Kathryn Elaine Snell

Assistant Professor, Director of CU Boulder Earth Systems Stable Isotope Lab
Department of Geological Sciences, University of Colorado Boulder
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Research Interests

Paleoclimatology, paleoaltimetry and tectonics, stable isotope geochemistry, sedimentology

1. Education

2002 B.A. cum laude, Geology with Distinctions, The Colorado College
2004 – 2011 Ph.D., Earth Sciences, University of California, Santa Cruz (Advisor: Dr. Paul Koch)

2. Employment

2015-Present Assistant Professor of Geological Sciences, CU Boulder
Research leave semester: Fall 2016
Parental leave semesters: Fall 2018; Fall 2020
2014 Senior Postdoctoral Scholar, California Institute of Technology
2011-2013 Postdoctoral Scholar, California Institute of Technology
Advisors: Dr. John Eiler and Dr. Brian Wernicke
2009 Visiting Professor, Block 3, The Colorado College
2004-2010 Teaching and Research Assistant, UC Santa Cruz
2003-2004 GIS Research Assistant, GeoMap NW, University of Washington, Seattle, WA
2003 Hydrologic Technician, USDA Forest Service, Priest Lake, ID

3. Grants, Awards and Honors

2020 – 2022 National Science Foundation Low Temperature Geochem and Geobio grant:
What Controls Carbonate Formation in Fine-grained and Clay-rich Soils? Gaining Perspective from Serial Soil Water Stable Isotope Datasets (Sole PI) EAR-2023385 - $270,918
2021 supplement: $40,843

2020 ICDP Workshop proposal: PlioWest: Drilling Pliocene Lakes in Western North America
$62,451 total (Co-PI)

2018 - 2021 National Science Foundation SedGeo and Paleobio grant:
2021 (1 yr ext) Collaborative Research: Assessing the sensitivity of high-altitude environments to globally warm climate as recorded by lacustrine microbialite carbonates (Lead PI; 3 co-PIs including CU Co-PI E. Trower) EAR-1826850 - $317,570 /$598,733 (CUB/Total)
2021 supplement: $55,759

2018 - 2020 National Science Foundation Low Temperature Geochem and Geobio grant:
2021 (1 yr ext) A predictive framework for micro-scale carbonate diagenesis: Towards more accurate reconstructions of global climate and environmental change (Co-PI; Lead is Postdoc Miquela Ingalls) EAR-1826805 - $184,321

2015 - 2017 National Science Foundation Tectonics grant:
2018 (1 yr ext) Collaborative Research: The Record of Early Cretaceous Growth of the Nevadaplano From Syn-orogenic Deposits of the Sevier Hinterland (Lead PI; 2 co-PIs)
EAR-1524785 – $140,965 /$389,514 (CUB/Total)

4. Research and Creative Work

<u>Peer-reviewed Publications:</u>*grad student, ^postdoc, +student committee, #staff, **undergrad

Fetrow, AC*, **Snell, KE**, di Fiori, R. v., Long, SP, & Bonde, JW (2022). How Hot Is Too Hot? Disentangling Mid-Cretaceous Hothouse Paleoclimate from Diagenesis. *Paleoceanography and Paleoclimatology*. https://doi.org/10.1029/2022pa004517

Pérez-Angel, LC+, Sepúlveda, J., Montes, C., Smith, JJ, Molnar, P., González-Arango, C., **Snell, KE**, & Dildar, N. (2022). Mixed Signals From the Stable Isotope Composition of Precipitation and Plant Waxes in the Northern Tropical Andes. *Journal of Geophysical Research: Biogeosciences*, *127*(12). https://doi.org/10.1029/2022JG006932

Simon, RE+, Budd, DA, & **Snell, KE** (2022). The history of calcite diagenesis and origin of exceptionally negative oxygen isotope values in chalks of the Niobrara Formation, Denver Basin, USA. *Depositional Record*. https://doi.org/10.1002/dep2.218

Widlansky, SJ+, Secord, R, **Snell, KE,** Chew, AE, & Clyde, WC. Carbon isotope stratigraphy and mammal turnover during post-PETM hyperthermals. *Climate of the Past*, 18, 681-712 (April, 2022).

