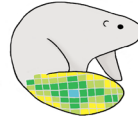


# EMILY FAIRFAX, PhD

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 [@EmilyFairfax](https://twitter.com/EmilyFairfax)



ECOHYDROLOGY

BEAVERS

REMOTE SENSING

## EDUCATION

**Ph.D. Geological Sciences**, University of Colorado Boulder      2015 - 2019  
Certificate in Hydrologic Sciences  
Certificate in College Teaching  
*NDSEG Fellow*

**B.A. Chemistry & Physics**, Carleton College      2010 - 2014  
*cum laude*

## APPOINTMENT HISTORY

**California State University Channel Islands, CA**  
*Environmental Science and Resource Management Department*  
Assistant Professor      2019 - present

**Univeristy of Colorado Boulder, CO**  
*Department of Geological Sciences*  
Lecturer      2019  
ASSETT Fellow      2018 - 2019  
NDSEG Fellow      2015 - 2018

**UNAVCO, CO**  
Professional Development Instructor      2019  
RESESS Graduate Fellow      2018

**Los Alamos National Laboratory, NM**  
Systems Engineer      2014 - 2015  
SULI Materials Science Research Assistant      2013

# RESEARCH OUTPUT

## PEER-REVIEWED PUBLICATIONS

*\*student supervised*

Fairfax, E., & \*Whittle, A. (in revision), Calculating Landscape-Scale Surface Water Storage in Beaver Ponds Using Google Earth: a Case Study and Discussion of Uncertainties

Fairfax, E. and \*Whittle, A. (2020), [Smokey the Beaver: beaver-dammed riparian corridors stay green during wildfire throughout the western USA](#). Ecological Applications. In Press. doi:10.1002/eap.2225

Fairfax, E., & Brown, M. R. M. (2019), [Increasing Inclusion and Accessibility in Undergraduate Geology Labs Through Scenario-Based TA Training](#). Journal of Geoscience Education. DOI: 10.1080/10899995.2019.1602463

Fairfax, E., & Small, E. E. (2018), [Using remote sensing to assess the impact of beaver damming on riparian evapotranspiration in an arid landscape](#). Ecohydrology 11(7). doi:10.1002/eco.1993

## PUBLISHED DATASETS

*\*student supervised*

Fairfax, E.; \*Whittle, A. (2020): Google Earth Path Files of Beaver Dams and Ponds in Laramie Ranger District, Medicine Bow Routt National Forest, WY. PANGAEA, <https://doi.pangaea.de/10.1594/PANGAEA.913923>

Fairfax, E.; \*Whittle, A. (2019): Normalized Differenced Vegetation Index (NDVI) of riparian areas with and without beaver damming within wildfire perimeters in Western US. PANGAEA, <https://doi.pangaea.de/10.1594/PANGAEA.900944>

## INVITED PRESENTATIONS

(upcoming) Panelist on Beavers and Climate Change. 2020 Natural Areas Association Annual Conference. October 16th, 2020

(upcoming) *Talk Title TBD*. CSUCI Mathematics Colloquium. October 26th, 2020

(upcoming) *Talk Title TBD*. University of Nevada Reno Ecology and Evolutionary Biology Colloquium. Nov 12th, 2020

[Beavers without Borders](#). BeaverCON 2020. March 3rd, 2020

[Smokey the Beaver: Can Beaver Dams Help Protect Riparian Vegetation During Wildfire?](#) Webinar for the U.S. Forest Service. January 28th, 2020

[Dam Big Data](#). CSUCI Computer Science Colloquium. October 15th, 2019.

[Beavers: the other professional engineer](#). AEG (Association of Environmental and Engineering Geologists) Mile High Chapter Meeting. May 14th, 2019.

**CONFERENCE  
PRESENTATIONS**  
*\*student supervised*

**Fairfax, E.** and \*Whittle, A. (2019) Smokey the Beaver: Can Beaver Dams Help Protect Riparian Vegetation During Wildfire?, AGU Annual Fall Meeting 2019

**Fairfax, E.** (2019) How Can You Talk About Your Research and Tell a Story Without Saying Any Words? With a Little Bit of Patience and Whole Lot of Felt: Lessons Learned from Creating and Sharing an Elevator Video, AGU Annual Fall Meeting 2019

**Fairfax, E.** (2018) Roll a Water Check! Using Games to Teach Hydrology, submitted for Pop-Up Talk at AGU Annual Fall Meeting 2019

