

KATHARINE C. KELSEY

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ASSISTANT PROFESSOR

DEPARTMENT OF GEOGRAPHY & ENVIRONMENTAL SCIENCE

UNIVERSITY OF COLORADO DENVER; 1200 LARIMER STREET, DENVER, CO 80204

APPOINTMENTS

- 2019 – present **Dept. of Geography and Environmental Science**, Asst Professor, CU Denver
2015 – 2019 **Dept. of Biological Sciences**, Postdoctoral Fellow, UA Anchorage
2011 – 2015 **Terrestrial Biogeochemistry Lab**, Graduate Research Assistant, CU Boulder
2008 – 2011 **US Geological Survey**, Physical Science Technician, Boulder, CO

EDUCATION

- 2015 **PhD**, University of Colorado, Boulder; *Environmental Studies - Biogeoscience*
2011 **MS**, University of Colorado, Boulder; *Geology*
2007 **BS**, University of Puget Sound; *Geology*

PUBLICATIONS

- 2021** **Kelsey, K. C.**, Pedersen, S. H., Leffler, A. J., Sexton, J. O., Feng, M., Welker J. M., Winter snow and spring temperature have differential effects on vegetation phenology and productivity across Arctic plant communities, *Global Change Biology*, doi: 10.1111/gcb.15505.
- 2021** Ballantyne, A. P., Liu, Zhihua, Anderegg, W. R. L., Yu, Z., Stoy, P., Poulter, B. Vanderwall, J., Watts, J., **Kelsey, K. C.**, Neff, J. C., Reconciling carbon-cycle processes from ecosystem to global scales, *Frontiers in Ecology and the Environment*.
- 2020** Chin A., Simon G. L., Anthamatten, P., **Kelsey, K. C.**, Crawford, B. R., Weaver A. J., Pandemics and the future of human-landscape interactions Anthropocene, *Anthropocene*.
- 2020** Choi R. T., Beard K. H., **Kelsey, K. C.**, Leffler, A. J., Schmutz J. A., Welker J. M., Early Goose Arrival Increases Soil Nitrogen Availability More Than an Advancing Spring in Coastal Western Alaska, *Ecosystems*, 10.1007/s10021-019-00472-9.
- 2019** Beard K. H., **Kelsey, K. C.**, Leffler, Welker J. M., The Missing Angle: Ecosystem Consequences of Phenological Mismatch, *Trends in Ecology and Evolution*, 34(10):885-888.
- 2019** Leffler, A. J., Beard K. H., **Kelsey, K. C.**, Choi R. T., Schmutz J. A., Welker J. M., Cloud cover and delayed herbivory relative to timing of spring onset interact to dampen climate change impacts on net ecosystem exchange in a coastal Alaskan wetland, *Environmental Research Letters*, 14(8).
- 2019** Choi R. T., Beard K. H., Leffler, A. J., **Kelsey, K. C.**, Schmutz J. A., Welker J. M., Phenological mismatch between season advancement and migration timing alters Arctic plant traits, *Journal of Ecology*, 107(5):2503-2518.

