

Curriculum Vitae • 21 October 2022

STEVEN SEMKEN

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EDUCATION

Professional Preparation

<u>Institution</u>	<u>Degree</u>	<u>Year</u>	<u>Field</u>
Massachusetts Institute of Technology	Ph.D.	1989	Ceramics (Materials Science)
University of California, Los Angeles	M.S.	1984	Geochemistry
Massachusetts Institute of Technology	S.B.	1980	Earth and Planetary Science

Ph.D. Dissertation

Semken, S. C. (1989). Epitaxial crystal growth and oxygen diffusion studies in MgO and CaO, Department of Materials Science and Engineering, Massachusetts Institute of Technology. (Dissertation advisor: Prof. Bernhardt J. Wuensch)

M.S. Thesis

Semken, S. C. (1984). A neodymium and strontium isotopic study of late Cenozoic basaltic volcanism in the southwestern Basin and Range province, Department of Earth and Space Sciences, University of California, Los Angeles. (Thesis advisor: Prof. Donald J. DePaolo)

Active Professional Certifications

Certified Interpretive Guide, National Association for Interpretation, 2016.

Certificate in Diné (Navajo) Educational Philosophy, Diné College, Navajo Nation, 1991.

Arizona State Community College Certification in Earth Sciences and Geology, 1989.

ACADEMIC LEADERSHIP AND FACULTY APPOINTMENTS

<u>Institution</u>	<u>Title</u>	<u>Dates</u>	<u>Major Field or Program</u>
Arizona State University School of Earth and Space Exploration	Professor	Since 2016	Geoscience Education Research, Geological Sciences, and Science Teacher Professional Development
Mary Lou Fulton Teachers College	Affiliate Faculty	Since 2021	Science Teacher Preparation and Professional Development
Global Drylands Center	Affiliate Faculty	Since 2018	Drylands-related Geoscience and Geoscience Education Research
Julie Ann Wrigley Global Futures Laboratory	Senior Global Futures Scientist	Since 2013	Sustainability Science Education Research

Arizona State University Barrett, The Honors College	Honors Faculty	Since 2007	Honors Geology Education and Honors Thesis Mentoring
School of Earth and Space Exploration	Associate Director for Community Outreach	2015-2017	Oversight of SESE Public Outreach Activities and Major Events; Liaison to Faculty
	Associate Professor	2009-2016	Geoscience Education Research, Geological Sciences, and Science Teacher Professional Development
	Associate Director for Undergraduate Programs	2011-2013	Curriculum Oversight; Course and Faculty Scheduling; New Course and Program Development; Undergraduate Academic Issues
School of Earth and Space Exploration (formerly Department of Geological Sciences)	Assistant Professor	2003-2009	Geoscience Education Research, Geological Sciences, and Science Teacher Professional Development
New Mexico Institute of Mining and Technology Department of Earth and Environmental Science	Adjunct Professor	2002-2003	Geological Sciences and Science Teacher Professional Development
United States Air Force Academy Department of Chemistry	Visiting Associate Professor	1998 (sabbatical)	Geochemistry and Planetary Science Education and Research and Cadet Leadership Training
Diné College (Tribal College of the Navajo Nation), Division of Mathematics, Science, and Technology	Geology and Environmental Science Instructor	1988-2003	Geology, Environmental Science, and Chemistry Education and Research
	Division Chair	2000-2003	Academic Unit Administrator and Faculty and Staff Supervisor
Massachusetts Institute of Technology Department of Materials Science and Engineering	IBM Graduate Research Fellow	1986-1989	Crystal Chemistry and Transport Properties of Oxide Ceramics

NATIONAL LEADERSHIP AND ACADEMIC FELLOWSHIPS

2018-2019	Local Chair, Geological Society of America 131 st Annual Meeting, Phoenix, AZ, September 2019.
2016-2017	EarthScope Program Speaker (funded by National Science Foundation).

2011-2015	EarthScope Program National Office (funded by National Science Foundation) Deputy Director for Education and Outreach.
2007-2008	Institute for Humanities Research, Arizona State University Institute for Humanities Research Fellow.
2000-2001	National Association of Geoscience Teachers (NAGT), Elected President.
1996-2000	National Association of Geoscience Teachers, Distinguished Speaker.
1999-2000	National Association of Geoscience Teachers, First Vice-President.
1998-1999	National Association of Geoscience Teachers, Second Vice-President.
1996-1998	National Association of Geoscience Teachers Councilor at Large, Executive Committee.
1991-1995	National Association of Geoscience Teachers President, Southwest Section (Arizona, New Mexico, Colorado, Utah).

HONORS AND AWARDS

Outstanding Paper Award, *Journal of Geoscience Education*, National Association of Geoscience Teachers (with co-authors C. Mead [lead], S. Buxner, G. Bruce, W. Taylor, and A. Anbar), 2020.

Provost's Teaching Fellow, 2015-2017, Arizona State University.

Named to River Dell Regional High School Hall of Fame as Distinguished Graduate, Oradell, New Jersey, 2017.

Best Geological Guidebook Award, for *Route 66 Country*, New Mexico Geological Society Guidebook 64 (with co-editors K. Ziegler [lead], M. Timmons, and S. Timmons), Geoscience Information Society, 2015.

Zebulon Pearce Distinguished Teaching Award in the Natural Sciences, College of Liberal Arts and Sciences, Arizona State University, 2014-2015 (Highest teaching award for natural-sciences faculty in the College and University; previously nominated for the award for 2008-2009).

Elected Fellow of the Geological Society of America, 2014.

Editor's Citation as Outstanding Reviewer for *Eos*, American Geophysical Union, 2013.

Honorary Visiting Professor, Hetao University, Inner Mongolia Autonomous Region, China, 2008.

Institute for Humanities Research Fellow, Arizona State University, 2007.

Award for Meritorious Contributions to American Indian People, Northeastern State University of Oklahoma, 1999.

Award for Outstanding Educational Paper, Waste-management Education and Research Consortium (WERC) Conference on the Environment, 1996 and 1999.

Burlington Resources Foundation Faculty Teaching Award, Diné College, 1991 and 1992.

Dean's Award for Outstanding Instruction, Diné College, 1990 and 1995.

Goodwin Medal (Graduate Teaching Assistant of the Year), Massachusetts Institute of Technology, 1985.

John Wulff Graduate Teaching Award, Department of Materials Science and Engineering, MIT, 1984.

BIBLIOGRAPHY

Notes: *denotes ASU student co-author; †denotes Diné College student co-author.

Guest Editorships

2012-2014: NAGT-designated guest Managing Editor for the two-issue special themed edition of the *Journal of Geoscience Education* titled Teaching Geoscience in the Context of Culture and Place: Volume 62, Numbers 1 and 2, February and May 2014.

2000: NAGT-designated guest Managing Editor for the special themed edition of the *Journal of Geoscience Education* titled Some Great Ideas for Geoscience Teachers: Volume 48, Number 5, November 2000.

Papers in Review or Under Revision

69. Foley, K.*, Petcovic, H. & **Semken, S.** (in review). How college geoscience instructors find and implement virtual field experiences in their courses. *Journal of Geoscience Education*.
68. Hubbard, K.*, Haberle, C., Elkins-Tanton, L., Christensen, P., & **Semken, S.** (in review). Thermal-infrared emission spectroscopy of graybody minerals (sulfide): Implications for extraterrestrial exploration for magmatic ore deposits. *Earth and Space Science*.
67. Ruberto, T.*, Mead, C., Anbar, A. D., & **Semken, S.** (in review). Content learning outcomes from virtual field trips can exceed those from in-person field trips. *Journal of Geoscience Education*.
66. Gober, P., Wentz, E. A., Fischer, H., García, Á. A.*, & **Semken, S.** (under revision). What focus groups and job ads in Phoenix reveal about workforce training in natural hazards. *Journal of Geography in Higher Education*.
65. Shusterman, M. L.*, Wing, B. R., Sim, C., Chamberlain, C. F., Robinson, M. S., & **Semken, S.** (under revision). AccessColor: Producing palettes for diverse color acuities. *Journal of Geoscience Education*.

Refereed Scholarly Publications

64. Londoño, S. C.*, **Semken, S.**, Brandt, E., & Garzón, C. (in press). Understanding the geology of the Colombian Amazon through Indigenous eyes: Educational potential of an ethnogeology of the Uitoto territory. In P. W. U. Chinn & S. Nelson-Barber (Eds.), *Indigenous STEM education: Perspectives from the Pacific Islands, the Americas, and Asia, Volume 1*. Springer.
63. Corbett, A., Bierman, P., **Semken, S.**, & Whitaker, J. (2022). Can community laboratory facilities increase access and inclusivity in geoscience? *Earth and Space Science*, 9(5), <https://doi.org/10.1029/2021EA002028>.
62. **Semken, S.**, & Garcia, Á. A., Jr.* (2021). Synergizing standards-based and place-based science education. *Cultural Studies of Science Education*, 16(2), 447-460, <https://doi.org/10.1007/s11422-021-10020-4>.
61. St. John, K., McNeal, K., Macdonald, H., Kastens, K., Bitting, K., Cervato, C., McDaris, J., Petcovic, H., Pyle, E., Riggs, E., Ryker, K., **Semken, S.**, & Teasdale, R. (2021). A community framework for geoscience education research: Summary and recommendations for future research priorities. *Journal of Geoscience Education*, 69(1), <https://doi.org/10.1080/10899995.2020.1779569>.
60. Robeck, E., Awad, A., **Semken, S.**, Manning, C., Daniels, M., & Blankenbicker, A. (2020). Earth science all around: Using immersive virtual field trips with place-based instruction in Earth and space science education. *The Earth Scientist*, 36(1), 15-21, <https://www.nestanet.org/resources/Documents/Advocacy/TES/2015-2020/Spring%202020.pdf>.
59. García, Á. A., Jr.*, **Semken, S.**, & Brandt, E. (2020). The construction of cultural consensus models to characterize ethnogeological knowledge. *Geoheritage*, 12, <https://doi.org/10.1007/s12371-020-00480-5>.

