

## SARAH E. CRUMP

Institute of Arctic and Alpine Research (INSTAAR) & Geological Sciences  
University of Colorado Boulder (CU Boulder)  
[sarah.crump@colorado.edu](mailto:sarah.crump@colorado.edu)

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### EDUCATION

2013–2019 | PhD in Geological Sciences, University of Colorado Boulder

Advisor: Gifford Miller

Thesis: *Deconvolving climatic and non-climatic controls on Holocene glacier and ecological change on Baffin Island, Arctic Canada*

2006–2010 | Bachelor of Arts, Carleton College (Northfield, MN)

Major: Geology; Concentration: Environmental Studies

GPA: 3.84 (*Magna cum Laude*)

### RESEARCH APPOINTMENTS

2019–present | Postdoctoral Research Associate, INSTAAR, CU Boulder

2016–present | Visiting researcher, Trace and Environmental DNA Lab, Curtin University

2014–2019 | Graduate Research Assistant, INSTAAR, CU Boulder

2016–2017 | Graduate Research Assistant, Center for the Study of Origins, CU Boulder

2013 | Paleolimnology laboratory assistant, INSTAAR, CU Boulder

2012 | Paleoclimate modeling intern, PaleoResearch Institute, Golden, CO

2008, 2009 | Undergraduate research assistant, Pacific Northwest Paleomagnetism Laboratory, Western Washington University

### PUBLICATIONS

#### *In Preparation*

**Crump, S.E.**, Miller, G.H., Young, N.E., Briner, J.P., and Pendleton, S.L., *in prep*, Cirque glaciers and ice caps on Baffin Island responded synchronously to Early Holocene cold reversals: *to be submitted to Quaternary Science Reviews*.

**Crump, S.E.**, Miller, G.H., Florian, C.R., de Wet, G., Harning, D., and Pendleton, S.L., *in prep*, Failure of the "Modern" in a transient world: Quaternary science in an era of disequilibrium: *to be submitted to Quaternary Science Reviews*.

#### *In Review or in revision*

**Crump, S.E.**, Miller, G.H., Power, M., Sepúlveda, J., Dildar, N., Coghlan, M., and Bunce, M., *in review*, Arctic shrub colonization lagged peak postglacial warmth: Molecular evidence in lake sediment from Arctic Canada: *Global Change Biology*.

Young, N.E., Briner, J.P., Miller, G.H., **Crump, S.E.**, Lesnek, A.J., Thomas, E.K., Pendleton, S.L., Zimmerman, S., Caffee, M., Lamp, J., and Schaefer, J.M., *in review*, Arctic deglaciation interrupted by abrupt coolings: *Science Advances*.

Larsen, D.J., **Crump, S.E.**, Abbott, M.B., Harbert, W., Blumm, A., Wattrus, N.J., and Hebbeger, J.J., *in*

*review*, Paleoseismic evidence for climatic and magmatic controls on Teton fault, WY: *PNAS*.

Florian, C.R., **Crump, S.E.**, Geirsdóttir, Á., Miller, G.H., Zalzal, K., Fogel, M., *in revision*, Catchment geometry influences proxy response in late Holocene records from two proximal lakes located in north Iceland: *Journal of Paleolimnology*.

### **Peer-reviewed Publications**

Pendleton, S.L., Miller, G.H., Lifton, N., Lehman, S.J., Southon, J., **Crump, S.E.**, Anderson, R.S., 2019, Rapidly receding Arctic Canada glaciers revealing landscapes continuously ice-covered for more than 40,000 years: *Nature Communications*. DOI:10.1038/s41467-019-08307-w

Anderson, R.S., Anderson, L.S., Armstrong, W.H., Rossi, M.W., **Crump, S.E.**, 2018, Glaciation of alpine valleys: the glacier–debris-covered glacier–rock glacier continuum: *Geomorphology*, v. 311, p. 127–142. DOI:10.1016/j.geomorph.2018.03.015

**Crump, S.E.**, Anderson, L. S., Miller, G. H. and Anderson, R. S., 2017, Interpreting exposure ages from ice-cored moraines: a Neoglacial case study on Baffin Island, Arctic Canada: *Journal of Quaternary Science*, v. 32, p. 1049–1062. DOI:10.1002/jqs.2979

