

## Suzanne Prestrud Anderson

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### Education

Ph.D., Geology, University of California, Berkeley	1995
M.S., Geology, University of Washington	1987
B.S. cum laude, Chemistry, University of Puget Sound, Tacoma, Washington	1979

### Positions held

<i>Professor</i> , Dept. of Geological Sciences, University of Colorado, Boulder	2019-present
<i>Professor</i> , Dept. of Geography, University of Colorado, Boulder	2016-2018
<i>Visiting Professor</i> , Laboratory of HYdrology and GEochemistry of Strasbourg (LHYGES) University of Strasbourg, France	2012
<i>Fellow</i> , Institute of Arctic and Alpine Research (INSTAAR)	2009-present
<i>Associate Professor</i> , Dept. of Geography, University of Colorado at Boulder	2009-2016
<i>Assistant Professor</i> , Dept. of Geography, University of Colorado at Boulder	2004-2009
<i>Research Associate</i> , INSTAAR, University of Colorado at Boulder	2003-2009
<i>Assistant Research Scientist</i> , Institute of Tectonics/CSIDE, UC Santa Cruz	1997-2003
<i>Lecturer</i> , Dept. of Earth Sciences, UC Santa Cruz	1997-1999
<i>NSF Earth Sciences Post-doctoral Fellow</i> , University of Wyoming	1995-1997

### Honors and Awards

<i>GK Gilbert Award in Surface Processes</i> , American Geophysical Union	2020
<i>Fellow</i> , Geological Society of America	2019
<i>Certificate of Recognition</i> , International Association of GeoChemistry (IAGC)	2012
<i>NSF Post-doctoral Fellowship in Earth Sciences</i>	1995-1997
<i>NASA Graduate Student Fellowship in Global Change Research</i>	1991-1994

### Professional Memberships

American Association for the Advancement of Science, American Geophysical Union, Geochemical Society, Geological Society of America, International Association of GeoChemistry, and International Glaciological Society

### Selected Publications (\*student author)

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Wlostowski, AN, Molotch, N, **Anderson, SP**, Brantley, S, Chorover, J, Dralle, D, Kumar, P, Li, L, Lohse, K, Mallard, JM, McIntosh, JC, Murphy, SF, Parrish, E, Safeeq, M, Seyfried, M, Shi, Y, and Harman, C (2020): Signatures of hydrologic function and coevolution across the Critical Zone Observatory Network. *Water Resources Research*. doi:10.1029//2019WR026635

Rossi, MW, Anderson, RS, **Anderson, SP** and Tucker, GE (2020): Orographic controls on sub-daily rainfall statistics and flood frequency in the Colorado Front Range, USA. *Geophysical Research Letters* 47, e2019GL085086, doi: 10.1029/2019GL085086.

**Anderson, SP** (2019): Breaking it down: Mechanical processes in the weathering engine. *Elements* (15): 247-252, doi: 10.2138/gselements.15.4.247.

Anderson, RS, Rajaram, H, and **Anderson, SP** (2019): Climate driven co-evolution of weathering profiles and hillslope topography generates dramatic differences in critical zone architecture. *Hydrological Processes* 33(1): 4-19, doi: 10.1002/hyp.13307.