58. Hoke, K., O'Connell, K., **Semken, S.**, & Arora, V. (2020). Promoting a sense of place virtually: A review of the ESA Weekly Water Cooler Chat focused on virtual sense of place. *Bulletin of the Ecological Society of America*, 101, <https://dx.doi.org/10.1002/bes2.1734>.
57. Atchison, C., Parker, W., Riggs, N., **Semken, S.**, & Whitmeyer, S. (2019). Accessibility and inclusion in the field: A field guide for central Arizona and Petrified Forest National Park. In P. A. Pearthree (Ed.), *Geologic excursions in southwestern North America: Geological Society of America Field Guide 55* (pp. 39-60). Boulder, CO: Geological Society of America, [https://doi.org/10.1130/2019.0055\(02\)](https://doi.org/10.1130/2019.0055(02)).
56. St. John, K., Bitting, K., Cervato, C., Kastens, K., Macdonald, H., McDaris, J., McNeal, K., Petcovic, H., Pyle, E., Riggs, E., Ryker, K., **Semken, S.**, & Teasdale, R. (2019). An evolutionary leap in how we teach geosciences. *Eos*, 100, <https://doi.org/10.1029/2019EO127285>.
55. Mead, C., Buxner, S., Bruce, G., Taylor, W., **Semken, S.**, & Anbar, A. D. (2019). Immersive, interactive virtual field trips promote science learning. *Journal of Geoscience Education*, 67(2), 131-142, <https://doi.org/10.1080/10899995.2019.1565285>. Winner of the 2020 JGE Outstanding Paper Award, National Association of Geoscience Teachers.
54. Horodyskyj, L., Mead, C., Belinson, Z., Buxner, S., **Semken, S.**, & Anbar, A. D. (2018). *Habitable Worlds: Delivering on the promises of online education. Astrobiology*, 18(1), 86-99, <https://doi.org/10.1089/ast.2016.1550>.
53. Perera, V. *, Mead, C., Buxner, S., Lopatto, D., Horodyskyj, L., **Semken, S.**, & Anbar, A. D. (2017). Students in fully online programs report more positive attitudes toward science than students in traditional, in-person programs. *CBE-Life Sciences Education*, 16(4), ar60, <https://doi.org/10.1187/cbe.16-11-0316>.
52. **Semken, S.**, Ward, E. G., Moosavi, S., & Chinn, P. W. U. (2017). Place-based education in geoscience: Theory, research, practice, and assessment. *Journal of Geoscience Education*, 65(4), 542-562, <https://doi.org/10.5408/17-276.1>.
51. Londoño, S. C. *, Makuritofe, V., Brandt, E., **Semken, S.**, & Garzón, C. (2016). Ethnogeology in Amazonia: Surface-water systems in the Colombian Amazon, from perspectives of Uitoto traditional knowledge and mainstream hydrology. In G. R. Wessel & J. K. Greenberg (Eds.), *Geoscience for the public good and global development: Toward a sustainable future: Geological Society of America Special Paper 520* (pp. 221-232). Boulder, CO: Geological Society of America, [https://doi.org/10.1130/2016.2520\(20\)](https://doi.org/10.1130/2016.2520(20)).
50. Ward, E. G., **Semken, S.**, & Libarkin, J. (2014). The design of place-based, culturally informed geoscience assessment. *Journal of Geoscience Education*, 62(1), 86-103, <https://doi.org/10.5408/12-414.1>.
49. Apple, J.°, Lemus, J.°, & **Semken, S.**° (2014). Teaching geoscience in the context of culture and place. *Journal of Geoscience Education*, 62(1), 1-4, <https://doi.org/10.5408/1089-9995-62.1.1>. (°All authors contributed equally to this paper and are listed alphabetically.)
48. Allison, C. M. *, Porter, R. C., Fouch, M. J., & **Semken, S.** (2013). Seismic evidence for lithospheric modification beneath the Mojave Neovolcanic Province, Southern California. *Geophysical Research Letters*, 40, 5119-5124, <https://doi.org/10.1002/grl.50993>.
47. Mathis, A., Lillie, R. J., & **Semken, S.** (2013). Sharing geology with the public along I-40 using interpretive and place-based educational techniques. In K. Zeigler, J. M. Timmons, S. Timmons, & **S. Semken** (Eds.), *Geology of the Route 66 region: Flagstaff to Grants: New Mexico Geological Society Guidebook 64* (pp. 20-22). Socorro, NM: New Mexico Geological Society. **ISBN: 9781585460991**.
46. Zeigler, K., Timmons, J. M., Timmons, S., & **Semken, S.** (Eds.). (2013). *Geology of the Route 66 region: Flagstaff to Grants: New Mexico Geological Society Guidebook 64*. Socorro, NM: New Mexico Geological Society. **ISBN: 9781585460991**. Winner of the 2015 Best Geological Guidebook Award, Geoscience Information Society.

45. Bohon, W.*, Robinson, S., Arrowsmith, R., & **Semken, S.** (2013). Building an effective social media strategy for science programs. *Eos, Transactions, American Geophysical Union*, 94(27), 237-238, <https://doi.org/10.1002/2013EO270001>.
44. Bueno Watts, N.*, Baker, D. R., & **Semken, S.** (2013). The impact of writing-intensive professional development on high school teachers' science content knowledge of energy in systems. *Global Journal of Human Social Science-G*, 13(3), 45-58. <https://pdfs.semanticscholar.org/0d23/dd6093c32cb3c685de58c66eb52faa13d657.pdf>.
43. **Semken, S.** (2012). Place-based teaching and learning. In N. M. Seel (Ed.), *Encyclopedia of the sciences of learning* (pp. 2641-2642). New York: Springer. ISBN: 9781441914279.
42. Luft, J., Wong, S.*, & **Semken, S.** (2011). Rethinking recruitment: The comprehensive and strategic recruitment of secondary science teachers. *Journal of Science Teacher Education*, 22, 459-474, <https://doi.org/10.1007/s10972-011-9243-2>.
41. van der Hoeven Kraft, K.*, Srogi, L., Husman, J., **Semken, S.**, & Fuhrman, M. (2011). Engaging students to learn through the affective domain: A new framework for teaching in the geosciences. *Journal of Geoscience Education*, 59(2), 71-84, <https://doi.org/10.5408/1.3543934a>.
40. Williams, D.*, & **Semken, S.** (2011). Ethnographic methods in analysis of place-based geoscience curriculum and pedagogy. In A. P. Feig & A. Stokes (Eds.), *Qualitative inquiry in geoscience education research: Geological Society of America Special Paper 474* (pp. 49-62). Boulder, CO: Geological Society of America, [https://doi.org/10.1130/2011.2474\(05\)](https://doi.org/10.1130/2011.2474(05)).
39. **Semken, S.**, & Brandt, E. (2010). Implications of sense of place and place-based education for ecological integrity and cultural sustainability in contested places. In D. Tippins, M. Mueller, M. van Eijck, & J. Adams (Eds.), *Cultural studies and environmentalism: The confluence of ecojustice, place-based (science) education, and indigenous knowledge systems* (pp. 287-302). New York: Springer, https://doi.org/10.1007/978-90-481-3929-3_24.
38. **Semken, S.**, Williams, D.*, Ross, J., Kerr, B., & Monhardt, R. (2010). Design elements and learning outcomes of two place-based teacher professional development programs situated in the Southwest United States: Concordance with Universal Design for Learning. *Proceedings of the National Association for Research in Science Teaching*, Philadelphia, Pennsylvania.
37. Bueno Watts, N.*, Baker, D. R., **Semken, S.**, & Lang, M. (2010). Improving high school teachers' content knowledge of energy in systems through research-based professional development. *Proceedings of the National Association for Research in Science Teaching*, Philadelphia, Pennsylvania.
36. **Semken, S.**, Butler Freeman, C.*, Bueno Watts, N.*, Neakrase, J.*, Dial, R.*, & Baker, D. (2009). Factors that influence sense of place as a learning outcome of place-based geoscience teaching. *Electronic Journal of Science Education*, 13, 136-159. <https://ejse.southwestern.edu/article/view/7803>.
35. Gonzales, D., & **Semken, S.** (2009). A comparative study of field-inquiry in an undergraduate petrology course. In S. J. Whitmeyer, D. W. Mogk, & E. J. Pyle (Eds.), *Field geology education: Historical perspectives and modern approaches: GSA Special Paper 461* (pp. 205-221). Boulder, CO: Geological Society of America. [https://doi.org/10.1130/2009.2461\(18\)](https://doi.org/10.1130/2009.2461(18)).
34. **Semken, S.**, Dodick, J., Ben-David, O., Pineda, M.*, Bueno Watts, N.*, & Karlstrom, K. (2009). Timeline and time scale cognition experiments for a geological interpretative exhibit at Grand Canyon. *Proceedings of the National Association for Research in Science Teaching*, Garden Grove, California.
33. Brand, B. D.*, Clarke, A. B., & **Semken, S.** (2009). Eruptive dynamics and depositional processes of Narbona Pass maar volcano, Navajo volcanic field, Navajo Nation, New Mexico (USA). *Bulletin of Volcanology*, 71, 49-77. <https://doi.org/10.1007/s00445-008-0209-y>.

32. Karlstrom, K., **Semken, S.**, Crossey, L., Perry, D., Gyllenhaal, E. D., Dodick, J., Williams, M., Hellmich-Bryan, J., Crow, R., Bueno Watts, N.*, & Ault, C. (2008). Informal geoscience education on a grand scale: the Trail of Time exhibition at Grand Canyon. *Journal of Geoscience Education*, 56(4), 354-361. https://doi.org/10.5408/informal_geoscience_education_.
31. **Semken, S.**, & Butler Freeman, C.* (2008). Sense of place in the practice and assessment of place-based science teaching. *Science Education*, 92(6), 1042-1057. <https://doi.org/10.1002/sce.20279>.
30. Bueno Watts, N. F.*, **Semken, S.**, Pineda, M.*, & Alvarado, C.* (2008). Visitors' geological conceptions and meaning making at Petrified Forest National Park. *Proceedings of the National Association for Research in Science Teaching*, Baltimore, Maryland.
29. **Semken, S.**, Fouch, M., Garner, E., Zah, P., & Lippert, D. (2007). Meshing American Indian concerns with goals of EarthScope's USArray. *Eos, Transactions, American Geophysical Union*, 88, 309-310. <https://doi.org/10.1029/2007EO310001>.
28. **Semken, S.**, & Butler Freeman, C. L.* (2007). Cognitive and affective outcomes of a Southwest place-based approach to teaching introductory geoscience. *Proceedings of the National Association for Research in Science Teaching*, New Orleans, Louisiana.
27. Butler Freeman, C. L.*, **Semken, S.**, Lawson, A., Oehrtman, M., Schaufele, C., & Jensen, J.* (2007). How old is the Earth: an exploration of geologic time through place-based inquiry. *Proceedings of the National Association for Research in Science Teaching*, New Orleans, Louisiana.
26. Gonzales, D., & **Semken, S.** (2006). Integrating undergraduate education and scientific discovery through field research in igneous petrology. *Journal of Geoscience Education*, 54, 133-142. <https://doi.org/10.5408/1089-9995-54.2.133>.
25. Hahn, D.*, Brem, S. K., & **Semken, S.** (2005). Exploring the social, moral, and temporal qualities of pre-service teachers' narratives of evolution. *Journal of Geoscience Education*, 53, 456-461. <https://doi.org/10.5408/1089-9995-53.4.456>.
24. **Semken, S.** (2005). Sense of place and place-based introductory geoscience teaching for American Indian and Alaska Native undergraduates. *Journal of Geoscience Education*, 53(2), 149-157. <https://doi.org/10.5408/1089-9995-53.2.149>.
23. Wilson, D., Aster, R., West, M., Ni, J., Grand, S., Gao, W., Baldrige, W. S., **Semken, S.**, & Patel, P. (2005). Lithospheric structure of the Río Grande Rift. *Nature*, 433, 851-855. <https://doi.org/10.1038/nature03297>.
22. Wilson, D., Aster, R., Ni, J., Grand, S., West, M., Gao, W., Baldrige, W. S., & **Semken, S.** (2005). Imaging the seismic structure of the crust and upper mantle beneath the Great Plains, Río Grande Rift, and Colorado Plateau using receiver functions. *Journal of Geophysical Research*, 110, B05306, <https://doi.org/10.1029/2004JB003492>.
21. Lucas, S. G., **Semken, S. C.**, Berglof, W. R., & Ulmer-Scholle, D. S. (Eds.). (2003). *Geology of the Zuni Plateau: New Mexico Geological Society Guidebook 54*. Socorro, NM: New Mexico Geological Society. <https://nmgs.nmt.edu/publications/guidebooks/54/>.
20. **Semken, S.** (2003). Black rocks protruding up: the Navajo volcanic field. In S. G. Lucas, **S. C. Semken**, W. R. Berglof, & D. S. Ulmer-Scholle (Eds.), *Geology of the Zuni Plateau: New Mexico Geological Society Guidebook 54* (pp. 133-138). Socorro, NM: New Mexico Geological Society. https://nmgs.nmt.edu/publications/guidebooks/downloads/54/54_p0133_p0138.pdf.
19. Blackhorse, A.†, **Semken, S.**, & Charley, P. (2003). A Navajo-English thesaurus of geological terms. In S. G. Lucas, **S. C. Semken**, W. R. Berglof, & D. S. Ulmer-Scholle (Eds.), *Geology of the Zuni Plateau: New Mexico Geological Society Guidebook 54* (pp. 103-108). Socorro, NM: New Mexico Geological Society. https://nmgs.nmt.edu/publications/guidebooks/downloads/54/54_p0103_p0107.pdf.

