

# William "Ryan" Currier, Ph.D. | Curriculum Vitae

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## Education

<b>University of Washington</b> <i>Doctor of Philosophy in Civil Engineering, Hydrology and Hydrodynamics</i>	<b>Seattle, WA</b> December 2019
<b>University of Washington</b> <i>Master of Science in Civil Engineering, Hydrology and Hydrodynamics</i>	<b>Seattle, WA</b> December 2016
<b>University of Colorado</b> <i>Bachelor of Arts in Environmental Studies, and Ecology &amp; Evolutionary Biology</i>	<b>Boulder, CO</b> May 2013

## Fellowships and Awards

<b>NASA Earth and Space Science Fellowship</b> Improving snow water equivalent modeling in forests using remote sensing at multiple spatial scales.	<b>May 2016–December 2019</b>
<b>Ronald and Mary Nece Endowed Fellowship</b> Awarded annually to the top Ph.D. students in the hydrology and hydrodynamics program, based on their Ph.D. dissertation, scholarship, and academic performance.	<b>July 2019</b>
<b>Award Winning Student Presentation</b> AMS Annual Meeting: 28th Conference on Weather Analysis and Forecasting	<b>January 2018</b> Seattle, WA

## Publications

### First Author

- Currier, W. R. and others, 2019. Comparing aerial lidar observations with terrestrial lidar and snow-probe transects from NASA's 2017 SnowEx campaign. *Water Resour. Res.*, doi:[10.1029/2018WR024533](https://doi.org/10.1029/2018WR024533)
- Currier, W. R. and J. D. Lundquist, 2018. Snow depth variability at the forest edge in multiple climates in the western United States. *Water Resour. Res.*, doi:[10.1029/2018WR022553](https://doi.org/10.1029/2018WR022553)
- Currier, W. R., T. Thorson, and J. D. Lundquist, 2017. Independent evaluation of frozen precipitation from WRF and PRISM in the Olympic Mountains, WA, USA. *J. Hydrometeor.* doi:[10.1175/JHM-D-17-0026.1](https://doi.org/10.1175/JHM-D-17-0026.1)

### Co-Author

- Mazzotti, G., W. R. Currier, J. Deems, J. Pflug, J. D. Lundquist, and T. Jonas, 2019. Revisiting snow cover variability within forest stands: insights from airborne LiDAR data to inform modelling strategies. *Water Resour. Res.*, doi:[10.1029/2019WR024898](https://doi.org/10.1029/2019WR024898)
- Lundquist, J. D., C. Chickadel, N. Cristea, W. R. Currier, B. Henn, E. Keenan, and J. Dozier, 2018. Separating snow and forest temperatures with thermal infrared remote sensing. *Remote Sens. Environ.*, doi:[10.1016/j.rse.2018.03.001](https://doi.org/10.1016/j.rse.2018.03.001)
- Cao, Q., T. H. Painter, W.R. Currier, J. D. Lundquist, and D. P. Lettenmaier, 2017. Estimation of precipitation over the OLYMPEX Domain during Winter 2015/16, *J. Hydrometeor.* doi:[10.1175/JHM-D-17-0076.1](https://doi.org/10.1175/JHM-D-17-0076.1)

## Work Experience

<b>Hydrologist</b> <i>NOAA Physical Sciences Laboratory</i>	<b>Boulder, CO</b> October 2020–Present
<ul style="list-style-type: none"><li>○ Analyze hydrologic model forecasts from NOAA's National water model.</li><li>○ Conduct analyses of NOAA's HRRR and GFS models.</li><li>○ Understand how uncertainty in forcing translates to uncertainty in streamflow, ET, and SWE.</li></ul>	
<b>Postdoctoral Fellow</b> <i>National Center for Atmospheric Research</i>	<b>Boulder, CO</b> January 2020–October 2020
<ul style="list-style-type: none"><li>○ Analyze and dynamically/statistically downscale global climate models.</li><li>○ Parameterize macroscale hydrological models over the Colorado River Basin.</li><li>○ Assess regional changes in orographic precipitation, snow accumulation/melt, and evapotranspiration.</li><li>○ Interact and share results with stakeholders and multiple water management organizations.</li></ul>	

## Graduate Research Assistant

Mountain Hydrology Research Group

Seattle, WA

August 2014–December 2019

- Review literature, write manuscripts and technical reports for publication in peer-reviewed journals.
- Maintain, process, and provide access to hydrometeorological observations/data.
- Run numerical simulations and analyses focused on hydrologic variables (e.g. snow accumulation/melt, ET, streamflow).

## Institute for Snow & Avalanche Research (SLF)

Visiting Fellow

Davos, Switzerland

February–March 2018

- Collaborated with SLF by evaluating airborne and terrestrial lidar observations.
- Collected snow depth and SWE observations with a GPR and probes. Maintained mobile meteorological towers.

