Management with the Simon Fraser University Avalanche Research Program (SARP) in Vancouver, British Columbia and has a decade of experience as a guide, educator, and snow safety director. Her interests include examining the effectiveness of operational risk management practices, education curriculum, and public risk communication products in the avalanche context. For her master's research, Anne evaluated how public avalanche bulletins are being used by backcountry recreationists to offer evidence-based solutions for how bulletin products could resonate more effectively. This winter, Anne is excited to be joining the team at Avalanche Canada as a public avalanche forecaster in Revelstoke, British Columbia.

Frank Techel
Frank has worked since 2011 as an avalanche forecaster at the national avalanche warning service in Switzerland. Before taken up this position, Frank worked in various positions in ski area and highway snow safety programs in Switzerland and New Zealand. Besides forecasting, Frank's current research interests include the question of whether avalanche forecasts are produced and communicated consistently. He Is currently pursuing a PhD investigating how to improve data analysis in regional avalanche forecasting.

Laura McGladrey
Laura McGladrey is an instructor and advisor to the curriculum for NOLS Wilderness medicine and works with mountain rescue teams, ski patrols and outdoor organizations in support of critical incident, near miss support and Psychological First Aid. She was recently featured on The Sharp End Podcast discussing Stress Injuries in climbing and rescue. She lives outside of Boulder, Colorado, is a member of Portland Mountain rescue and works with Monarch Ski patrol as an ALS volunteer and Eldora Ski Patrol as a Stress and Resilience Advisor. Laura works as a nurse practitioner in the Emergency Department at Unviersity of Colorado, as well as the Stress Trauma and Adversity Research and Treatment Center, as an educator, clinician and consultant to Law Enforcement, Fire and EMS responders.

Trevor Alcott
Trevor Alcott is a meteorologist at the NOAA Earth System Research Laboratory in Boulder. He assesse the skill of computer forecast models in complex terrain, and quantifying uncertainty in weather forecasts. Previously, he worked on research and development efforts for the National Weather Service Western Region. He holds MS and PhD degrees in Atmospheric Sciences from the University of Utah, where he specialized in snowfall forecasting and mountain meteorology. Although stuck behind computer screens on the job, much of Trevor's mountain weather knowledge comes first-hand from spending his spare time running and skiing peaks across the Western US and Alaska.

Kris Sanders
Kris is a Forecaster at the National Weather Service (NWS) Forecast Office in Grand Junction, CO. Prior to being a Forecaster in Grand Junction, CO, he went to Saint Louis University for both his undergraduate and masters degree. He was a student volunteer at the NWS Forecast Office in St. Louis, MO, and during his last year of graduate school went through the Student Career Experience Program. After graduation he became an Intern at the NWS Forecast Office in Topeka, KS and eventually a Forecaster. While in Topeka he taught an Operational Forecasting course to undergraduates at the University of Kansas. He enjoys all aspects of weather and has been heavily involved in research that focuses on freezing rain and hail. He helped develop the Freezing Rain Accumulation Model, which is used to forecast ice accumulation across the NWS. He participated in the HailSTONE research field project, which was a grassroots effort to study hail sizes and fall characteristics within thunderstorms. Outside of work he enjoys hiking, fishing, camping, snowboarding, floating, and photography.

Jamie Yount
Jamie Yount is originally from Bozeman, Montana where he first started learning about snow and avalanches. In 2002 he graduated from the University of Utah with a meteorology degree and moved to Jackson, Wyoming where he managed the Wyoming DOT's avalanche forecasting and control program for 15 years. He is a certified Master Gunner and president of the Avalanche Artillery Users of North America Committee (AAUNAC). Jamie moved to Colorado in 2017 and is now the Winter Operations Program Manager for the Colorado Department of Transportation.

Jeff Deems
Emerging from the legendary ski town of San Diego, Jeff's skiing habit was solidified as a student at CU Boulder and through time in Colorado mountain towns. Degrees from Montana State and Colorado State added some small measure of legitimacy to that pursuit. As a researcher at the National Snow and Ice Data Center at CU Boulder, and a co-founder of the Airborne Snow Observatory, Jeff studies spatial variability in snow properties with field measurements, models, and remote sensing.

Jeffrey Johnson and HP Marshall
Jeffrey Johnson is a geophysics professor at Boise State University focused on infrasound studies and on monitoring gravity-driven-mass movements, like volcanic debris flows, rockfalls, and avalanches that produce infrasound. His lab specializes in the design, calibration, and construction of low-cost infrasound sensors. Johnson's co-author, Hans Peter Marshall, is also a professor at Boise State University; he is an expert in remote sensing of snow and ice using microwave radars and other high-resolution measurement techniques.

The 2019 Colorado Snow and Avalanche Workshop is presented by: