C. David Moeser

Email: cdmoeser@yahoo.com
Website: davidmoeser.com
Phone: +1 775.357.6668

Education

Ph.D **- ETHZ - Swiss Federal Institute of Technology Zürich** (Jan. 2012- Dec. 2015)
- Department of Environmental Systems Science: *Surface Water Hydrology*

Dissertation Title: The Influence of Forest Canopy Structure on Snow Hydrology

M.S. **- University of Nevada, Reno** (2008- 2010)
- Department of Hydrologic Sciences: *Surface Water Hydrology*

Thesis Title: Development, Analysis and Use of a Distributed Wireless Sensor Network for Quantifying Spatial Trends of Snow Depth and Snow Water Equivalence

B.S. **- Fort Lewis College,** Durango, Colorado (2001-2004)
- Department of Geosciences: *Environmental Geology, Chemistry Minor*

Thesis Title: Discriminating Pre- and Post- Mining Effects on The Middle Fork of Mineral Creek, Silverton, CO, Using Tree Core Analysis

- Awarded outstanding senior in the earth sciences (Eugene M. Shoemaker Award) | Freda T. Roof and Julie Turner Oliva Scholarship recipient, given for superior academic performance

Languages

- *Spanish – CEFR level B2* | Xela, Guatemala (2005) | Bogota, Colombia (2006) | La Paz, Bolivia (2007)
- *German – CEFR level B2* | Chur, Switzerland (2012-2014) | Davos, Switzerland (2014-2016)

Employment

USGS – NM Water Science Center –*Hydrologist (GS-12*: July 2016 – Present; fulltime) Albuquerque, NM

- *Serve as the center's technical authority on all surface water modeling and snow hydrology activities, both, in the office and the field.*
- *Act as a regional technical advisor to external land managers with stakes in water resources and planning.*
- *Charged with all technical watershed-modeling activities.*
- *Develop novel data processing and analysis techniques.*
- *Currently developing and implementing novel characterizations of forests and snow modeling tools to quantify the effects of canopy disturbance and changing climate on water resources from several recently awarded competitive grants from the South Central Climate Adaptation Science Center.*

WSL Institute for Snow and Avalanche Research SLF –*Research Hydrologist / PhD candidate* (February 2012 – February 2016) Davos, Switzerland

World Business Council for Sustainable Development – Water Project – *Temporary Contract Hydrologist* (September 2011 – February 2012) Geneva, Switzerland

WSL Institute for Snow and Avalanche Research SLF – *(Intern) Hydrologist* (Jan 2011 – July 2011) Davos, Switzerland

University of Nevada, Reno – *Research Assistant* (September 2008 – December 2010)

BLM / Public Lands Center– *Hydrologic Technician* (2005- 2007) Durango, CO

Tom D. Gorton Construction – *Carpenter* (1999- 2004) Durango, Colorado

---

Teaching

Guest Instructor – **Fort Lewis College**, Department of Environment Science (2023) | Course: *Collaborative Environmental Research (400)*

- Field measurement techniques for snow

Invited Instructor – **ETHZ**, Department of Environment Systems Science (2013, 2014) | Course: *Environmental Measurement Laboratory (701)*

- Developed course and laboratory structure for a 6-hour lecture module that was designed to integrate matlab programing with remotely sensed data

Teaching assistant - University of Nevada, Reno – Department of Natural Resources and Environmental Science (2008–2010) | Course(s): *Ecohydrology (295), Ecohydrology field camp (400)*

- Developed new course material and methods
- Lectured and supervised field and laboratory work

University of Nevada Cooperative Extension, *"Discover your Future Program"* (2009, 2010)

- Served as activity leader and guest lecturer about basic hydrologic field methods and applications for high school students

---

Published Papers

Mankin, K.R., Rumsey, C., **Moeser, D**.,...2022, *Upper Rio Grande Basin Water-Resource Status and Trends: Focus Area Study Review and Synthesis.*, Journal of the American Society of Agricultural and Biological Engineers, https://doi.org/10.13031/ja.14964