- 2019 Beard K. H., Choi R. T., Leffler, A. J., Carlson, L. G., **Kelsey, K. C.**, Schmutz J. A., Welker J. M., Migratory goose arrival time plays a larger role in influencing forage quality than advancing springs in an Arctic coastal wetland, *PLoS ONE*, 14(3).
- 2018 **Kelsey, K. C.**, Leffler, A. J., Beard K. H., Choi R. T., Schmutz J. A., Welker J. M., Phenological mismatch in coastal western Alaska may increase summer season greenhouse gas uptake, *Environmental Research Letters*, 13(4).
- 2018 Leffler, A. J., Beard, K. H., **Kelsey, K. C.**, Choi, R.T., Schmutz J. A., Welker J. M., Delayed herbivory by migratory geese increases summer-long CO₂ uptake in coastal western Alaska, *Global Change Biology*; DOI: 10.1111/gcb.14473
- 2018 Redmond, M. D* and **Kelsey, K. C.*** (*equal contribution), Topography and overstory mortality interact to control tree regeneration in spruce-fir forests of the southern Rocky Mountains, *Forest Ecology and Management*, 427: 106-133.
- 2017 **Kelsey, K. C.**, Redmond, M. D., Barger N. N., Neff, J. C., Species, Climate and Landscape Physiography Drive Variable Growth Trends in Subalpine Forests, *Ecosystems* 21(1): 125-140.
- 2017 Redmond, M.D., **Kelsey, K.C.**, Urza, A. K., Barger, N.N., Variation in piñon growth responses to climate across an abiotic stress gradient, *Ecosphere*, 8(3).
- 2017 Lu, X., **Kelsey, K. C.**, Yan, Y., Sun, J., Wang, X., Cheng G., Neff J., Effects of grazing on ecosystem structure and function of alpine grasslands in the Qinghai-Tibetan Plateau, *Ecosphere*, 8(1).
- 2016 **Kelsey, K. C.**, Leffler, A. J., Beard K. H., Schmutz J. A., Choi R. T., Welker J. M., Interactions among vegetation, climate, and herbivory control greenhouse gas fluxes in a subarctic coastal wetland, *JGR – Biogeosciences*, 128(12): 2960 – 2975.
- 2016 Dilling, L., **Kelsey, K.C.**, Fernandez, D.P., Huang, Y.D., Milford, J.B., Neff, J.C., Managing carbon on federal public lands: Opportunities and challenges in southwestern Colorado, *Environmental Management*, 58(2): 283-296.
- 2014 **Kelsey, K.C.**, Barnes, K. L., Ryan, M.G., Neff, J.C., Short and long-term carbon balance of bioenergy electricity production fueled by forest treatments, *Carbon Balance and Management*, 9(6).
- 2014 **Kelsey, K.C.**, Neff, J.C., Improving Regional Estimates of Aboveground Biomass from Texture Analysis of Landsat Imagery, *Remote Sensing*, 6(7): 6407-6422.
- 2012 **Kelsey, K.C.**, Wickland, K.P., Striegl, R.G., Neff, J.C., Variation in Soil Carbon Dioxide Efflux at Two Spatial Scales in a Topographically Complex Boreal Forest; *Arctic, Antarctic and Alpine Research*, 44(4): 457-468.

TEACHING AND PEDAGOGY

CERTIFICATE IN COLLEGE TEACHING, Graduate Teacher Program, CU Boulder, Spring 2015

COURSES TAUGHT

CU Denver

Landscape Biogeochemistry

Introduction to Environmental Science
Climate Change: Causes, Impacts and Solutions

University of Alaska Anchorage

Introductory Biology, UA Anchorage

Exploration Ecology, UA Anchorage (Co-Instructor)

PROMOTING STUDENTS FROM UNDER-REPRESENTED BACKGROUNDS

Instructor - Alaska Native Science and Engineering Program (ANSEP)

Science Communication and Storytelling workshop (June - July 2018)

Introductory Biology (Summer 2017)

Mentor for Students from Underrepresented Backgrounds; Experience in Solid Earth Science for Students (RESESS), Funded by NSF, 3 students mentored; 2012 - 2014

Creator and Instructor - Inclusivity in Science Instruction; taught in partnership with Univ. of Alaska's Center for Advancing Faculty Development, Feb 26 & Mar 25, 2016.

Diversity in the College Classroom: Teaching the STEM Undergraduate (18 hr course), Center for the Integration of Research, Teaching and Learning, Fall 2015

PEDAGOGICAL MATERIALS DEVELOPED

Teaching Case Study, *Carbon Balance of Forest Thinning and Bioenergy Production*, Kelsey, K. C., National Center for Case Study Teaching in Science, University at Buffalo, State University of New York, Published May 2015

Contribution Article, "Transforming Graduate Training in STEM Education," Love Stowell, S.M., Churchill, A.C., Hund, A.K., **Kelsey, K.C.**, Redmond, M.D., Seiter, S.A., Barger, N.N; *Bulletin of the Ecological Society of America*, 2015; Vol. 96, No. 2, pp. 317-323

SCHOLARSHIP OF TEACHING AND LEARNING

Principle Investigator, *Exploring the use of reflective questions to enhance student metacognition and concept mastery in Environmental Studies*, CU Boulder, Spring 2014

Invited Instructor, *Making Metacognition Mainstream*, Teaching Institute for Graduate Education Research, University of Colorado; February 24, 2015

Invited Facilitator, *Transforming Graduate Training in STEM Education*, Center for the Integration of Research, Teaching and Learning (CIRTL); Sept 9, 2015

OUTREACH & SCIENCE WORKFORCE DEVELOPMENT

American Geophysical Union (AGU) - Voices for Science Program and training, Washington DC: April 13 - 14, 2018

Science Communication Workshop, NSF Office of Polar Programs - PolarICE, Oregon Museum of Science and Industry, Portland OR; Feb 11, 2018

