

TUESDAY, MAY 30TH

PLENARY

TIME: 0800 TO 0845 ROOM: ESB 1013

Forests, Snow, and Change

Jessica Lundquist

Dept. of Civil and Environmental Engineering, University of Washington

Forests cover about 40% of the North American snow zone and up to 100% of the snow zone in many key watersheds in British Columbia and the western United States. Many of these forests are actively managed, and many more are subject to disturbance from fire, insects, or drought. Because snowpack accumulation and melt rates depend on forest structure as well as climate, forest management (e.g., strategically retaining and/or removing forest cover in the right locations) has the potential to increase snow water storage, change the timing of snowmelt, and increase the overall resilience of terrestrial and aquatic ecosystems. Because of this importance, people have been studying forest-snow interactions for about a century, and still, these dynamics are not properly represented in models. Fortunately, several recent developments can be catalyzed to advance the science in this area: 1) a global framework for how local climate matters in forest-snow interactions; 2) a revolution in the precision and availability of lidar metrics and high-resolution aerial photos to characterize canopy properties and the snow underneath them, and 3) new widespread availability of time-lapse digital cameras to quantify spatio-temporal evolution of snow interception, accumulation, and melt under diverse forests. We discuss the current state of the science and propose the necessary steps to revolutionize how canopy processes are represented in distributed hydrologic models to better understand forest-snow interactions and to facilitate accurate numerical prediction related to prescribed (and unavoidable) forest change.

Bio: Dr. Jessica Lundquist grew up in California and spent every summer hiking in the Sierra Nevada. She received her B.S. in Atmospheric Science from University of California, Davis in 1999, her M.S. in Oceanography from Scripps Institution of Oceanography (SIO) at U.C. San Diego in 2000 (with a thesis on coastal fog), and her Ph.D. in Oceanography from SIO in 2004 (with a dissertation on diurnal cycles in mountain streamflow). She spent 2 years in Boulder as a CIRES postdoctoral fellow with the University of Colorado, Boulder and NOAA, where she finally learned to ski. She began her position as Assistant Professor at the University of Washington in fall 2006 and was promoted to Associate Professor in 2011, and to full Professor in 2017. Jessica received the American Geophysical Union's Cyrosphere Young Investigator Award in 2008, and the Water Resources Research Editor's Choice Award in 2014 for her paper on forest-snow interactions around the world. She became an Editor for Water Resources Research in 2017. Dr. Lundquist's research focuses on spatial patterns of snow and weather in the mountains and how those patterns are likely to affect streamflow and water resources in a changing climate.



Contact info: jdlund@uw.edu