- Richter, D, Billings, S, Groffman, P, Kelly, E, Lohse, K, McDowell, W, Riebe, C, Silver, W, White, T, **Anderson, SP**, Brantley, S, Brecheisen, Z, Chadwick, O, Hartnett, H, Hobbie, S, Kazanski, C, Markewitz, D, O'Neill, K, Schroeder, P, and Thompson, A (2018): Ideas and perspectives: Strengthening the biogeosciences in environmental research networks. *Biogeosciences* 15, 4815-4832, doi: 10.5194/gb-15-4815-2018.
- Litaor, MI, Suding, K, **Anderson, SP**, Litus, G, and Caine, TN (2018): Alpine catena response to nitrogen deposition and its effects on the aquatic system. *Catena* 170: 108-118, doi: 10.1016/j.catena.2018.06.004.
- \*Von Voigtlander, J, Clark, MK, Zekkos, D, \*Greenwood, WW, **Anderson, SP**, Anderson, RS, and Godt, JW (2018): Strong variation in weathering of layered rock maintains hillslope-scale strength under high precipitation. *Earth Surface Processes and Landforms*, 43: 1183-1194, doi: 10.1002/esp.4290.
- Brantley, SL, McDowell, W, Dietrich, WE, White, TS, Kumar, P, **Anderson, SP**, Chorover, J, Lohse, KA, Bales, R, Richter, D, Grant, G, and Gaillardet, J (2017): Designing a network of Critical Zone Observatories to explore the living skin of the terrestrial Earth. *Earth Surface Dynamics* 5:841-860, doi: 10.5194/esurf-5-841-2017.
- \*Aguirre, A, Derry, LA, \*Mills, TJ, and **Anderson, SP** (2017): Colloidal transport in the Gordon Gulch catchment of the Boulder Creek CZO and its effect on C-Q relationships for silicon. *Water Resour. Res.*, doi: 10.1002/2016WR019730.
- Hinckley, ES, Ebel, BA, Barnes, RT, Murphy, SF, and **Anderson, SP** (2017): Critical zone properties control the fate of nitrogen during experimental rainfall in montane forests of the Colorado Front Range. *Biogeochemistry* 132 (1): 213-231, doi:10.1007/s10533-017-0299-8.
- \*Mills, TJ, **Anderson, SP**, Bern, C, \*Aguirre, A, and Derry, LA (2017): Colloid mobilization and seasonal variability in a semi-arid, headwater stream. *J Environ. Qual.* 46 (1): 88-95, doi:10.2134/jeq2016.07.0268.
- Anderson, SW, **Anderson, SP**, and Anderson, RS (2015): Exhumation by debris flows in the 2013 Colorado Front Range storm, *Geology* 43 (5): 391-394, doi:10.1130/G36507.1. This paper was the subject of a *Geology* Research Focus commentary: McCoy, SW (2015): Infrequent, large-magnitude debris flows are important agents of landscape change, *Geology* 43 (5): 463-464, doi:10.1130/focus052015.1.
- \*Gabor, RS, Eilers, KG, McKnight, DM, Fierer, N, and **Anderson, SP** (2014): From the litter layer to the saprolite: Chemical changes in water-soluble soil organic matter and their correlation to microbial community composition, *Soil Biology and Biochemistry* 68: 166-176, doi:10.1016/j.soilbio.2013.09.029.
- Anderson, SP**, Anderson, RS, Tucker, GE, and Dethier, DP (2013): Critical zone evolution: Climate and exhumation in the Colorado Front Range. In Abbot, LD and Hancock, GS, eds., *Classic Concepts and New Directions: Exploring 125 Years of GSA Discoveries in the Rocky Mountain Region*: Geological Society of America, Field Guide 33, p. 1-18, doi:10.1130/2013.0033(01).
- Anderson, RS, **Anderson, SP**, and Tucker, GE (2013): Rock damage and regolith transport by frost: An example of climate modulation of critical zone geomorphology. *Earth Surface Processes and Landforms* 38: 299-316, doi:10.1002/esp.3330. (Publ. online 18 Oct 2012).
- Anderson, SP**, Anderson, RS, and Tucker, GE (2012): Landscape scale linkages in critical zone evolution. *Comptes rendus- Geoscience* 344: 586-596, doi:10.1016/j.crte.2012.10.008.
- \*Eilers, K, \*\*Debenport, S, **Anderson, SP**, and Fierer, N (2012): Digging deeper to find unique microbial communities: the strong effect of depth on the structure of bacterial and archaeal communities. *Soil Biology & Biochemistry* 50: 58-65, doi:10.1016/j.soilbio.2012.03.011.
- \*Frederick, ZA, **Anderson, SP**, and Striegl, R, (2012): Annual estimates of water and solute export from 42 tributaries to the Yukon River. *Hydrological Processes* 26 (13): 1949-1961, doi: 10.1002/hyp.8255.
- Anderson, SP** (2012): How deep and how steady is the Earth's surface? *Geology*, 40 (9): 863-864, doi:10.1130/focus092012.1.
- \*Befus, K.M., Sheehan, A.F., Leopold, M., **Anderson, S.P.** and Anderson, R.S. (2011): Seismic constraints on critical zone architecture, Boulder Creek watershed, Front Range, Colorado. *Vadose Zone Journal* 10: 915-927, doi: 10.2136/vzj2010.0108.

- \*Riggins, SG, Anderson, RS, **Anderson, SP**, and Tye, AM (2011): Solving a conundrum of a steady-state hillslope with variable soil depths and production rates, Bodmin Moor, UK. *Geomorphology*, 128: 73-84.
- Anderson, RS, and **Anderson, SP** (2010): *Geomorphology: The Mechanics and Chemistry of Landscapes*. Cambridge University Press, 340 pp
- \*Bartholomaeus, TC, Anderson, RS, and **Anderson, SP** (2008) Response of glacier basal motion to transient water storage. *Nature Geoscience*, 1: 33-37. (Published online: 20 December 2007)
- Anderson, SP**, Bales, RC, and Duffy, CJ (2008): Critical Zone Observatories: Building a network to advance interdisciplinary study of Earth surface processes. *Mineralogical Magazine*, 72(1): 7-10, doi:10.1180/minmag.2008.072.1.7.
- Anderson, SP**, von Blanckenburg, F, and White, AF (2007) Physical and chemical controls on the critical zone. *Elements* 3: 315-319.
- Molnar, P.H., Anderson, R.S., and **Anderson, SP** (2007): Tectonics, fracturing of rock, and erosion. *Journal of Geophysical Research-Earth Surface*, 112, F03014, doi:10.1029/2005JF000433, 12 pages.
- Anderson, SP** (2007): Biogeochemistry of glacial landscape systems, *Annual Review of Earth and Planetary Sciences*, Vol. 35: 375-399.
- Nemergut, DR, **Anderson, SP**, Cleveland, CC, Martin, AP, Miller, AE, Seimon, A, and Schmidt, SK (2007): Microbial community succession in an unvegetated, recently-deglaciated soil. *Microbial Ecology*, 53: 110-122 doi: 10.1007/s00248-006-9144-7. Published online 22 Dec 2006.
- \*Loso, MG, Anderson, RS, **Anderson, SP**, and Reimer, PJ (2006): A 1500-year record of temperature and glacial response inferred from varved Iceberg Lake, southcentral Alaska. *Quaternary Research* 66(1): 12-24.
- Anderson, SP**, Dietrich, WE, and Brimhall, GH, Jr. (2002): Weathering profiles, mass balance analysis, and rates of solute loss: Linkages between weathering and erosion in a small, steep catchment, *Geological Society of America Bulletin* 114(9): 1143-1158.
- \*Evans, MJ, Derry, LA, **Anderson, SP**, and France-Lanord, C (2001): A hydrothermal source of radiogenic Sr to Himalayan rivers, *Geology* 29(9): 803-806.
- Anderson, SP**, Drever, JI, Frost, CD, and Holden, P (2000): Chemical weathering in the foreland of a retreating glacier. *Geochimica et Cosmochimica Acta* 64 (7): 1173-1189.
- Anderson, SP**, Dietrich, WE, Montgomery, DR, Torres, R, Conrad, ME, and Loague, K (1997): Subsurface flow paths in a steep, unchanneled catchment. *Water Resources Research* 33 (12): 2637-2653.
- Anderson, SP**, Dietrich, WE, Torres, R, Montgomery, DR, and Loague, K (1997): Concentration-discharge relationships in a steep, unchanneled valley. *Water Resources Research* 33(1): 211-225.
- Anderson, SP** (1988): Upfreezing in sorted circles, western Spitsbergen. In Senneset, K., ed., Permafrost, Fifth International Conf. Proc. v.1: Trondheim, Norway, Tapir Publishers, p. 666-671.
- Hallet, B, and **Prestrud, S** (1986): Dynamics of periglacial sorted circles in western Spitsbergen. *Quaternary Research* 26: 81-99, 10.1016/0033-5894(86)90085-2.

