



Emily Fairfax

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Research Interests Ecohydrology Earth/Environmental Science Education Research
Wetlands Curriculum Development
Environmental Data Science Diversity and Inclusion
Remote Sensing and GIS Accessibility in Earth/Environmental Science

Education **University of Colorado Boulder** 2019 (expected)
PhD in Geological Sciences, NDSEG Fellow
Topic: Impact of Beaver-Damming on Drought-Afflicted Landscapes
Certificate in College Teaching
Certificate in Hydrologic Sciences

Carleton College 2014
Bachelor of Arts, Physics, *cum laude*
Bachelor of Arts, Chemistry, *cum laude*

Teaching Experience

Teaching Assistant

(2018) Teaching Assistant, GEOL 2001 Planet Earth
(2018) Teaching Assistant, GEOL 4241 Geomorphology
(2016) Teaching Assistant, GEOL 2001 Planet Earth

Tutoring

(2018 - 2019) Head Tutor, Geology Tutoring Room

Guest Lecturing

(2019) Guest Lecturer, GEOL 4715 Field Hydrogeology: Contouring
(2019) Guest Lecturer, GEOL 4715 Field Hydrogeology: Hydrologic Tracers
(2018) Guest Lecturer, GEOL 1030 Intro to Physical Geology, Topic: Minerals
(2018) Guest Lecturer, GEOL 1010 Intro to Geology, Topic: The Water Cycle
(2018) Guest Lecturer, GEOL 1010 Intro to Geology, Topic: Ecohydrology
(2017) Guest Lecturer, GEOL 1010 Intro to Geology, Topic: Hydrology

Formal Pedagogical Training

Classes

(2018) CIRTL Graduate Course: Equity in STEM for All Genders
(2018) EBIO Graduate Seminar: Practicing Scientific Teaching
(2018) CIRTL Reads Seminar: Evidence-Based Teaching
(2017) GEOL Graduate Seminar: Teaching and Learning in Geoscience
(2017) ENV5 Graduate Seminar: Pedagogy

Workshops and Conferences

(2018) CIRTLcast Workshop Series: Addressing Implicit Bias in STEM
(2018) Faculty Teaching Excellence Program: Story-Telling in the Classroom
(2018) Faculty Teaching Excellence Program: Tense Moments
(2018) CIRTL Workshop: Academic Advising for Future Faculty
(2017) NAGT Earth Educator Rendezvous Conference
(2015 – present) 30+ Graduate Teacher Program Workshops, CU Boulder

Publications **Peer Reviewed**

**italic = undergraduate student supervised*

- Fairfax, E., & Whittle, A.** (*in review*), A Remote Sensing Quantification of Surface Water Storage and Wetland Habitat Associated with Beaver Ponds in Wyoming, USA
- Fairfax, E., & Brown, M. R. M.** (*accepted*), Increasing Inclusion and Accessibility in Undergraduate Geology Labs Through Scenario-Based TA Training. In review with Journal of Geoscience Education.
- 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

Conference Presentations, Edited Volumes, Reports

- Fairfax, E.** (2018) Roll a Water Check! Using Games to Teach Hydrology, submitted for Pop-Up Talk at AGU Annual Fall Meeting
- 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
- 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
- M. R. M. Brown. and **Fairfax, E.** (2018), Assessing Accessibility Climate: What undergraduates think about accessibility in the geoscience classroom, AGU Annual Fall Meeting
- 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
- 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 M. R. M. Brown (2017), Characterizing the Accessibility Climate in Geology, in Teaching-as-Research Projects at CU Boulder: A Volume of Projects Done by the Teaching Institute for Graduate Education Research, edited by A. Blanford and J. Scott, University of Colorado Boulder.
- 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
- Fairfax, E.** (2016), The Role of Beaver Ponds in Providing Water to the Root Zone of Adjacent Riparian Vegetation, Report to Boulder County Open Space
- 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
- 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 H₂O: Monitoring the Terrestrial Water Cycle with reflected GPS signals recorded by the Plate Boundary Observatory Network, AGU Fall Meeting Abstracts.
- Fairfax, E.** and Steinzig, M. (2015), Case Histories of Residual Stress Related Mechanical Failures, SEM Conference Proceedings, Costa Mesa, CA

Mentoring Undergraduate Research Assistants

- (2018-2019) Andrew Whittle: Surface Water Storage in Beaver Ponds
- (2017) Alexis Ahlert: Hydrograph Damping by Beavers
- (2016) Claire Czarnecki: Beaver Dam Catalogue

Formal Programs

- (2018 – present) GATES (Graduate Admission in The Earth Sciences) Mentoring Program: Mentor for Owen vande Graaf
- (2018) Research Experience in Solid Earth Sciences for Students (RESESS) Graduate Fellow. General mentor for 8 undergraduates.
- (2018) Research Experience for Community College Students (RECCS) Science Mentor: Sean Will
- (2017) Research Experiences in Solid Earth Sciences for Students (RESESS) Communication Mentor: Danya AbdelHameid
- (2017) CU Boulder Summer Science Discovery Camp: Research Mentor for High School Students: Sage Basiri and Connor Jansen

