Rebecca M. Flowers

Curriculum Vitae

Professor of Geological Sciences, University of Colorado Boulder

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EDUCATION

PhD	Massachusetts Institute of Technology, Geology and Geochemistry	2005
MSc	University of Utah, Geology	2000
BSc	College of William & Mary, Geology	1998

PROFESSIONAL EXPERIENCE

Professor	Dept of Geological Sciences, University of Colorado Boulder	2020-present
Associate Professor	Dept of Geological Sciences, University of Colorado Boulder	2014-2020
Visiting Professor	Dept of Geosciences, University of Tuebingen, Germany	2016-2017
Assistant Professor	Dept of Geological Sciences, University of Colorado Boulder	2007-2014
Postdoctoral Fellow	Division of Geological and Planetary Sciences, Caltech	2005-2007

HONORS

2019	CU ASSETT Faculty Fellow
2018	CU Research & Innovation (RIO) Faculty Fellow
2017-2018	EarthScope Distinguished Speaker
2016-2017	Alexander von Humboldt Research Fellowship
2015-2016	Mineralogical Society of America Distinguished Lecturer
2010-2015	NSF CAREER award
1999-2003	NSF Graduate Research Fellowship

RESEARCH

RESEARCH INTERESTS

- Developing and refining geochronologic techniques, especially (U-Th)/He thermochronology
- Developing and applying "deep-time" (U-Th)/He thermochronology to constrain the timing of ancient unconformity development (e.g., the "Great Unconformities") and potential links with tectonic, environmental, and biologic change
- Determining long-term (10s-100s Ma) burial and erosion histories in continental interiors and their potential geodynamic and tectonic causes
- Deciphering Cenozoic histories of topographic evolution (e.g., carving of the Grand Canyon, rise of the southern African Plateau) to evaluate links among tectonics, mantle dynamics, erosion, and climate
- Constraining lunar impact histories using (U-Th)/He thermochronology

THERMOCHRONOLOGY LAB

I established and direct the CU Thermochronology Research and Instrumentation Lab (CU TRaIL; https://cutrail.org). The core goals of the CU TRaIL are to conduct innovative, collaborative, and high-

quality research and technique development while also providing geo- and thermochronologic data and training to the broader Earth science community. Our primary focus is on whole crystal and in situ (U-Th)/He dating, with recent implementation of laser-ablation U-Pb and trace element mapping capabilities. Instrumentation includes an ASI Alphachron quadrupole He system; an Agilent 7900 quadrupole ICP-MS; an ESI NWR193UC excimer laser; a KLA ZETA-20 optical profiler; and a new custom, low-volume, He extraction and measurement line built in-house that will be largely dedicated to laser-ablation He analyses. This equipment was funded by three NSF Instrumentation & Facilities awards in 2012, 2016, and 2019. Our lab has a strong user base and has generated >15,000 (U-Th)/He dates.

PUBLICATIONS

denotes *graduate advisee, **undergraduate student advisee, or §research associate in lab group

In Review

70. **Flowers, R.M.,** Ketcham, R.A., Macdonald, F.A., Siddoway, C.S., Havranek, R.E., in review, Existing thermochronologic data do not constrain Snowball glacial erosion below the Great Unconformities: *Proceedings of the National Academy of Sciences*, Letter to the Editor.
69. §Martin, P.E., §Metcalf, J.R., and **Flowers, R.M.,** in review, Calculation of uncertainty in the (U-Th)/He system: *Geochronology*.
68. Pu, J., Macdonald, F.A., Schmitz, M., Rainbird, R., Bleeker, W., Peak, B., **Flowers, R.M.,** Hoffman, P., Rioux, M., and Hamilton, M., in review, Emplacement of the Franklin large igneous province and initiation of the Sturtian Snowball Earth: *Science Advances.*

In Press

67. Macdonald, F.A., Yonkee, W.A., **Flowers, R.M.,** and Swanson-Hysell, N.L., 2022, Neoproterozoic of Laurentia: *GSA Memoir, Laurentia: An evolving continent.*

Published

66. **Flowers, R.M.,** Zeitler, P.K., Danišík, M., Reiners, P.W., Gautheron, C., Ketcham, R.A., Metcalf, J.R., Stockli, D.F., Enkelmann, E., and Brown, R.W., 2022, (U-Th)/He chronology: Part 1. Data, uncertainty, and reporting: *Geological Society of America Bulletin* special volume on the *Reporting and Interpretation of Geochronologic data,* https://doi.org/10.1130/B36266.1.
65. **Flowers, R.M.,** Ketcham, R.A., Enkelmann, E., Gautheron, C., Reiners, P.W., Metcalf, J.R., Danišík, M., Stockli, D.F., and Brown, R.W., 2022, (U-Th)/He chronology: Part 2. Considerations for evaluating, integrating, and interpreting conventional individual aliquot data: *Geological Society of America Bulletin* special volume on the *Reporting and Interpretation of Geochronologic data*, https://doi.org/10.1130/B36268.1.
64. *Havranek, R.E. and **Flowers, R.M.**, 2022, Zircon (U-Th)/He data for the Colorado Front Range "fourteeners" and testing Cryogenian exhumation of sub-Great Unconformity basement *Chemical Geology*, v. 591, https://doi.org/10.1016/j.chemgeo.2021.120702.
63. *Peak, B.A., **Flowers, R.M.**, Macdonald, F.A., and Cottle, J.M., 2022, Forum, Reply to Comment on: Zircon (U-Th)/He thermochronology reveals pre-Great Unconformity paleotopography in the Grand Canyon region: 50 (3): e544, https://doi.org/10.1130/G49965Y.1.
62. Abbott, L.D., **Flowers, R.M.,** Metcalf, J., Falkowski, S., and Niazy, F., 2022, Post-Laramide, Eocene epeirogeny in Colorado – The result of a mantle drip?: *Geosphere*, https://doi.org/10.1130/GES02434.1.
61. *Peak, B.A., **Flowers, R.M.**, Macdonald, F.A., and Cottle, J.M., 2021, Zircon (U-Th)/He thermochronology reveals pre-Great Unconformity paleotopography in the Grand Canyon region: *Geology*, v. 49, https://doi.org/10.1130/G49116.1.
60. *Sturrock, C.P., **Flowers, R.M.,** and Macdonald, F.A., 2021, The late Great Unconformity of the central Canadian Shield: *Geochem. Geophys. Geosyst.,* https://doi.org/10.1029/2020GC009567.
59. §Metcalf, J.R. and **Flowers, R.M.,** 2021, (U-Th)/He Chronology, *Encyclopedia of Geology*, 2nd Edition, p. 66-75, https://doi.org/10.1016/B978-0-12-409548-9.12385-1.