**Fairfax, E.** and E. E. Small. (2018) Over, Under, or Through: How the leakiness of a beaver dam influences groundwater-surface water interactions, AGU Annual Fall Meeting 2018

**Fairfax, E.** and M. R. M. Brown. (2018), Increasing Inclusion and Accessibility in Undergraduate Geology Labs Through Scenario-Based TA Training, AGU Annual Fall Meeting 2018

M. R. M. Brown. and **Fairfax, E.** (2018), Assessing Accessibility Climate: What undergraduates think about accessibility in the geoscience classroom, AGU Annual Fall Meeting 2018

\*Whittle, A., & **Fairfax, E.** (2018), Beaver Ponds are a Major Contributor to Surface Water Storage in the Medicine Bow-Routt National Forest, Laramie Ranger District, WY, USA. AGU Annual Fall Meeting 2018

**Fairfax, E.** (2018), Roll a Water Check! Using Game-Based Learning to Correct Common Alternate Conceptions of the Hydrologic Cycle. Center for STEM Education 10th Annual Symposium, Boulder, CO.

**Fairfax, E.** and E. E. Small. (2017), The Role of Beaver Ponds in Maintaining Vegetation Health During Droughts: A Case Study at Susie Creek and Maggie Creek, NV, GSA Fall Meeting Abstracts 2017

**Fairfax, E.** and E. E. Small. (2016), Hyporheic Exchange in a Stream Dammed by Beaver: A 1D Simulation with Spatial Energy Head Gradients and Heterogeneous Hydraulic Conductivity as Drivers, AGU Fall Meeting Abstracts 2016

**Fairfax, E.** and E. E. Small. (2016), 1D Simulation of Hyporheic Exchange in a Stream Dammed by Beaver, GSA Fall Meeting Abstracts

**Fairfax, E.**, et al. (2015), PBO H<sub>2</sub>O: Monitoring the Terrestrial Water Cycle with reflected GPS signals recorded by the Plate Boundary Observatory Network, AGU Fall Meeting Abstracts.

# FUNDING

## PENDING FUNDING (\$265,537)

**Fairfax, E.** (2020). Remote Sensing to Identify Beaver Dams in Priority Areas in Newfoundland and Labrador, Canada. World Wildlife Fund Canada Special Contract. (\$5000)

Sadegh, M., **Fairfax, E.**, Asanjan, A. (2021-2022). Remote Sensing of Beaver Dams in Northwestern U.S. with Very-High-Resolution Satellite Imagery. NASA SmallSat. Pending (\$150,000)

**Fairfax, E.**, Spies, B., Woo, M. (2021-2022). The Missing Keystone: understanding the role of coastal beaver activity in creating climate resiliency and habitat for endangered fishes in California. California Sea Grant and The California State University Council on Ocean Affairs, Science & Technology (COAST) New Faculty Award Program. Pending (\$89,812)

**Fairfax, E.** (2020-2021) Research Grant: Beavers, Climate Change, and Ecosystem Resilience. Special Project. Pending (\$20,725)

## AWARDED EXTERNAL FUNDING (\$179,175)

**Fairfax, E.** (2018) AWG (Association for Women Geoscientists) Takken Student Research Presentation Travel Award (\$500)

**Fairfax, E.** (2018) RESESS (Research Experience in Solid Earth Science for Students) Geological Sciences Graduate Fellowship (\$7000)

**Fairfax, E.** (2017) GSA (Geological Society of America) Rocky Mountain Section Travel Grant (\$75)

**Fairfax, E.** (2017) GSA (Geological Society of America) Graduate Student Research Grant, Geological Society of America: Drought Buffering in Riparian Areas Along Susie Creek, Nevada: The Role of Beaver Damming (\$2100)

**Fairfax, E.** (2015-2018) National Defense Science and Engineering Graduate Fellowship (NDSEG), Army Research Office, Air Force Office of Research, and ASEE (\$169,500)

## AWARDED INTERNAL FUNDING (\$92,256)

**Fairfax, E.** (2020-2021) Undergraduate Research Funding via HSI-SMART: STEM Model for Research and Teaching Undergraduate-intervention Program (*PI David Gillespie, \$2.5M award*) (\$26,200)

**Fairfax, E.** (2020) Teaching and Learning Innovations Fellowship. CSUCI. (\$19,292)

**Fairfax, E.** (2020) Your B.S. isn't BS: ESRM Speaker Series (ESRM 496). CSUCI Instructionally Related Activities Fund. (\$6,800)