Keynote Speaker; Univ of Alaska Anchorage STEM Day, Oct 6, 2018

Organizer and Speaker; Science Salon -Science Storytelling Event; March 26, 2018

Speaker, Coffee With a Scientist, Alaska Public Lands; June 24, 2017

Organizer & Presenter, University of Alaska Anchorage STEM Expo, April 1, 2017

Organizer, Panel Discussion Careers in the Sciences, Univ Alaska Anchorage, Feb 23, 2017

Organizer, Panel Discussion, Applying to Graduate School in the Sciences, Univ of Alaska Anchorage, November 18, 2016

Elementary school outreach; Alaska Commission on Higher Education, Oct 21 & Nov 16, 2016

Coordinator, UAA Biological Sciences Summer Book Club, Summer 2016

*Creator and instructor: **Science Now!** Anchorage Museum; 6-week class series introducing middle school students from diverse backgrounds to the scientific process and STEM careers; March - May, 2016*

STEM Night; Susitna Elementary School, March 10, 2016

ACADEMIC SERVICES

Invited Reviewer: *Global Change Biology, Biogeography, Journal of Ecology, Ecosphere, NSF Macrosystems Adhoc Reviewer, Journal of Geophysical Research – Biogeosciences; Remote Sensing; Environmental Science & Technology; Forest Ecology and Management; Journal of Photogrammetry and Remote Sensing; Cold Regions Science & Technology; Soil Biology and Biochemistry; Ecology and Evolution; Information; PlosOne*

University of Alaska Anchorage; Postdoc Association, Founding member

Member, *American Geophysical Union, 2007-present; Ecological Society of America, 2017-present*

GRANTS AND AWARDS

Principle investigator; Funded: CU Denver Office of Research Services New Faculty Grant; *Colder growing conditions in a warmer world? Effects of altered snowpack properties on alpine plant growth.* \$21,000

Co-investigator; Funded: CU Denver Office of Research Services Large Grant; *Altered phenology: how do cities affect vegetation growing season length and timing?* \$25,000

Selected Advocate; **American Geophysical Union (AGU) – Voices for Science Program,** April 2018 - April 2019.

Center for Advancing Faculty Excellence; Award for exemplary work on behalf of faculty development, Univ. of Alaska Anchorage, April 7, 2017

NSF EPSCoR Travel Grant, Western Alaska Interdisciplinary Science Conference, Unalaska, Alaska, 2017

Student Travel Grant, Graduate Climate Conference, 2014

Graduate Travel Grant, U-Colorado Boulder, Geological Sciences, 2011

Summer Field Internship Program Awardee; National Association of Geoscience Teachers/US Geological Survey; 2008

Trustee's Scholar, Four-year Merit-Based Scholarship, University of Puget Sound, 2003-2007

NASA Summer Research Scholar, Summer 2006

Norman R. Anderson Award, University of Puget Sound Geology Dept., May 2007

Certificate of Merit, USDA Forest Service, Pacific Southwest Research Station, August 2005