58. Stanley, J.R., Braun, J., Baby, G., Guillocheau, F., Robin, C., **Flowers, R.M.**, Brown, R., Wildman, M., Beucher, R., 2021, Constraining plateau uplift in southern Africa by combining thermochronology, sediment flux, topography, and landscape evolution modeling: *Journal of Geophysical Research: Solid Earth, 126,* e2020JB021243, https://doi.org/10.1029/2020JB021243
57. **Flowers, R.M.,** Macdonald, F.A., Siddoway, C.S., and *Havranek, R., 2020, Diachronous development of Great Unconformities before Neoproterozoic Snowball Earth: *Proceedings of the National Academy of Sciences,* v. 117 (19), www.pnas.org/cgi/doi/10.1073/pnas.1913131117.
56. *Baughman, J.S. and **Flowers, R.M.**, 2020, Mesoproterozoic burial of the Kaapvaal craton, southern Africa during Rodinia supercontinent assembly from (U-Th)/He thermochronology: *Earth and Planetary Science Letters*, v. 531, https://doi.org/10.1016/j.epsl.2019.115930.
55. *Stanley, J.R. and **Flowers, R.M.,** 2020, Mesozoic denudational history of the lower Orange River and eastward migration of erosion across the southern African Plateau: *Lithosphere*, https://doi.org/10.1130/L1121.1.
54. McDannell, K.T. and **Flowers, R.M.**, 2020, Vestiges of the ancient: Deep-time noble gas thermochronology: *Elements* issue "Noble gas thermochronology", v. 16 (5), p. 325-330, https://doi.org/10.2138/gselements.16.5.325.
53. Duvall, A.R., Harbert, S.A., Upton, P., Tucker, G., **Flowers, R.M.,** and Collett, C., 2020, River patterns reveal landscape evolution at the edge of subduction, Marlborough Fault System, New Zealand: *Earth Surface Dynamics*, v. 8, p. 177-194, https://doi.org/10.5194/esurf-8-177-2020.
52. *Robinson, K.H., **Flowers, R.M.,** and Metcalf, J.R.*, 2019, Rutile (U-Th)/He thermochronology: Temperature sensitivity and radiation damage effects: *Geochem. Geophys. Geosyst.* 20, https://doi.org/10.1029/2019GC008484.
51. Collett, C., Duvall, A.R., **Flowers, R.M.,** Tucker, G.E., and Upton, P., 2019, The timing and style of oblique deformation within New Zealand's Kaikoura Ranges and Marlborough Fault system from low-temperature thermochronology: *Tectonics,* v. 38, p. 1250-1272, https://doi.org/10.1029/2018TC005268.
50. **Flowers, R.M.** and Ehlers, T.E., 2018, Influence of rock erodibility on the interpretation of thermochronologic data: *Earth and Planetary Science Letters*, v. 482, p. 312-323, https://doi.org: 10.1016/j.epsl.2017.11.018.
49. **Flowers, R.M.,** Arrowsmith, R., McConnell, V., Metcalf, J.R., Rittenour, T., and Schoene, B.S. 2018, The AGeS2 (Awards for Geochronology Student research) Program: Supporting community geochronology needs and interdisciplinary science: *GSA Today, Groundwork article*, v. 29, p. 36-37, https://doi.org/10.1130/GSATG392GW.1.
48. *Baughman, J.S. and **Flowers, R.M.,** 2018, Deciphering a 2 Gyr-long thermal history from a multichronometer (U-Th)/He study of the Phalaborwa carbonatite, South Africa: *Geochem. Geophys. Geosyst.*, v. 19, https://doi.org/10.1029/2017GC007198.
47. §Kelly, N.M., **Flowers, R.M.,** Metcalf, J.R., and Mojzsis, S.J., 2018, Late accretion to the Moon recorded in zircon (U-Th)/He thermochronometry: *Earth and Planetary Science Letters,* v. 482, p. 222-235, https://doi.org/10.1016/j.epsl.2017.11.009.
46. **Weisberg, W.R., §Metcalf, J.R., **Flowers, R.M.,** 2018, Response to comment on "Distinguishing slow cooling versus multiphase cooling and heating in zircon and apatite (U-Th)/He datasets: the case of the McClure Mountain syenite standard": *Chemical Geology*, v. 498, p. 153-156, https://doi.org/10.1016/j.chemgeo.2018.03.038.
45. **Weisberg, W.R., §Metcalf, J.R., **Flowers, R.M.,** 2018, Distinguishing slow cooling versus multiphase cooling and heating in zircon and apatite (U-Th)/He datasets: the case of the McClure Mountain syenite standard: *Chemical Geology*, v. 485, p. 90-99, https://doi.org/10.1016/j.chemgeo.2018.07.033.
44. Powell, J., Schneider, D., Desrochers, A., **Flowers, R.M.,** Metcalf, J.R.*, Gaidies, F., and Stockli, D.F., 2018, Low-temperature thermochronology of Anticosti Island: A case study on the application of conodont (U-Th)/He thermochronology to carbonate basin analysis: *Marine and Petroleum Geology*, v. 96, p. 441-456, https://doi.org/10.1016/j.marpetgeo.2018.05.018.

43. *Baughman, J.S., **Flowers, R.M.,** Metcalf, J.R., and Dhansay, T., 2017, Influence of radiation damage on titanite He diffusion kinetics: Geochimica et Cosmochimica Acta, v. 205, p. 50-64, https://doi.org/10.1016/j.gca.2017.01.049.
42. *Johnson, J.E., **Flowers, R.M.,** Baird, G.B., and Mahan, K.H., 2017, "Inverted" zircon and apatite (U-Th)/He dates from the Front Range, Colorado: High-damage zircon as a low temperature (<50°C) thermochronometer: *Earth and Planetary Science Letters*, v. 466, p. 80-90, https://doi.org/10.1016/j.epsl.2017.03.002.
41. **Flowers, R.M.,** Farley, K.A., and Ketcham, R.A., 2016, Response to comment on: "A reporting protocol for thermochronologic modeling illustrated with data from the Grand Canyon": *Earth and Planetary Science Letters,* v. 441, p. 213, https://doi.org/10.1016/j.epsl.2016.02.024.
40. *Landman, R.L., **Flowers, R.M.,** Rosenau, N.A., and Powell, J., 2016, Conodont (U-Th)/He thermochronology: A case study from the Illinois Basin: *Earth and Planetary Science Letters*, v. 56, p. 55-65, https://doi.org/10.1016/j.epsl.2016.10.003.
39. *Stanley, J.R. and **Flowers, R.M.,** 2016, Dating kimberlite emplacement with zircon and perovskite (U-Th)/He geochronology: *Geochem. Geophys. Geosyst.* doi: 10.1002/2016GC006519, v. 17, p. 4517-4533, https://doi.org/10.1002/2016GC006519.
38. **Flowers, R.M.,** Farley, K.A., and Ketcham, R.A., 2015, A reporting protocol for thermochronologic modeling illustrated with data from the Grand Canyon: *Earth and Planetary Science Letters,* v. 432, p. 425-435, https://doi.org/10.1016/j.epsl.2015.09.053.
37. *Ault, A.K., **Flowers, R.M.,** and Bowring, S.A., 2015, Synchroneity of cratonic burial phases and gaps in the kimberlite record: Episodic magmatism or preservational bias?: *Earth and Planetary Science Letters,* v. 410, p. 97-104, https://doi.org/10.1016/j.epsl.2014.11.017.
36. *Stanley, J.R., **Flowers, R.M.,** and Bell, D.R., 2015, Erosion patterns and mantle sources of topographic change across the southern African Plateau derived from the shallow and deep records of kimberlites, *Geochem. Geophys. Geosyst.* v. 16, p. 3235-3256, doi:10.1002/2015GC005969, https://doi.org/10.1002/2015GC005969.
35. Condit, C.B., Mahan, K.H., Ault, A.K., and **Flowers, R.M.,** 2015, Foreland-directed propagation of high-grade tectonism in the deep roots of a Paleoproterozoic collisional orogen, SW Montana, USA: *Lithosphere*, https://doi.org/10.1130/L460.1.
34. **Flowers, R.M.**, 2014, News & Views, Geomorphology: Tales of Topography: Nature Geoscience, v. 7, p. 483-485, https://doi.org/10.1038/ngeo2177.
33. **Flowers, R.M.** and Farley, K.A., 2013, Response to Comments on "Apatite $^{4}He/^{3}He$ and (U-Th)/He evidence for an ancient Grand Canyon: *Science*, v. 340, p. 143-c, https://doi.org/10.1126/science.1234203.
32. *Ault, A.K., **Flowers, R.M.,** and Bowring, S.A., 2013, Phanerozoic surface history of the Slave craton: *Tectonics*, v. 32, p. 1-18, https://doi.org/10.1002/tect.20069.
31. *Landman, R.L. and **Flowers, R.M.,** 2013, (U-Th)/He thermochronologic constraints on the evolution of the northern Rio Grande rift, Gore Range, Colorado and implications for rift propagation models: *Geosphere*, v. 9, p. 170-187, https://doi.org/10.1130/GES00826.1.
30. *Stanley, J.R., **Flowers, R.M.,** and Bell, D.R., 2013, Kimberlite (U-Th)/He dating links surface erosion with lithospheric heating, thinning, and metasomatism in the southern African Plateau: *Geology*, v. 14, p. 1243-1246, doi:10.1130/G34797.1, https://doi.org/10.1130/G34797.1.
29. **Flowers, R.M.** and Farley, K.A., 2012, Apatite $^{4}He/^{3}He$ and (U-Th)/He evidence for an ancient Grand Canyon, *Science*, v. 338, p. 1616-1619, https://doi.org/10.1126/science.1229390.
28. **Flowers, R.M.,** *Ault, A.K., Kelley, S.A., Zhang, N., and Zhong, S., 2012, Epeirogeny or eustasy? Paleozoic-Mesozoic vertical motion of the North American continental interior from thermochronometry and implications for mantle dynamics: *Earth and Planetary Science Letters*, v. 317-318, p. 436-445, https://doi.org/10.1016/j.epsl.2011.11.015.
27. *Ault, A.K. and **Flowers, R.M.,** 2012, Is apatite U-Th zonation information necessary for accurate interpretation of apatite (U-Th)/He thermochronometry data?: *Geochimica et Cosmochimica Acta*, v. 79, p. 60-78, https://doi.org/10.1016/j.gca.2011.11.037.

