

# Eric Keenan

GLACIOLOGY · EARTH SYSTEM MODELING · COMPUTATIONAL EARTH SCIENCE

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## Education

### PhD: Atmospheric and Oceanic Sciences

May. 2018 - Present

UNIVERSITY OF COLORADO, BOULDER

Boulder, CO, USA

Advisor: Dr. Jan Lenaerts

### BSc: Earth and Space Sciences: Physics

Aug. 2013 - Jun. 2017

UNIVERSITY OF WASHINGTON, SEATTLE

Seattle, WA, USA

Graduated Cum Laude

## Research Experience

### Graduate Research Assistant

May. 2018 - Present

UNIVERSITY OF COLORADO, BOULDER - ICE SHEETS AND CLIMATE GROUP

Boulder, CO, USA

- Improved modeled representation of near-surface snow and firn density across the Antarctic ice sheet by adapting and deploying the detailed land-surface snow model, SNOWPACK.
- Evaluate regional climate model and atmospheric reanalyses representation of extreme precipitation in East Antarctica by comparing with ground and satellite based precipitation estimates.

### Water Isotope Geochemist

Jun. 2017 - Dec. 2017

JUNEAU ICEFIELD RESEARCH PROGRAM

Juneau, AK, USA

- Participated in an eight week geoscience expedition on the Juneau Icefield in South East Alaska.
- Successfully linked air temperature to snow water isotope concentrations in a maritime climate and presented results to an international audience at the 2017 American Geophysical Union Fall Meeting.

### Undergraduate Research Assistant

Nov. 2014 - Nov. 2017

UNIVERSITY OF WASHINGTON, SEATTLE - MOUNTAIN HYDROLOGY RESEARCH GROUP

Seattle, WA, USA

- Maintained a network of approximately 25 wilderness stream gauges and 25 hydrometeorological monitoring instruments from 2015-2017 in Yosemite National Park.
- Synthesized a meteorologic and surface snow data set designed to provide a platform to evaluate seasonal snow models in the rain-snow transition zone.

## Publications

Keenan, E., Wever, N., Dattler, M., Lenaerts, J. T. M., Medley, B., Kuipers Munneke, P., and Reijmer, C.: Physics-based modeling of Antarctic snow and firn density, *The Cryosphere Discuss.*, <https://doi.org/10.5194/tc-2020-175>, in review, 2020.

S. Stammerjohn, T. Scambos, ..., J. T. M. Lenaerts, **E. Keenan**, M. MacLennan, T. Gorte, and others. State of the Climate 2019: Antarctica. *Bulletin of the American Meteorological Society*, <https://doi.org/10.1175/BAMS-D-20-0090.1>.

Dunmire, D., Lenaerts, J.T.M., Banwell, A.F., Wever, N., Shragge, J., Lhermitte, S., Drews, R., Pattyn, F., Hansen, J.S.S., Willis, I.C., Miller, J., **Keenan, E.**, 2020. Observations of buried lake drainage on the Antarctic Ice Sheet. *Geophys. Res. Lett.* <https://doi.org/10.1029/2020GL087970>.

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 Sensing of Environment*, 209, 7640779. <https://doi.org/10.1016/j.rse.2018.03.001>.

Lundquist, J. D., Roche, J. W., Forrester, H., Moore, C., **Keenan, E.**, Perry, G., Cristea, N., Henn, B., Lapo, K., McGurk, B., Cayan, D. R. and Dettinger, M. D. (2016), Yosemite hydroclimate network: Distributed stream and atmospheric data for the Tuolumne River watershed and surroundings. *Water Resour. Res.*, 52, doi:10.1002/2016WR019261.

## Teaching Experience

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### Graduate Student Instructor

*Jan. 2020 - Mar. 2020*

UNIVERSITY OF COLORADO, BOULDER

*Boulder, CO, USA*

- Developed a cloud native platform for students to execute and analyze their own land-surface snow model experiments.
- Distributed a uniform compute environment for students via a JupyterHub deployed on Google Cloud.

### High School STEM Tutor

*Jan. 2019 - Jun. 2019*

I HAVE A DREAM FOUNDATION

*Boulder, CO, USA*

- Weekly after school STEM tutoring with low-income students at Boulder High School.

### Graduate Student Instructor

*Aug. 2018 - Dec. 2018*

UNIVERSITY OF COLORADO, BOULDER

*Boulder, CO, USA*

- Instructor for Atmospheric and Oceanic Sciences 1070 "Weather and Atmosphere Laboratory." Lead lectures, experiments, grading, and office hours for 48 students.