Broxton, P., **Moeser, D.,**Harpold, A., 2021, *Accounting for Fine-Scale Forest Structure is Necessary to Model Snowpack Mass and Energy Budgets in Montane Forests*., Water Resources Research, https://doi.org/10.1029/2021WR029716

Moeser, D., Chavarria, S., Wootten, A., 2021, *Streamflow Response to a Changing Climate in the Upper Rio Grande Basin*; United States Geological Survey Scientific Investigations Report 2021–5138, 41 p., https://doi.org/10.3133/sir20215138

Moeser, D., Broxton, P., Harpold, A., 2020; *Estimating the effects of wildfire on snow water resources using canopy structure disturbance patterns and meteorological conditions*., Water Resources Research, https://doi.org/10.1029/2020WR027071

Sexstone , G., Penn, C., Liston, G., **Moeser, D**., Clow, D., 2020; Spatial variability in seasonal snowpack trends across the Rio Grande headwaters (1984 – 2017), Journal of Hydrometeorology, https://doi.org/10.1175/JHM-D-20-0077.1

Helbig, N., **Moeser, D.,** Teich, M., Vincent, L, Lejeune, Y., Sicart, J.E., Monnet, J.M., 2020; *Snow Processes in Mountain Forests: Interception Modeling for Coarse-scale applications*, Hydrology and Earth Systems Science. Chttps://doi.org/10.5194/hess-2019-348

Mazzotti, G., Essery, R., **Moeser, D**., Jonas, T., 2020; *Resolving small-scale forest snow patterns with an energy balance snow model and a 1-layer canopy*; Water Resources Research, doi: https://doi.org/10.1029/2019WR026129

Moeser, D., Douglas-Mankin, K., 2021; *Simulating Hydrologic Effects of Wildfire on a Small Sub-alpine Soutwestern U.S. Watershed*., Transactions of the ASABE, 64(1):130-150, doi: https://doi.org/10.13031/trans.13938

Chavarria, S.B., **Moeser, D**., and Douglas-Mankin, K.R., 2020, *Application of the Precipitation-Runoff Modeling System (PRMS) to simulate near-native streamflow in the Upper Rio Grande Basin*: U.S.

Geological Survey Scientific Investigations Report 2020–5026, 38 p., https://doi.org/10.3133/sir20205026

Douglas-Mankin, K. and **Moeser, D**., 2019; *Calibration of PRMS to Simulate Pre- and Post-Fire Hydrologic Response in the Upper Rio Hondo Basin, New Mexico*; United States Geological Survey Scientific Investigations Report, doi: https://doi.org/10.3133/sir20195022

Moeser, D., G. Mazzotti, N. Helbig, T. Jonas, 2016; *Representing spatial variability of forest snow: Implementation of a new interception model*; Water Resources Research, doi: 10.1002/2015WR017961

Moeser, D., M. Stähli, T. Jonas, 2015; *Improved snow interception modeling using novel canopy parameters from airborne LIDAR data*; Water Resources Research, doi: 10.1002/2014WR016724

Moeser, D., F. Morsdorf, T. Jonas, 2015; *Novel forest structure metrics from airborne LiDAR data for improved snow interception estimation*; Agriculture and Forest Meteorology, doi: 10.1016/j.agrformet.2015.04.013

Moeser, D., J. Roubinek, P. Schleppi, F. Morsdorf, T. Jonas, 2014; *Canopy closure, LAI and radiation transfer from airborne LiDAR synthetic images*; Agricultural and Forest Meteorology, doi: 10.1016/j.agrformet.2014.06.008

Data and Code Releases

Chavarria, S.B., **Moeser, D.**, Ball, G.P., and Shephard, Z.M., 2020, *Hydrologic simulations using projected climate data as input to the Precipitation-Runoff Modeling System (PRMS) in the Upper Rio Grande Basin (ver. 2.0, September 2021)*: U.S. Geological Survey, https://doi.org/10.5066/P9ML93QB