26. *Ault, A.K., **Flowers, R.M.,** and Mahan, K.H., 2012, Quartz shielding of sub-10 um zircons from radiation damage-enhanced Pb loss: an example from a metamorphosed mafic dike, northwestern Wyoming craton: *Earth and Planetary Science Letters*, v. 339-340, p. 57-66, https://doi.org/10.1016/j.epsl.2012.04.025.
25. Farley, K.A. and **Flowers, R.M.,** 2012, (U-Th)/Ne and multidomain (U-Th)/He systematics of a hydrothermal hematite from eastern Grand Canyon: *Earth and Planetary Science Letters,* v. 359-360, p. 131-140, https://doi.org/10.1016/j.epsl.2012.10.010.
24. Moser, D.E., Cupelli, C.L., Barker, I., **Flowers, R.M.,** Bowman, J.R, Wooden, J., and Hart, R.J., 2012, Reply to the discussion by Rajesh and Knoper on "New shock phenomena for dating and reconstruction of large impact basins revealed by zircon microstructural (EBSD, CL), U-Pb and (U-Th)/He analysis of the Vredefort dome": *Canadian Journal of Earth Sciences*,v. 49, p. 863-864, https://doi.org/10.1139/e2012-014.
23. Zhang, N., Zhong, S., and **Flowers, R.M.,** 2012, Predicting and testing continental vertical motion histories since the Paleozoic: *Earth and Planetary Science Letters*, v. 317-318, p. 426-435, https://doi.org/10.1016/j.epsl.2011.10.041.
22. **Flowers, R.M.** and Kelley, S.A., 2011, Interpreting data dispersion and "inverted" dates in apatite (U-Th)/He and fission-track datasets: An example from the U.S. midcontinent: *Geochimica et Cosmochimica Acta,* v. 75, p. 5169-5186, https://doi.org/10.1016/j.gca.2011.06.016.
21. Moser, D.E., Cupelli, C.L., Barker, I., **Flowers, R.M.,** Bowman, J.R, Wooden, J., and Hart, R.J., 2011, New shock phenomena for dating and reconstruction of large impact basins revealed by zircon microstructural (EBSD, CL), U-Pb and (U-Th)/He analysis of the Vredefort dome: *Canadian Journal of Earth Sciences*, Special Issue on the theme of *Geochronology* in honor of Tom Krogh, v. 48, p. 117-139, https://doi.org/10.1139/E11-011.
20. **Flowers, R.M.** and Schoene, B., 2010, (U-Th)/He thermochronometry constraints on unroofing of the eastern Kaapvaal craton and significance for uplift of the southern African Plateau: *Geology*, v. 38, p. 827-830, https://doi.org/10.1130/G30980.1.
19. **Flowers, R.M.,** 2010, The enigmatic rise of the Colorado Plateau, Research Focus: *Geology*, v. 38, p. 671-672, https://doi.org/10.1130/focus072010.1.
18. **Flowers, R.M.,** Schmitt, A., and Grove, M., 2010, Decoupling of U-Pb dates from chemical and crystallographic domains in granulite-facies zircon: *Chemical Geology*, v. 270, p. 20-30, https://doi.org/10.1016/j.chemgeo.2009.11.002.
17. **Flowers, R.M.,** 2009, Exploiting radiation damage control on apatite (U-Th)/He dates in cratonic regions: *Earth and Planetary Science Letters,* v. 277, p. 148-155, https://doi.org/10.1016/j.epsl.2008.10.005.
16. **Flowers, R.M.,** Ketcham, R.A., Shuster, D.L., and Farley, K.A., 2009, Apatite (U-Th)/He thermochronometry using a radiation damage accumulation and annealing model: *Geochimica et Cosmochimica Acta*, v. 73, p. 2347-2365, https://doi.org/10.1016/j.gca.2009.01.015.
15. *Ault, A.K., **Flowers, R.M.,** and Bowring, S.A., 2009, Phanerozoic burial and unroofing history of the western Slave craton and Wopmay orogen from apatite (U-Th)/He thermochronometry, *Earth and Planetary Science Letters*, v. 284, p. 1-11, https://doi.org/10.1016/j.epsl.2009.02.035.
14. **Flowers, R.M.,** Bowring, S.A., Mahan, K.H., Williams, M.L., and Williams, I.S., 2008, Stabilization and reactivation of cratonic lithosphere from the lower crustal record in the western Canadian shield: C*ontributions to Mineralogy and Petrology*, v. 156, p. 529-549, https://doi.org/10.1007/s00410-008-0301-5.
13. **Flowers, R.M.**, Wernicke, B.P., and Farley, K.A., 2008, Unroofing, incision and uplift history of the southwestern Colorado Plateau from apatite (U-Th)/He thermochronometry: *GSA Bulletin*, v. 120, p. 571-587, https://doi.org/10.1130/B26231.1.
12. Mahan, K.H., Goncalves, P., **Flowers, R.,** Williams, M.L., and Hoffman-Setka, D., 2008, The role of heterogeneous strain in the development and preservation of a polymetamorphic record in high-P granulites, western Canadian shield: *Journal of Metamorphic Geology,* v. 26, p. 669-694, https://doi.org/10.1111/j.1525-1314.2008.00783.x.

