# Katherine Ruth Barnhart

(e) katherine.barnhart@colorado.edu
(e) kbarnhart@asc.penn.edu
(w) http://instaar.colorado.edu/people/katy-barnhart/

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## education

**University of Colorado at Boulder**, Boulder, Colorado (Fall 2008-August 2015)

*PhD Geological Sciences,* August 2015 (defended May 2015)
Advisor: Robert S. Anderson (started working with RSA in July 2010)
Thesis: Erosion of icy coastlines in the face of changing sea ice

*MS Geological Sciences*, May 2010
Advisor: Kevin H. Mahan
Thesis: Deep crustal xenoliths from the Great Falls Tectonic Zone, Montana: Investigating the timing and mechanisms of high-velocity lower crust formation

**Princeton University**, Princeton, New Jersey

*BSE Civil and Environmental Engineering* (Honors), June 2008
Certificates: Geological Engineering
Advisor: Lincoln S. Hollister
Thesis: Metamorphism of Proterozoic rocks in North Central New Mexico based on quantitative thermobarometry

## employment

William Henrich Distinguished Postdoctoral Fellowship, **Annenberg Public Policy Center**, Philadelphia, Pennsylvania (starting September 2015): Science of science communication

## research interests

Arctic coastal erosion, sea ice change, and climate
Glacial hydrology and proglacial lake development
Arctic and alpine permafrost soil properties and processes
Glacial geomorphology
Remote Sensing and GIS
Numerical modeling of geomorphic processes
Problems in science communication

## awards

W. Taylor Thom Jr. Prize, Princeton Department of Civil Engineering, 2008
Arthur F. Buddington Award, Princeton Department of Geological Sciences, 2008
NSF Graduate Research Fellowship, Honorable Mention, 2010
NASA Earth and Space Science Fellowship-Earth Sciences Graduate Research Fellowship 2012

## membership

American Geophysical Union, Community Surface Dynamics Modeling System, Geological Society of America, Meteorological Society of America, Permafrost Young Researchers Network, United States Permafrost Association, Association for Women Geoscientists

## experience

*Field Efforts*

- Development of a cold-region soil sensor network on Niwot Ridge, Colorado (2014 – present)
- Measuring the motion, subglacial hydrology, and proglacial lake development of the Kennicott Glacier, Alaska (2012 – 2014)
- Monitoring the processes of rapid coastal erosion of the Beaufort Sea coast, Alaska (2011)
- Gauging rivers and fjord oceanography to develop novel methods of river discharge estimation, South West Greenland (2011)
- Field mapping of structural geology and petrology, Southwestern Montana (2008-2010)
- Structural geology and petrology, Northern New Mexico (2007-2009)

*Major research projects*

- Constraining the impact of orbital variations on slope-aspect dependent insolation and hillslope processes
- Sea ice change in CESM-LE ensemble of climate models
- Pro-glacial lake and outlet stream dynamics of the Kennicott glacier
- Whole-Arctic sea ice change and its implications for coastal regions
- Modeling the process of ice-rich permafrost coastal erosion
- Applied satellite-based observations of ground temperature to subsurface permafrost development
- Petrology, structural geology, and monazite geochronology of Proterozoic rocks of southwestern Montana
- Petrology and mictrostructure of Proterozoic rocks of Northern New Mexico

## technical skills

- Scientific computing: Python, MATLAB, bash shell scripting
- Creative design: Adobe Illustrator and Photoshop
- Geographic Information Systems: ArcGIS, Grass Open Source GIS
- Citation management: Papers, Mendeley, web-based citation managers
- Document preparation: Microsoft Office Suite, LaTeX
- Database management: MySQL and MySQL Workbench

## invited talks

CSDMS Annual Meeting (Invited Student Speaker) March 2013: Melting Coasts and Toppled Blocks: Modeling Coastal Erosion in Ice-Rich Permafrost Bluffs, Beaufort Sea, Alaska

## community service

Serves on the Geological Society of America membership committee (2015-present, 3 year term)
Convened session "Thermal Control on Weathering, Erosion and Landscape Evolution" at AGU 2012 with R. S. Anderson, B. T. Crosby, and T. Barnhart
Convened session "Risks from a changing cryosphere" at EGU 2015 with C. Huggel and J.Kargel
Will convene session "Mechanistic underpinnings of damage, disruption, and downslope transport of rock and regolith" at AGU 2015 with J. Marshall, T.C. Hales, and G. Stock.

## small grants

Alaska Geological Society Graduate Research Grant (2012): Permafrost in Alaska $1000
CU Boulder Department of Geological Sciences (2012): Alpine Permafrost Dataloggers, $1750
American Alpine Club (2012): Alpine Permafrost Dataloggers, $250
GSA Graduate Student Grant (2009): Monazite Geochronology of Xenoliths from within the Great Falls Tectonic Zone, $2,000.

## publications

***Barnhart, K. R***., C. Miller, I. Overeem, and J. E. Kay, Mapping the future expansion of Arctic open water, in review (July 2015)

Mahon, R. C., J. B. Shaw, ***K. R. Barnhart***, D. E. J. Hobley, and B. McElroy (2015), Quantifying the stratigraphic completeness of delta shoreline trajectories. J. Geophys. Res. Earth Surf., 120, 799–817. doi: 10.1002/2014JF003298.