### **In press**

- Anderson, SP**, Kelly, PJ, Hoffman, N, Barnhart, K, Befus, K, and Ouimet, W: Is this steady state? Weathering and critical zone architecture in Gordon Gulch, Colorado Front Range. In *Chemical Weathering and Soil Formation*, AGU Water Resources Monograph, ed. by A.G. Hunt and M. Egli. Accepted 9/7/19.

### **Grant funding**

#### **Active grants**

- NSF-OPP ANS 2001225: Icy landscapes from the Brooks Range to the Beaufort Sea: Quantifying the mobilization, transport and deposition of sediment and carbon in Arctic Alaska. PI: I Overeem, Co-PI: RS Anderson, SP Anderson. \$1,306,498. 9/1/20-8/31/23.

- NSF-EAR-1331828 Boulder Creek CZO II: Evolution, Form, Function, and the Future of the Critical Zone. PI: SP Anderson, Co-PI: RS Anderson, NP Molotch, H Rajaram, GE Tucker. \$4,900,000. 10/1/13-11/30/20. NCE for this and its supplements to 11/30/21.
- NSF-EAR-1929517: Supplement to Boulder Creek CZO II: Evolution, Form, Function, and Future of the Critical Zone. PI: SP Anderson. \$725,000. 9/1/19-11/30/20. (*Maintains BcCZO for 1 year to see completion of student & postdoc projects and maintain field and data infrastructure.*)
- NSF-EAR-1928430: Supplement to Boulder Creek CZO II: Evolution, Form, Function, and Future of the Critical Zone. PI: SP Anderson. \$37,482. (*Supports 1 current graduate student to intern with the USGS for 3 months via the Non-Academic Research Internships for Graduate Students (INTERN) (NSF 18-102) program.*)
- NSF-EAR 1818965: Supplement to Boulder Creek Critical Zone Observatory II: Evolution, Form, Function, and Future of the Critical Zone (*supports National Cross-CZO post-doc, 2<sup>nd</sup> year*). PI: SP Anderson, Co-PI: RS Anderson, NP Molotch, H Rajaram, GE Tucker. \$136,105. 12/1/17-11/30/20.
- NSF-EAR-1822062: Topographic response to the transition from snowmelt- to rainfall-triggered extremes. PI: Matt Rossi, Co-PI: RS Anderson, SP Anderson, GE Tucker. \$404,990. 3/1/18-2/28/20.
- NSF-EAR-1840758: Supplement to Boulder Creek Critical Zone Observatory II: Evolution, Form, Function, and Future of the Critical Zone (*supports graduate students, post-docs, staff, and monitoring*). PI: SP Anderson. \$670,423. 4/1/19-11/30/20.
- JSPS (Japan Society for the Promotion of Science), Ministry of Education, Culture, Sports, Science and Technology (MEXT), Grants-in-aid for Scientific Research (*Kahenhi*): Mechanism of the landslides induced by the 2018 Hokkaido Eastern Iwate Earthquake and methodology of forest rehabilitation. PI: Seiji Yanai (Ishikawa Prefectural University). ¥13,000,000 (\$130,000). 3/1/19-2/28/23. (*SPA is one of 6 team members; supports travel to Japan for collaboration and fieldwork, postponed due to COVID-19.*)

### **Recent non-peer reviewed abstracts (presentations at conferences)**

\*denotes student presenter

AGU = American Geophysical Union, EGU = European Geosciences Union, Goldschmidt = V.M. Goldschmidt Conference, largest annual international geochemistry meeting, GSA = Geological Society of America

#### **2020**

- Janson, J, Sandiford, M, Fujioka, T, Cohen, TJ, Struck, M, Anderson, SP, Anderson, RS and Egholm, DL (2020): Geomorphic imprint of dynamic topography and intraplate tectonism in central Australia. *EGU General Assembly*, 3-8 May 2020, Vienna, Austria.
- Rossi, MW, Tucker, GE, Anderson, SP, and Anderson RS (2020): Simulating thin and patchy soils using an Agent-Based Model of forest dynamics, root growth, and soil production. Abstract, *Fall Meeting, AGU*, San Francisco, CA, 7-11 Dec 2020.
- Salberg, L, Anderson, SP, and Ge, Shemin (2020): Modeling groundwater-surface water interactions in a semi-arid, montane environment, Gordon Gulch, Colorado. Abstract, *Fall Meeting, AGU*, San Francisco, CA, 7-11 Dec 2020.