11. **Flowers, R.M.,** Shuster, D.L., Wernicke, B.P., and Farley, K.A., 2007, Radiation damage control on apatite (U-Th)/He dates from the Grand Canyon region, Colorado Plateau: *Geology*, v. 35, p. 447-450, https://doi.org/10.1130/G23471A.1.
10. **Flowers, R.M.,** Bowring, S.A., and Reiners, P.W., 2006, Low long-term erosion rates and extreme continental stability documented by ancient (U-Th)/He dates: *Geology*, v. 34, p. 925-928, https://doi.org/10.1130/G22670A.1.
9. **Flowers, R.M.,** Bowring, S.A., and Williams, M.L., 2006, Timescales of high-pressure, high-temperature metamorphism and mafic dike anatexis, Snowbird tectonic zone, Canada: *Contributions to Mineralogy and Petrology*, v. 151, p. 558-581, https://doi.org/10.1007/s00410-006-0066-7.
8. **Flowers, R.M.,** Mahan, K.H., Bowring, S.A., Williams, M.L., Pringle, M.S., and Hodges, K.V., 2006, Multistage exhumation and juxtaposition of lower continental crust in the western Canadian Shield: Linking high-resolution U-Pb and $^{40}Ar/^{39}Ar$ thermochronometry with P-T-D paths: *Tectonics*, 25, https://doi.org/10.1029/2005TC001912.
7. Mahan, K.H., Williams, M.L., **Flowers, R.M.,** Jercinovic, M.J., Baldwin, J.A., and Bowring, S.A., 2006, Geochronological constraints on the Legs Lake shear zone with implications for regional exhumation of lower crust, western Churchill Province, Canadian Shield, Canada: *Contributions to Mineralogy and Petrology*, v. 152, p. 223-242, https://doi.org/10.1007/s00410-006-0106-3.
6. Shuster, D.L., **Flowers, R.M.**, and Farley, K.A., 2006, The influence of natural radiation damage on helium diffusion kinetics in apatite: *Earth and Planetary Science Letters*, v. 249, p. 148-161, https://doi.org/10.1016/j.epsl.2006.07.028.
5. **Flowers, R.M.,** Bowring, S.A., Tulloch, A.J., and Klepeis, K.A., 2005, Tempo of burial and exhumation within the deep roots of a magmatic arc, Fiordland, New Zealand: *Geology*, v. 33, p. 17-20, https://doi.org/10.1130/G21010.1.
4. **Flowers, R.M.,** Royden, L.H., and Bowring, S.A., 2005, Isostatic constraints on lithospheric thermal evolution: Application to the Proterozoic orogen of the southwestern United States, *in* Karlstrom, K.E. and Keller, R.G., eds., The Rocky Mountain region – An evolving lithosphere: Tectonics, geochemistry and geophysics: *American Geophysical Union Monograph 154,* p. 125-138, https://doi.org/10.1029/154GM10.
3. **Flowers, R.M.,** Royden, L.H., and Bowring, S.A., 2004, Isostatic constraints on the assembly,stabilization, and preservation of cratonic lithosphere: *Geology*, v. 32, p. 321-324, https://doi.org/10.1130/G20177.2.
2. **Flowers, R.M.,** Moser, D.E. and Hart, R.J., 2003, Evolution of the amphibolite- granulite facies transition exposed by the Vredefort impact structure, Kaapvaal Craton, South Africa: *Journal of Geology*, v. 111, p. 455-470, https://doi.org/10.1086/375282.
1. Moser, D.E., **Flowers, R.M.** and Hart, R.J., 2001, Birth of the Kaapvaal tectosphere 3.08 billion years ago: *Science*, v. 291, p. 465-468, https://doi.org/10.1126/science.291.5503.465.

Other Publications

2. **Flowers, R.M.,** Arrowsmith, R., Metcalf, J.R., Rittenour, T., and Schoene, B.S., 2014, New EarthScope Geochronology Graduate Student Research and Training Program, *inSights the EarthScope Newsletter,* Fall 2014, p. 3.
1. **Flowers, R.M.,** 2009, Pushing back the Age of the Grand Canyon: *OUTCROP*, Newsletter of the Rocky Mountain Association of Geologists, v. 58, no. 9, p. 8, 12-13.

GRANT FUNDING

External Grant Funding

Active

24. **NSF Geobiology & Low Temperature Geochemistry**, EAR-2203532, "Collaborative Research: EAGER: Developing new high spatial resolution hematite (U-Th)/(He-Pb) double dating

techniques to date ancient oxidation," **co-PI** (lead-PI: P. Martin; co-PI: N. Swanson-Hysell), **$80,155** to CU, 12/1/21-11/30/22.

23. **NSF Instrumentation & Facilities,** Supplement to "Acquisition of a 193 nm excimer laser-ablation system, hardware for a custom quadrupole He system, and an optical profiler for in situ (U-Th)/He and U-Pb geo- and thermochronology at the University of Colorado Boulder", **lead PI** (co-PI J. Metcalf), **$68,695** supplement, 9/1/21-8/31/22.
22. **NASA Solar System Workings**, "Collaborative Research: Building a Global Record of Lunar Magmatism and Impact Processes: A Consortium Study of Apollo Regolith Apatite," **co-PI** (lead PI: C. Crow; co-PIs: J. Boyce, M. Brounce, R. Economos, B. Schoene), **$192,651** to Flowers, 1/1/20-12/31/23.
21. **NSF Petrology & Geochemistry, Geophysics,** EAR-1844182, "Deciphering lithospheric and deeper mantle contributions to the surface history of the North American Arctic from the unique mantle to surface record of kimberlites", **lead PI** (co-PI: S. Zhong), **$388,842 to CU**, 7/1/19-6/30/22.
20. **NSF Instrumentation & Facilities,** EAR-1920648, "Acquisition of a 193 nm excimer laser-ablation system, hardware for a custom quadrupole He system, and an optical profiler for in situ (U-Th)/He and U-Pb geo- and thermochronology at the University of Colorado Boulder", **lead PI** (co-PI: J. Metcalf), **$499,562 to CU,** 9/1/19-2/28/22.
19. **NSF Frontier Research in Earth Sciences**, EAR-1925489, "Collaborative Research: Do arc-continent collisions in the tropics set the Earth's climate state?", **co-PI** (lead PI: F. Macdonald; co-PIs: J. Chiang, O. Jagoutz, L. Lisiecki, N. Swanson-Hysell), **$279,152 to CU,** 8/1/19-7/31/23.
18. **NSF Sedimentary Geology & Paleobiology,** EAR-1822119, "Collaborative Research: Did the formation of the Great Unconformity trigger oxygenation and the Cambrian explosion?", **lead PI** (co-PI: F. Macdonald), **$229,950 to CU,** 9/1/18-8/31/20.