Chavarria, S.B., **Moeser, D**., and Shephard, Z.M., 2020, *Input and Output Data for the Application of the Precipitation-Runoff Modeling System (PRMS) to Simulate Near-Native Streamflow in the Upper Rio Grande Basin*: U.S. Geological Survey data release, https://doi.org/10.5066/P9YOPYW7

Moeser, D., 2020, Lidar2CanopyMetrics [package of scripts to calculated canopy structure and density from aerial lidar data], https://doi.org/10.5281/zenodo.4088667

Moeser, D., Shephard, Z., 2019, *The effects of wildfire on snow water resources estimated from canopy disturbance patterns and meteorological conditions*: U.S. Geological Survey, https://doi.org/10.5066/P9BBCSVN.

Moeser, D., Douglas-Mankin, K., Mitchell, A.C., Chavarria, S.B., 2018; *PRMS simulations for the Rio Hondo Basin, New Mexico;* United States Geological Survey data release, doi: https://doi.org/10.5066/F7KD1X7Q

Successful Competitive Grant Proposals (first author)

South Central Climate Science Center – *'Estimating Future Effects of Forest Disturbance on Snow Water Resources in a Changing Environment (2021): ~460,000 USD*

South Central Climate Science Center – *'The Effects of Wildfire on Snow Water Resources Under Multiple Climate Conditions (2017): ~375,000 USD*

Swiss National Science Foundation – *'Snow Distribution Dynamics under Forest Canopy' (2012): ~175,000 USD*

Agriculture Research Service – *'Recommended Procedure for Assessing Soil Disturbances in Vegetation Management Projects within Sensitive Areas of the Lake Tahoe Basin'* (2008)

Conference Papers and Presentations

Moeser, D., Broxton, P., Harpold, A.; 'The Effects of Wildfire on Snow Water Resources Under Multiple Canopy Structures and Meteorological Conditions,' American Geophysical Union meeting, San

Francisco, California, December 2019

Sexstone, G., Penn, C., Liston, G., Gleason, K., **Moeser, D**., Clow, D.; 'Fine-Scale Spatial Variability in Seasonal Snowpack Trends,' American Geophysical Union meeting, San Francisco, California, December 2019

Moeser, D., Broxton, P., Harpold, A.; 'The Effects of Wildfire on Snow Water Resources Under Multiple Canopy Structures and Meteorological Conditions,' International Union of Geodesy and Geophysics, Montreal, Canada, July 2019

Helbig, N., **D. Moeser**, M. Teich, L. Vincent, Y. Lejeune, M. Lafaysse, J. Sicart, J. Monnet 'Parameterizing snow interception over forest canopy,' European Geophysical Union, Vienna, Austria, April 2019

Helbig, N., **D. Moeser**, M. Teich; 'Spatially-Averaged Sky View Factors for Snow Interception over Forest Canopy,' European Geophysical Union, Vienna, Austria, April 2018

Tillery, A., **Moeser, D.,** Trader, L., Martin, D., Post-Wildfire Hydrologic and Geomorphic Response in a Severely Burned, Semi-Arid Watershed: Implications for Early Flood Warning System Installations, The Geologic Society of America, Phoenix, Arizona, September 2019

Moeser, D., K. Douglas - Mankin; 'Hydrologic Impacts of Wildfire on a Small Sub-alpine Southwestern U.S. Watershed: A Simplified Modeling Approach,' American Geophysical Union, New Orleans, LA, December 2017

Sexstone, G., C. Penn, D. Clow, **D. Moeser,** G. Liston; 'Changes in the Relation Between Snow Station Observations and Basin Scale Snow Water Equivalence,' American Geophysical Union, December 2017

Moeser, D., M. Stähli; 'Forest Canopy Controls on Snow Hydrology,' Western Snow Conference, Boise, Idaho, March 2017