#### **2019**

- \*Greenwood, W, Zekkos, D, Clark, M, Cowell, K, Anderson, S, and Anderson R (2019): Seismic slope stability and characterization of a basaltic cliff at Kauhola Point on the Island of Hawaii. *7<sup>th</sup> International Conference on Earthquake Geotechnical Engineering*, Rome, Italy, 17-20 June 2019.
- Heindel, RC, Putman, AL, Hinckley, E-L S, Murphy, SF, Repert, DA, and Anderson, SP (2019): Dry deposition delivers nutrients and heavy metals to the Colorado Front Range. *National Atmospheric Deposition Program Scientific Symposium and Fall Meeting*, 4-8 November 2019, Boulder, Colorado.
- \*Hoffman, N, Anderson, SP, and Wing, BA (2019): Hydrologic mixing model approach identifies saprolite as the source of inorganic colloids in a granitoid catchment. Abstract H43L-2203, *Fall Meeting, AGU*, San Francisco, CA, 9-13 Sept.
- Rossi, MW, Anderson, RS, Anderson, SP and Tucker, GE (2019): Interactions among hydrologic and geomorphic thresholds in fluvial landscape evolution. Abstract EP33E-2375, *Fall Meeting, AGU*, San Francisco, CA, 9-13 Dec 2019.
- Anderson, SP, Hinckley, ES, Ragar, D, Gill, N, and Parrish, EG (2019): A catchment in the transitional snow zone: Gordon Gulch, Boulder Creek Critical Zone Observatory. Abstract PA11C-0962, *Fall Meeting, AGU*, San Francisco, CA, 9-13 Dec 2019.

## 2018

- Anderson, SP, Anderson, RS, and Rajaram, H (2018): Hillsclapes in wet and dry conditions: Contrasting climates produce dramatically different critical zone architectures. *Goldschmidt Abstracts*, Boston, August 12-17, 2018.
- Gold, A, Curry, R, Briggs, J, Smith, L, McNeal, KS, Atkins, RM, Batchelor, R, Luna, LM, and Anderson, SP (2018): Research experience for community college students: Expanding the pipeline for 2YC students into geoscience programs at 4YCs. *GSA Abstracts with programs* 50 (6), doi: 10.1130/abs/2018AM-323350.
- \*Hale, K, Wlostowski, AN, Badger, A, Anderson, SP, Godsey, S, and Molotch, NP (2018): Unpacking the influence of warming on hydrological partitioning in rain-snow transition zones of the western United States. Abstract H11R-0681 *Fall Meeting, AGU*, Washington, DC, 10-14 Dec.
- Heindel, RC, Hinckley, ES, Murphy, SF, Repert, DA, and Anderson, SP (2018): Quantifying atmospheric dust deposition to the Colorado Front Range. Abstract A21I-0119 presented at 2018 *Fall Meeting, AGU*, Washington, DC, 10-14 Dec.
- Rossi, MW, Anderson, RS, Anderson, SP and Tucker, GE (2018): Runoff and erosion thresholds dictated by the balance between stochastic rainfall statistics and Critical Zone architecture. Abstract EP23G-2221 *Fall Meeting, AGU*, Washington, DC, 10-14 Dec.

## 2017

- \*Klein, TI, Anderson, SP, Murphy, SF, Rossi, M., Hammack, G, and Anderson, RS (2017): High-intensity rain storm connects hillslopes to channels in a steep semi-arid catchment. AGU Chapman Conference on *Extreme Climate Events on Aquatic Biogeochemical Cycles and Fluxes*, San Juan, Puerto Rico.
- Anderson, SP, Wlostowski, A, Murphy, SF, Rock, ND, and Hoffman, C (2017): Runoff response in a semi-arid headwater driven by catchment-scale water movement. *GSA Abstracts with programs*, 49 (6), doi: 10.1130/abs/2017AM-306446.
- Rossi, MW, Anderson, RS, Anderson, SP, and Tucker, GE (2017): Geomorphic implications on the orographic transition from snowmelt to rainfall triggered extremes in the Colorado Front Range. *GSA Abstracts with programs*, 49 (6), doi: 10.1130/abs/2017AM-308125.
- \*Glade, RC, Lanka, DJ, Anderson, SP, and Anderson, RS (2017): Legions of lobes: self-organization and movement of solifluction features at Niwot Ridge. *GSA Abstracts with programs*, 49 (6), doi: 10.1130/abs/2017AM-306312.
- Smith, L, Gold, AU, Anderson, SP, Taylor, JL, Luna, LM, and Batchelor, R (2017): Research experience for community college students in critical zone science: Smoothing the pipeline for 2YC students into geoscience programs at 4YCs. *GSA Abstracts with programs*, 49 (6), doi: 10.1130/abs/2017AM-305594.
- \*Selander, B, Anderson, SP, and Rossi, M (2017): The breakdown: Hillslope sources of channel blocks in bedrock landscapes. *Eos Trans. AGU* 98 (52), Fall Meeting Suppl., Abstract EP33B-1938.
- Anderson, SP, Rengers, FK, Foster, MA, Winchell, EW, and Anderson, RS (2017): Rainfall influence on styles of mass movement. *Eos Trans. AGU* 98 (52), Fall Meeting Suppl., Abstract EP51B-1638.
- Anderson, RS, Rajaram, H, and Anderson, SP (2017): Effects of climate on co-evolution of weathering profiles and hillsclapes. *Eos Trans. AGU* 98 (52), Fall Meeting Suppl., Abstract H44G-05.
- \*Rush, M, Rajaram, H, Anderson, RS, and Anderson, SP (2017): Modeling aspect controlled formation of seasonally frozen ground on montane hillslopes: A case study from Gordon Gulch, Colorado. *Eos Trans. AGU* 98 (52), Fall Meeting Suppl., Abstract H43S-05.