SELECTED PROFESSIONAL PRESENTATIONS

*denotes invited presentation

- 2020 **Kelsey, K. C.,** Pedersen, S. H., Leffler, A. J., Sexton, J. O., Feng, M., Welker J. M., Winter and spring drivers of phenology are consistent but drivers of productivity differ among vegetation types in northern Alaska, *Ecological Society of America*, Remote – schedule for Salt Lake City, Utah, Aug 4-8, 2020. Oral Presentation.
- 2019 **Kelsey, K. C.,** AGU.
- 2018 **Kelsey, K. C.,** Using Daily NDVI to Understand Climate-Induced Changes in Vegetation Phenology During Critical Time Periods for Caribou Foraging in Northern Alaska, *University of the Arctic, Arctic Congress*, Oulu Finland, Sept 4, 2018. Oral Presentation.
- 2017 * **Kelsey, K. C.,** Ecological and Biogeochemical Effects of Climate Change, Herbivory and Land Management, *Invited Seminar; Department of Natural Resource Management, South Dakota State University*, Brookings, SD Nov 17, 2017. Oral Presentation.
- 2017 **Kelsey, K. C.,** Leffler, A. J., Beard, K. H., Schmutz, J., Choi, R. T., Welker, J. M., Climate Driven Changes in Phenology and Grazing Alter Greenhouse Gas Emissions from Alaskan Coastal Tundra, *Ecological Society of America Annual Meeting*, Portland, OR Aug 7-11, 2017. Oral Presentation.
- 2017 **Kelsey, K. C.,** Leffler, A. J., Beard, K. H., Schmutz, J., Choi, R. T., Welker, J. M., Effects of Phenological Changes in Herbivore-Vegetation Interactions in Alaskan Coastal Tundra, *Western Alaska Interdisciplinary Science Conference*, April 26 – April 29, 2017, Unalaska, Alaska. Oral Presentation.
- 2017 * **Kelsey, K. C.,** Dilling, L., Fernandez, D.P., Huang, Y.D., Milford, J.B., Neff, J.C., Managing carbon on federal public lands: Opportunities and challenges in southwestern Colorado, *2017 Forest Vegetation Simulator e-Conference*, Ft. Collins CO, Feb 28 – March 2, 2017. Oral Presentation.
- 2016 **Kelsey, K. C.,** Leffler, A. J., Beard, K. H., Lynøe, R.T., Choi, R. T., Welker, J. M., Greenhouse gas (CO₂, CH₄ & N₂O) feedbacks are regulated by phonological changes in herbivore-vegetation interactions in Alaskan coastal tundra, *American Geophysical Union Fall Meeting*, San Francisco, CA Dec 12-16, 2016. Poster Presentation.
- 2015 **Kelsey, K. C.,** Leffler, A. J., Beard, K. H., Choi, R. T., Welker, J. M., Sub-arctic Wetland Greenhouse Gas (CO₂, CH₄ & N₂O) Emissions are Driven by Interactions of Environmental Controls and Herbivore Grazers, *American Geophysical Union Fall Meeting*, San Francisco, CA Dec 14-18, 2015. Oral Presentation.
- 2015 **Kelsey, K. C.,** Barger, N. N., Dilling, L., Fernandez, D. P., Milford, J.B., Redmond, M. D., Neff, J. C., Managing Forest Carbon on Public Lands Under a Changing Climate, *5th Annual North American Carbon Program Investigators Meeting*, Washington DC, Jan 26-29, 2015. Poster Presentation.
- 2014 **Kelsey, K. C.,** Barger, N. N., Neff, J. C., Interacting Effects of Climate and Regional Landscape Physiography on High Elevation Forest Growth, *American Geophysical Union Fall Meeting*, San Francisco, CA Dec 15-19, 2014. Poster Presentation.

- 2014 *** **Kelsey, K. C.,** Improving Estimates of Aboveground Forest Biomass Using Texture Analysis of Landsat Imagery: Applications within San Juan National Forest. *Invited Seminar Presentation, US Geological Survey, Geosciences and Environmental Change Center, Denver, CO May 28, 2014.*
- 2013** **Kelsey, K.C., Neff, J.C.,** Creating a Multi-Proxy Based Estimate of Regional Carbon Stocks from Ground-Based Biomass Measurements and Remotely Sensed Imagery. *American Geophysical Union Annual Conference, December 9-13, 2013, San Francisco, CA. Oral Presentation.*
- 2013** **Kelsey, K.C., Fernandez, D., Neff, J.C.,** Mapping Forest Carbon Stocks and Quantifying Carbon Stock Uncertainty in San Juan National Forest, *4th Annual North American Carbon Program Investigators Meeting, February 4-7, 2013,*
- 2011** **Kelsey, K.C., Wickland, K.P., Striegl, R.G., Neff, J.C.,** Spatial variability in soil CO₂ production and CO₂ efflux from a topographically complex mature black spruce forest, interior Alaska. *American Geophysical Union Annual Conference, Dec 5-9, 2011, San Francisco, CA. Poster Presentation.*
- 2011** **Kelsey, K.C., Wickland, K.P., Striegl, R.G., Neff, J.C.,** How does complex topography affect soil respiration in boreal forests? *41st International Arctic Workshop, March 2-4, 2011, Montreal, Canada. Oral presentation.*
- 2010** **Kelsey, K.C., Wickland, K.P., Striegl R., Neff, J.C.,** The effects of small and large scale landscape heterogeneity on soil CO₂ production and efflux from a mature black spruce forest. *American Geophysical Union Annual Conference December 13-17, 2011, San Francisco, CA. Poster Presentation.*
- 2010** **Kelsey, K.C., Wickland, K.P.,** Topographic controls on soil respiration and methane flux in a boreal forest watershed, *40th International Arctic Workshop, March 10-12, 2010, Winter Park, CO. Poster Presentation.*
- 2007** **Kelsey, K.C., Horton, T.,** Source and fate of metals in two catchments of the Upper Columbia River Basin, Stevens County, WA, *Geological Society of America, Spring Cordillera Meeting, May 4-6, 2007, Bellingham, WA. Poster Presentation.*