**Fairfax, E.** and Patsch, K. (2019). Data without Borders: Establishing a Collaborative Cross-Border Environmental Drone and GIS Research Program in Todos Santos, Baja California Sur, Mexico. CSUCI Faculty Research & Development Mini-grant. 2019-2020. (\$7,979)

Blackwood, E., **Fairfax, E.**, and Patsch, K. (2019). In a Repository Far, Far Away: Using virtual reality to bridge the gap between Santa Rosa Island data and the people who care about it. CSUCI Faculty Research & Development Mini-grant. 2019-2020. (\$7,990)

**AWARDED  
INTERNAL  
FUNDING**  
*continued*  
(\$92,256)

**Fairfax, E.** and Patsch, K. (2019). I See CI: Virtual Reality Exploration of Santa Rosa Island. CSUCI Summer SURF Student Research Program. (\$14,000)

**Fairfax, E.** (2018) Undergraduate Research Mentorship Grant, CU Boulder Department of Geological Sciences: ET Across Beaver-Dammed Landscapes. (\$1000)

**Fairfax, E.** (2018) United Government of Graduate Students Travel Grant (\$500)

**Fairfax, E.** (2018) Conference Travel Grant, CU Boulder Department of Geological Sciences (\$800)

**Fairfax, E.** (2018) Penny E. Patterson Graduate Research Grant, CU Boulder Department of Geological Sciences: Using the Leakiness of Beaver Dams to Assess their Hydrologic Function in a Landscape (\$1095)

**Fairfax, E.** (2018) Undergraduate Research Mentorship Grant, CU Boulder Department of Geological Sciences: Surface Water Storage in Beaver Ponds (\$1000)

**Fairfax, E.** (2017) University of Colorado Graduate School Travel Grant (\$300)

**Fairfax, E.** (2017) Birkeland Graduate Scholarship Research Grant, CU Boulder Department of Geological Sciences: Using Remote Sensing to Evaluate the Role of Beaver Ponds in Buffering the Effects of Drought on Nearby Riparian Vegetation (\$1500)

**Fairfax, E.** (2016) Conference Travel Grant, CU Boulder Department of Geological Sciences (\$800)

**Fairfax, E.** (2016) Spetzler Research Grant, CU Boulder Department of Geological Sciences: Beaver Dam Shallow Subsurface Hydrology (\$2000)

**Fairfax, E.** (2016) Undergraduate Research Mentorship Grant, CU Boulder Department of Geological Sciences: Beaver Dam Catalogue (\$1000)

# STUDENT MENTORSHIP

UNDERGRAD  
STUDENT  
RESEARCHERS  
MENTORED  
*\* = student at  
CSUCI*

## Beaver Dam Hydrology

Cooper Lienhart (2020-present)  
\*Ramie Klocko (2020-present)  
\*Sizzinette Hernandez (2020-present)  
\*Brandon Osorio (2020-present)  
\*Keitreice Kirksey (2020-present)  
\*Viviana Celeya (2020-present)  
\*Natalie Perez (2020-present)  
\*Kyle Ball (2019-2020)  
\*Jaquie Lazeau (2019-2020)  
Andrew Whittle (2017-2019)  
Sean Will (2018)  
Alexis Ahlert (2017)  
Danya Abelhameid (2017)  
Sage Basiri (2017)  
Connor Jansen (2017)  
Claire Czarnecki (2016)

## Virtual Reality and Field Accessibility

\*Emily Orsborn (2020-present)  
\*April Hoberg (2020-present)  
\*Alyssa Connaughton (2019-present)  
\*Jenny Shirhall (2019-2020)  
\*Jen Bayes (2019-2020)

## Data Visualization

\*Jenny Shirhall (2019)  
\*Nikolette Dussault-Martin (2019)  
\*Alyssa Connoaughton (2019)

REU PROGRAM  
MENTORING

CSU Channel Islands Summer SURF (2020)  
Research Experiences in Solid Earth Sciences for Students (RESESS) (2017-2019)  
Geo-Launch Pad (2018-2019)  
Research Experiences for Community College Students (RECCS) (2018)

# TEACHING

## ON-CAMPUS TEACHING EXPERIENCE

### California State University Channel Islands

ESRM 100: Introduction to Environmental Science and Resource Management

ESRM 203: Environmental Statistics

ESRM 303: Data Visualization and Climate Communication

ESRM 328: Introduction to GIS (Geographic Information Systems)