## 2016

- \*Greenwood, W, Clark, M, Zekkos, D, Von Voigtlander, J, Bateman, J, Lowe, K, Hirose, M, Anderson, SP, Anderson, RS, and Lynch, J (2016): Assessment of rock mechanical properties and seismic slope stability in variably weathered layered basalts. *Geophysical Research Abstracts* 18, EGU2016-11787.
- Clark, M.K., Anderson, SP, Anderson, RS, and Zekkos, D. (2016): Effects of weathering on mechanical strength of layered basalts. *GSA Abstracts with Programs*, 48 (7), doi: 10.1130/abs/2016AM-284546
- Smith, L, Gold, A, Anderson, SP, Taylor, J, and Batchelor, R (2016): Research Experience for Community College Students in Colorado: Insights on Improving the Pipeline of 2YC Students into the Geosciences. *GSA Abstracts with programs*, 48 (7), doi: 10.1130/abs/2016AM-281684.
- \*Ross, SL, and Anderson, SP (2016): Rock weathering observed in outcrops and in bedrock exposed by debris flows: A preliminary investigation of granodiorite weathering in a landscape context. *GSA Abstracts with programs*, 48 (7), doi: 10.1130/abs/2016AM-285787.
- Anderson, SP, and Mills, TJ (2016): Seasonal variations in stream chemistry in a semi-arid montane headwater stream reveal changing hydrologic flowpaths. *Eos Trans. AGU* 97 (52), Fall Meeting Suppl., Abstract H54E-02.

## Recent invited talks

### (No abstract published, not listed above)

- Feb or Mar 2021 Gilbert Club virtual meeting, “*Unearthing the critical zone*”
- 9 Jan 2017 University of Potsdam, Germany, Earth Surface Processes speaker series, “*The critical zone: Geo-bio-hydro interactions that shape the Earth’s surface*”.
- 2 Nov 2016 University of California, Santa Barbara, Department of Earth Sciences Crowell Lecturer, “*In the wake of a knick zone: From block fall to debris flows*”

- 12 May 2016 NSF EarthCube Building Block: Earth System Bridge, Environmental Chemistry Names/Ontology Workshop, Boulder, CO, “*Geochemistry Names: Geochemical data in the CZOs*”.
- 14 Apr 2016 Montana State University, Department of Earth Sciences colloquium, “*The long and the short of it: Frost cracking, debris flows, and critical zone architecture*”.
- 4 Mar 2016 University of Iceland, Faculty of Earth Sciences, Reykjavík, “*Weathering in glaciated landscapes*”.

### **Recent teaching**

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- GEOL 1010 **Exploring Earth:** (F2019). Enrollment 165.
- GEOG 1011 Environmental Systems 2: **Landscapes and Water** (Sp2006; Sp2007; F2007; Sp2009; Sp2010; Sp2013; Sp2014; Sp2015; Sp2017; Sp2018) Physical geography core. Enrollment 100-150.
- GEOL/GEOG 4241 **Principles of Geomorphology** (F2009, F2010, F2012, F2013, F2014, F2015, F2016; Sp2020, Sp2021) Enrollment 18-30.
- GEOG 4261 **Glaciers and Permafrost**, Course number has varied. Developed this course on physical science of the cryosphere as Geog 4120/6181, Geol 4700/5700: F2005- (team taught with R.S. Anderson, Geol) 12 undergrad, 7 grad. Geog 4120/5100: F2007- 10 undergrad, 4 grad; Sp2009- 22 undergrad; Sp2010- 39 undergrad. Geog 4261: Sp2016- 18 students; Sp2018-12 students

### **Postdoctoral Researchers Supervised**

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- Matt Rossi, 2016-19, EarthLab (CU Grand Challenge project)/Boulder Creek CZO post-doc, co-supervised with Greg Tucker and Bob Anderson.
- Christian Mavris, 2012-13, Visiting Swiss National Science Foundation Post-doctoral Fellow, Global warming induced vegetation changes and their effects on mineral weathering in a cold-dry and alpine environment (Wind River Range). (Now post-doc at Natural History Museum, London)
- Eve-Lyn Hinckley, 2009-11, NSF Earth Sciences Post-doctoral Fellow, An Integrated Approach to Study the Interactions between Hydrologic Response and Nitrogen Biogeochemistry (Now Assistant Prof. University of Colorado, Boulder)
- Daniel Bain, 2004-6, National Research Council Post-doctoral Fellow, (co-advised with Tom Bullen, USGS), Hydrology and hydrochemistry of the Santa Cruz marine terraces. (Now Assistant Prof. University of Pittsburg)