18. Gok, R., Ni, J., West, M., Sandvol, E., Wilson, D., Aster, R., Baldrige, W.S., Grand, S., Gao, W., Tillman, F., & **Semken, S.** (2003). Shear-wave splitting and mantle flow beneath LA RISTRA. *Geophysical Research Letters*, 30(12), 1614, <https://doi.org/10.1029/2002GL016616>.
17. Wilson, D., Leon, J., Aster, R., Ni, J., Schlue, J., Grand, S., **Semken, S.**, Baldrige, S., & Gao, W. (2002). Broadband seismic background noise at temporary seismic stations observed on a regional scale in the southwestern United States. *Bulletin of the Seismological Society of America*, 92(8), 3335-3341. <https://doi.org/10.1785/0120010234>.
16. Riggs, E. M., & **Semken, S. C.** (2001). Culture and science: Earth science for Native Americans. *Geotimes*, 46, 14-17.
15. **Semken, S. C.** (2001). The Navajo volcanic field. In L. S. Crumpler & S. G. Lucas (Eds.), *Volcanoes of New Mexico: Bulletin 18* (pp. 79-83), Albuquerque, NM: New Mexico Museum of Natural History and Science. <https://econtent.unm.edu/digital/collection/bulletins/id/847>.
14. Reynolds, S. J., & **Semken, S. C.** (2000). Rocks before terms and tables—from the concrete to the abstract. *Journal of Geoscience Education*, 48, 572. <https://doi.org/10.5408/1089-9995-48.5.572a>.
13. **Semken, S. C.** (Ed., invited). (2000). Some great ideas for geoscience teachers [special issue]. *Journal of Geoscience Education*, 48(5). <https://doi.org/10.5408/1089-9995-48.5.570a>.
12. **Semken, S. C.** (1999, invited). Oxygen. In C. P. Marshall & R. W. Fairbridge (Eds.), *Encyclopedia of geochemistry* (pp. 467-469): Dordrecht, Netherlands: Kluwer Academic Publishers.
11. Kelly, M., Ort, M., Tashiro, J., & **Semken, S.** (1999). *VR Excursions: Exploring Earth's Environment*. Upper Saddle River, NJ: Prentice-Hall.
10. Dubiel, R. F., Hasiotis, S. T., & **Semken, S. C.** (1997). Hands-on geology for Navajo Nation teachers. *Journal of Geoscience Education*, 45(2), 113-116. <https://doi.org/10.5408/1089-9995-45.2.113>.
9. **Semken, S. C.**, & Morgan, F. (1997). Navajo pedagogy and Earth systems. *Journal of Geoscience Education*, 45(2), 109-112. <https://doi.org/10.5408/1089-9995-45.2.109>.
8. **Semken, S. C.** (1997). NAGT/GSA symposium on geoscience education in Native American communities. *Journal of Geoscience Education*, 45(2), 104-105. <https://doi.org/10.5408/1089-9995-45.2.104>.
7. Tsosie, B. †, **Semken, S.**, & Harrison, B. (1997). The Shiprock uranium-mill tailings remedial action (UMTRA) site. In O. J. Anderson, B. S. Kues, & S. G. Lucas (Eds.), *Mesozoic geology and paleontology of the Four Corners region: New Mexico Geological Society Guidebook 48* (pp. 279-281). Socorro, NM: New Mexico Geological Society. https://nmgs.nmt.edu/publications/guidebooks/downloads/48/48_p0279_p0281.pdf.
6. **Semken, S. C.**, & McIntosh, W. C. (1997). ⁴⁰Ar/³⁹Ar age determinations for the Carrizo Mountains laccolith, Navajo Nation, Arizona. In O. J. Anderson, B. S. Kues, & S. G. Lucas (Eds.), *Mesozoic geology and paleontology of the Four Corners region: New Mexico Geological Society Guidebook 48* (pp. 75-80). Socorro, NM: New Mexico Geological Society. https://nmgs.nmt.edu/publications/guidebooks/downloads/48/48_p0075_p0080.pdf.
5. **Semken, S. C.**, & Oversby, V. M. (1994). Coal ash as a naturally-occurring radioactive material—regulation before research? *Proceedings, 29th Intersociety Energy Conversion Engineering Conference*, 48-50.
4. Wuensch, B. J., **Semken, S. C.**, Uchikoba, F., & Yoo, H. I. (1991). The mechanisms for self-diffusion in magnesium oxide. *Ceramic Transactions*, 24, 79-89.
3. Farmer, G. L., Perry, F. V., **Semken, S.**, Crowe, B., Curtis, D., & DePaolo, D. J. (1989). Isotopic evidence on the structure and origin of subcontinental lithospheric mantle in southern Nevada. *Journal of Geophysical Research*, 94, 7885-7898. <https://doi.org/10.1029/JB094iB06p07885>.

2. Ingel, R. P., Lewis, D., III, Bender, B. A., & **Semken, S. C.** (1988). Properties and microstructures of rapidly solidified zirconia-based ceramic alloys. In S. Somiya (Ed.), *Science and technology of zirconia III: Advances in Ceramics 24* (pp. 385-396). Cincinnati, OH: American Ceramic Society.
1. Sclater, J. G., Royden, L., Horváth, F., Burchfiel, B. C., **Semken, S.**, & Stegena, L. (1980). The formation of the intra-Carpathian basins as determined from subsidence data. *Earth and Planetary Sciences Letters*, 51, 139-162. [https://doi.org/10.1016/0012-821X\(80\)90262-9](https://doi.org/10.1016/0012-821X(80)90262-9).

White Papers

- W2. **Semken, S.**, Bhattacharyya, J., Duggan-Haas, D., Pallant, A., & Wiggen, J. (2018). Research on instructional strategies to improve geoscience learning in different settings and with different technologies. In K. St. John (Ed.), *Community framework for geoscience education research*. National Association of Geoscience Teachers. https://doi.org/10.25885/ger_framework/9.
- W1. Hall-Wallace, M., Benthien, M., Boyd, T., Marvinney, R., Meertens, C., **Semken, S.**, Taber, J., & Wald, L. (2002). *EarthScope education and outreach program plan*. Washington, DC: EarthScope.

Other Publications for Education and Public Outreach

- E42. **Semken, S.** (2021). *Tsé ligaii: The white sandstone of the Chuska Mountains. Leading the Way: The Wisdom of the Navajo People*, 19(3), 20-21.
- E41. **Semken, S.** (2017). Dikes. *Leading the Way: The Wisdom of the Navajo People*, 15(7), 31.
- E40. Apple, J.^e, Lemus, J.^e, & **Semken, S.**^e (2014). Teaching geoscience in the context of culture and place: Theme issue continued. *Journal of Geoscience Education*, 62(2), 157. (^eAll authors contributed equally to this paper and are listed alphabetically.) <https://doi.org/10.5408/1089-9995-62.1.1>.
- E39. Zeigler, K., **Semken, S.**, & Moore, C. (2013). Meteor Crater: from misunderstanding to obsession to geologic icon. In K. Zeigler, J. M. Timmons, S. Timmons, & **S. Semken** (Eds.), *Geology of the Route 66 region: Flagstaff to Grants: New Mexico Geological Society Guidebook 64* (pp. 22-23). Socorro, NM: New Mexico Geological Society.
- E38. Zeigler, K., & **Semken, S.** (2013). Old Route 66: Getting your kicks in the American Southwest. In K. Zeigler, J. M. Timmons, S. Timmons, & **S. Semken** (Eds.), *Geology of the Route 66 region: Flagstaff to Grants: New Mexico Geological Society Guidebook 64* (pp. 23-24). Socorro, NM: New Mexico Geological Society.
- E37. Zeigler, K., Timmons, J. M., & **Semken, S.** (2013). Third-day road log: Trip 1, Trip 2, and Trip 3: Pre-trip: From El Rancho Hotel in Gallup, New Mexico to Northwest Regional Visitor's Center in Grants, New Mexico. In K. Zeigler, J. M. Timmons, S. Timmons, & **S. Semken** (Eds.), *Geology of the Route 66 region: Flagstaff to Grants: New Mexico Geological Society Guidebook 64* (pp. 50- 74). Socorro, NM: New Mexico Geological Society.
- E36. Parker, W., Martz, J., Zeigler, K., **Semken, S.**, & Timmons, J. M. (2013). Second-day road log: From a corner in Winslow, Arizona, through Petrified Forest National Park, to the El Rancho Hotel in Gallup, New Mexico. In K. Zeigler, J. M. Timmons, S. Timmons, & **S. Semken** (Eds.), *Geology of the Route 66 region: Flagstaff to Grants: New Mexico Geological Society Guidebook 64* (pp. 25- 49). Socorro, NM: New Mexico Geological Society.
- E35. Zeigler, K., Riggs, N., Timmons, J. M., Ort, M., & **Semken, S.** (2013). First-day road log: From Flagstaff to SP and Colton Craters, Wupatki and Sunset Crater National Monuments, and Meteor Crater. In K. Zeigler, J. M. Timmons, S. Timmons, & **S. Semken** (Eds.), *Geology of the Route 66 region: Flagstaff to Grants: New Mexico Geological Society Guidebook 64* (pp. 9-24). Socorro, NM: New Mexico Geological Society.
- E34. **Semken, S.** (2013). Antelope Canyon history. *Leading the Way: The Wisdom of the Navajo People*, 11(1), 24.
- E33. **Semken, S.** (2012). EarthScope and place-based education. *inSights*, summer 2012.

- E32. **Semken, S.** (2012). Seashells in the Shiprock area. *Leading the Way: The Wisdom of the Navajo People*, 10(7), 22-23.
- E31. **Semken, S.**, Schaufele, C., & Zumoff, N. (2012). Math and geoscience “placed” in context. *In the Trenches*, 2(2), 12-13.
- E30. Peterson, V. L., Garver, J. I., **Semken, S.**, & Williams, W. J. W. (2011). Enhancing participation of two-year college faculty in the Geological Society of America. *GSA (Geological Society of America) Today*, 21(12), 36-38.
- E29. **Semken, S.** (2011). A sense of the American Southwest: Place-based Earth system science for diverse students. *In the Trenches*, 1(3), 1-4.
- E28. **Semken, S.** (2011). Place, place knowledge, and sense of place as themes for cross-cultural science curriculum: A photoessay. *Indigenous Science Network Bulletin*, 14(1). Retrieved 01 February 2011 from http://members.ozemail.com.au/%7Emmie/bulletin_feb11.pdf.
- E27. Crow, R., Karlstrom, K., Crossey, L., **Semken, S.**, Perry, D., Williams, M., & Bryan, J. (2011). It’s about time: Innovations in geoscience education at the Grand Canyon. *Legacy*, 22, 26-27.
- E26. **Semken, S.** (2010). Ship Rock and the Navajo volcanic field. In L. G. Price (Ed.), *The geology of northern New Mexico’s parks, monuments, and public lands* (pp. 85-91). Socorro, NM: New Mexico Bureau of Geology and Mineral Resources.
- E25. **Semken, S.**, Dodick, J., Frus, R.*, Wells, M., Perry, D., Bryan, J., Williams, M., Crow, R., Crossey, L., & Karlstrom, K. (2009, November-December). Studies of informal geologic time learning at the “Trail of Time” in Grand Canyon National Park. *Informal Learning Review*, 1(99), 1-5.
- E24. **Semken, S.** (2009, April). Putting Earth science back in its place. *Arizona Geology*. Retrieved 08 April 2009 from http://www.azgs.gov/arizona_geology/april09/article_earthscience%20.html.
- E23. **Semken, S.** (2008). A sense of the Southwest. *Newsletter, Bioregional Outdoor Education Project*, 9(3), 1-12.
- E22. Heckert, A. B., Kues, B. S., & **Semken, S. C.** (2003). From Bear Spring to Fort Wingate. In S. G. Lucas, S. C. Semken, W. R. Berglof, & D. S. Ulmer-Scholle (Eds.), *Geology of the Zuni Plateau: New Mexico Geological Society Guidebook 54* (pp. 37-40). Socorro, NM: New Mexico Geological Society.
- E21. Lucas, S. G., Heckert, A. B., Berglof, W. R., Kues, B. S., Crumpler, L. S., Aubele, J. C., McLemore, V. T., Owen, D. E., & **Semken, S. C.** (2003). Second-day road log, from Gallup to Fort Wingate, Sixmile Canyon, Ciniza, Red Rock Park, Church Rock, White Mesa, Thoreau, and Grants. In S. G. Lucas, S. C. Semken, W. R. Berglof, & D. S. Ulmer-Scholle (Eds.), *Geology of the Zuni Plateau: New Mexico Geological Society Guidebook 54* (pp. 35-68). Socorro, NM: New Mexico Geological Society.
- E20. Lucas, S. G., **Semken, S. C.**, Heckert, A. B., Berglof, W. R., Hoffman, G., Kues, B. S., Crumpler, L. S., & Aubele, J. C. (2003). First-day road log, from Gallup to Gamerco, Yah-Ta-Hey, Window Rock, Fort Defiance, Navajo, Todilto Park, Crystal, Narbona Pass, Sheep Springs, Tohatchi, and Gallup. In S. G. Lucas, S. C. Semken, W. R. Berglof, & D. S. Ulmer-Scholle (Eds.), *Geology of the Zuni Plateau: New Mexico Geological Society Guidebook 54* (pp. 1-34). Socorro, NM: New Mexico Geological Society.
- E19. Riggs, E., & **Semken, S.** (2003). Earth science education for Native Americans. *Newsletter, Bioregional Outdoor Education Project*, 4(3), 1-10.
- E18. **Semken, S.**, & Gonzales, D. (2002, October 15). Rainbows in the rocks. *Daily Times, Farmington, New Mexico*, pp. A1, A5.
- E17. **Semken, S. C.** (2002, invited). Citation: National Association of Geoscience Teachers 2001 Neil Miner Award. *Journal of Geoscience Education*, 50, 221-223.