Ingalls, M^, Fetrow, AC*, Snell KE, Frantz, CM, Trower, EJ. "Lake level controls the recurrence of giant stromatolite facies." *Sedimentology*. (December 24, 2021).

Di Fiori, R.V., Long, S.P., **Fetrow, A.C.*, Snell, K.E**., Bonde, J.W., Vervoort, J.D. "The role of shortening in the Sevier hinterland within the U.S. Cordilleran retroarc thrust system: Insights from the Cretaceous Newark Canyon Formation in central Nevada." *Tectonics*. 40 (5) (April 30, 2021).

S. Bernasconi, M Daëron, KD Bergmann, M Bonifacie, AN Meckler, H Affek, N Anderson, D Bajnai, E Barkan, E Beverly, D Blamart, L Burgener, D Calmels, C Chaduteau, M Clog, **B Davidheiser-Kroll#**, A Davies, F Dux, JM Eiler, B Elliott, **A Fetrow***, J Fiebig, S Goldberg, M Hermoso, K Huntington, E Hyland, M Ingalls, M Jaggi, C John, A Jost, S Katz, J Kelson, T Kluge, I Kocken, A Laskar, T Leutert, DS Liang, J Lucarelli, T Mackey, X Mangenot, N Meinicke, S Modestou, I Mueller, S Murray, A Neary, N Packard, B Passey, E Pelletier, S Petersen, A Piasecki, A Schauer, **K Snell,** A Tripati, P Swart, D Upadhyay, T Vennemann, I Winkelstern, D Yarian, N Yoshida, N Zhang, M Ziegler. "InterCarb: A community effort to improve interlaboratory standardization of the carbonate clumped isotope thermometer using carbonate standards." *Geochemistry Geophysics Geosystems*. 22 (5) (April 13, 2021).

Ingalls, M^, Snell, KE. "Tools for comprehensive assessment of fluid-mediated and solid-state alteration of carbonates used to reconstruct ancient elevation and environments." *Frontiers in Earth Science (Sedimentology, Stratigraphy and Diagenesis).* 9 (February 25, 2021).

Fetrow AC*, Snell KE, Di Fiori R, Long SP, Bonde JW. "Early Sevier orogenic deformation exerted principal control on changes in depositional environment recorded by the Cretaceous Newark Canyon Formation." *Journal Of Sedimentary Research*. 90 (9) (October 01, 2020): 1175-1197.

Suarez MB, Knight JA, Godet A, Ludvigson GA, **Snell KE**, Murphy L, Kirkland JI. "Multiproxy strategy for determining palaeoclimate parameters in the Ruby Ranch Member of the Cedar Mountain Formation." *Geological Society, London, Special Publications* (August 05, 2020).

Perez-Angel LC+, Sepulveda J, Molnar P, Montes C, Rajagopalan B, **Snell KE**, Gonzalez-Arango C, Dildar N. "Soil and Air Temperature Calibrations Using Branched GDGTs for the Tropical Andes of Colombia: Toward a

Pan-Tropical Calibration." *Geochemistry Geophysics Geosystems*. 21 (8) (August 01, 2020): ARTN e2020GC008941.

Rasmussen DM[+], Foreman BZ, Fricke HC, **Snell KE**, Gipson L, Housen B. "The early Paleogene stratigraphic evolution of the Huerfano Basin, Colorado." *Rocky Mountain Geology*. 55 (1) (July 01, 2020): 1-26.