Past

17. **NSF Tectonics, Petrology & Geochemistry,** EAR-1759200, "Collaborative Research: AGeS2 (Awards for Geochronology Student research) Program: Democratizing access to geochronology and promoting interdisciplinary science", **lead PI** (co-PIs: R. Arrowsmith, V. McConnell), **$94,964 to CU**; $850,400 total consisting mostly of student award funds, 9/1/18-7/31/21.
16. **NSF Tectonics Program,** EAR-1450181, "Hypsometric history of the North American continental interior and implications for mantle dynamics", **lead PI** (with co-PI S. Zhong), **$296,833**, 8/1/15-7/31/18.
15. **NSF Instrumentation and Facilities Program,** EAR-1559306, "Acquisition of a quadrupole ICPMS system for (U-Th)/He thermochronology and trace element analysis at the University of Colorado Boulder", **lead PI** (with co-PI J. Metcalf), **$183,646,** 8/1/16-7/31/18.
14. **NSF EarthScope,** Supplement to "Collaborative Research: Earthscope geochronology: A student research and training program and EarthScope Institute", **lead PI** (co-PIs R. Arrowsmith, J. Metcalf, T. Rittenour, B. Schoene), **$69,681** supplement ($11,369 to CU), 8/1/17-7/31/18.
13. **Alexander von Humboldt Fellowship for Experienced Researchers,** "Influence of rock strength variations on the exhumation history of cratons", **sole PI, $39,550 EUR,** 7/10/16-7/9/17.
12. **NSF EarthScope Program, EAR-1358514,** "Collaborative Research: Earthscope geochronology: A student research and training program and EarthScope Institute", **lead PI** (co-PIs R. Arrowsmith, J. Metcalf, T. Rittenour, B. Schoene), **$348,407** ($56,845 to CU), 8/1/14-7/31/17.
11. **NASA Cosmochemistry Program,** NNX14AG31G, "Coupled U-Pb and (U-Th)/He geochronology of lunar zircons", **co-PI** (with lead PI S. Mojzsis and co-PI J. Metcalf), **$390,001,** 1/1/14-12/31/16.
10. **NSF CIDER program,** funds to convene workshop in spring 2015 entitled "Integrating Dynamic Topography with Surface and Geological Processes" in Boulder, CO, with Shijie Zhong and Thorsten Becker, **$18,750,** 2014-2015.
9. **ACS Petroleum Research Fund, New Directions Grant 53526-ND8,** "Quantitative constraints on thermal histories in carbonates and marine shales: Conodont (U-Th)/He thermochronometry", **sole PI, $100,000,** 6/1/13-8/31/15.

8. **NSF Tectonics Program,** EAR-1321735, "Collaborative Research: Tracing the geomorphic signature of strike-slip faulting in Marlborough Hill Country, South Island, NZ", **co-PI** (with lead PI A. Duvall and co-PI G. Tucker), **$419,519,** 9/1/13-8/31/17, with no-cost extension.
7. **NSF Instrumentation and Facilities Program,** EAR-1126991, "Early Career: Acquisition of a He system for (U-Th)/He thermochronology at the University of Colorado, Boulder", **sole PI, $320,000,** 9/15/11-8/31/15.
6. **NSF Directorate for Education and Human Resources,** Enhanced Experience Supplement to "CAREER: Evolution of the southern African Plateau using advances in (U-Th)/He thermochronometry, and enhancing student critical thinking in science", **sole PI, $35,000**, 6/15/16-7/31/17.
5. **NSF Tectonics Program,** EAR-0951518, "CAREER: Evolution of the southern African Plateau using advances in (U-Th)/He thermochronometry, and enhancing student critical thinking in science", **sole PI, $531,933**, 6/15/10-6/14/15.
4. **ACS Petroleum Research Fund, New Investigator Grant 47476-G8,** "Evolution of the Rio Grande Rift in the heart of the southern Rockies: Cooling and unroofing history of the Gore Range, Colorado", **sole PI, $50,000,** 3/1/08-2/28/10
3. **NSF Tectonics Program,** EAR-071145, "Quantifying the stability of continents using advances in apatite (U-Th)/He, $^{4}He/^{3}He$ and U/Pb thermochronometry", **sole PI, $193,144,** 9/1/07-8/31/12.

Internal Grant Funding

Past

2. **CU College of Arts & Sciences Renovation Fund Award,** CU TRaIL (U-Th)/He lab renovation**, lead faculty member** (with J. Metcalf), $99,863, 1/1/20-12/31/20.
1. **CU Renovation and Infrastructure Improvement Award** (U-Th)/He lab renovation, **lead faculty member** (with J. Metcalf**), $62,688,** 8/1/16-7/31/17

INVITED TALKS

Invited Talks in Departmental Seminars

2021 Stony Brook University, Dept of Geosciences, virtual
East Carolina University, Dept of Geology, virtual
University of Texas at Arlington, Dept of Earth and Environmental Sciences, virtual
2020 University of California Santa Barbara, Dept of Earth Science
2019 Utah State University, Geology Dept - Forster Lecturer selected by graduate students (two talks)
2018 Yale University, Dept of Geology & Geophysics
College of William & Mary, Geology Dept, 100 years of Women Geoscience Celebration
University of Puerto Rico, Dept of Geology
Appalachian State University, Dept of Geological and Environmental Sciences
Lawrence University, Dept of Geology
2017 Harvard University, Earth & Planetary Sciences
University of Alberta, Dept of Earth and Atmospheric Sciences – Grace Anne Stewart speaker selected by graduate students
Montana State University, Dept of Geology
Southern Methodist University, Roy Huffington Dept of Earth Sciences
University of Potsdam, Institute of Earth and Environmental Science
GFZ German Research Center, Earth Surface Process Modeling Group
University of Bristol, School of Earth Sciences
Cardiff University, School of Earth and Ocean Sciences
University of Franche-Compte, Institute of the Environment
2016 University of Tuebingen, Dept of Geologie and Geodynamik
University of Illinois Champaign-Urbana, Dept of Geology
Grand Valley State University, Dept of Geology
Bowling Green State University, Dept of Geology

University of Arizona, Dept of Geosciences
New Mexico State University, Dept of Geological Sciences
Texas Tech, Dept of Geosciences

2015 University of Idaho, Dept of Geological Sciences
Idaho State University, Dept of Geosciences
University of Montana, Dept of Geosciences

2014 Rice University, Dept of Earth Sciences
University of Houston, Dept of Earth and Atmospheric Sciences – brownbag seminar
Utah State University, Dept of Geology
UNAVCO, Boulder, CO
University of North Carolina Chapel Hill, Dept. of Geological Sciences
University of Northern Colorado, Dept of Earth and Atmospheric Sciences

2013 University of Utah, Dept. of Geology and Geophysics
Princeton University, Dept. of Geosciences
University of Oregon, Dept. of Geological Sciences (two talks)
New Mexico Tech, Dept. of Earth and Environmental Science (two talks)
U.S. Geological Survey, Lakewood, CO
University of the Witwatersrand, School of Geosciences, South Africa

2012 University of Wyoming, Dept. of Geology and Geophysics
Southern Methodist University, Dept. of Earth Sciences
Colorado State University, Dept. of Geosciences
Colorado College, Geology Department
Colorado Scientific Society, Lakewood, Colorado

2011 University of Nevada, Las Vegas, Dept. of Geoscience
The University of the Free State, Dept. of Geology, South Africa
Nelson Mandela Metro University, Dept. of Geosciences, South Africa

2010 Stanford University, Dept. of Geological and Environmental Sciences

2009 University of Texas, Austin, Jackson School of Geological Sciences (two talks)
Boston University, Dept. of Earth Sciences
Colorado School of Mines, Dept. of Geology and Geological Engineering
Four Corners Geological Society, Colorado

2008 University of New Mexico, Dept. of Earth and Planetary Sciences
University of Florida, Dept. of Geological Sciences
University of Montana, Dept. of Geosciences
University of Wyoming, Dept. of Geology and Geophysics
Colorado State University, Dept. of Geosciences

2007 University of Colorado, Boulder, Dept. of Geological Sciences
University of California, Davis, Dept. of Geology
California Institute of Technology, Geoclub Seminar

2006 University of North Dakota, Dept. of Geology and Geological Engineering
North Dakota State University, Dept. of Geosciences
University of Colorado, Boulder, Dept. of Geological Sciences
University of Arizona, Dept. of Geosciences
University of Tennessee, Knoxville, Dept. of Earth and Planetary Sciences
University of Texas, El Paso, Dept. of Geological Sciences