- E16. **Semken, S. C.** (2002). *Ch'óoshgai doo Tsézhiiin 'íí 'áhi: the Chuska Mountains, Defiance Plateau, and Navajo Volcanic Field: Western Slope Intercollegiate Field Conference Guidebook 14*. Shiprock, NM: Diné College.
- E15. **Semken, S. C.** (2001). Comments on a list of references on science teaching and Native cultures. *Tribal College Journal*, 12, 7.
- E14. **Semken, S. C.**, Drummond, C., & Harder, V. (2001). The National Association of Geoscience Teachers: dedicated to geoscience education. *GSA (Geological Society of America) Today*, 11(10), 53.
- E13. **Semken, S. C.** (1999). Aboriginal cultures and Earth science. *GSA (Geological Society of America) Today*, 9(8), 18.
- E12. Ridgway, K., Dowse, M., Geary, E. E., Maxson, J., **Semken, S.**, Stephenson-Hawk, D., & Winkler, J. (1997, invited). How can we increase diversity, recruitment, and retention of students in the Earth and space sciences? In M. F. W. Ireton, C. A. Manduca, & D. W. Mogk (Eds.). *Shaping the future of undergraduate Earth science education: Innovation and change using an Earth system approach* (pp. 39-43). Washington, DC: American Geophysical Union.
- E11. Anderson, O. J., Lucas, S. G., **Semken, S. C.**, Chenoweth, W. L., & Black, B. A. (1997). Third-day road log, from Durango, Colorado, to Aztec, Farmington, and Shiprock, New Mexico. In O. J. Anderson, B. S. Kues, & S. G. Lucas (Eds.), *Mesozoic geology and paleontology of the Four Corners region: New Mexico Geological Society Guidebook 48* (pp. 35-56). Socorro, NM: New Mexico Geological Society.
- E10. Lucas, S. G., Anderson, O. J., Leckie, R. M., Wright-Dunbar, R., & **Semken, S. C.** (1997). Second-day road log, from Cortez, Colorado, to Mesa Verde National Park, Mancos, and Durango. In O. J. Anderson, B. S. Kues, & S. G. Lucas (Eds.), *Mesozoic geology and paleontology of the Four Corners region: New Mexico Geological Society Guidebook 48* (pp. 19-33). Socorro, NM: New Mexico Geological Society.
- E9. Anderson, O. J., Lucas, S. G., Chenoweth, W. L., & **Semken, S. C.** (1997). First-day road log, from Cortez, Colorado, to Montezuma Creek, Bluff, Aneth, and Four Corners. In O. J. Anderson, B. S. Kues, & S. G. Lucas (Eds.), *Mesozoic geology and paleontology of the Four Corners region: New Mexico Geological Society Guidebook 48* (pp. 1-18). Socorro, NM: New Mexico Geological Society.
- E8. Brown, L. F., Hickmott, D. D., Currier, R. P., **Semken, S. C.**, Lameman, T.†, Martin, S.†, & Yazzie, S.† (1996). *Reducing adverse health effects and improving performance of stoves on the Navajo Reservation, a plan for action: Los Alamos National Laboratory Report LA-UR-96-4016*. Los Alamos, NM: Los Alamos National Laboratory.
- E7. **Semken, S. C.** (1996). Introduction to the geology and hydrogeology of northwestern New Mexico. *Proceedings, New Mexico Water Conference, New Mex. Water Resources Research Institute*, 13-21.
- E6. **Semken, S.** (1996, February 2). Creationist beliefs refuted. *Daily Times, Farmington, New Mexico*, p. B4.
- E5. **Semken, S.** (1996, January 12). Scientists are curious human beings: Response to creationists. *Daily Times, Farmington, New Mexico*, p. B4.
- E4. **Semken, S. C.** (1992). Looking after the land. *Tribal College Journal*, 3, 11-12.
- E3. **Semken, S. C.**, Slate, C., & Crank, L., Jr.†. (1992). Geologic road log from Shiprock to Chinle, Navajo Nation. In **S. C. Semken** (Ed.), *Ti' Diné bitsé' dadiniil': Field guide to a geologic excursion in the northeastern Navajo Nation: Western Slope Intercollegiate Field Conference Guidebook 4* (pp. 5-32). Shiprock, NM: Navajo Community College.
- E2. **Semken, S. C.** (Ed.). (1992). *Ti' Diné bitsé' dadiniil': Field guide to a geologic excursion in the northeastern Navajo Nation: Western Slope Intercollegiate Field Conference Guidebook 4*. Shiprock, NM: Navajo Community College.

- E1. **Semken, S. C.** (1983). Geology of Cima Dome, Cima Volcanic Field, Afton Canyon, and Manix Fault areas, California. In D. Casebier (Ed.), *Guide to the Mojave Road* (pp. 137, 173-174, 177, 216-219). Los Angeles: Mojave Road Publications.

Digital Resources Produced or Co-Produced

Earth Science All Around-360 Imagery and Place-Based Education: <https://bit.ly/395s2C4>
Grand Canyon Virtual Field Trip: <https://vft.asu.edu/iVFTLocations/GrandCanyon/GCOptions.html>
Red Rocks Virtual Field Trip: <https://aelp.smartsparrow.com/v/open/xir5pehl>
Dinosaur Doom (K-Pg) Virtual Field Trip: <https://vft.asu.edu/iVFTLocations/KPG/KPGOptions.html>
Science Education Resource Center (SERC) Contributions: <https://serc.carleton.edu/person/1096.html>

Physical Resources Co-Produced

Co-designer and co-constructor of the *Trail of Time Geoscience Exhibition* at Grand Canyon National Park, funded by the National Science Foundation with support from the National Park Service: <https://www.nps.gov/grca/planyourvisit/the-trail-of-time.htm>.

INVITED PROFESSIONAL PRESENTATIONS

Note: ¶ denotes a presentation as *National Association of Geoscience Teachers (NAGT) Distinguished Speaker*, § denotes a presentation as *EarthScope Speaker*, and # denotes an *online* presentation.

- 2022 *VI Simpósio Brasileiro de Patrimônio Geológico* (6th Brazilian Geological Heritage Symposium), São Paulo, Brazil, Invited Speaker[#].
University of Minnesota *Graduate Student Symposium*, Keynote Speaker[#].
Geological Society of Minnesota[#].
Chandler-Gilbert Community College[#].
- 2021 University of Wyoming: for online multi-university seminar *Diversity and Inclusion in Geoscience*[#].
AGU Sharing Science Webinar: *Honoring Living Landscapes with Stories*[#].
National Park Service, Montezuma Castle and Tuzigoot National Monuments, Geological Training Webinar[#].
National Academies of Sciences, Engineering, and Medicine *Roundtable on Systemic Change in Undergraduate STEM Education*[#].
New Mexico Institute of Mining and Technology[#].
UNESCO *Geoheritage for Resilience to Geohazards* Webinar Series[#].
Paleontological Research Institution: *Science in the Virtual Pub*[#].
- 2020 NAGT *On the Cutting Edge Webinar on Developing a Sense of Place During Distance Learning*, Invited Speaker[#].
University of Wisconsin-Madison[#]. Algoma University[#].
National Academy of Sciences, National Park Service, U. S. Geological Survey, and American Geosciences Institute, *America's Geoheritage Workshop II*, Distinguished Speaker[#].
Grand Canyon National Park, National Park Service: *Virtual Grand Canyon GeoFest 2020*[#].
University of New Mexico[#].
Ecological Society of America *Virtual Water Cooler Chat: Connecting to Place—Virtually*[#].

- 2019 Association of Environmental and Engineering Geologists, Phoenix Chapter.
Mapping Grand Canyon Conference, Arizona State University, Invited Speaker.
- 2018 University of Vermont.
- 2018 Puerto Rico Louis Stokes Alliance for Minority Participation, Universidad de Puerto Rico.
- 2017 University of Colorado, Boulder.
James Madison University[§].
University of Missouri[§].
University of Texas, Arlington[§].
University of Arizona.
Michigan State University[§].
- 2016 *35th International Geological Congress*, Cape Town, South Africa, Invited Keynote Speaker.
Grand Canyon National Park, Office of Interpretation, National Park Service.
- 2015 *EarthScope National Meeting*, Stowe, VT, Invited Plenary Speaker.
- 2014 Arizona Western College, Faculty Professional Development, Invited Keynote Speaker.
- 2013 Purdue University.
National Academy of Sciences, U. S. Geological Survey, National Park Service, American Geosciences Institute, and Colorado Geological Survey, *America's Geologic Heritage Workshop I*, Lakewood, CO, Invited Keynote Speaker.
- 2012 University of Nebraska-Lincoln: *Stout Lecture Series*.
- 2011 University of Oklahoma: *Native Science Series*.
- 2009 NAGT/NSF *On the Cutting Edge* Workshop on the Affective Domain, Mesa Community College, Invited Keynote Speaker.
- 2008 Hetao University (Bayonnaer, Inner Mongolia, China).
Ningxia University (Yinchuan, Ningxia Hui, China).
Northwest University for Nationalities (Yinchuan, Ningxia Hui, China).
University of Northern Colorado.
- 2006 University of Oklahoma.
New Mexico State University.
New Mexico Institute of Mining and Technology.
- 2005 Diné College.
- 2004 Mesa Community College.
Southwestern Indian Polytechnic Institute.
Fort Lewis College.
Four Corners Geological Society.
- 2003 New Mexico Bureau of Geology and Mineral Resources.
University of North Dakota.
- 2002 Navajo Nation Department of Health.
University of Arizona.
University of New Mexico.

- 2000 Prescott College[¶].
 2000 San Juan College.
 Monument Valley Navajo Tribal Park.
 2000 Navajo Nation Department of Emergency Management.
 Northwest Indian College[¶].
 1999 Snow College[¶].
 University of California, Riverside[¶].
 Northeastern State University (Oklahoma)[¶].
 1998 Colorado College[¶].
 Mount Holyoke College[¶].
 Northern Arizona University.
 1997 Cerritos College[¶].
 Michigan Technological University[¶].
 Hamilton College[¶].
 University of Delaware[¶].
 University of British Columbia[¶].

INVITED EDUCATION AND OUTREACH ACTIVITIES

Public Talks, Workshops, Hikes, and Field Trips Led for Community Education and Outreach

Note: # denotes an online presentation.

- Recurring Boyce Thompson Arboretum State Park, Superior, AZ, and
 Lost Dutchman State Park/Superstition Wilderness, Pinal County, AZ.
 (Since 2009, I have led hikes for public outreach an average of 5 times/yr in these parks)
 Earth and Space Exploration Day, School of Earth and Space Exploration, ASU (annually).
- 2022 Classical Academy Charter School of Clifton, Clifton, NJ[#].
 Dead Horse Ranch State Park, Cottonwood, AZ.
 Superior Chamber of Commerce, Superior, AZ.
- 2021 STEM Summer Scholars Academy, Passaic County Comm. College, Paterson, NJ[#].
 Many Farms Chapter Summer Student Program, Many Farms, Navajo Nation, AZ[#].
 Lifelong Learning at PebbleCreek, Goodyear, AZ.
- 2020 STEM Summer Scholars Academy, Passaic County Comm. College, Paterson, NJ[#].
 Desert Botanical Garden, Phoenix, AZ.
 Lifelong Learning at PebbleCreek, Goodyear, AZ.
- 2019 Beaver Creek Trails Coalition, Lake Montezuma, AZ.
 "Voice of Democracy Arizona" radio program, KFNX-AM, Phoenix, AZ.
 Herberger Institute of Design and the Arts Outreach Day, Arizona State University.
 Superior Chamber of Commerce, Superior, AZ.
 Grand Canyon National Park, AZ.