### **Graduate Theses Supervised**

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#### **Masters degrees**

- Lauren Salberg, in progress, Geological Sciences. (B.A. Geology, Carleton College, 2015), *Modeling groundwater surface water interactions in a semi-arid watershed*.
- Noah L. Hoffman, 2019, *Lithogenic mixing model approach identifies saprolite as the source of inorganic colloids in a granitoid catchment*, M.A. thesis, Dept. of Geography, University of Colorado. (B.A. Geology and B.A. Biology, Oberlin College, 2015. Now PhD student on NSF GRFP at U Minnesota).
- Patrick Kelly, 2012, *Subsurface evolution: Characterizing physical and geochemical weathering in bedrock of Gordon Gulch, Boulder Creek Critical Zone Observatory*, M.A thesis, Dept. of Geography, University of Colorado. (B.S., Geology, Colorado State University, 2009). Now at US EPA, San Francisco, CA.
- Zanden Frederick, 2008, *Water and solute export from the Yukon River and its tributaries*, M.A. thesis, Dept. of Geography, University of Colorado, 77 pp. (B.S., Geology, Western Washington University, 2000). Now in Anchorage, Alaska.
- Cynthia Cacy, 2006, *Chemical weathering in the loess-mantled landscape of the Matanuska Valley, Alaska*, M.S. thesis, Dept. of Environmental Studies, University of Colorado, 101 pp. (B.S. Chemical Engineering, Rensselaer Polytechnic Institute, 2004). Hired by hydrologic consulting firm S.S. Papadopoulos & Associates, Boulder.
- Erin Kraal, 2001, *The 1999 and 2000 Hidden Creek Lake outburst floods on the Kennicott Glacier, Alaska*, M.S. thesis, Dept. of Earth Sciences, University of California, Santa Cruz, 119 pp. (B.S. Geology, Washington and Lee University, 1999) Now faculty, Kutztown University, PA.

## Doctor of Philosophy

- Brittany Selander, in progress, Geography. (BS, Earth Science, UC Santa Cruz, 2011; MS, Geology, San Jose State University, 2015)
- Taylor Joseph Mills, 2016, Geography. *Water chemistry under a changing hydrologic regime: Investigations into the interplay between hydrology and water-quality in arid and semi-arid watersheds in Colorado, USA.* (BA, Environmental Studies, CU, 2008; MS, Colorado School of Mines, 2010). Now at NCAR, Boulder, CO.
- Susan G. Riggins, 2010, Geography. *The production and evolution of mobile regolith: Modeled soil production and measured chemical weathering.* (B.S. with distinction, Geology, University of Illinois, Urbana-Champaign, 2000; M.S. Geological Sciences, University of Colorado, 2003.) Awarded CZEN International Scholars Fellowship, 2006-2007. Lecturer, Geological and Environmental Sciences, California State University, Chico.

## Student Advising

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Served on thesis committee (completion dates indicated):

- Rachel Havranek, PhD, Geological Sciences. in progress. Committee chair.
- Mylène Jacquemart, PhD, Geological Sciences, in progress.
- Aaron Hurst, PhD, Geological Sciences, in progress.
- Michael Rush, PhD, Civil Engineering, CU, 2020.
- Isaac Bukoski, MA, Geography, CU, 2019.
- Rachel Glade, PhD, Geology, CU, 2019.
- Katherine Hale, MA, Geography, CU, 2018.
- Theo Barnhart, PhD, Geography, 2018.
- Derek Weller, PhD, Geology, CU, 2017.
- Eric Winchell, PhD., Geology, CU, 2017.
- Melissa A. Foster, PhD, Geology, CU, 2016.
- Sachin Pandey, PhD, Civil and Environmental Engineering, CU, 2015.
- Fei Xing, PhD, Geology, CU, 2015.
- Anya Byers, MA, Geography, CU, did not complete.
- Abigail Langston, PhD, Geological Sciences, CU, 2014.
- Rachel Gabor, PhD, Environmental Studies, CU, 2013.
- Scott Anderson, MA, Geography, CU, 2013.
- Danielle Perrot, MA, Geography, CU, 2012.
- Erich Mueller, PhD, Geography, CU, 2012.
- Peter (Ty) Atkins, MA, Geography, CU, did not complete.
- Katie Eilers, MA, Ecology and Evolutionary Biology, CU, 2011.
- Roland Viger, PhD, Geography, CU, 2011.
- Kurt Refsnider, PhD, Geological Sciences, CU, 2011.
- Rory Cowie, MA, Geography, CU, 2010.
- Jordan Parman, MA, Geography, CU, 2010.
- Kevin Befus, MA, Geological Sciences, CU, 2010.
- Barbara-Lynn Concienne, MA, Ecology and Evolutionary Biology, CU, 2010.
- Corey Lawrence, PhD, Geological Sciences, CU, 2009.
- Anthony La Greca, MA, Geography, CU, 2009.
- Aimee McLaughlin, MS, Environmental Studies, CU, 2009.
- Rachel McLoughlin, MS, Environmental Studies, CU, 2009.
- Daniel McGrath, MA, Geography, CU, 2009.
- Benjamin Andre, PhD, Civil, Environmental and Architectural Engineering, CU, 2009.
- Maureen Berlin, PhD, Geological Sciences, CU, 2009.
- Catalina Segoura-Sossa, PhD, Geography, CU, 2008.
- Timothy Bartholomaeus, MS, Geological Sciences, CU, 2007.
- Kristina Klos Wynne, MA, Geography, CU, 2006.
- Daniel Cordalis, MA, Geography, CU, 2006.
- Michael G. Loso, PhD, Earth Sciences, UCSC, 2004.