2005 University of Calgary, Dept. of Geology and Geophysics
California Institute of Technology, Geoclub Seminar
University of California, Los Angeles, Dept. of Earth and Space Sciences
University of California, Santa Cruz, Dept of Earth Sciences
University of Texas, El Paso, Dept. of Geological Sciences
Vanderbilt University, Dept. of Earth and Environmental Sciences

Other Invited Talks

2017 National Science Foundation Headquarters, Arlington, VA – Future of the AGeS (Awards for Geochronology Student research) program

Invited Talks to Public Groups

2021 Science from Your Sofa, College of Arts & Sciences, University of Colorado Boulder, virtual
Commencement Speaker, Dept of Geological Sciences, University of Colorado Boulder
2020 Colorado Scientific Society
2014 Collegiate Peaks Forum Series, Buena Vista, CO; Southwest Seminars, Santa Fe, NM
2013 Café Scientifique, University of Colorado, Colorado Springs
2012 Academy for Lifelong Learning, Denver, CO

Invited and Keynote Talks at Meetings

denotes *graduate mentee and **undergraduate mentee
GSA – Geological Society of America; AGU – American Geophysical Union; GAC-MAC – Geological Association of Canada-Mineralogical Association of Canada

18. **Flowers, R.M.,** Arrowsmith, R., McConnell, V., Metcalf, J.R., Rittenour, T., Schoene, B.S., Eriksson, S., 2019, The AGeS2 (Awards for Geochronology Student research 2) program: An update and seeking community input on its future**:** National GSA meeting, Phoenix, AZ, September 2019.
Session: "Diversifying Geochronology: Innovations in techniques, applications, and perspectives"
17. **Flowers, R.M.,** Bowring, S.A., Zhong, S., Macdonald, F.A., 2019, Deep-time (U-Th)/He thermochronology, the missing sedimentary record, and the Great Unconformity: Gordon Research Conference on "Geochronology: Timing, tempo, and drivers of biotic evolution", Waterville, NH, August 2019.
Session: "Supercontinents and biogeography"
16. **Flowers, R.M.,** *Baughman, J.S., *Robinson, K.H., and Metcalf, J.R., 2018, Titanite and rutile (U-Th)/He thermochronology: Diffusion kinetics, radiation damage effects, and utility: 2018 International Conference on Thermochronology, Quedlinburg, Germany. September 2018.
Session: "Noble gas diffusion applied to thermochronology"
15. **Flowers, R.M.,** *Baughman, J.S., *Johnson, J.E., and Metcalf, J.R., 2017, The expanding temperature sensitivity range of (U-Th)/He thermochronology from improved understanding of the "big three" (apatite, zircon and titanite): approaches and examples: National GSA meeting, Seattle, WA, October 2017.
Session: "Improvements and Challenges in Geochronology: Organizing the Past while Planning for the Future"
14. **Flowers, R.M.,** Arrowsmith, R., Metcalf, J.R., Rittenour, T., Schoene, B.S., Hole, J., Pavlis, T., Wagner, L., Whitmeyer, S., and Williams, M.L., 2015, Geology, Geochronology, and EarthScope: The EarthScope AGeS program and a new idea for a 4D-Earth initiative: Fall AGU meeting, San Francisco, CA, December 2015.
Session: "Crustal structure and evolution across the continental US from 10 years of Earthscope investigations: What have we learned and what are the open questions?"
13. **Flowers, R.M.,** *Baughman, J.S., *Johnson, J.E., *Landman, R.L., *Stanley, J.R., **Weisberg, W.R., and Metcalf, J.R., 2015, Expanding the temperature sensitivity range and applicability of the (U-Th)/He system: some examples National GSA meeting, Baltimore, MD, November 2015.
Session: "Novel Methods, Applications, and Data Interpretations in Thermochronology"
12. **Flowers, R.M.,** *Ault, A.K., Zhong, S., and Bowring, S.A., 2015, Exploring relationships between kimberlite distributions, mantle dynamics, and the hypsometric history of the North American cratonic interior: Spring
AGU/GAC-MAC Joint Assembly meeting, Montreal, Canada, May, 2015.

Session: "Origin of cratonic mantle lithosphere, diamonds, and deeply sourced volatile-rich melts: Processes and timescales"

11. **Flowers, R.M.** and Farley, K.A., 2014, Grand Canyon, models, and the interpretation of thermochronology data: Thermo2014, 14th International Conference on Thermochronology, Chamonix, France, September 2014.
    Session: "Landscape evolution on different timescales"
10. **Flowers, R.M.,** 2013, Kimberlites, thermochronology, and the Phanerozoic elevation change histories of cratons: Keynote speaker, post-AGU Cooperative Institute for Dynamic Earth Research symposium, Berkeley, CA, December 2013.
9. **Flowers, R.M.,** Blackburn, T.J., Kelley, S.A., and *Ault, A.K., 2013, Evidence for post-100 Ma deposition, erosion and vertical motion of North American interior regions lacking preserved Cretaceous cover: Invited Speaker, Fall AGU meeting, San Francisco, CA, December 2013.
    Session: "Origin, evolution, and impacts of high topography in continental interiors"
8. **Flowers, R.M.** and Farley, K.A., 2013, Constraints on an ancient Grand Canyon and the topographic evolution of the southwestern Colorado Plateau from thermochronometry: Invited Speaker, National GSA meeting, Denver CO, October 2013.
    Session: "Paleotopography"
7. **Flowers, R.M.,** *Ault, A.K., Kelley, S.K., Zhang, N., and Zhong, S., 2011, Deciphering the history and causes of the cryptic rise and fall of continental interiors using low temperature thermochronology: Invited Speaker, Fall AGU meeting, San Francisco, CA, December 2011.
    Session: "The long road to flat – Towards understanding the drivers and quantifying change in 'dead' orogens"
6. **Flowers, R.M.,** *Ault, A.K., Kelley, S.A., Zhang, N., and Zhong, S., 2011, Testing mantle dynamic models from thermochronology constraints on the rise and fall of continental interiors: Invited Speaker, Special meeting on Dynamic Topography organized by the Royal Astronomical Society, Geological Society and the British Geophysical Association, September 2011.
5. **Flowers, R.M.,** 2010, Interpretation of apatite (U-Th)/He thermochronometry data from cratonic rocks: Invited speaker, Thermo2010, 12th International Conference on Thermochronology, Glasgow, Scotland, August 2010.
    Session: "Interpretation of thermochronology data: Limitations and potential"
4. **Flowers, R.M.,** 2010, Deciphering unroofing, paleotopography and elevation gain of cratonic plateaus using (U-Th)/He thermochronometry: case studies from the Colorado Plateau and southern Africa: Keynote speaker, Structural Geology and Tectonics Forum, Madison, WI, May 2010.
    Session: "Exhumation and large scale tectonics"
3. **Flowers, R.M.,** Wernicke, B.P., and Farley, K.A., 2009, Constraints on Early Tertiary incision and uplift of the Grand Canyon region of the Colorado Plateau from apatite (U-Th)/He thermochronometry: Invited speaker, AGU Joint Assembly, Toronto, Canada, May 2009.
    Session: "Surface geological and tectonic constraints on time-dependent mantle convection"
2. **Flowers, R.M.,** 2008, High to low temperature geo- and thermochronology and the reactivation and stability of continental lithosphere, western Canadian shield: Keynote speaker, Goldschmidt international geochemistry meeting, Vancouver, Canada, July 2008.
    Session: "4D structure of the continental crust: greenstones to granulites",
1. **Flowers, R.M.** and Kelley, S., 2008, Thermal histories in sedimentary basins from integrated low-temperature thermochronometry: An example from the High Plains of New Mexico and western Texas: Invited speaker, Goldschmidt international geochemistry meeting, Vancouver, Canada, July 2008.
    Session: "Sedimentary basin development and evolution"

I am an author on 12-15 abstracts per year submitted to national and international meetings for each of the last few years.