Pendleton, S.L., Miller, G.H., Anderson, R.S., **Crump, S.E.**, 2017, Episodic Neoglacial expansion and rapid 20<sup>th</sup> century retreat of a small ice cap on Baffin Island, Arctic Canada, and modeled temperature change: *Climate of the Past*, v. 13, p. 1527–1537. DOI:10.5194/cp-13-1527-2017

Titus, S.J., **Crump, S.**, McGuire, Z., Horsman, E., and Housen, B., 2011, Using vertical axis rotations to characterize off-fault deformation across the San Andreas fault system, central California: *Geology*, v. 39, p. 711–714. DOI:10.1130/G31802.1

### **HONORS & FELLOWSHIPS**

2020–2022 | NSF EAR Postdoctoral Fellow (co-funded by BIO; *start date*: June 2020, UC Santa Cruz)

2014–2018 | NSF Graduate Research Fellow

2017 | J. Hoover Mackin Award, Quaternary Geology & Geomorphology, Geological Society of America

2014–2015 | Geological Sciences Departmental Fellowship, CU Boulder

2013 | Dean’s Fellowship, CU Boulder

2010 | Phi Beta Kappa, Carleton College chapter

2010 | Distinction in Major, Carleton College

2010 | Distinction in Senior Integrative Exercise, Carleton College Geology Department

2010 | Jefferson Natural Sciences Teaching Award, Carleton College

2009–2010 | Duncan Stewart Fellow, Carleton College Geology Department

2009 | Patricia V. Damon Scholar, Carleton College

### **RESEARCH GRANTS**

2018 | CU Nature, Environment, Science & Technology Studio for the Arts grant (\$2,500)

2017 | NSF Arctic System Science grant #1737712 (proposal contributor and named Postdoc; \$2,290,769 total budget)

2017 | National Geographic Society Early Career Grant (\$5,000)

2017 | Charles A. & June R.P. Ross Research Fund, Geological Society of America (\$3,643)

2016 | NSF Geography & Spatial Sciences Doctoral Dissertation Research Improvement grant (\$15,999)

2016 | NSF GRFP Graduate Research Opportunities Worldwide – Australia (\$5,000 + \$12,000AUD)

2015 | Dean's Graduate Student Research Grant, University of Colorado (\$9,995)

2015, 2016 | Spetzler Research Grant, CU Geological Sciences (\$4,000)

2015 | Geological Society of America graduate student grant (\$1,875)

2014, 2017 | Beverly Sears Student Research Grant, University of Colorado (\$2,000)

2014 | Arctic Institute of North America Grant-in-Aid (\$1,000)

2014 | Sigma Xi Grant-in-Aid of Research (\$1,000)

2013 | Mentorship Grant, CU Geological Sciences (\$1,000)

## **TEACHING EXPERIENCE**

2014–2017 | Tutor, Geology tutoring room, CU Boulder

2013–2014 | Course Instructor, Introduction to Geology (GEOL 1030), CU Boulder

Summer 2014, 2015 | Field Geology Instructor, CU Science Discovery Summer Camp

2010–2011 | Naturalist Instructor, Widjiwagan Outdoor Learning Program, Ely, MN

Fall 2009 | Teaching Assistant, Plate Tectonics, Carleton College

Spring 2009 | Teaching Assistant, Geology in the Field, Carleton College

Spring 2008 | Teaching Assistant, Introduction to Geology, Carleton College

### *Guest Lectures:*

- Greenhouse gases and Earth's Climate (GEOL 1010, CU Boulder), June 2018
- Forests and Climate, Global Change (GEOL 1060, CU Boulder), November 2017
- Ancient DNA in lake sediment, Paleoclimatology (GEOL 4070, CU Boulder), November 2017
- Ozone 101, Global Change (GEOL 1060, CU Boulder), December 2015
- Cosmogenic radionuclide dating lecture and lab, Geomorphology (GEOL 4241, CU Boulder), January 2015

## **UNIVERSITY AND PROFESSIONAL SERVICE**

Fall 2018–present | Graduate student representative, INSTAAR Directorate, CU Boulder

Fall 2017–present | Values & Ethics Committee member, CU Boulder Office of the Chancellor

Fall 2017–present | Student Representative, Geological Society of America (GSA) Quaternary Geology & Geomorphology Division

Fall 2017–present | Student Advisory Committee member, Geological Society of America

October 2018 | GSA Annual Meeting co-chair for session T56: From Alpine Glaciers to Ice Sheets

Fall 2013 | Annual Meeting Student Committee member, Geological Society of America

Reviewer for: *Arctic, Antarctic, and Alpine Research*

## SELECTED OUTREACH ACTIVITIES

2017–present | Social media manager, GSA Quaternary Geology & Geomorphology Division

2016–2018 | President, Women in Science and Engineering (WiSE) group, CU Boulder

December 2018 | Team Leader, AGU Congressional Visits Day, Washington, D.C.