## Institute of Arctic and Alpine Research (INSTAAR)

Lab Technician

Boulder, CO

October–December 2013

## Skills and Competences

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### Computer Languages and Software

**Proficient:** Python, Matlab, C, Bash, HPC, GDAL, QGIS, GNU Parallel, ENVI, L<sup>A</sup>T<sub>E</sub>X

**Familiar:** Fortran, GrADS

### Geophysical Models

**Proficient:**

- Structure for Unifying Multiple Modeling Alternatives (SUMMA)
- Distributed Hydrologic Soil and Vegetation Model (DHSVM)
- Variable Infiltration Capacity (VIC) Model
- SnowModel/Micromet/SnowTran3D
- Intermediate Complexity Atmospheric Research (ICAR) Model
- Generalized Analog Regression Downscaling (GARD) Tool
- Snow Accumulation and Ablation Model (SNOW-17)

**Familiar:**

- Weather Research and Forecasting (WRF) Model
- National Water Model/WRF-Hydro
- ALPINE 3D

### Geophysical Data Collection and Surveying

- Stereo Based Imagery: *Ames Stereo Pipeline*, SfM: *Pix4d*, *DroneDeploy*
- GNSS: *Trimble and Emlid Software*, *RTKLib*
- Terrestrial Lidar Scanning: *Riegl RiSCAN Pro*, *CloudCompare*, *LAStools*, *PDAL*

## Recent Oral Presentations

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### Airborne Snow Observatory Workshop

**2018.** Lasers vs Lasers: A spatially explicit comparison between lidar datasets from NASA's 2017 SnowEx campaign.

### American Geophysical Union Annual Meeting

**2018.** Lasers vs Lasers: A spatially explicit comparison between lidar datasets from NASA's 2017 SnowEx campaign.

**2017.** Snow depth variability at the forest edge in multiple climates in the western United States.

### American Meteorological Society Annual Meeting

**2017.** An Independent Evaluation of the WRF model and PRISM in the Olympic Mountains, WA, USA for WY 2015 and 2016. *Student Award Recipient:* [Link to presentation](#).

### Colorado River Symposium

**2020.** Using ICAR and En-GARD to understand future climate variability of the Colorado River Basin.

### Mountain Climate Conference

**2018.** Snow depth variability at the forest edge in multiple climates.

### Northwest Weather Workshop, NOAA Regional Center

**2017.** An Independent Evaluation of the WRF model and PRISM in the Olympic Mountains, WA, USA for WY 2015

and 2016.

## Olympic National Park Perspective Series.....

2017. *Invited Speaker*, Fieldwork for Evaluating Precipitation Estimates.

## Western Snow Conference.....

2019. Lasers vs Lasers: A spatially explicit comparison between lidar datasets from NASA's 2017 SnowEx campaign.

2018. Classifying hillslope-scale snow depth variability in multiple climates from lidar.

2016. Measuring Snow in the Olympic Mountains.

## Field Experience

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### Switzerland Field Work

*Coincident GPR, snow depth, and snow pit observations in forest stands.*

**Davos, Switzerland**

*February–March 2018*

### NASA's SnowEx

*Set up time-lapse cameras and collected terrestrial lidar scans, snow depth, and snow pit obs.*

**Grand Mesa, CO**

*February 2017*

### NASA's OLYMPEX

*Led students and set up a snow/meteorological observational network within remote locations.*

**Olympic National Park, WA**

*2014–2016*

### Infrared Remote Sensing

*Thermal infrared camera observations coincident with airborne and satellite overpasses.*

**Yosemite National Park, CA**

*February 2016*

### Easton Glacier Field Survey

*Semi-annual UAV SfM survey of the terminating mountain glacier.*

**Mount Baker, WA**

*2017–2018*

### Energy Balance Towers

*Maintained/analyzed eddy covariance and meteorological instruments/observations.*

**Colorado & Washington**

*2013–2015*

Snoqualmie Pass in Washington, Five Ameriflux Towers in the Front Range of Colorado.

## Volunteer Experience

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### Reviewer.....

- Water Resources Research (WRR)
- The Cryosphere (TC)
- Hydrologic Processes (HP)

### Professional.....

#### A high school module for rain-on-snow flooding

*Presented at: UW Program on Climate Change & CUHASI Virtual Poster Session.*

High school module contains a [YouTube video](#) on rain-on-snow-flooding

**Seattle, WA**

*Fall 2015*

#### CUHASI Snow Measurement Field School Teaching Assistant

Field sampling strategies/techniques based on scientific objectives, time, and financial constraints.

**Fraser, CO**

*January 2018*

#### UW Freshwater Initiative Steering Committee Member

Developed the Freshwater Dam Exploration Series that led a fieldtrip tour around Diablo Dam.

Organized a student discussion, and a faculty and professional about dams.

**Seattle, WA**

*2017–Present*

#### USGS National Research Program

Retrieved and analyzed data from five different Eddy Covariance Towers to look at the biological and physical processes that control the generation, consumption, and exchange of greenhouse gases.

**Lakewood, CO**

*2013–2014*

### Educational.....

#### Mary Gates Fellowship Mentor

Help students formulate research hypotheses and write research proposals, test them, write code, present their research, run hydrologic models, and collect quality observations.

**Seattle, WA**

*2015–2018*

#### University of Washington Engineering Discovery Days

Taught K-12 students about infrared radiation and using it to predict mountain runoff

**Seattle, WA**

*2015–2019*

#### American Meteorological Society Weatherfest

Taught K-12 students how to convert from snow depth to snow water equivalent

**Seattle, WA**

*January 2017*

## Professional Memberships

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- o American Geophysical Union, *Student member since 2017*
- o American Meteorological Society, *Student member since 2016*

## Poster Presentations

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American Geophysical Union Annual Meeting.....  
**2020.** Using ICAR and En-GARD to understand future climate variability of the Colorado River Basin. **2019.** How does forest-edge snow depth variability affect streamflow?

Eastern Snow Conference.....  
**2017.** Detecting forest-snow interception from MODIS fSCA and ancillary fractional vegetation data.

NASA SnowEx Workshop.....  
**2017.** Evaluating the accuracy of LiDAR in forested areas and understanding the snow depth variability with respect to the canopy.

Precipitation Measuring Mission Workshop.....  
**2017.** An Independent Evaluation of Frozen Precipitation from WRF and PRISM in the Olympic Mountains

## Miscellaneous

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Selective Service.....  
Registered with selective service

Citizenship.....  
United States Citizen