Havranek RE*, Snell KE, Davidheiser-Kroll B[#]**,** Bowen GJ, Vaughn B. "The Soil Water Isotope Storage System (SWISS): An integrated soil water vapor sampling and multiport storage system for stable isotope geochemistry." *Rapid Communications In Mass Spectrometry*. 34 (12) (June 30, 2020)

Ingalls M^, Frantz CM, **Snell KE**, Trower EJ. "Carbonate facies-specific stable isotope data record climate, hydrology, and microbial communities in Great Salt Lake, UT." *Geobiology*. 18 (5) (March 20, 2020): 566-593.

Di Fiori, RV, Long, SP, **Fetrow, AC*, Snell, KE**, Bonde, JW, Vervoort, J. 2020. Syncontractional deposition of the Cretaceous Newark Canyon Formation, Diamond Mountains, Nevada: Implications for strain partitioning within the U.S. Cordillera. *Geosphere*, v. 16. DOI: 10.1130/GES02168.1

Lukens, WE, Fox, DL, **Snell, KE**, Wiest, LA, Layzell, AL, Uno, KT, Polissar, PJ, Martin, RA, Fox-Dobbs, K, Peláez-Camponaes, P. 2019. Pliocene paleoenvironments in the Meade Basin, southwest Kansas. *Journal of Sedimentary Research*.

Lunt, D.J., Huber, M., Anagnostou, E., Baatsen, M.L.J., Caballero, R., DeConto, R., Dijkstra, H.A., Donnadieu, Y., Evans, D., Feng, R., Foster, G., Gasson, E., von der Heydt, A.S., Hollis, C.J., Inglis, G.N., Jones, S.M., Kiehl, J., Kirtland Turner, S., Korty, R.L., Kozdon, R., Krishnan, S., Ladant, J.B., Langebroek, P., Lear, C.H., LeGrande, A.N., Littler, K., Markwick, P., Otto-Bliesner, B. Pearson, P., Poulsen, C.J., Salzmann, U., Shields, C., **Snell, K.E.,** Starz, M., Super, J., Tabor, C., Tierney, J., Tourte, G.J.L., Tripati, A., Upchurch, G.R., Wade, B.S., Wing, S.L., Winguth, A.M.E., Wright, N., Zachos, J.C., and Zeebe, R. 2017. DeepMIP: experimental design for model simulations of the EECO, PETM, and pre-PETM. *Geoscientific Model Development*. 10: 889-901. DOI: 10.5194/gmd-10-889-2017.

Fox, DL, Martin, RA, Roepke, E, **Fetrow, AC***, Femal, B, Uno, KT, Fox-Dobbs, K, **Snell, KE**, Haveles, AW, Polissar, PJ. 2015. Biotic and Abiotic Forcing During the Transition of Modern Grassland Ecosystems: Evolutionary and Ecological Responses of Small Mammal Communities Over the Last 5 Million Years. *In P. D. Polly, J. J. Head, & D. L. Fox (Eds.), Earth-Life Transitions: Paleobiology in the Context of Earth System Evolution. Paleontological Society Papers* v. 21. Yale Press, New Haven, CT. p. 197-218.

Snell, KE, Koch, Pl, Eiler, JM, Druschke, P. 2014. High elevation of the Nevadaplano during the Late Cretaceous. *Earth and Planetary Science Letters.* 386: 52–63. DOI: 10.1016/j.epsl.2013.10.046

Snell, KE, Thrasher, B, Eiler, JM, Koch, PL, Sloan, LC, Tabor, N, Dettman, D. 2013. Hot summers in the Bighorn Basin during the early Paleogene*. Geology,* 41: 55-58. DOI: 10.1130/G33567.1

Clyde, WC, Ting, S, **Snell, KE**, Bowen, GJ, Tong, Y, Koch, PL, Qian, L, Wang, Y. 2010. New paleomagnetic and stable isotope results from the Nanxiong Basin, China: Implications for the K/T Boundary and the timing of Paleocene mammalian turnover. *Journal of Geology*, 118: 131-143. DOI: 10.1086/649893