October 2018 | Career Center invited speaker (topic: Student and Early Career Research Grants),  
GSA Annual Meeting

July 2018 | Volunteer, Girls on Rock outdoor science program, Gore Range, Colorado.

April 2018 | Guest instructor, Limnology field camp, Nunavut Arctic College Environmental  
Technology Program, Iqaluit, Baffin Island, Canada

March 2017 | Volunteer scientist, Science Teen Café, CU Science Discovery, Boulder, CO

2015–2016 | Grant committee member, WiSE group, CU Boulder

Spring & Fall 2014 | Volunteer scientist, Earth Explorers 501(c)3 nonprofit, Boulder, CO

2006–2010 | Volunteer and Program Director, Kids for Conservation environmental education  
program, Carleton College

2009–2010 | Volunteer and program director, Northfield Middle School English Language Learner  
STEM tutoring program, Northfield, MN

## SELECTED CONFERENCE ABSTRACTS

**Crump, S.E.**, Montes, Z., and de Saillan, N., 2018, Engaging the public in climate research through multi-media communication efforts: An example from the Canadian Arctic: AGU Fall Meeting, Washington, D.C.

de Wet, G., **Crump, S.E.**, Raberg, J., Bunce, M., Thomas, E., Miller, G.H., and Sepúlveda, J., 2018, Pairing lipid biomarkers and sedimentary ancient DNA to reconstruct paleoenvironmental change in the Arctic – preliminary results from the PACEMAP Project on Baffin Island: AGU Fall Meeting, Washington, D.C.

**Crump, S.E.**, Power, M., Miller, G.H., Sepúlveda, J., Dildar, N., Coghlan, M., and Bunce, M., 2018, Arctic shrub colonization lagged postglacial climatic optimum: Molecular evidence in lake sediment from Baffin Island, Arctic Canada: International Paleolimnology Association–International Association of Limnogeologists Joint Meeting, Stockholm, Sweden.

**Crump, S.E.**, Power, Matthew, Miller, G.H., Sepúlveda, J., Coghlan, Megan, and Bunce, M., 2018, The paleoecological potential of ancient DNA in lake sediment: Preliminary results from Baffin Island: 48th International Arctic Workshop, Boulder, CO.

**Crump, S.E.**, Sepúlveda, J., Bunce, M., de Wet, G.A., Walker, D., Thomas, E., Reynolds, M., Raberg, J., Miller, G.H., 2017, The PACEMAP project – Predicting Arctic Change through Ecosystem MoleculAr Proxies: Arctic Change Meeting, Quebec City, Canada

- Crump, S.E.**, Sepúlveda, J., Bunce, M., and Miller, G.H., 2017, Molecules in the mud: Combining ancient DNA and lipid biomarkers to reconstruct vegetation response to climate variability during the Last Interglacial and the Holocene on Baffin Island, Arctic Canada: AGU Fall Meeting, New Orleans, LA.
- Crump, S.E.** and Larsen, D.J., 2017, Evidence of Younger Dryas glacier activity in the Teton Mountain Range, Wyoming: GSA Annual Meeting, Seattle, WA.
- Crump, S.E.**, Miller, G.H., Young, N.E., Briner, J.P., Pendleton, S.L., 2017, Early Holocene glacier chronologies from Baffin Island, Arctic Canada: 47th International Arctic Workshop, Buffalo, NY.
- Crump, S.E.**, Miller, G.H., Bunce, M., 2016, A Holocene paleoecological record from ancient DNA preserved in lake sediments on Baffin Island, Arctic Canada: AGU Fall Meeting, San Francisco, CA.
- Crump, S.E.** and Larsen, D.J., 2016, Exposure dating of major landslides along the Teton fault, WY: Preliminary results and implications for paleoseismicity: GSA Annual Meeting, Denver, CO.
- Crump, S.E.**, Miller, G.H., Bunce, M., 2016, Envisioning a warmer Arctic: Exploring the use of ancient DNA preserved in interglacial lake sediments on Baffin Island: 46th International Arctic Workshop, Boulder, CO.
- Crump, S.E.**, Florian, C.R., Miller, G.H., Geirsdottir, A., Zalzal, K., 2015, A tale of two lakes: Catchment-specific responses to Late Holocene cooling in northwest Iceland: AGU Fall Meeting, San Francisco, CA.
- Crump, S.E.**, Anderson, L.S., Miller, G.H., and Anderson, R.S., 2015, Interpreting the moraine record of debris-covered glaciers: A Neoglacial case study on Baffin Island, Arctic Canada: 45th International Arctic Workshop, Bergen, Norway.
- Crump, S.E.**, and Miller, G.H., 2014, Constraining the Timing of Neoglaciation: Moraine Exposure Ages from Baffin Island, Arctic Canada: AGU Fall meeting, San Francisco, CA.
- Crump, S.E.**, and Miller, G.M., 2014, Constraining the timing and duration of early Holocene and early Neoglacial advances on Baffin Island, Arctic Canada: 44th International Arctic Workshop, Boulder, CO.
- Crump, S.**, Titus, S.J., McGuire, Z., and Housen, B., 2009, Paleomagnetic data from the Rinconada fault in central California: Evidence for off-fault deformation: AGU Fall meeting, San Francisco, CA.