### University of Colorado Boulder

GEOL 1010: Introduction to Geological Sciences

GEOL 2001: Planet Earth (Teaching Assistant)

GEOL 4241: Geomorphology (Teaching Assistant)

### UNAVCO RESESS and Geo Launch Pad Internships

Research Skill Development for Community College Interns

Professional Communication Skills for All Interns

## OFF-CAMPUS TEACHING EXPERIENCE

### Field Excursions

3-Day Field Trip to Santa Rosa Island, CA, USA. For ESRM 328: Introduction to GIS. (2019)

### Off-Campus Programs

2-Week Program in Todos Santos, Baja California Sur, Mexico. UNIV 392: Data Without Borders. Partnership with Colorado State University. Scheduled January 2021. Postponed due to COVID-19.

## PEDAGOGICAL TRAINING

### Full Courses (10+ weeks each)

THRIVE Online Educator Training. CSU Channel Islands. 2020

Equity in STEM for All Genders. CIRTL. 2018

Addressing Implicit Bias in STEM. CIRTL. 2018

Practicing Scientific Teaching. CU Boulder. 2018

Evidence-Based Teaching. CIRTL. 2018

Teaching and Learning in Geoscience. CU Boulder. 2017

Pedagogy in Environmental Science. CU Boulder. 2017

### Workshops and Short Courses

60+ hours, focused primarily on equity, accessibility, and technology

# COMMUNITY ENGAGEMENT

## NON-PROFIT WORKING RELATIONSHIPS

[The Beaver Trust](#): Scientific Advisory Board. 2020-present

[The Beaver Coalition](#): Science and Technical Information Committee (STIC) Member. 2020-present

[SLO Beaver Brigade](#): Partner Scientist. 2020 - present

## PUBLIC PRESENTATIONS

[Guided Beaver Nature Walks](#). Atascadero, CA.

Three walks on June 27, 2020.

One walk on Aug 2, 2020.

Virtual Presentation for 4H Hiking Club New Jersey. May, 2020

[Public research talk for CSUCI Library Lecture Series at Camarillo Public Library](#).

Smokey the Beaver: Can Beavers Prevent Wildfires? Scheduled March 2020, cancelled due to COVID-19

[Public research talk for CSUCI Library Lecture Series at Ojai Public Library](#). Smokey the Beaver: Can Beavers Prevent Wildfires? October 2019

[Lens on Climate Change](#) Mentor and Interviewee. 2018, 2019

## CREATIVE PIECES

[Finding a Home](#). Digital Art. 87 Beavers Project. 2020

[What do beavers have to do with wildfire?](#) Stop-Motion Animation. 2019

[#HaikuYourResearch](#). Poetry. 2018.

## PODCAST INTERVIEWS

Artemis: Hunt to Eat. [Beaver Believers \(!\) with Emily Fairfax](#). July 2020

Water Talk. [Beaver Hydrology and Management](#). June 2020

Ask a Scientist. [Dr. Emily Fairfax - Beavers](#). May 2020

SciPod. [Oh Dam Look, That Beaver Just Put Out A Forest Fire!](#) May 2019

Curiosity Hour. [Emily Fairfax, PhD](#). May 2019

The Irrelevant Information Podcast. [Beavers](#). May 2019.

## VIDEO INTERVIEWS

Yale Climate Connections. [Creative Climate Communication: 4 Scientists, 4 Approaches](#). 2019