Moeser, D.; 'Forest snow hydrology,' Department colloquium series, Department of Earth and Environmental Science, New Mexico Tech, Socorro, New Mexico, January 2017

Moeser, D.; 'The influence of forest canopy structure on snow hydrology: Novel modeling and visualization approaches,' Department colloquium series, Department of Earth and Planetary Sciences, University of New Mexico, Albuquerque, New Mexico, December 2016

Moeser, D., M. Stähli; 'The influence of canopy structure on snow,' poster presentation, American Geophysical Union meeting, San Francisco, California, December 2016

Moeser, D., M. Stähli, T. Jonas; '*Snow interception modeling*,' oral presentation, The International Union of Geodesy and Geophysics, Prague, Czech Republic, June 2015

Moeser, D., F. Morsdorf, T. Jonas; *'Improving snow interception modeling using LiDAR data,'* poster presentation, American Geophysical Union meeting, San Francisco, CA, December 2014

Moeser, D., J. Roubinek, F. Morsdorf, T. Jonas; '*Snow distribution dynamics under forest canopy*,' poster presentation, American Geophysical Union meeting, San Francisco, CA, December 2013

Moeser, D., T. Jonas, F. Morsdorf; *'Linking snow accumulation patterns in forests with LiDAR derived canopy structure data,'* oral presentation, Davos Atmosphere and Cryosphere Assembly – The International Union of Geodesy and Geophysics, Davos, Switzerland, July 2013

Jonas, T., **D. Moeser**, F. Morsdorf; '*Linking forest snow distribution measurements with canopy structure data*,' Presented by Dr. Tobias Jonas at the American Geophysical Union meeting, San Francisco, California, December 2012

Jonas, T., **D. Moeser**, J. Magnusson, M. Bavay; '*Validation of multiple approaches for modeling SWE Distribution and subsequent snowmelt in a small alpine watershed*,' Presented by Dr. Tobias Jonas at the International Union of Geodesy and Geophysics, Melbourne, Australia, July 2011

Moeser, D., M. Walker, C. Skalka, J. Frolik; '*A distributed wireless sensor network for quantifying*

spatial trends of snow depth and snow water equivalent,' Presented by Dr. Mark Walker at the 79th Annual Western Snow Conference, Stateline, NV, April 2011.

Moeser, D., M. Walker, C. Skalka, J. Frolik; *'Development, analysis & sse of a distributed wireless sensor network for quantifying spatial trends of snow,'* Presented by Dr. Mark Walker at the Nevada Water Resources Association, Annual conference Reno, NV, February 2011.

Moeser, D., Skalka, C**.**, M. Walker, J. Frolik; 'Sno*wcloud: development of a distributed in situ instrument for snowpack monitoring*,' Poster presentation, American Geophysical Union meeting, San Francisco, California, December 2009

Stakeholder Presentations and Colloquiums

Moeser, D., Upper Rio Grande Basin Response to Potential Changes in Climate to 2100, 2023 Annual Meeting of the Engineer Advisers to the Rio Grande Compact Commission, March 2023

Moeser, D., Chavarria, S., Streamflow Response to Potential Changes in the Upper Rio Grande Basin, Middle Rio Grande Endangered Species Collaborative Program, December 2022

Moeser, D., Chavarria, S., Snow and Watershed Modeling in Forested Environments, United States Forest Severe Forest Science Laboratory Collaborative, November 2022

Moeser, D., Chavarria, S., Sexstone, G., Wootten, A., Broxton, P., Harpold, A., ~~Can't~~ See the Forest ~~For~~ and The Trees: High Resolution and Large-scale Canopy Characterization from Aerial Lidar, USGS Geospatial Group webinar, September 2022

Sexstone, G., Fulton, J., McDermott, W.,…..**Moeser, D**., From Stations to Satellites: Next Generation USGS Snow Hydrology Monitoring Activities to Improve Water Availability Assessments in the Upper Colorado River Basin, Rocky Mountain Region Science Exchange Workshop, April 2022