Clyde, WC, Tong, Y, **Snell, KE**, Bowen, GJ, Ting, S, Koch, PL, Li, Q, Wang, Y, and Meng, J. 2008. An integrated stratigraphic record from the Paleocene of the Chijiang Basin, Jiangxi Province (China): Implications for mammalian turnover and Asian block rotations. *Earth and Planetary Science Letters*, 269: 553-563. DOI: 10.1016/j.epsl.2008.03.009

Myrow, PM, **Snell, KE**, Hughes, N, Paulsen, T., Heim, N, Parcha, S. 2006. Cambrian depositional history of the Zanskar Valley region of the Indian Himalaya: Tectonic implications. *Journal of Sedimentary Research*, 76: 364-381. DOI: 10.2110/jsr.2006.020

Non-Peer Reviewed Publications and Government Reports:

Kenworthy, J.P., V. L. Santucci, M. McNerney, and **K. Snell**. 2005. Paleontological Resource Inventory and Monitoring, Upper Columbia Basin Network. National Park Service TIC# D-259.

Submitted works In Review or Post-Review Revision:

Havranek, R. E., Snell, K. E., Kopf, S. H., Davidheiser-Kroll, B., Morris, V., and Vaughn, B.: Lessons from and best practices for the deployment of the Soil Water Isotope Storage System, In review, Hydrology and Earth Systems Sciences [preprint], https://doi.org/10.5194/egusphere-2022-1170, 2022.

Hollis, S.P. Dennis, P.F., Menuge, J.F., Doran, A.L., Marca, A., **Davidheiser-Kroll, B#., Snell, K.E.,** Wilkinson, J.J., Turner, O., Guven, J., Boyce, A. *In Review*. Tracking fluid temperature and evolution in carbonate-hosted hydrothermal ore systems using clumped C-O isotopes. *Economic Geology.*

Courses Taught at CU:

GEOL 1020: Introduction to Earth History (Fall, 2015; Spring, 2017, Fall 2019, Fall 2021)
GEOL 4675/5675: Stable Isotopes in Paleoclimate and Paleoecology (Spring, 2016; Spring, 2018, Spring 2021)
GEOL 4380/5380: Fundamentals of Stable Isotope Geochemistry (Spring, 2020, Fall 2022)
GEOL 5704: Carbonate Seminar (Spring, 2019, Spring 2020, Spring 2021, Fall 2021, Fall 2022)
GEOL 4700/5700: Ancient Climate and Elevation (Spring 2015)
GEOL 5700: Climate and Geology in Paleoaltimetry (Spring, 2017)
GEOL 5700: Frontiers in Stable Isotopologue Geochemistry (Fall, 2017)
GEOL 5700: Polar Amplification (Spring, 2019)

Students Advised at CU:

PhD theses:

2016-2022	Anne Fetrow – defended April 2022; NSF GRFP
	Current position: Visiting Assistant Professor, Bates College
	Awarded NSF Postdoctoral Fellowship in 2022, begins term in May 2023
2017-Present	Rachel Havranek – defended November 2022
	Awarded NSF Postdoctoral Fellowship in 2022, begins term in February 2023
2019-Present	Juliana Olsen-Valdez – candidacy Spring 2022; NSF GRFP
2022-Present	Haley Brumberger – began Fall 2022

MS theses:

2015-2019	Victoria Crystal – co-advised with Jaelyn Eberle, defended Spring 2019
	Current position: Collections Manager for Geologic Materials Repository, Lakewood USGS
2016-2017	Cara Lauria (ENVS) - co-advised with Eve-Lyn Hinckley, defended December 2017

Undergraduate research and Honors theses:

2022	Zoe Bennet (CU Boulder; UROP)
2021	Sarah Brookins (CU Boulder; UROP, honors thesis – cum laude)
2017-2018	Sierra Baker (CU Boulder; UROP)
2016-2019	Anna Todd (CU Boulder; UROP, honors thesis – summa cum laude)
2017	Alejandro Murillo (CU Boulder; UROP, honor thesis – cum laude)
2009 -2010	Kayla Martin (UC Santa Cruz, honors thesis)