## **OTHER PUBLICATIONS**

- Crump, S.E.**, 2019, Deconvolving climatic and non-climatic controls on Holocene glacier and ecological change on Baffin Island, Arctic Canada. CU Boulder PhD Thesis. 230 pp.
- Crump, S.E.**, 2018, A Quest for Old, Cold Mud: Sediments from frigid lakes on Baffin Island tell the story of climate change over the past 10,000 years. Scientific American: <https://blogs.scientificamerican.com/observations/a-quest-for-old-cold-mud/>
- Crump, S.E.**, 2010, Paleomagnetic data from the Rinconada fault in central California: Evidence for off-fault deformation. Carleton College Undergraduate Thesis. 49 pp.

## **MEDIA COVERAGE**

February 2019 | [Colorado Arts & Sciences Magazine piece](#) on ancient DNA and other Arctic research

October 2018 | [Colorado Public Radio segment](#) on CU NEST art/science collaborations

September 2018 | [USAPECS Polar Film Festival](#) featuring our Baffin Island field film

April 2018 | [Curtin University piece](#) on Baffin Island ancient DNA research

December 2017 | [Association for Women in Science Magazine](#) feature on CU WiSE leadership

October 2017 | [CU Boulder Today feature](#) on Baffin Island fieldwork

October 2017 | [GlacierHub story](#) on ice-cored moraine research (Crump et al., 2017, JQS)

## **SHORT COURSES, WORKSHOPS, & CERTIFICATIONS**

2019 | CU WiSE SciComm Symposium Writing Workshop

2019 | Paleo to Policy Workshop (UC Davis Bodega Marine Laboratory)

2017 | Communicating Science Conference (ComSciCon) Rocky Mountain West

2016 & 2017 | CU WiSE Science Communication Symposium (organizer & participant)

2014 | Urbino Summer School in Paleoclimatology (Urbino, Italy)

2007–2015 | Wilderness First Responder (Wilderness Medical Institute/NOLS)

2013 | NSF Arctic Field Training (CH2Mhill Polar Services)

2013 | Polar Bears: A Guide to Safety (CH2Mhill Polar Services)

## **PROFESSIONAL ORGANIZATIONS**

American Geophysical Union (2014–present)

Geological Society of America (2014–present)

## **FIELD EXPERIENCE**

2013–2018 | Six field seasons on Baffin Island, Arctic Canada; lake sediment coring, instrumenting lake catchments, moraine boulder sampling for exposure dating, glaciological data collection.

2014–2019 | Seven field campaigns in Grand Teton National Park, WY; lake sediment coring, landslide and moraine boulder sampling for exposure dating.

2007–2009 | Various field trips in MN, WI, MI, and CA; Carleton College.

2007–2010 | Wilderness canoe guide in northern MN and Canada; YMCA Camp Menogyn

## **COMPUTER AND LABORATORY SKILLS**

- Programming languages: Matlab, R, Python
- Adobe Creative Suite (Illustrator, Photoshop)
- Cosmogenic  $^{10}\text{Be}$  sample prep and wet chemistry

- Lake sediment bulk geochemistry, algal pigments, lipid biomarkers, ancient DNA
- Experience with HPLC, mass spectrometry, FTIRS