Grants, Fellowships and Awards

Total Funding from 2015 through present: ~\$182,100

- (2018) AGU Hydrologic Sciences “Haiku Your Research” Best Haiku Winner
- (2018) Undergraduate Research Mentorship Grant, CU Boulder Department of Geological Sciences: *ET Across Beaver-Dammed Landscapes*
- (2018) Nominated for K. Patricia Cross Future Leaders Award
- (2018) United Government of Graduate Students Travel Grant
- (2018) Conference Travel Grant, CU Boulder Department of Geological Sciences
- (2018) AWG (Association for Women Geoscientists) Takken Student Research Presentation Travel Award
- (2018) RESESS (Research Experience in Solid Earth Science for Students) Geological Sciences Graduate Fellowship
- (2018) AWG (Association for Women Geoscientists) Outstanding Student Award
- (2018) Nominated for Governor’s Energy & Environment Fellowship
- (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*
- (2018) Undergraduate Research Mentorship Grant, CU Boulder Department of Geological Sciences: *Surface Water Storage in Beaver Ponds*
- (2017) GSA (Geological Society of America) Rocky Mountain Section Travel Grant
- (2017) University of Colorado Graduate School Travel Grant
- (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*
- (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*
- (2016) Conference Travel Grant, CU Boulder Department of Geological Sciences
- (2016) Spetzler Research Grant, CU Boulder Department of Geological Sciences: *Beaver Dam Shallow Subsurface Hydrology*
- (2016) Undergraduate Research Mentorship Grant, CU Boulder Department of Geological Sciences: *Beaver Dam Catalogue*
- (2015-2018) National Defense Science and Engineering Graduate Fellowship (NDSEG), Army Research Office, Air Force Office of Research, and ASEE

Media Coverage

- (2019) Research featured in CU Arts and Sciences Magazine: “CU Boulder’s geoscientists, ranked world’s best, showcase rock-it science”
<https://www.colorado.edu/asmagazine/2019/02/05/cu-boulders-geoscientists-ranked-worlds-best-showcase-rock-it-science>
- (2018) Research Haiku featured in EOS: “Can you express your science in 17 syllables?”
Haiku also featured on MartinezBeavers.org: “Haiku Beaver”
<https://www.martinezbeavers.org/wordpress/2018/10/17/haiku-beaver/>
<https://eos.org/geofizz/can-you-express-your-science-in-17-syllables>
- (2018) Featured on MartinezBeavers.org: “Emily and the 360 View Beaver Pond”
<https://www.martinezbeavers.org/wordpress/2018/09/28/emily-and-the-360-view-beaver-pond/>
- (2018) Blog post about beavers sourced in National Resource Defense Council article: “Beavers Are the Working-Class Heroes of Their Ecosystems—America Should Appreciate Them More”
<https://www.nrdc.org/onearth/beavers-are-working-class-heroes-their-ecosystems-america-should-appreciate-them-more>
- (2018) Blog post about beavers sourced in Davidson Land Conservancy post: “Wow – beavers!”
<http://www.davidsonlands.org/wow-beavers/>
- (2018) Mentee interviewed and research featured in CU Boulder Today: “Drones, beaver dams help community college students get involved in research”
<https://www.colorado.edu/today/2018/07/31/drones-beaver-dams-help-community-college-students-get-involved-research>
- (2018) Blog post about beavers sourced in GreenTumble environmental blog: “12 Examples of Keystone Species”
<https://greentumble.com/12-examples-of-keystone-species/>
- (2017) Interviewed for feature article in Earth Magazine: “Beavers preserve wetlands in water-stressed areas”
<https://www.earthmagazine.org/article/beavers-preserve-wetlands-water-stressed-areas>

Outreach **One-Time Events**

- (2018) Lens on Climate Change Interviewee: Beavers and Climate Change
- (2018) National Ocean Science Bowl
- Regional Trout Bowl: Science Judge
 - National Ocean Science Bowl: Science Judge
- (2017) CU Boulder Research Sampler: Full Day Workshop and Activities for High School Students
- (2017) Diverse Learners Awareness Week Roundtable Discussion Host: “Accessibility and Field Trips in STEM”

Long-Term Programs

- (2016 - 2017) Letters to a Pre-Scientist Pen Pal Program
- (2014 - 2015) Expand Your Horizons Fair Planning Committee

Service **Peer Reviewer**

Journal of the American Water Resources Association
Ecohydrology

Committees

- (2018 – present) CU Boulder Hydrologic Sciences Steering Committee
 - Committee Member and Representative from Geological Sciences
- (2018 – present) CU Boulder Dept. of Geological Sciences Department Action Team
 - Committee Member
- (2016 – present) CU Boulder Dept. of Geological Sciences Colloquium Committee
 - TIPS Trained Bartender and Social Hour Designee (2018 – Present)
 - Committee Lead and Faculty Liaison (2016 – 2018)
- (2016 – 2018) CU Boulder Dept. of Geological Sciences Social Planning Committee
 - Budget Coordinator (2016 – 2018)
 - Committee Lead (2017 – 2018)

One-Time Events

- (2018, 2017) Accessibility and Inclusion Training for New Teaching Assistants, Organizer and Facilitator
- (2018) Panelist for Professional and Educational Developers (PED) Learning Community at CU Boulder
- (2018) Advisory Board Graduate Student Poster Session Organizer
- (2017) Geological Society of American Annual Fall Meeting Student Volunteer

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)
 - Geoscience Education Research Division (2016 – present)
- Association for Women Geoscientists (2016 – present)
- Colorado Groundwater Association (2018 – present)
- Society of Wetland Scientists (2018 – present)

Appointment History

University of Colorado Boulder

- (2019) Research Assistant with ASSETT: Arts & Sciences Support of Education Through Technology
- (2018) RESESS (Research Experiences in Solid Earth Sciences for Students) Graduate Fellow
- (2016 – 2018) Teaching Assistant
- (2015 – 2018) NDSEG Fellow

Los Alamos National Laboratory

- (2014 – 2015) Systems Engineer
- (2013) Materials Science Research Assistant

Carleton College

- (2011 – 2014) Resident Assistant