TEACHING

ADVISEES OR LAB MEMBERS

Current Graduate Students

Barra Peak, PhD, Fall 2019-present, ***CU Chancellors Fellow***

Spencer Zeigler, PhD, Fall 2020-present, ***NSF Graduate Research Fellow***

Past Graduate Students

Morgan Baker, MSc, 2019-2022, Correcting for systematic error and estimating uncertainties of alpha-ejection corrections and eU values for the zircon (U-Th)/He method

Colin Sturrock, PhD, 2015-2021, Deciphering burial and erosion histories across the interior of the Canadian shield and implications for mantle dynamics.

Katherine Robinson, MSc, 2017-2019, Development of rutile (U-Th)/He thermochronology.

Jaclyn Baughman, PhD, 2013-2018, Bridging high and low temperature thermal histories across the Kaapvaal craton, southern Africa from advances in titanite and zircon (U-Th)/He thermochronology. Now Assistant Professor at Humboldt State University.

Rachel Havranek, MSc, 2015-2017, Coupling vertical transect zircon (U-Th)/He and Raman spectroscopy data to constrain Colorado Front Range evolution. Now PhD student at CU Boulder.

Jessica Stanley, PhD, 2010-2015, Discerning erosion patterns and mantle sources of topography across the southern African Plateau from the shallow and deep records of kimberlites. ***NSF Graduate Research Fellow.*** Now Assistant Professor at University of Idaho.

Josh Johnson, MSc, 2013-2015, "Inverted" zircon and apatite (U-Th)/He dates and interpretation of high-damage zircon from the southern Rocky Mountains, Front Range, Colorado. Now at Idaho Conservation League, Ketchum, Idaho.

Rachel Landman, PhD 2011-2015, Thermochronologic investigations of Cenozoic unroofing and surface uplift in the southern Rocky Mountains and High Plains.

Rachel Landman, MSc, 2008-2010, Tertiary cooling history of the Gore Range: a northern Rio Grande Rift flank uplift, central Colorado.

Alexis Ault, PhD, 2007-2012, Constraints on craton stability from thermochronologic and geochronologic studies of the Slave and Wyoming cratons. ***NSF Graduate Research Fellow.*** Now Associate Professor at Utah State University. Awarded a CAREER grant and the International Early Career Thermochronology Prize.

Research Associates in Lab Group

Dr. James Metcalf, 2012-present

Dr. Peter Martin, 2020-2022

Dr. Ellen Alexander, 2020-2022

Dr. Jeff Benowitz, Jan 2022-April 2022

Dr. Nigel Kelly, 2014-2017

Geochronology Mentor for AGeS Students

Brian Penserini, UCSB PhD student, 2021 AGeS project entitled: "Testing Multiple Hypotheses for Large-Scale Capture Events using low-T Thermochronometry, Sutlej River, western Himalaya"

Ellen Lamont, Oregon State University PhD student, 2019 AGeS project entitled: "Evaluating Late Cenozoic Mountain Range Evolution in India's Himalayan Fold-and-Thrust Belt"

Matthew Morriss, University of Oregon PhD student, 2016 AGeS project entitled: "Thermochronometric constraints on the age of Hells Canyon, testing lithospheric foundering in NE Oregon".

Mariana Bonich, Syracuse University PhD student, 2015 AGeS project entitled: "Deciphering novel methods to link source rock to sediment sink: Overcoming the 'stepladder effect'"

RESESS Underrepresented Undergraduate Interns in TRaIL
Addison Curtis, 2022, RESESS summer intern in collaboration with PhD student Barra Peak
Haley May, 2018, RESESS summer intern in collaboration with PhD student Colin Sturrock
Fatima Niazy, 2017, RESESS summer intern in collaboration with Dr. Lon Abbott and Dr. Jim Metcalf
Wes Weisberg, 2014-2016, RESESS summer intern in collaboration with Dr. Jim Metcalf
Brandt Scott, 2015, RESESS summer intern in collaboration with Dr. Jim Metcalf
Cristina Lugo-Centeno, 2012, RESESS summer intern in collaboration with Dr. Alison Duvall

Current and Past Undergraduates working in (U-Th)/He Lab
Sabrina Kainz, 2020-2022, Honors thesis in collaboration with Dr. Lon Abbott
Lane Daigle, 2018-2019, Geological Sciences mentoring program and summer UROP in collaboration with Dr. Ben Johnson
Kristin Putnam, Research project in collaboration with Dr. Lon Abbott
Evan Schanock, Research project in collaboration with Dr. Lon Abbott
Noah McCorkel, 2017, Honors thesis in collaboration with Dr. Lon Abbott and Dr. Jim Metcalf
Jamie Glass, 2015-17, UROP and Geological Sciences mentoring program
Coleman Hiett, 2015-17, Honors thesis in collaboration with Dr. Lon Abbott and Dr. Jim Metcalf, now in PhD program at Utah State University, recipient of a 2019 NSF Graduate Research Fellowship
Ryan Stoner, 2015-16, UROP and Geological Sciences mentoring program, Honors thesis, now in PhD program at UCSB, recipient of a 2018 NSF Graduate Research Fellowship
David Liefert, 2014-15, Honors thesis
Melissa Lowe, 2014, Geological Sciences mentoring program
Brenda Kessenich, 2012-2014, UROP and Geological Sciences mentoring program
Connor Simmons, 2013-2014, CU UROP and CU work-study programs
Matthew Tello, 2012- 2013, CU UROP and Geological Sciences mentoring programs
Keith Bowhan, 2012- 2013
Ryan Nell, 2009-2010, CU UROP and Geological Sciences mentoring program
Emily Gregonis (now Wolin), 2008-2009, CU UROP and Geological Sciences mentoring program
Katherine Anarde, 2009, Geological Sciences mentoring program
Marc Serravezza, 2008, Geological Sciences mentoring program
Brian Meyer, 2008, CU Summer undergraduate research experience (SURE) program

CLASSES TAUGHT

GEOL 1010, Introduction to Geology, 3 credits.	Fall 2007-2009, Spring 2011,13,15
GEOL 2005, Introduction to Earth Materials, 4 credits.	Spring 2014-16, 2018-22
GEOL 3090, Developing Scientific Writing Skills, 3 credits.	Fall 2011-13, 2018
GEOL 4500, Critical Thinking, 3 credits.	Spring 2009
GEOL 4960, Writing in Geosciences, 1 credit.	Fall 2009
GEOL 5215/4215, Geochronology, 2 or 3 credits.	Spring 2009,12. Fall 2015,17,20,22
GEOL 5216, Geochronology Reading Seminar, 1 credit	Spring 2020-21
GEOL 5700, Graduate Writing, 2 credits.	Spring 2018. Fall 2019-22.
GEOL 5703, Tectonics reading seminar, 1 credit.	Fall 2014
GEOL 5700/4700, Problems in the Rockies, co-taught, 3 credits.	Spring 2008

Science Education Activities
Participant, Science Education Initiative (SEI) in GEOL, GEOL 4500, GEOL 1010 2x
Participant, multi-institutional NSF-funded GARNET Project, GEOL 1010 2x
Participant, NAGT Temporal Journal Learning Club, monthly virtual discussions of readings that explored the cognitive underpinnings of understanding geologic time, 2011