Kelly MacGregor, PhD, Earth Sciences, UCSC, 2002.  
Dave Schlepner, MS, Dept. of Earth Sciences, UCSC. 1999.  
Kara Goscinski, MS, Dept. of Geology and Geophysics, University of Wyoming, 1998

Served on exam committee (exam dates noted):

Eric Smyth, PhD, Geological Sciences, 20 Nov 2019.  
Rachel Havranek, PhD, Geological Sciences. 22 April 2019.  
Mylène Jacquemart, PhD, Geological Sciences, 29 January 2019.  
Aaron Hurst, PhD, Geological Sciences, 12 Nov 2018.  
Mickey Rush, Civil Engineering, 8 Dec 2017.  
Rachel Glade, Geological Sciences, 21 Oct 2016.  
Eric Winchell, Geological Sciences, 11 Feb 2015.  
Fei Xing, Geological Sciences, 4 May 2012.  
Melissa Foster, Geological Sciences, 16 April 2012.  
Abigail Langston, Geological Sciences, 2011.  
Rachel Gabor, Environmental Studies, 2010.  
Erich Mueller, Geography, 2009.  
Roland Viger, Geography, 2009.  
Benjamin Andre, Civil, Environmental and Architectural Engineering, 2008.  
Kurt Refsnider, Geological Sciences, 2008.  
Maureen Berlin, Geological Sciences, 2006.  
Catalina Segoura-Sossa, Geography, 2006.  
Leora Nanus, Geography, 2005.  
Catherine Riihimaki, UCSC, 2001.  
Lesley Perg, UCSC, 2000.  
Kelly MacGregor, UCSC, 1999.

Served as external opponent for doctoral defense:

Eydís Salome Eiriksdóttir, Faculty of Earth Science, University of Iceland, Reykjavík, March 4, 2016.

Undergraduates advised

Kevin Knopp, BA May 2019 in Physical Geography. Senior thesis: *Mass balance of the Arikaree Glacier*. Published in CU College of Arts and Sciences Honors Journal (<https://www.colorado.edu/honorsjournal/archives/2019>).

Dylan Lanka, BA *summa cum laude* in Physical Geography, 2018. Senior honors thesis: *Solifluction Lobes on Niwot Ridge: Using Drones, Time-lapse Cameras, and Weather Data to Study Periglacial Features*. Supported by a von Dreden Stacey Fellowship in summer 2017.

Kristina Cowell, BA 2017 in Geography. (Did not complete thesis) Working title: *Hydrochemistry of Betasso catchment in the Boulder Creek watershed*. Supported by a von Dreden Stacey Fellowship in summer 2016.

Garret Hammack, BA in Geological Sciences, 2017. Senior thesis: *Runoff generation in Betasso catchment: Investigation of Hortonian overland flow*.

Emily Gulick, BA 2016 in Geography and Environmental Studies. Senior honors thesis: *Analyzing heterogeneous landscapes to reveal ecological processes: the spatial modeling of forest-meadow ecotones using aerial photography*. Supported by a von Dreden Stacey Fellowship in summer 2015.

Satya Akquia, BA in Geography, 2015. Senior thesis: *Bedrock incision and gravel deposition along the rivers in the High Plains*.

Chris Heckman, BA *cum laude* in Environmental Studies, 2012. Honors thesis: *Springs of Gordon Gulch: A groundwater analysis*.



Nathan Rock, BA *cum laude* in Geography, 2010. Honors thesis: *Water balance for Gordon Gulch, Colorado Front Range*.  
Jaclyn Gorman, BA *magna cum laude* in Geography, 2006. Honors thesis: *Fluvial Transportation of the New Zealand Mudsnaill*.  
C. Beckett Hart, BA *magna cum laude* in Geography, 2005. Honors thesis: *Hydrochemistry of Middle Boulder Creek and Coal Creek*.  
Sharon Longacre, UCSC, BS in Earth Sciences, 2001. Senior thesis: *Chemistry of Kennicott River during an outburst flood: Implications for sub-glacial hydrology*.  
Shannon Wong, UCSC, BS in Earth Sciences, 1997. Senior thesis: *Preferential flow: Its significance on the water table response to rainfall at Elkhorn Slough, California*.

#### Undergraduate thesis committee

Dillon Ragar, BA Environmental Studies, 2017.  
Cole Pazar, BA Geological Sciences, 2016.  
Emily Gulick, BA Geography and Environmental Studies, 2016.  
David Liefert, BA *magna cum laude* in Geological Sciences, 2015.  
Molly Jane Jones, BA *cum laude* in English, 2010.  
Nina Russell, BA *magna cum laude* in Environmental Studies, 2010.  
Daniel Eldridge, BS *summa cum laude* in Geological Sciences, 2009.

#### **Recent Professional Service**

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Chair, American Association for the Advancement of Science (AAAS) Section on Geology and Geography, 2021-2022.  
Chair-Elect, American Association for the Advancement of Science (AAAS) Section on Geology and Geography, 2020-2021.  
Science Committee for the Goldschmidt 2021 meeting, Lyons, France. Identify themes and theme chairs for the meeting, help choose plenary lecturers.  
External Review Committee member, University of Wyoming Department of Geology and Geophysics, 2019.  
Search Committee external expert for new professorship in Soil Weathering and Development. Faculty of Geosciences and Environment, University of Lausanne, Switzerland, 2017-2018.  
Reviewer for student awards, Quaternary Geology and Geomorphology division of the Geological Society of America, 2016.  
Niwoot Ridge Long Term Ecological Research (LTER) site Science Advisory Board member, 2015-2018.  
QWARTS (Quantifying WeAthering RaTes for Sustainable Forestry) Science Advisory Board member, 2013-2018. Swedish joint program between SLU (Swedish Agricultural University) and Uppsala University  
AGU Earth and Planetary Surface Processes focus group Executive Committee, 2009-2018  
*Convener of* “The Value of CZ Science in Service of Society” and “Tree, water, regolith and rock: The role of roots and plant hydraulics in CZ processes”, 2018; “The Architecture and Workings of the Critical Zone”, and Union session “The Critical Zone: Revealing the Structure, Function, and Evolution of Earth’s Living Skin”, 2016.  
*Awards committee* (GK Gilbert Award, Luna Leopold Award): 2016, 2018  
Scientific Program Committee, Twelfth International Symposium on the Geochemistry of the Earth’s Surface (GES12), Zurich, Switzerland, postponed to 2021.