## Outreach and Service

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### Journal Referee

The Cryosphere, Journal of Geophysical Research: Atmospheres

### Diversity Committee

Sep. 2019 - May. 2020, Department of Atmospheric and Oceanic Sciences, Boulder, CO

### Skype a Scientist

Feb. 2019 - Present, Classrooms in Winnipeg, Manitoba, Santa Monica, CA, and Mansfield, TX

### High School STEM Tutor

Jan. - May. 2019, I Have a Dream Foundation, Boulder, CO

### Colloquium Committee

Sep. 2018 - Present, Department of Atmospheric and Oceanic Sciences, Boulder, CO

### Poster Conference Committee

Sep. - Nov. 2018, Department of Atmospheric and Oceanic Sciences, Boulder, CO

### STEM Rocketry Outreach

Apr. 2017, Northwest Earth and Space Sciences Pipeline, Seattle, WA

### Snow Hydrology Outreach

Apr. 2016, Engineering Discovery Days, Seattle, WA

### Snow Hydrology Outreach

Apr. 2015, Engineering Discovery Days, Seattle, WA

## Computer Skills

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### Operating Systems

Linux, macOS, and Windows

### Programming Languages

Python, Bash, MATLAB, R, Java, and LaTeX

### Tools

Google Cloud, JupyterHub, git, xarray, CDO, pandas, cartopy

## Field Experience

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2019 **Belgian Antarctic Expedition**, Princess Elisabeth Station, Dronning Maud Land, East Antarctica

*Nov. - Dec.*

2017 **UAV Glacier Survey**, Mt. Baker Easton Glacier, WA, USA.

*Oct. 5th*

2017 **Stream Gaging**, Tuolumne Meadows, Yosemite National Park, CA, USA.

*Aug. - Sep.*

2017 **Glacier Mass Balance and Water Isotope Sampling**, Juneau Icefield, AK, USA.

*Jun. - Aug.*

2017 **NASA SnowEx**, Grand Mesa, CO, USA.

*Feb.*

2016 **Meteorologic Measurements**, Kapp Linné, Svalbard.

*Sep.*

2016 **Hydrographic Measurements**, Fram Straight and Isfjorden, Svalbard.

*Aug.*

2016 **Stream Gaging**, Tuolumne Meadows, Yosemite National Park, CA, USA.

*Jun. - Jul.*

2016 **Remote Sensing Ground Validation**, Dana Meadows, Yosemite National Park, CA, USA.

*Feb.*

2016 **NASA International Snow Remote Sensing Group Field School**, Fraser, CO, USA.

*Jan.*

2015 **Stream Gaging**, Tuolumne Meadows, Yosemite National Park, CA, USA.

*Jun. - Jul.*

## Awards and Grants

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2019	<b>IACS-IGS Graham Cogley Award</b> , \$500 CAD.	<i>Jul.</i>
2019	<b>IUGG General Assembly Student Travel Grant</b> , \$390 CAD.	<i>Jul.</i>
2018	<b>Graduate School Domestic Travel Grant</b> , \$300.	<i>Dec.</i>
2016	<b>Mary Gates Undergraduate Research Scholarship</b> , \$5000.	<i>Jan. - Jun.</i>
2016	<b>First Place, American Society of Civil Engineers Student Presentations</b> , \$300	<i>Jun.</i>

## Presentations

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- Universtiy of Colorado, Department of Atmospheric and Oceanic Sciences Colloquium, Advances in physics-based modeling of Antarctic snow properties. Seminar. May 18th, 2020.
- 2019 IUGG General Assembly, Montreal, Canada. Modeling Antarctic surface mass balance using a detailed multi-layered snow model. Poster presentation. July 10th, 2019.
- 2018 American Geophysical Union Fall Meeting, Washington, DC. Do climate models properly represent atmospheric rivers in East Antarctica? Poster presentation. December 13th, 2018.
- 2018 Earth System and Space Science Poster Conference, Boulder, CO. Do climate models properly represent atmospheric rivers in East Antarctica? Poster presentation. November 30th, 2018.
- 2017 American Geophysical Union Fall Meeting, New Orleans, LA. Can we untangle the weather? Stable water isotope controls on the Juneau Icefield. Poster presentation. December 15th, 2017.
- 2017 University of Washington Undergraduate Research Symposium, Seattle, WA. M2 tides along the west coast of Svalbard: Simple is better. Oral presentation. May 19th, 2017.
- 2017 Department of Earth and Space Sciences Research Gala, Seattle, WA. Observations of M2 tidal propagation and decay along the west coast of Spitsbergen: New possibilities for numerical model evaluation. Oral presentation. March 31st, 2017.
- 2016 University of Washington American Society of Civil Engineers student presentations. Seattle WA. Airborne thermal infrared remote sensing of snow surface temperature. Oral presentation. June 3rd, 2016.
- 2016 University of Washington Undergraduate Research Symposium, Seattle WA. Thermal infrared remote sensing of snow surface temperature. Oral presentation. May 20th, 2016.
- 2016 Western Snow Conference, Seattle WA. Thermal infrared remote sensing of snow surface temperature. Poster presentation. April 19th, 2016.
- 2016 Department of Earth and Space Sciences Research Gala, Seattle, WA. Thermal infrared remote sensing of snow surface temperature. Oral presentation. March 31st, 2016.

## Professional Memberships

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<b>International Association of Cryospheric Sciences</b>	2019 - Present
<b>American Geophysical Union</b>	2018 - Present