2018 Beaver Creek Trails Coalition, Lake Montezuma, AZ.
 Superstition Area Land Trust, Apache Junction, AZ.
 Community STEAM Night, Pascua Yaqui Tribal Center, Guadalupe, AZ.

2018 Desert Botanical Garden, Phoenix, AZ.
 Herberger Institute of Design and the Arts Outreach Day, Arizona State University.

2017 Community STEAM Night, Pascua Yaqui Tribal Center, Guadalupe, AZ.
 Desert Botanical Garden, Phoenix, AZ.
 Grand Canyon National Park Public Programs, AZ.

2016 Legends of Superior Trails Ecotourism Festival, Superior, AZ.
 Superstition Area Land Trust, Apache Junction, AZ.

2015 Desert Botanical Garden, Phoenix, AZ.
 Scientific Panelist, Phoenix Comic-Con, Phoenix, AZ.
 Legends of Superior Trail Ecotourism Festival, Superior, AZ.

2014 Annual Great Arizona ShakeOut EarthScope Public Event, ASU, Tempe, AZ.
 Legends of Superior Trail Ecotourism Festival, Superior, AZ.
 Central Arizona Geology Club, Prescott, AZ.

2013 Annual Great Arizona ShakeOut EarthScope Public Event, ASU, Tempe, AZ.
 Bullion Plaza Historical Museum, Miami, AZ.
 Legends of Superior Trail Ecotourism Festival, Superior, AZ.

2012 Annual Great Arizona ShakeOut EarthScope Public Event, ASU, Tempe, AZ.
 Legends of Superior Trail Ecotourism Festival, Superior, AZ.

2011 Sun City Anthem Hiking Club, Florence, AZ.

2010 Arcadia Neighborhood Learning Center, Scottsdale, AZ.

2009 Southwest Cultures Club, Fountain Hills, AZ

2008 International Yin Shan Rock Art Scientific Inspection, Inner Mongolia, China.
 Yinchuan Middle School #1, Yinchuan, Ningxia Hui, China.
 McDowell Sonoran Conservancy, Scottsdale.

2005 ASU President's Community Enrichment Program, Heard Museum, Phoenix.
 Pueblo Grande Museum, Phoenix.

2004 Society for Advancement of Chicanos and Native Americans in Science, Austin, TX.

2000 American Indian Science and Engineering Society, Gallup, NM.

1997 Society of Mining and Metallurgical Engineers, Albuquerque, NM.

GRANTS AWARDED (*active)

#	Title	Agency	Funds	Duration	Semken %	and Role
25*	Dutton's Atlas: How Cartography Helped the Canyon Become Grand	Arizona Humanities Council	\$ 21,000	01/01/22 to 12/31/22	25%	Co-PI Lead PI: M. Toro, ASU Libraries
24*	NASA SMD Exploration Connection	NASA Goddard Space Flight Center NNX16AD79A	\$4,000,000	01/21/16 to 12/31/25	5%	Collaborator PI: A. Anbar, ASU SESE
23*	GP-IMPACT: Collaborative Workforce Training in Geoscience and Social Science for Natural-Hazards Preparedness and Mitigation (HazPM)	NSF Improving Undergraduate Science Education Program GEO-1600562	\$ 481,235	09/01/16 to 08/31/19	20%	PI Co-PI: P. Gober, ASU SoGSUP
22	Flipping Into Science: Teachers and Principals Working Together: A Team Approach to Implementing AZCCRS in Science	Arizona Board of Regents Improving Teacher Quality Program	\$ 250,000	07/01/15 to 06/30/16	20%	Co-PI PI: D. Baker, ASU MLFTC
21	Collaborative Research: RUI: Deep Drilling of Lake Junin, Peru: Continuous Tropical Records of Glaciation, Climate Change, and Magnetic Field Variations Spanning the Late Quaternary	NSF Global Change Program EAR-1402076 Supplement	\$ 35,079	06/01/15 to 05/30/18	100%	Senior Personnel PI: D. Rodbell, Union College
20	Exploration-Driven Online Science Education: Habitable Worlds 2.0	NSF Transforming Undergraduate Science Education Program DUE-1225741	\$ 599,078	01/01/13 to 12/31/15	40%	Co-PI PI: A. Anbar, ASU SESE
19	ESNO Earth Science Education and Outreach Provider Summit	NSF Earth Sciences Program EAR-1216301	\$ 33,050	01/10/12 to 01/09/14	50%	PI Co-PI: J R. Arrowsmith, ASU SESE
18	Copper Triangle Pilot Project: Enhancing Opportunities for Geoscience Studies and Careers in a Culturally Diverse, Underserved Rural Mining Area	NSF Opportunities for Enhancing Diversity in the Geosciences Program GEO-1108044	\$ 198,975	08/15/11 to 07/31/15	35%	PI Co-PI: E. Vivoni, ASU SESE

17	Bridging Data, New Technologies, and Communities to Enable and Communicate EarthScope Exploration and Discovery: EarthScope National Office at Arizona State University	NSF EarthScope EAR-1101100	\$2,450,744	05/01/11 to 04/30/16	20%	Co-PI PI: J R. Arrowsmith, ASU SESE
16	Collaborative Research: Cultural Validation of Geoscience Assessment	NSF Geoscience Education Program GEO-1034926	\$ 59,311	10/01/10 to 09/30/14	100%	Sole ASU PI Lead PI: E. Ward, Rocky Mountain College
15	NASA Triad: A Triangulated Program to Promote NASA STEM Education Nationwide	NASA Goddard Space Flight Center K-12 CAN	\$ 597,829	09/01/10 to 08/31/15	20%	Co-PI PI: E. Robeck, American Geosciences Institute
14	Follow the Elements	NASA Astrobiology Institute	\$7,517,437	01/01/09 to 12/31/14	4%	Co-PI PI: A. Anbar, ASU SESE
13	Science Teachers in Arizona: Recruitment and Retention (STARR)	NSF Robert Noyce Scholarship Program DUE-0833311	\$ 750,000	09/01/08 to 08/31/14	25%	Co-PI PI: M. Orchinik, ASU SoLS
12	Communication in English and Science Inquiry Project for High Schools (CESIP-HS)	Arizona Board of Regents Improving Teacher Quality Program	\$ 238,184	01/03/08 to 06/30/10	8%	Senior Personnel PI: M. Lang, Maricopa Community College District
11	Collaborative Research: Evaluating Student Learning in Geoscience Curricula that Employ Conceptests Using Electronic Student Response Systems	NSF Course, Curriculum, and Lab Improvement Program DUE-0716296	\$ 64,889	08/01/07 to 07/31/12	100%	Sole ASU PI Lead PI: D. Steer, University of Akron
10	Sustainability and Sense of Place in Cultural Landscapes	ASU Institute for Humanities Research Fellows Program	\$ 36,828	05/01/07 to 08/15/08	33%	Co-PI PI: E. Brandt, ASU SHESC

9	Situating Earth Science and Mathematics in Superior: Outcomes and Applications of Place-Based Earth Science Teaching	NSF Small Grants for Exploratory Research GEO-0706653	\$ 49,821	11/15/06 to 01/31/09	100%	Sole PI
8	Collaborative Research: The Trail of Time: Integrated Geoscience Education at Grand Canyon National Park	NSF Informal Science Education Program ISE-0610345	\$ 272,909	08/01/06 to 05/31/11	100%	Sole ASU PI Lead PI: K. Karlstrom, University of New Mexico
7	Technology Assistance with Implementation and Operation of Transportable Array Element of USArray and EarthScope	NSF Earth Sciences Program EarthScope	\$ 105,552	04/01/05 to 06/30/06	50%	Co-PI PI: M. Fouch, ASU SESE
6	Native American Perspectives and Preferences Bearing on EarthScope Deployments in the Southwest	NSF Earth Sciences Program EarthScope EAR-0454502	\$ 29,998	03/01/05 to 12/31/07	25%	PI Co-PI: E. Garnero, ASU SESE
5	USArray Transportable Array Siting Outreach	Incorporated Research Institutions for Seismology (IRIS) Education and Outreach Program	\$ 30,179	01/01/05 to 06/30/06	50%	PI Co-PI: M. Fouch, ASU SESE
4	CRESMET Project Pathways MSP: Opening Routes to Math and Science Success for All Students	NSF Math/Science Partnerships Program EHR-0412537	\$12,500,000	08/01/04 to 07/31/10	4%	Senior Personnel PI: M. Carlson, ASU SoMSS
3	Enhancing Large-Enrollment Geology Lecture Classes with Technology-Assisted, Real-Time Peer Interaction	ASU College of Liberal Arts and Sciences Quality of Undergraduate Education Program	\$ 10,340	07/01/04 to 06/30/05	100%	PI
2	Indigenous Geology: Development and Assessment of a Culturally-Resonant, Place-Based Model of Geology Education for American Indian Pre-Service Teachers	Arizona Board of Regents Learner-Centered Education Program	\$ 25,000	01/01/04 to 03/31/06	25%	PI Co-PI: D. Baker, ASU MLFTC

1	Kéyah Math: Place-Based, Culturally-Responsive, Technology-Intensive, Quantitative Modules for Introductory Undergraduate Geoscience	NSF Opportunities for Enhancing Diversity in the Geosciences Program GEO-0355224	\$ 429,629	09/01/03 to 04/30/08	25%	PI Co-PI: C. Schaufele, Diné College
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TEACHING

Courses Taught at Arizona State University (In the School of Earth and Space Exploration, Mary Lou Fulton Teachers College, and School of Sustainability)

Introduction to Geology I: Physical Geology (GLG 101): Spring 2004, Fall 2005, Fall 2006.

Introduction to Geology II: Historical Geology (GLG 102/104): Fall 2008, Spring 2011, Spring 2014, Spring 2016.

Earth Science in Arizona and the Southwest (GLG 301/598/SOS 372): Fall 2010 (created the course), Fall 2011, 2012, 2013, and 2014; Spring 2015; Fall 2015, 2016, 2018, 2019, 2020, and 2021.

The Storied Southwest: Landscapes, Climate, Culture, and Change (GLG 394/ENG 394): Spring 2021 (co-created and co-taught with Prof. Joni Adamson, Department of English).

SESE Colloquium (GLG 400/500): Spring 2006.

Computers in Geology (GLG 410): Fall 2004.

Field Geology I (GLG 451): Spring 2008, 2009, 2010, and 2017.

Field Geology II (GLG 452): Summer 2007, 2008, 2009, and 2010 (co-taught with Prof. Thomas Sharp).

Advanced Field Geology (GLG 455): Spring 2007.

Cordilleran Regional Geology (GLG 456); Spring 2006 (co-taught with Prof. Stephen Reynolds).

Pro-Seminar (GLG 498): Spring 2012 (co-taught with Prof. Kip Hodges).

Connecting Biology, Geology, and Mathematics (GLG 593/598): Spring 2006 (co-created the course; co-taught with Prof. Anton Lawson).

Situating Earth and Space Sciences (GLG 598): Spring 2007 and 2008 (created the course).

Exploration of Science Teaching (SES/SED 111): Spring 2007, Fall 2007 and 2008, Spring 2009, Fall 2010 (co-created the course; co-taught with Prof. Julie Luft and Dr. Sissy Wong Kavas).

History of Earth and the Solar System and Laboratory (SES 122/124): Spring 2020 (co-taught with Prof. Stephen Reynolds); Spring 2021 and 2022.

Exploring SESE (SES 191): Fall 2022.

Teaching Earth and Space Sciences (SES 480): Fall 2003, Fall 2005 (expanded course to 3 units), Spring 2011 (co-taught with Dr. Katrien van der Hoeven Kraft), Spring 2015 and 2019.

Creating Virtual Field Trips for Teaching Earth and Space Sciences (SES 494/598): Spring 2020 (created the course).

Patterns in Nature (BLE 498, ASU-Diné College Teacher Education Program): Fall 1997.