SERVICE

PROFESSIONAL SERVICE

National and International Service

2014-present	Lead PI, co-founder, and co-director of the AGeS (Awards for Geochronology Student research) Program. There are now 62 labs and >100 senior geochronologists who are part of the AGeS lab network. AGeS-grad has funded 77 collaborative geochronology projects between graduate students and labs averaging ~$8200 each, and seen 331 proposals submitted over 6 proposal cycles. The AGeS-DiG (Diversity in Geochronology) program was launched as a pilot in 2022, and is aimed at expanding access to geochronology for those underrepresented in the Earth sciences. AGeS-DiG has funded 6 projects averaging ~$14,350 each and saw 16 proposals submitted during its first proposal cycle. https://www.agesgeochronology.org/
2019-present	GSA Geochronology Division Management Board, currently Chair
2014-present	Standing Committee for the International Thermochronology Conferences
2017-present	International Steering Committee, EARTHTIME initiative
2021	NSF Review Panel member
2020	NSF Review Panel member
2019	NASA Review Panel member
2019-2021	Organizing Committee, Thermo2021, 17th International Conference on Thermochronology, Santa Fe, NM
2015-18	Member, GSA Student Research Grant Committee
2017	Member, GSA position statement panel on “Removing Barriers to Career Progression for Women in the Geosciences”
2015-17	Secretary, GSA Structural Geology and Tectonics Division
2017	NSF PIRE Site Visit Review Panel member
2012-15	NSF EarthScope Steering Committee
2015	Co-organizer, 2-day NSF CIDER workshop, "Linking dynamic topography with the observational record" in the Dept of Geological Sciences at CU-Boulder
2014	Co-organizer, 2-day GSA short course “EarthScope Institute: Geochronology and the Earth Sciences”, Vancouver, Canada
2013-14	Associate Editor, *Geosphere*
2012-14	Colorado Scientific Society, Counselor,
2013	Organizer, 1.25-day short course, “An introduction to low temperature thermochronology”, at the African Earth Observatory Network, Port Elizabeth, South Africa, attended by 19 diverse African graduate students and postdocs,
2013	Co-organizer, 1-day GSA short course at the CU-Boulder TRaIL, “An introduction to the theory and methods of (U-Th)/He thermochronology”
2013	Organizing committee, NSF EarthCube Geochronology workshop
2013	Instructor at CIDER (Cooperative Institute for Dynamic Earth Research) Summer Program at UC Berkeley
2011-12	AGU Tectonophysics Program Committee
2008	NSF Panel Member

Session Convener

2007, 2009, 2014	AGU Fall Meetings
2010, 2013	GSA National Meetings
2010, 2011, 2013	Goldschmidt Conferences

Panelist/Round Table Discussions

2018 Panelist, two separate round tables on "Diffusion" and "Reproducibility" at the 16th International Conference on Thermochronology, Quedlinburg, Germany.

2016 Panelist, "'Insights into the Writing & Publishing Process" at the Career Development Workshop for NSF Geoscience Postdoctoral Researchers, NOAA, Boulder, CO.

2014 Panelist, "Developing synergies between disciplines" at the Challenges and Opportunities in Geochronology Workshop, pre-Goldschmidt Meeting.

2014 Panelist, two separate round tables on "Diffusion" and "Databases" at the 14th International Conference on Thermochronology, Chamonix, France.

Referee for Journals, Proposals, and Books

Referee for academic journals (27 different journals, typically complete 8-12 manuscript reviews/year): *American Journal of Science, Analytical Chemistry, Chemical Geology, Contributions to Mineralogy and Petrology, Earth and Planetary Science Letters, Earth Surface Processes and Landforms, G-cubed, Geological Society of America Bulletin, Geochimica et Cosmochimica Acta, Geochronology, Geology, Geomorphology, Geophysical Research Letters, Geosphere, Joiurnal of African Earth Sciences, Journal of the Geological Society, Journal of Geophysical Research-Surface Processes, Journal of Metamorphic Geology, Journal of Geology, Journal of Structural Geology, Lithos, Lithosphere, Mountain Geologist, Nature, Precambrian Research, Science, Science Advances, Tectonics, Tectonophysics, Terra Nova*

Referee for National Science Foundation proposals (15 different NSF programs, 6-8 NSF reviews/year): Antarctic Earth Sciences, Arctic Research Opportunities; EarthCube, EarthScope, Frontiers in Earth Science Research, Geoinformatics, Geomorphology, Geophysics, Instrumentation and Facilities, Integrated Earth Systems, Major Research Instrumentation, Marine Geology and Geophysics, Petrology and Geochemistry, Postdoctoral Fellowship, Sedimentary Geology and Paleobiology, Tectonics

Referee for other programs (1-3 proposals/year): American Chemical Society Petroleum Research Fund, Canadian NSERC program, Department of Energy, Dutch Council for Earth and Life Sciences, W.M. Keck Foundation proposals

Referee for book: "Geochronology and Thermochronology" by Reiners, Carlson, et al.

PUBLIC OUTREACH AND RESEARCH DISSEMINATION TO PUBLIC

2021 Geology Bites podcast, 30 min, on "Deciphering the Thermal History of Rocks". https://www.geologybites.com/becky-flowers

2021 Public interest in research on the Great Unconformity in the Grand Canyon. CU press release and coverage from numerous media outlets.

2021 Gneiss Chats podcast interview on "Thermochronology" with the Traveling Geologist. https://www.travelinggeologist.com/podcast/thermochronology/

2020 Public interest in research on the Great Unconformity at Pike Peak, Colorado. Coverage from CNN and other media outlets

2018-19 Science Coach in American Chemical Society, American Association of Chemistry Teachers program. Serve as mentor for high school science teacher Susan Kelly.

2017 Presentation on Geologic Time to first and second graders at Flatirons Elementary School

2012 Public interest in Grand Canyon research. Coverage from hundreds of media outlets, including the front page of *NY Times*, *Washington Post*, and *LA Times*, as well as reports on *NPR* and *PBS NewsHour*.

2010 Filmed for National Geographic "Naked Science" documentary on the origin and evolution of the Grand Canyon

2008 Grand Canyon research included in an annual review for the 2009 Britannica Book of the Year in Geology & Geochemistry

2008 Public interest in Grand Canyon region research. Coverage from Science, Nature, MSNBC, National Geographic.com, Earth Magazine, Science Spin, and other media outlets.

UNIVERSITY SERVICE

2021-22 CU Arts & Sciences Council
2021-22 CU Arts & Sciences Council Planning Committee
2022 CU Arts & Sciences Search Committee for Award Administrator
2020 Reviewer for CU Graduate School Research Grants
2018-19 CU Arts & Sciences Search Committee for Post-Award Administrator
2015-16 CU Arts & Sciences Council
2015-16 CU Arts & Sciences curriculum committee

DEPARTMENT SERVICE

2019-22 Analytical facilities and space committee
2019-22 Graduate curriculum committee
2019-22 Member, SamPLER prep lab committee
2020-22 Graduate admissions committee
2018-19 Member, new chair committee
2018-19 Chair, Salary equity and grievance committee
2017-19 Chair, SamPLER prep lab commitee
2017-18 Futures committee
2017-18 Executive committee
2017-18 Salary equity and grievance committee
2015-16 Search committee, Geobiology faculty member
2014-15 Executive committee
2013-15 Graduate curriculum committee
2012-13 Member, new chair committee
2012-13 Member, Salary equity and grievance committee
2012-13 Undergraduate curriculum committee
2010-12 Analytical facilities and space committee
2009 Colloquium organizer
2008-09 Executive committee
2007-08 Graduate curriculum committee

MEMBERSHIPS

American Geophysical Union
Geological Society of America
Mineralogical Society of America