#### **Recent Reviewing and Editorial Service**

Reviewer for U.S. National Science Foundation, U.K. Natural Environmental Research Council, Israel Science Foundation, and German Research Foundation (DFG).  
Reviewer for journals and publishers, e.g. in 2020: *Geological Society of America Bulletin*; *Geology*; *Geophysical Research Letters*; *Hydrological Processes*; *Science*.  
Guest editor, *Hydrological Processes* Special Issue on “Water in the Critical Zone”, with Ying Fan Reinfelder (Rutgers) and Gordon Grant (USFS/OSU). Completed in 2019.

*The Holocene* Editorial Advisory Board member, 2017-  
*Earth Surface Processes and Landforms* International Advisory Board member, 2014-2019.

### **Recent University Service**

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INSTAAR ARPAC (Academic Review and Planning Advisory Committee) Committee member, 2020-2021.  
Member of INSTAAR/Ecology & Evolutionary Biology Primary Unit Review Committee for Professor Merritt Turetsky promotion, 2020.  
Member of Geological Sciences Department Primary Unit Review Committees for Professor Seb Kopf reappointment, 2020; for Professor Karen Chin promotion, 2019; for Dr. Jennifer Stempien promotion, 2019; for Professor Irina Overeem reappointment, 2019.  
Chair, Geography Department Search Committee, Assistant Professor in Physical Geography, 2017-2018.  
Chair, Geography Department Colloquium Committee, 2017-2018.  
Member of Geography Department Primary Unit Evaluation Committees for Professor Najeeb Jan tenure and promotion, 2016; for Professor Seth Spielman tenure and promotion, 2015-16.  
Internal reviewer for the Department of Germanic and Slavic Languages and Literature, 2015-2016.  
Arts and Science Council ad hoc Core Revision Committee, 2015-16  
Geography Dept. Undergraduate Committee member, 2014-15, 2015-16. *Restructured Undergraduate degree requirements. Gave Geography Dept commencement faculty speech, May 8, 2015.*

### **Supervision of Professional Staff**

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*Note: with BcCZO closing in November 2020, professional staff supervision ended in late 2020.*

#### Classified Staff

Wendy Roth, Lab Coordinator II, Manager of the INSTAAR Sedimentology Laboratory, Brief job description: Schedules multi-use of the laboratory by various users, runs analyses, trains and supervises students in the use of research instruments, and maintains instruments in the laboratory.

#### Professional Research Assistants

Nagam Gill, Lab manager for the Boulder Creek Critical Zone Observatory. Brief job description: works with Field Manager to carry out field sampling programs for water, sediment and soils, and completes analysis of samples collected in the laboratory, works with the Data Manager to insure timely and efficient Q/A and Q/C and transfer of monitoring data into the CZO database.

Eric Parrish, Graphics and data specialist for the Boulder Creek Critical Zone Observatory. Brief job description: Maintains database for CZO. Creates and develops graphics, scientific illustrations, GIS and remote-sensing-based products, and helps to maintain website.

Dillon Ragar, Field manager for the Boulder Creek Critical Zone Observatory. Brief job description: Installs and maintains field instrumentation, conducts field sampling programs for water, sediment and soils, works with the Boulder Creek CZO Data Manager to insure timely and efficient transfer of monitoring data into the CZO database, oversees undergraduate research assistants

### **Recent Outreach**

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*General public:* Science advisor and contributor to Museum of Boulder exhibit, “Our Living Landscape: Exploring Boulder’s Watershed”, January-March 2020.

*General public:* Science expert for INSTAAR tour by group from Frasier Meadows Retirement Community, Jan 30, 2020.

*K-12 community:* Science expert on field trip with K-12 Professional Development class on Mountain Research Experience, Niwot Ridge, June 27, 2018.

*Scientific community:* Quoted in article on Critical Zone Observatories: “Earth’s skin is an interdisciplinary laboratory” by Toni Feder, *Physics Today* 71, 1, 22 (2018): <https://doi.org/10.1063/PT.3.3813>.

*Scientific community:* Hosted delegation of 15 scientists from Chinese Geological Survey to the Boulder Creek Critical Zone Observatory, Nov 6-10, 2017.

*Scientific community:* Hosted delegation of 8 scientists from Kangwon National University, South Korea to the Boulder Creek Critical Zone Observatory, Jan 27-30, 2016.

*Undergraduate students:* Led University of Nebraska, Omaha geoscience students on a field trip to Boulder Creek CZO, May 17, 2016. (20 undergraduate students and 4 faculty).

*Undergraduate students:* Featured in a virtual field trip video supplement to *McKnight's Physical Geography: A Landscape Appreciation* by Darryl Hess (Pearson). The 9-minute video, titled "The Critical Zone at Boulder Creek", is one of 20 virtual field trip videos accessible to students who purchase the textbook.