Courses Taught at United States Air Force Academy, 1998 (In the Department of Chemistry)

General Chemistry I Lecture and Lab (Chem 141): Spring and Fall 1998.

General Chemistry II Lecture and Lab (Chem 142): Spring 1998.

Space Chemistry: Inner Solar System (Chem 325): Fall 1998.

Courses Taught at Diné College, 1988-2003 (In the Division of Math, Science, & Technology)

Indigenous Physical Geology Lecture and Laboratory (GLG 101).

Historical Geology Lecture and Laboratory (GLG 102).

Environmental Geology (GLG 203).

Field and Laboratory Geology for Navajo Nation Teachers (GLG 229).

Practicum in Earth and Environmental Sciences (ENV 297).

Fundamental Chemistry Lecture and Laboratory (CHM 100).

General Chemistry I Lecture and Laboratory (CHM 151).

General Chemistry II Lecture and Laboratory (CHM 152).

Introduction to Physics I Lecture and Laboratory (PHY 101).

College Algebra (MTH 110).

Other ASU Teaching Activities

- Since 2015 *Osher Lifelong Learning Institute at Arizona State University*: created and taught several short non-credit courses and colloquia for community members:
- *A Geological Narrative of Arizona and the Southwest* (course), at Tempe Public Library, Tempe, AZ, in Spring 2015, 2016, 2017, and 2018;
 - *Geologic History of Grand Canyon* (colloquium), at Maravilla, Scottsdale, AZ, Summer 2017; and Online, Spring 2021.
 - *Volcanoes of Arizona* (colloquium), Online, Fall 2020.
- 2007 *Physics of Earth and Planetary Surfaces and Interiors (PEPSI) Seminar Series*: I organized and ran this weekly seminar series in the School of Earth and Space Exploration during the Spring 2007 semester.

Curriculum and Program Development

- Created or co-created and piloted these new courses for the School of Earth and Space Exploration, School of Sustainability, and Mary Lou Fulton Teachers College at ASU:
 - Earth Science in Arizona and the Southwest* (GLG 301/SOS 372; 3 credit major elective course); a Southwest place-based Earth system science and environmental geoscience course; it was approved for credit toward the Science and Society requirement in the College of Liberal Arts and Sciences and is cross-listed in the ASU School of Sustainability.
 - Teaching Earth and Space Sciences* (SES 480; 3 credit major seminar course); a revised research-based instructional methods course for pre-service teachers.
 - Exploration of Science Teaching* (SES 111/SED 111; 1-credit practicum); this course affords potential pre-service teachers the opportunity to experience student teaching early in the program. Co-developed with Julie Luft.
- Directed the design and 2006-07 implementation, and the 2009-2010 revision, of the *Bachelor of Arts in Education/Initial Teacher Certification degree program in Secondary Earth and Space Sciences Education* (a joint degree with the Mary Lou Fulton Teachers College).

- Developed and piloted new courses *Exploration of Science Teaching*, *Teaching Earth and Space Sciences*, *Situating Earth and Space Sciences in the Southwest*, and *Connecting Biology, Geology, and Mathematics* under the auspices of the Center for Research on Education in Science, Mathematics, Engineering, and Technology (CRESMET) at ASU. The latter two courses are specifically aimed at in-service middle-school and high-school teachers. I taught the two courses for in-service teachers in school districts in Chandler, Mesa, Superior, and San Carlos Apache Nation, AZ. The latter two are high-need, minority-majority school districts.
- Infused Southwestern place-based teaching and learning approach into large-lecture *Introduction to Physical Geology* (GLG 101) and *Introduction to Historical Geology* (GLG 102) courses in SESE to enhance relevance to students.
- Collaborator in the ASU *College of Liberal Arts and Sciences Information Infusion Initiative* (CLAS I³) during 2003 and 2004, helping to develop Information Literacy standards for CLAS curricula and disseminating Information Literacy resources to colleagues.
- Guided implementation of *Blackboard course management software* and *student response systems* (“clickers”) by School of Earth and Space Exploration faculty, under the auspices of the CLAS I³. Presented several day-long Blackboard training sessions for faculty colleagues. Installed response-system receivers in lecture rooms with funding from a CLAS *Quality of Undergraduate Instruction* grant.

Educator, Interpreter, and Researcher Professional Development Workshops Organized and Led

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| 2021 | Co-organized and co-led a <i>Workshop on Preparing for Student Creation of Virtual Contexts for Exploring Geoscience Environments</i> at the <i>Online 2021 Earth Educators’ Rendezvous</i> , July 2021. |
| 2020 | Co-organized and co-led a <i>Mini-Workshop on Applying the ICAP Theory of Cognitive Engagement to Active Geoscience Learning</i> at the <i>Online 2020 Earth Educators’ Rendezvous</i> , July 2020.

Co-organized and co-led a <i>Roundtable Discussion on Place-Based Geoscience Teaching</i> at the <i>Online 2020 Earth Educators’ Rendezvous</i> , July 2020.

Co-facilitated an online <i>Teacher Professional Development Workshop in Classroom-Created Virtual Contexts</i> for Somerset County, Maryland, Schools, organized by the American Geosciences Institute, June-August 2020. |
| 2019 | Co-organized and co-led the <i>International Association for Geoscience Diversity Accessible Geologic Field Trip to Petrified Forest National Park</i> , <i>Geological Society of America 131st Annual Meeting</i> , Phoenix, AZ, September 2019. |
| 2018 | Co-organized and co-led the <i>Geological Society of America GeoTeachers Professional Development Field Workshop</i> in Northern Arizona, July 2018. |
| 2017 | Co-organized and co-led a <i>Workshop on Place, Cultural Context, and Geoscience Teaching</i> at the <i>2017 Earth Educators’ Rendezvous</i> , University of New Mexico, Albuquerque, NM, July 2017.

Co-facilitated a <i>Workshop on Geoscience Education Research Grand Challenges and Strategies</i> at the <i>2017 Earth Educators’ Rendezvous</i> , University of New Mexico, Albuquerque, NM, July 2017. |
| 2016 | Organized and led a <i>Mini-Workshop on Place-Based Teaching in Support of Sustainability</i> at the <i>2016 Earth Educators’ Rendezvous</i> , University of Wisconsin, Madison, WI, July 2016. |

- 2016 Co-organized and co-led a Field Workshop on Earth Science and Mathematics from Native and Western Perspectives under the auspices of the Center for Science and Mathematics Education, University of Utah, San Juan County, UT, June 2016.
- 2015 Co-organized and co-led a *Planetary Geology Field Expedition* for U.S. in-service secondary-school Earth and Space Science teachers, under the auspices of the NASA-American Geosciences Institute-Arizona State University Triad Program, Flagstaff, AZ, August 2015.
- Co-organized and led a *Midwest Native Science Educators Workshop* for in-service secondary-school and middle-school science teachers of Native American students, under the auspices of the EarthScope National Office Education and Outreach Program, Leech Lake Ojibwe Reservation, Cass Lake, MN, August 2015.
- 2015 Co-organized and co-led a *Field Workshop on Earth Science from Native and Western Perspectives* under the auspices of the Center for Science and Mathematics Education, University of Utah, San Juan County, UT, June 2015.
- Co-organized and led a *Southwest Native Science Educators Workshop* for in-service secondary-school and middle-school science teachers of Indigenous students, under the auspices of the EarthScope National Office Education and Outreach Program, Arizona State University, Tempe, AZ, March 2015.
- 2014 Co-organized and co-led a *Teacher Leadership Academy in Earth and Space Sciences* for U.S. in-service secondary-school Earth and Space Science teachers, under the auspices of the NASA-American Geosciences Institute-Arizona State University Triad Program, NASA Wallops Space Flight Center, VA, August 2014.
- Co-organized and led the *Alaska-Yukon Earth Science Workshop for Interpretive Professionals* under the auspices of the EarthScope National Office Education and Outreach Program, Anchorage, AK, April 2014.
- Co-hosted and co-facilitated the NAGT/NSF *InTeGrate* Workshop on “Broadening Access to the Earth and Environmental Sciences: Increasing the Diversity of Undergraduate Students Learning About the Earth,” Arizona State University, Tempe, AZ, February 2014.
- 2013 Co-organized and led the *Northeastern Earth Science Workshop for Interpretive Professionals* under the auspices of the EarthScope National Office Education and Outreach Program, Acadia National Park, ME, September 2013.
- Co-organized and co-led a *Teacher Leadership Academy in Earth and Space Sciences* for U.S. in-service secondary-school Earth and Space Science teachers, under the auspices of the NASA-American Geosciences Institute-Arizona State University Triad Program, NASA Jet Propulsion Laboratory, CA, August 2013.
- Co-organized and co-led a *Teacher Field Workshop on Earth and Biological Sciences: Exploring Western and Navajo Perspectives* under the auspices of the Center for Science and Mathematics Education, University of Utah, San Juan County, UT, June 2013.
- 2013 Co-organized and led the *Southeastern Earth Science Workshop for Interpretive Professionals* under the auspices of the EarthScope National Office Education and Outreach Program, Charleston, SC, January 2013.
- 2012 Organized and presented a Professional Development Workshop on *Active Learning Strategies for Geoscience Teaching* for college faculty at the Geological Society of America Rocky Mountain Section Meeting, Albuquerque, NM, May 2012.

- 2012 Co-organized and led the *Central Appalachian Earth Science Workshop for Interpretive Professionals* under the auspices of the EarthScope National Office Education and Outreach Program, James Madison University, Harrisonburg, VA, March 2012.
Hosted and co-facilitated the NAGT/NSF *On The Cutting Edge* Workshop on “Teaching About Time,” Arizona State University, Tempe, AZ, February 2012.
- 2011 Co-organized and co-led a *Teacher Leadership Academy in Earth and Space Sciences* for U.S. in-service secondary-school Earth and Space Science teachers, under the auspices of the NASA-American Geosciences Institute-Arizona State University Triad Program, NASA Johnson Space Flight Center, TX, August 2011.
Co-organized and led a *Teacher Leadership Academy in Earth and Space Sciences* and posts-Academy Field Trip for U.S. in-service secondary-school Earth and Space Science teachers, under the auspices of the NASA-American Geosciences Institute-ASU Triad Program, Arizona State University, Tempe, AZ, June 2011.
Presented a webinar on *The Energy-Water Nexus: A theme for interdisciplinary Earth Science inquiry* for the NAGT/NSF *On the Cutting Edge Climate and Energy Webinar Series*, April 2011.
- 2010 Co-organized and co-facilitated the NAGT/NSF *On the Cutting Edge* Workshop on *Preparation for Academic Careers*, Stanford University, July 2010.
- 2009 Co-organized and co-led the *Colorado Plateau-Río Grande Rift Earth Science Workshop for Interpretative Professionals* under the auspices of the EarthScope National Office Education and Outreach Program, Albuquerque, NM, October 2009.
Co-organized and co-led the *EarthScope Geoscience Professional Development Workshop* for Native American K-12 teachers under the auspices of the Incorporated Research Institutions for Seismology (IRIS) Siting Outreach Program, Flagstaff, AZ, September 2009.
- 2002 Co-organized and co-facilitated the NAGT/NSF *On the Cutting Edge Workshop for Early-Career Geoscience Faculty*, College of William & Mary, July 2002.
- 2001 Co-organized and co-facilitated the NAGT/NSF *On the Cutting Edge Workshop for Early-Career Geoscience Faculty*, College of William & Mary, July 2001.

Other Contributions to the Scholarship of Teaching and Learning

- 2017 Invited Discussant for a topical session on *Culture, Context and Science Assessments: Obstacles or Opportunities for Glocalization?* at the Annual Meeting of the National Association for Research in Science Teaching (NARST) in San Antonio, April 2017.
- 2015 Invited Discussant for a topical session on *Culture, Language, Practices, and Place in STEM Education: Indigenous and Place-Based Approaches from the Pacific and Americas* at the Annual Meeting of the National Association for Research in Science Teaching (NARST) in Chicago, April 2015.
- 2013 Invited Discussant for topical session on *Science Learning Within Cultures: What does it mean to ‘do science’ for different world cultures?*, at the Annual Meeting, American Educational Research Association (AERA) in San Francisco, April 2013.