WRITTEN  
MEDIA  
COVERAGE

- [Frequent features](#) on Martinez Beavers: Worth a Dam. 2018 - present
- [Frequent features](#) on SLO Beaver Brigade. 2019 - present
- Edible Magazine Ojai and Ventura County. [Dammed if They Don't](#). 2020.
- Edible Magazine Ojai and Ventura County. [Tour a Stream with a Beaver Expert](#). 2020
- Popular Science. [Beavers might be making the arctic melt even faster](#). 2020
- Natural Resources Defense Council (NRDC); Rockies Dispatch. [The Humble Beaver: troublemaker or climate superhero?](#) 2020
- University of California Cooperative Extension Forestry. [From being an engineer to researching nature's engineers](#). 2020
- The Confluence. [From being an engineer to researching nature's engineers](#). 2020
- Medium. [God Dam: Why Rivers Need Beavers](#). 2020
- Climate Ready Missoula. [Ecosystems and Wildfire](#). 2020
- Global Weather and Climate Center. [Relationship between beavers and wildfire](#). 2020
- San Francisco Estuary Magazine. [Beaver dams may offer wildfire protection to western watersheds, in addition to providing better-known benefits such as groundwater recharge, wetland and habitat creation, and riparian restoration](#). 2020
- Landscape Architecture Magazine. [Smokey the Beaver](#). 2020
- Clark Fork Coalition. [Beaver Habitat Surveys in Western Montana](#). 2020
- Eos. [Finding Wildfire's Fingerprint in the Atmosphere](#). 2020
- NASA Landsat Science News. [Smokey the Beaver? Beaver Dams and Wildfire](#). 2019
- Eos. [Are beavers nature's "little firefighters?"](#). 2019
- Colorado Arts and Sciences Magazine. [Instructors improve accessibility of geology](#). 2019
- Ojai Valley News. [Wildfire? Drought? Leave it to Beavers](#). 2019
- USGS and NPS. [Fire History of the Jemez Mountains](#). 2019
- Mountain West News. [Scientists turn to video, art, graphics to convey data](#). 2019
- Yale Climate Connections. [Four scientists make creativity a key to communicating their research](#). 2019
- The Singing Wilderness. [What do beavers have to do with wildfire?](#) 2019
- The Coloradan Magazine. [Emily Fairfax wants you to appreciate beavers](#). 2019
- The Verge. ['Dam good' video shows how beavers could fight fires](#). 2019



WRITTEN  
MEDIA  
COVERAGE  
*continued*

Edge Effects Magazine. [How a beaver became a twitter star](#). 2019

Cottage Life Magazine. [PhD student's creative video shows how beavers help prevent fires](#). 2019

The Kids Should See This. [Beaver dams and wildfire, a stop motion demonstration](#). 2019

Lake Superior Magazine. [Smokey the Beaver?](#) 2019

ClimateCocks.com. [What do beavers have to do with wildfire?](#) 2019

cnBeta.com. [A cute video showing how beavers fight wildfires raises attention on twitter](#). 2019

LangweileDich.net. [Stopmotion zeigt positive Nebeneffekte von Biber-Dämmen](#). 2019

LetemSvětém Applem. [Twitter válcuje naučné stop-motion video. Mrkněte na něj i v](#). 2019

Beavers and Brush. Beavers: [California's Missing Keystone to Mitigate Wildfire Risk](#). 2019

CU Arts and Sciences Magazine. [CU Boulder's geoscientists, ranked world's best, showcase rock-it science](#). 2019

Eos. [Can you express your science in 17 syllables?](#) 2018

CU Boulder Today: ["Drones, beaver dams help community college students get involved in research."](#) 2018

Earth Magazine. [Beavers preserve wetlands in water-stressed areas](#). 2017

# PROFESSIONAL SERVICE

## ONGOING CAMPUS ACTIVITIES

### Campus Leadership

Justice and Equity With an Environmental Lens (JEWEL) Student Club Faculty Advisor. California State University Channel Islands. (2020-present)

### Committee Membership

Curriculum Committee. California State University Channel Islands. (2019-present)

Hydrologic Sciences Committee Member. University of Colorado Boulder. (2018-2019)

Colloquium Committee Member. University of Colorado Boulder. (2016-2019)

## ONE-TIME EVENTS

### One-Time Events (Workshops, Panels, etc.)

AGU Outstanding Student Presentation Award Judge (2019)

Building Educational Computer Games – Faculty Workshop: Workshop Creator and Facilitator (2019)

Gamifying Your Class - Faculty Workshop: Workshop Creator and Facilitator. (2019)

Accessibility and Inclusion Training for New Teaching Assistants, Organizer and Facilitator. (2018, 2017)

Panelist for Professional and Educational Developers (PED) Learning Community at CU Boulder (2018)

Advisory Board Graduate Student Poster Session Organizer (2018)

Geological Society of American Annual Fall Meeting Student Volunteer (2017)

## PEER REVIEW

### Peer Reviewer

Ecohydrology

Hydrologic Processes

Journal of Geoscience Education Research

Journal of the American Water Resources Association

Legislative-Citizen Commission on Minnesota Resources

NSF Hydrologic Sciences Division

River Research and Applications

Scientific Reports

Wetlands

## PROFESSIONAL MEMBERSHIPS

American Geophysical Union (2015 – present)

Geological Society of America (2015 – present)

The International Association for Geoscience Diversity (2016 – present)

National Association for Geoscience Teachers (2016 – present)

Association for Women Geoscientists (2016 – present)