***Barnhart, K. R***., R. S. Anderson, I. Overeem, C. Wobus, G. D. Clow, and F. E. Urban (2014), Modeling erosion of ice-rich permafrost bluffs along the Alaskan Beaufort Sea coast, J. Geophys. Res. Earth Surf., 119, doi:10.1002/2013JF002845.

***Barnhart, K. R.,*** Overeem, I., and Anderson, R. S. (2014), The effect of changing sea ice on the physical vulnerability of Arctic coasts, The Cryosphere, 8, 1777-1799, doi:10.5194/tc-8-1777-2014.

***Barnhart, K.,*** Mahan, K., Blackburn, T., Bowring, S., Dudas, F., (2012) Deep crustal xenoliths from central Montana: Implications for the timing and mechanisms of high-velocity lower crust formation, Geosphere. doi. 10.1130/GES00765.1.

***Barnhart, K.***, Walsh, P., Hollister, L., Daniel, C., Andronicos, C. (2012) Decompression during late Proterozoic "triple point" metamorphism at Cerro Colorado, New Mexico. Journal of Geology, Vol. 120, No. 4, pp. 385-404.

Blackburn, T., Bowring, S., Perron, T., Mahan, K., Dudas F., ***Barnhart, K.,*** (2012) A thermal and exhumation history of continents at billion year time-scales. Science v. 335, p. 73-76.

## conference abstracts

***Barnhart, K., R***., Anderson, R.S. Linking subsurface temperature and hillslope processes through geologic time. 2015 EGU General Assembly in Vienna, Austria.

***Barnhart, K., R***., Overeem, I., Kay, J.E., and Anderson R. S., Sea ice, erosion, and vulnerability of Arctic coasts. 2015 EGU General Assembly in Vienna, Austria.

***Barnhart, K.R***., Length of the open water season along the Arctic coast using the CESM Large Ensemble. CESM Polar Climate Working Group Meeting, Boulder, Colorado, 2015.

***Barnhart, K., R***., Anderson, R.S. Chilly Hilly: coupling models of landscape evolution and subsurface thermal processes. 2014 AGU Annual Meeting in San Francisco, CA

Anderson, S.P., ***Barnhart, K.R.,*** Kelly, P.K., Foster, M.A., Langston, A.L. Using Opposing Slope Aspects to Understand Water and Energy Flow Controls on Critical Zone Architecture. 2014 AGU Annual Meeting in San Francisco, CA

Mahon, R. C., Shaw, J., ***Barnhart, K., R.***, Hobely, D. E. J., McElroy, B. Quantifying the completeness of shoreline trajectories in the stratigraphic record. 2014 GSA Annual Meeting in Vancouver, British Columbia

***Barnhart K.***, Anderson, R., Overeem, I. Influence of the sea-ice edge on the Arctic nearshore environment. AGU Fall meeting 2013

Barnhart, S., Coq, R. N., R Frederic, R., DeRiel, E., Camara, H., ***Barnhart, K. R***. Advancing Research Methods to Detect Impact of Climate Change on Health in Grand'Anse, Haiti. AGU Fall Meeting 2013

***Barnhart K.***, Anderson, R., Overeem, I., Wobus, C., Clow, G., Urban., F., Stanton, T., LeWinter, A. (2011) Relationship between environmental conditions and rates of coastal erosion in Arctic Alaska. AGU

Armstrong, W.H., ***Barnhart, K. R.***, Anderson, R. S., Rajaram, H. Variations in melt inputs and basal sliding velocity on the Kennicott Glacier, Alaska, USA AGU Fall Meeting 2012

***Barnhart K.***, Anderson, R., Overeem, I., Wobus, C., Clow, G., Urban., F., Stanton, T., LeWinter, A. (2011) Modeling the rate and style of Arctic coastal retreat along the Beaufort Sea, Alaska. CSDMS

***Barnhart K.***, Anderson, R., Overeem, I., Wobus, C., Clow, G., Urban., F., Stanton, T., LeWinter, A. (2011) Modeling the rate and style of Arctic coastal retreat along the Beaufort Sea, Alaska. AGU

***Barnhart, K***., Walsh, P., Hollister, L., Daniel, C., Andronicos, C. (2010) Inverted metamorphism and decompression in the southern Tusas mountains, New Mexico. GSA.

***Barnhart, K***., Mahan, K., Blackburn, T., Bowring, S., Dudas, F. (2010) Xenoliths from High Velocity Lower Crust, Montana: Constraints on the timing and mechanisms of high velocity lower crust formation. GSA.

***Barnhart K.***, Anderson, R., Overeem, I., Wobus, C., Clow, G. (2010) Exploring the controls on permafrost coastal bluff retreat rate, North Slope, Alaska. CSDMS

***Barnhart K***, Anderson, R., Overeem, I., Wobus, C., Clow, G., Urban, F., Stanton, T. (2010). Modeling the rate and style of Arctic coastal retreat along the Beaufort Sea, Alaska. AGU

Mahan, K*.,* ***Barnhart, K.***, Schulte-Pelkum, V., Blackburn, T., Bowring, S.A., Dudas, F.O. (2010) High seismic velocity (7.x) lower crustal layers in cratonic North America: a view from xenoliths and EarthScope seismic data. AGU

***Barnhart, K.***, Mahan, K., Blackburn, T., Bowring, S. (2009) Deep Crustal Xenoliths From The Great Falls Tectonic Zone, Montana. GSA.