MENTORING

Graduate Student Theses and Dissertations Solely Supervised

- Thomas Ruberto, *Ph.D. in progress* and M.S., 2018, Implications of learning outcomes of in-person and virtual field-based geoscience instruction at Grand Canyon National Park, School of Earth and Space Exploration. *Tom is now studying for a Ph.D. in ASU SESE under my supervision.*
- Ángel Antonio García, Jr., Ph.D., 2018, A study of ethnogeological knowledge and other traditional scientific knowledge in Puerto Rico and Dominican Republic, School of Earth and Space Exploration. *Ángel is now a tenure-track Assistant Professor in the Department of Geology and Environmental Science at James Madison University, VA. He received the GSA Karst Division Young Scientist Award in 2020.*
- Rebecca Mathews Frus, M.S., 2011, A study on how the public uses the landscape to understand principles of geologic time while experiencing the Trail of Time interpretative exhibition in Grand Canyon National Park, School of Earth and Space Exploration. *Rebecca earned a Ph.D. at the University of New Mexico in 2016 and is now a geoscientist with the U.S. Department of Energy.*
- Brian Gleim, M.N.S., 2010, Informal high-school astronomy resources for Arizona, School of Earth and Space Exploration. *Brian is now a tenured Astronomy Instructor at Glendale Community College, AZ.*
- Tracy Perkins, M.S. 2008, Place attachment in geology students and the general public, School of Earth and Space Exploration. *Tracy is now a Geology Instructor at Phoenix College, AZ, and founder-owner-proprietor of Strawberry Hedgehog, a purveyor of vegan health and beauty products.*
- Megan O'Shea, M.S. 2008, Hydropolitics: Examining the role of science in Arizona's Groundwater Management Act of 1980, School of Earth and Space Exploration and Center for Science, Policy, and Outcomes. *Megan is now a Speech Pathologist at Raymond Elementary School, WI.*
- Nievita Bueno Watts, M.S., 2007, Visitor preconceptions and meaning-making at Petrified Forest National Park, School of Earth and Space Exploration. *Nievita earned a Ph.D. in the ASU Mary Lou Fulton Teachers College and is now Director of the Indian Natural Resource Science and Engineering Program at Humboldt State University, CA.*
- Leslie Ann Field, M.N.S., 2004, A model 400-level Field Hydrogeology course, Department of Geological Sciences. *Leslie was last a Licensed Professional Geologist in Hawai'i, but sadly, is now deceased.*

Graduate Student Theses and Dissertations Co-Supervised

- Don Balanzat, *M.N.S. in progress*, Virtual-reality simulation of mass spectrometric analysis for teaching purposes, School of Earth and Space Exploration.
- Sandra Carolina Londoño Arias, Ph.D., 2016, Ethnogeology at the core of basic and applied research: Surface water systems and mode of action of a natural antibacterial clay of the Colombian Amazon, School of Earth and Space Exploration. *Carolina is now a Geology Instructor at Chandler-Gilbert Community College, AZ.*
- Heather Anne Pacheco-Guffrey, Ph.D., 2014, Choice and participation of career by STEM professionals with sensory and orthopedic disabilities and the role of assistive technologies, Mary Lou Fulton Teachers College. *Heather is now an Associate Professor of Elementary and Early Childhood Education at Bridgewater State University, MA.*

- Chris Mead, Ph.D., 2014, Biogeochemistry science and education: Using non-traditional stable isotopes as environmental tracers and Identifying and measuring undergraduate misconceptions biogeochemistry, School of Earth and Space Exploration. *Chris is now an Assistant Research Professor in the School of Earth and Space Exploration at ASU.*
- Patrick Schwab, Ph.D., 2013, Evaluation of online teacher and student materials for the NRC Science Framework crosscutting science and engineering concepts, Mary Lou Fulton Teachers College. *Patrick is now a tenure-track Assistant Professor of Education at Utah Tech University, UT.*
- Katrien van der Hoeven Kraft, Ph.D., 2013, Determining persistence of community college students in introductory geology classes, Mary Lou Fulton Teachers College. *Katrien (Kaatje) is now a tenured Geology Instructor at Whatcom Community College, WA.*
- Brittany Brand, Ph.D., 2008, Mafic phreatomagmatic volcanism and density current dynamics, School of Earth and Space Exploration. *Brittany is now a tenured Associate Professor of Geosciences at Boise State University, ID.*

Graduate Student Dissertations Served as Second Project Advisor and Committee Member

Note: In the School of Earth and Space Exploration, Ph.D. candidates must defend two distinct research projects for their qualifying exams. The Second Project Advisor has a role intermediate between that of a Dissertation Supervisor and a regular Committee Member.

- Adeolu Aderoju, *Ph.D. in progress*, Mixed-methods study of geoscience education practices in Nigerian universities, School of Earth and Space Exploration.
- Morgan Shusterman, *Ph.D. in progress*, Visualizing data for the color-deficient reader, School of Earth and Space Exploration.
- George Che, Ph.D., 2018, Advancements in kinetic inductance detector, spectrometer, and amplifier technologies for millimeter-wave astronomy, School of Earth and Space Exploration.
- Chelsea Allison, Ph.D., 2017, Highly explosive mafic volcanism: The role of volatiles, School of Earth and Space Exploration.
- Jude Viranga Dingantrige Perera, Ph.D., 2017, Driven by affect to explore asteroids, the Moon, and science education, School of Earth and Space Exploration.
- Mary Hannah Schultz, Ph.D., 2017, The Late Cenozoic climatic and tectonic evolution of the Mount Everest region, central Himalaya, School of Earth and Space Exploration.
- Andrew Darling, Ph.D., 2016, The roles of erosion rate and rock strength in the evolution of canyons along the Colorado River, School of Earth and Space Exploration.
- David Haddad, Ph.D., 2014, Effects of fault segmentation, mechanical interaction, and structural complexity on earthquake-generated deformation, School of Earth and Space Exploration

Graduate Student Theses and Dissertations Served as Committee Member

- Franklyn Telles, *Ph.D. in progress*, Climatic implications of dust on the Colorado Plateau and Dust as a theme for place-based STEM curricula. School of Sustainability and Earth Sciences, Northern Arizona University.
- Elisheva Sherman, *Ph.D. in progress*, Subsurface imaging to assess magma migration in distributed volcanic fields. School of Earth and Space Exploration.
- Alana Williams, *Ph.D. in progress*, Testing the shorter and variable recurrence interval hypothesis along the Cholame segment of the San Andreas Fault, and Exploring the use of (U-Th)/He to date young volcanic eruptions, School of Earth and Space Exploration.

- Michelle Aigner, *M.S. in progress*, Detrital-zircon analysis of Pennsylvanian-Permian strata of central New Mexico, School of Earth and Space Exploration.
- Catherine Cullicott, *Ph.D. in progress*, Pedagogical content knowledge and the ICAP hypothesis in geoscience education, Mary Lou Fulton Teachers College.
- Kevin Hubbard, *Ph.D. in progress*, Geochemistry of layered intrusions and mineral potential of extraterrestrial bodies, School of Earth and Space Exploration.
- Matthew Derrick, *Ed.D. in progress*, Mary Lou Fulton Teachers College.
- Zebediah Teichert, Ph.D., 2022, Secondary-ion mass-spectrometry analysis of lithium content and isotopic compositions in kerogen, School of Earth and Space Exploration.
- Kristen Foley, M.S., 2022, Instructor selection and use of virtual field experiences in college geoscience courses, Department of Geological and Environmental Sciences, Michigan State University.
- Zachary Keller, M.S., 2021, Runoff connectivity, controls, and evolution during the North American Monsoon, School of Earth and Space Exploration.
- Danielle Accetta, M.S., 2021, Source-area analysis of a Miocene arkosic conglomerate in the Goldfield Mountains, and Evaluating the reform of an introductory undergraduate course sequence, School of Earth and Space Exploration.
- Holly Brown, M.S., 2021, Geology of the Hassayampa River Canyon Area, Wickenburg, Arizona, School of Earth and Space Exploration.
- Megan Miller, Ph.D., 2018, Remote sensing and modeling of stressed aquifers and the associated hazards, School of Earth and Space Exploration.
- Svetlana Shkolyar, Ph.D., 2016, Informing Mars sample selection strategies: Identifying fossil biosignatures and assessing their preservation potential, School of Earth and Space Exploration.
- Allison Severson, M.S., 2015, Shear-zone hosted gold and silver deposits in the Sierra Cacachilas, Baja California Sur, Mexico, School of Earth and Space Exploration.
- Deborah Williams, Ph.D., 2012, Speaking place, saving place: Western Apache cultural diversity and public discourse, School of Human Evolution and Social Change.
- Jeni McDermott, Ph.D., 2012, Exploring evidence for Quaternary north-south directed extension at the southern margin of the Tibetan Plateau, School of Earth and Space Exploration.
- Gretchen Hawkins, M.S., 2012, Assessing the effects of climate change in a semi-arid basin utilizing a fully distributed hydrologic model: A case study of Beaver Creek, Arizona, School of Earth and Space Exploration.
- Brad Vance, M.S., 2012, Structural evolution of the McDowell Mountains, Maricopa County, Arizona, School of Earth and Space Exploration.
- Alka Tripathy, Ph.D., 2011, Exploring the history of India-Eurasia collision and subsequent deformation in the Indus Basin, NW Indian Himalaya, School of Earth and Space Exploration.
- Melanie Busch, Ph.D., 2011, Late Quaternary normal faulting and hanging wall basin evolution of the southwestern rift-margin from gravity and geology, B.C.S., MX; and Exploring the influence of text-figure format on introductory geology learning, School of Earth and Space Exploration.
- Joshua Coyan, Ph.D., 2011, Eye-tracking investigations exploring how students learn geology from photographs; and The structural setting of hydrothermal gold deposits in the San Antonio area, B.C.S., MX, School of Earth and Space Exploration.
- Sarah Robinson, M.S., 2011, Integrating LiDAR topography into the study of earthquakes and faulting, School of Earth and Space Exploration.

- Ashley Tillman, M.A., 2011, Students' understanding of weathering and erosion, Mary Lou Fulton Teachers College.
- Sissy Sze-Mun Wong, Ph.D., 2010, Exploring the beliefs of persisting secondary science teachers in general induction programs: A longitudinal study, Mary Lou Fulton Institute and Graduate School of Education.
- Jennifer Neakrase, Ph.D., 2010, A characterization of the knowledge and practices of beginning secondary physics teachers, Division of Curriculum and Instruction, Mary Lou Fulton Institute and Graduate School of Education.
- Tracy Lund, M.S., 2010, Major-ion and trace-element cycling in an arid, spring-fed stream, School of Earth and Space Exploration.
- Gerardo Lopez, M.S., 2010, Changes in inquiry practices for beginning chemistry teachers, Mary Lou Fulton Institute and Graduate School of Education.
- Shawn Wright, Ph.D., 2009, Terrestrial fieldwork and laboratory thermal infrared spectroscopy of basaltic impactites from the Earth and Mars, School of Earth and Space Exploration.
- Elizabeth Lewis, Ph.D., 2009, Secondary science teachers' views toward and classroom translation of sustained professional development, Division of Curriculum and Instruction, Mary Lou Fulton College of Education.
- Valeria Routt, M.S., 2009, Microbialites in Cuatro Ciénegas, Mexico, School of Earth and Space Exploration.
- Kevin Goldman, M.S., 2009, Diabase alteration and relation to low-temperature mineral deposits, Salt River Canyon area, Arizona, School of Earth and Space Exploration.
- Sharon Schleigh, Ed.D., 2008, The interaction of assessment format and sex in assessing the knowledge structure coherence of middle school students' understanding of the concept of force, Division of Curriculum and Instruction, Mary Lou Fulton College of Education.
- Nathan Wilkens, Ph.D., 2008, Paleocology of Early Jurassic Navajo Sandstone interdune deposits, School of Earth and Space Exploration.
- Sian Proctor, Ph.D., 2006, Student visual-spatial abilities in map use, Division of Curriculum and Instruction, Mary Lou Fulton College of Education.
- Rebecca Escobar Dial, M.S., 2006, The origin and modification of the Medusae Fossae Formation (MFF), Mars, Department of Geological Sciences.
- Deirdre Hahn, Ph.D., 2005, Psychological, moral, and intellectual dimensions of pre-service teachers' attitudes toward teaching evolution, Division of Psychology in Education, Mary Lou Fulton College of Education.
- Joshua Coyan, M.S., 2005, Subsurface geology of a groundwater remediation site, eastern Phoenix basin, Arizona, Department of Geological Sciences.
- Anthony Salem, M.S., 2005, Structural geology and stratigraphy of Paleozoic rocks of the Big Maria syncline, southeastern California, Department of Geological Sciences.
- Kathleen McFadden, M.S., 2004, End-Permian karst stratigraphy and geochemistry at the Kaibab-Moenkopi contact and its relationship to the Permian-Triassic boundary for northern Arizona, Department of Geological Sciences.
- Bernadette Tsoie, M.S., 1997, Hydrogeologic characterization of the floodplain that lies below the Uranium-Mill Tailings Remedial Action Site at Shiprock, New Mexico, Department of Earth and Environmental Science, New Mexico Institute of Mining and Technology.