Moeser, D., Chavarria, S., Sexstone, G., Wootten, A., Broxton, P., Harpold, A., A changing Rio Grande Watershed: Two Modelling Perspectives, Southern Planes Climate Science Webinar, April 2022

Moeser, D., Chavarria, S., Recently Completed Snow and Watershed Modeling Projects in the Upper Rio Grande Basin, 2022 Annual Meeting of the Engineer Advisers to the Rio Grande Compact Commission, March 2022

Moeser, D., Chavarria, S., Recently Completed Snow and Watershed Modeling Projects, Oregon Water Science Center Seminar Series, February 2022

Moeser, D., The Effects of Canopy Structure Changes on Snow Water Resources, USGS Fire Water Working Group, June 2021

Moeser, D., The Effects of Canopy Structure Changes on Snow Water Resources Bureau of Reclamation Colloquium series, May 2021

Moeser, D., The Effects of Wildfire on Snow Water Under Multiple Canopy Structure and Meteorological Conditions, New Mexico Forest and Watershed Health Coordinating Group, January 2021

Moeser, D., Canopy disturbance and Snow Water Resources in the Upper Rio Grande Basin, 2-3-2 Collaborative, October 2020

Moeser, D., The Effects of Canopy Structure Changes on Snow Water Resources, Rocky Mountain Region Science Exchange Conference, September 2020

Moeser, D., Surface Water Modeling: The Effects of Landscape Changes in the Rio Grande Watershed, USGS Office of International Programs collaborative with the NM WSC, June 2018

Moeser, D.; 'Snow Hydrology Research in The New Mexico Water Science Center,' New Mexico Bureau of Geology and Mineral Resources, New Mexico Tech, Socorro, New Mexico, June 2017

Moeser, D.; 'Forest snow hydrology,' Department colloquium series, Department of Earth and Environmental Science, New Mexico Tech, Socorro, New Mexico, January 2017

Moeser, D.; 'The influence of forest canopy structure on snow hydrology: Novel modeling and visualization approaches,' Department colloquium series, Department of Earth and Planetary Sciences, University of New Mexico, Albuquerque, New Mexico, December 2016

Moeser, D., M. Stähli; 'The influence of canopy structure on snow,' poster presentation, American Geophysical Union meeting, San Francisco, California, December 2016

Moeser, D.; 'The influence of forest canopy structure on snow hydrology' Department colloquium series, USGS New Mexico Water Science Center, Colloquium series, Albuquerque, New Mexico, October 2016

Websites, Videos, and Press

USGS Upper Rio Grande Basin Climate Projections and Dynamic Hydrographs

Long Format Interview, 'Climate and Snow Pack, New Mexico Water Data Stories: NM Water Data Stories Climate & Snowpack

AP report found in a variety of papers including the Albuquerque journal, US News, Durango Herald, Colorado Politic, San Francisco Chronicle among others,
Experts: 'Drastic Changes' Forecast for Rio Grande | New Mexico News | US News

SC CASC webinar A Changing Rio Grande Watershed: Two Modeling Perspectives 21April2022 - YouTube

USGS Geospatial Group webinar ~~*Can't*~~ *See the Forest* ~~*For*~~ *and The Trees: High Resolution and Large-scale Canopy Characterization from Aerial Lidar*

Service Activities Conference / Colloquium Organization

Conference Organization: 86th Annual Western Snow Conference (2018), 'Snow in the context of Climatic Extremes' Albuquerque, New Mexico, USA https://westernsnowconference.org/meeting/2018
Colloqium Organization: U.S. Geological Survey - New Mexico Water Science Center Colloquium Series (2018-2020) – Monthly series of external speakers – open to public
U.S. Geological Survey – International Programs meeting series with NM Water Science Center (2018)

Volunteer experience

Student Organization for International Water Issues (2008-2010) Reno, NV

Animas River Stakeholders Group (2003 – 2006) Silverton, CO

Hobbies

Rock Climbing, Mountaineering, Woodworking, Travel, Languages