- Edward Henry, M.S., 1994, Groundwater modeling at the Shiprock Uranium-Mill Tailings Remedial Action Site, Department of Civil Engineering, University of New Mexico.

Honors Undergraduate Student Theses Supervised or Co-Supervised

- Cameron Reed, Honors B.S., 2021, Decolonizing cross-cultural geoscience education, Barrett, the Honors College, and School of Earth and Space Exploration.
- James Ruberto, Honors B.S., 2020, Developing a dual-medium virtual environment for geoscience-education research and teaching, Barrett, the Honors College, and the Fulton School of Engineering.
- Trey Gossard, Honors B.S., 2016, Influences of research experiences for undergraduates on educational and career goals, Barrett, the Honors College, and School of Earth and Space Exploration.
- Kara Gasperone, Honors B.A., 2009, Family outdoor experiences and student's selection of an introductory science course, Barrett, the Honors College, and School of Social and Family Dynamics.

Honors Undergraduate Student Theses Served as Committee Member

- Mikayla Finger and Rick Spitzer, Honors B.S., 2017, Analysis of Pennsylvanian-Permian conglomerate from the Oak Creek Canyon to Mogollon Rim region, Barrett, the Honors College, and School of Earth and Space Exploration.
- Calley Galarowicz, Honors B.S., 2013, The Blue Mound Chert: Interpreting a topographic anomaly in southern Wisconsin, Barrett, the Honors College, and School of Earth and Space Exploration.

PROFESSIONAL SERVICE

Professional Affiliations

American Geophysical Union.

American Indian Science and Engineering Society.

Association of American Geographers.

Geological Society of America (Lifetime Member).

National Association of Geoscience Teachers (Elected President 2000-2001).

National Association for Interpretation.

National Association for Research in Science Teaching.

National Earth Science Teachers Association.

National Science Teachers Association.

Sigma Xi, The Scientific Research Honor Society.

Society for Advancement of Chicanos and Native Americans in Science.

Arizona Geological Society.

Arizona Hydrological Society.

Four Corners Geological Society.

New Mexico Geological Society (Lifetime Member).

Service to Professional Community

- 2004-2021 Associate Editor, *Geosphere*, published by Geological Society of America (GSA).
- 2021 Co-Convener, Pardee Keynote Symposium on “Geoheritage: Celebrating our Past, Protecting our Future,” at Geological Society of America 133rd Annual Meeting, Portland, OR, October 2021.
- 2018-2020 Member, Geological Society of America Diversity Committee.
- 2012-2019 Member, Science Standing Committee for the 2015 and 2019 *National Assessment of Educational Progress* (NAEP).
- 2019 Co-Organizer, Pardee Keynote Symposium on “Grand Ideas, Grand Events: Geoscience Research, Geoscience Education, and Human Connections to Grand Canyon,” at Geological Society of America 131st Annual Meeting, Phoenix, AZ, September 2019.
- Co-Organizer, Grand Canyon Centennial Geology and Geoscience Education Public Symposium, Grand Canyon National Park, April 2019.
- 2018-2019 Local Chair, Organizing Committee, Geological Society of America 131st Annual Meeting, Phoenix, AZ, September 2019.
- Co-Organizer and Local Host, Geoscience Alliance Fourth National Conference, Phoenix and Tempe, AZ, February 2019.
- 2002-2018 Associate Editor, *Journal of Geoscience Education*, published by National Association of Geoscience Teachers (NAGT).
- 2018 Co-Convener, Poster Session on “Geoscience and Environmental Science Education in the Cordillera and Rockies,” Geological Society of America Joint Cordilleran- Rocky Mountain Sectional Meeting, Flagstaff, AZ, May 2018.
- Organizer and Leader, Pre-Meeting Geological Field Trip to Trail of Time Exhibition, Grand Canyon National Park, Geological Society of America Joint Cordilleran-Rocky Mountain Sectional Meeting, Flagstaff, AZ, May 2018.
- 2017-2018 Invited Group Leader for the “Grand Challenges in Geoscience Education Research” Workshop and White Paper, led by K. St. John and sponsored by the National Science Foundation (NSF), during the 2017 Earth Educators’ Rendezvous and 1 year following.
- 2016-2017 Member of the Planning Committee for the 2017 Earth Educators’ Rendezvous, University of New Mexico, Albuquerque, NM, July 2017.
- 2016 Co-Convener, Poster Session on “Education through Exploration: Research and Practice through Digital Platforms,” American Geophysical Union (AGU) Fall Meeting, San Francisco, CA, December 2016.
- 2015 Lead Co-Convener, Poster Session on “Education and Outreach through Large Facilities,” American Geophysical Union (AGU) Fall Meeting, San Francisco, CA, December 2015.
- 2011-2015 Member, *ex officio*, EarthScope Education and Outreach Steering Committee.
- Member, *ex officio*, Incorporated Research Institutions for Seismology (IRIS), Education and Public Outreach Steering Committee.
- Member, *ex officio*, UNAVCO Education and Community Engagement Advisory Committee.
- 2000-2014 Treasurer, National Association of Geoscience Teachers (NAGT) Southwest Section.

- 2014 Lead Co-Convener, Poster Session on “Broader Impacts of the EarthScope Program: Recent and Active Geoscience Education & Outreach Activities,” American Geophysical Union (AGU) Fall Meeting, San Francisco, CA, December 2014.
- Co-Convener, Topical Session on “Teaching Geoscience in the Context of Culture and Place for Diversity and Sustainability,” Geological Society of America Cordilleran and Rocky Mountain Sections Joint Meeting, Bozeman, MT, May 2014.
- 2013 Lead Co-Convener, Poster Session on “Broader Impacts of EarthScope: Geoscience Education and Outreach Activities,” American Geophysical Union Fall Meeting, San Francisco, CA, December 2013.
- 2012 Nominated (one of two candidates) and stood for national election for Member-At-Large, Section on Education, American Association for the Advancement of Science(AAAS), 2012-2013. (Was not elected.)
- Lead Co-Convener, Poster Session on “EarthScope in Geoscience Education and Outreach,” American Geophysical Union Fall Meeting, San Francisco, CA, December 2012.
- Lead Co-Convener, Topical Session on “EarthScope in Geoscience Education and Outreach: Past Successes and Future Opportunities,” Geological Society of America Annual Meeting, Charlotte, NC, November 2012.
- Co-Convener, Topical Session on “Geoscience Education: Current Practice and Research,” Geological Society of America Rocky Mountain Section Meeting, Albuquerque, NM, May 2012.
- Advisory Board Member and Presenter, Native American Geoscience Alliance Conference, Salish Kootenai College, Montana, March 2012.
- Organizer and Lead Convener, EarthScope Earth Science Education Provider Summit, ASU, Tempe AZ, February 2012.
- 2011 Co-Convener, Topical Session on “Time, Events, and Places: Understanding Temporal and Spatial Learning in Geoscience Education,” Geological Society of America Annual Meeting, Minneapolis, MN, October 2011.
- 2010 Chair, American Geophysical Union Waldo Smith Medal Selection Committee.
- Advisory Board Member and Presenter, Native American Geoscience Alliance Conference, Fond du Lac Nation, MN, September 2010.
- 2006-2010 Member, Geological Society of America Education Standing Committee.
- 2009 Co-Convener, Topical Session on “Place-based Education in Earth Science,” Geological Society of America Annual Meeting, Portland, OR, October 2009.
- Panel Member, Incorporated Research Institutions for Seismology (IRIS), Education and Outreach Program Review.
- 2005-2008 Member, EarthScope Education and Outreach Steering Committee.
- 2002-2005 Member, Incorporated Research Institutions for Seismology (IRIS), Education and Public Outreach Steering Committee.
- 2004 Invited Member, National Science Foundation Geoscience Education Second Working Group (GEWG-II); see https://nsf.gov/geo/adgeo/geoedu/GEWGII_Report_sept_2005.pdf
- 2000-2001 Elected President, National Association of Geoscience Teachers.
- 1996-2001 Member, Haskell Indian Nations University Environmental Research Studies Advisory Board.

- 1996-2000 Member, American Geophysical Union Committee on Education and Human Resources.
- 1995-1996 Member, Geological Society of America Committee on Women and Minorities.
Chair, Western Partnership for Environmental Technology Education (Western PETE).
- 1993-1994 President, Four Corners Geological Society.

Service to Regional and Local Communities

- Since 2010 Member, Resolution Copper Mining Company, Education Advisory Committee.
- 2021 Expert Reviewer in Earth and Space Sciences for Arizona State Science Standards, Arizona Department of Education.
- 2009-2011 Member, Development and Review Panel for Earth Science Exam, Arizona Educator Proficiency Assessments, Arizona Department of Education.
Member, New Mexico EPSCoR Climate Change Project, External Advisory Committee.
- 2006-2008 Member, Salt River Project/WESTCARB Carbon Sequestration Project, Advisory Board.
Member, Superior, Arizona Town Council Community Education Committee.
- 2002-2008 Member, Four Corners School of Outdoor Education, NSF Bioregional Outdoor Education Program Advisory Board.
- 2001-2003 Member, Navajo Nation Environmental Protection Agency, Advisory Committee on Water Quality.
Member, Navajo Nation Uranium Education Program Advisory Panel.

**Service to Arizona State University (ASU), College of Liberal Arts and Sciences (CLAS),
and School of Earth and Space Exploration (SESE)**

- Since 2018 Natural Sciences Chair, University General Studies Council, Arizona State University.
- Since 2014 Representative, Arizona Geology Articulation Task Force and Arizona Course Equivalency Tracking System, ASU School of Earth and Space Exploration.
- Since 2007 Faculty Advisor, Rho (ASU) Chapter of the Kappa Sigma International Fraternity.
- Since 2003 Member, Arizona State University American Indian Consortium.
Graduate Mentor, ASU Mary Lou Fulton Teachers College.
- 2020-2022 Chair, Online Learning and Education Group, ASU School of Earth and Space Exploration.
- 2021 Member, Provost's Task Force on University General Education Requirements, Arizona State University.
- 2019-2021 Co-Facilitator and Presenter, ASU INSPIRE College Readiness Program for American Indian High School Students.
- 2019 Member, University Faculty Fund for Teaching Initiatives Committee.
- 2018-2021 Member and Chair (2020-2021), Promotion and Tenure Committee, ASU School of Earth and Space Exploration.

2017-2019 Member, Awards Committee, ASU School of Earth and Space Exploration.

2014-2016 Member, Curriculum Committee, ASU School of Earth and Space Exploration.
Chair (2015-2016) and Natural Sciences Representative, Arizona State University Curriculum and Academic Programs Committee.

2011-2014 Member, College of Liberal Arts and Sciences Committee on Quality of Instruction.

2010-2013 Senator, College of Liberal Arts and Sciences Faculty Senate.

2010-2012 Member, Annual Evaluation Committee, ASU School of Earth and Space Exploration.

2009-2011 CLAS Faculty Representative, ASU Provost's Education Envoy Working Group.

2006-2021 Faculty Advisor, Student Geology Club, ASU School of Earth and Space Exploration..

2005-2014 Alternate ASU SESE Representative, Arizona Geology Articulation Task Force.

2004-2006 Member, Curriculum Committee, ASU School of Earth and Space Exploration.

2003-2005 Member, College of Liberal Arts and Sciences Information Technology Committee.