

# ELIZABETH JACQUELINE CATLOS

## Associate Professor

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## Google Scholar

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## RESEARCH INTERESTS

Developing and applying petrochemical and geochemical techniques to the study of lithosphere dynamics. Investigating metamorphic processes, including advances in understanding of mineral equilibria to estimate environmental conditions during dynamic recrystallization. Applying accessory mineral geochronology to broad questions about Earth's history. Models for heat, mass, and fluid flow along fault systems, primarily compressional and extensional.

## EDUCATION

Ph.D.	2000	University of California Los Angeles	Geochemistry
Phil. Cand.	1999	University of California Los Angeles	Geochemistry
B.Sc.	1994	University of California, San Diego	Chemistry w/ Spec. Earth Science

## PROFESSIONAL APPOINTMENTS

2008-	Associate Professor, UT Austin
2019-	Affiliate Faculty, Center for Russian and Eastern European Studies (CREEES)
2001-2008	Oklahoma State University (Assistant-Associate Professor)
Jan. 2001-Aug. 2001	University of California, Los Angeles, Dept. Earth and Space Sciences/Smithsonian Museum of Natural History, Dept. Mineral Sciences (Postdoctoral research)

### *Visiting Appointments*

Fall 2017	Max Kade Distinguished Visiting Professor, Univ. of Heidelberg, Germany
Summer 2015	Visiting Researcher, Dept. of Earth and Space Sciences UCLA
2008-2009	Senior Lecturer, Fulbright Program, Middle East Technical University (METU), Ankara, Turkey
2007-2008	Donald D. Harrington Fellow Visiting Faculty, UT Austin

## FELLOWSHIPS AND AWARDS

### *Research*

- 2017: Max Kade Distinguished Visiting Professorship, Univ. of Heidelberg, Germany
- 2013: Notable Paper American Mineralogist Catlos, E.J. (2013) Generalizations about monazite: Implications for geochronologic studies. American Mineralogist, 98, 819–832.
- 2008-2009: Fulbright Lecturing Award, Middle East Technical University, Turkey
- 2007: Fellow of the Geological Society of America
- 2007: Young Innovator, Smithsonian Magazine
- 2007-2008: UT Austin Donald D. Harrington Fellowship
- 2006: Geological Society of America's Young Scientist Award (Donath Medal)
- 2000: UCLA Fellow of the Institute of Geophysics and Planetary Physics

- 1997: Predoctoral Fellowship, Smithsonian Institution
- 1994: Undergraduate Summer Research Fellowship, NASA

#### Teaching

- 2019-2021: Selected as UT Austin Experiential Learning Ambassador based on distinguished accomplishments in teaching, mentoring, and service to the UT community
- 2015: Carolyn G. and G. Moses Knebel Teaching Award for Introductory Course (GEO401)
- 2011: Texas Exes Teaching Award

#### Service

- 2013-2017: Elected Councilor for the Geological Society of America
- 2017: Jackson School Outstanding Service Award: Department of Geological Sciences Female Faculty as a team for their work towards improving JSG workplace environment
- 2015: Outstanding Reviewer for Earth and Planetary Science Letters, Elsevier
- 2006: Oklahoma State University College of Arts and Sciences Junior Faculty Award
- 2006: Outstanding Reviewer for Geological Society of America Bulletin

### RESEARCH PROJECTS:

#### Funded External

- 11/18/18, 36 months, European Commission. *Project IN-TIME: Developing a luminescence instrument for geochronology on Mars*. US partner collaborator: amount \$15,000.
- 06/1/15, 36 months, National Science Foundation, International. *IREs: Closing Oceans: Assessing the Dynamics of Turkish suture zones*, PI Catlos with Co-PIs Elliott, Kyle. Amount \$249,991.
- 0/1/15, 36 months, TUBITAK (Turkish Research Council) *Link Between Mineralization in Magmatic-Hydrothermal Systems associated with Granitoid Intrusions in NE of Yenice (Çanakkale, Biga Peninsula)* PI Tolga Oyman with co-PIs Catlos and Melanie Kaliwoda. Amount 300,008YTL.
- 01/01/08-12/31/12: NSF, International. *International: Research Opportunities in Extensional Dynamics for US Undergraduate and Graduate Geosciences Students in Western Turkey* PI Catlos with collaborators Cemen, Atekwana, Amount \$150,000.
- 02/01/05-01/31/08: NSF, Tectonics. *Collaborative Research: Extensional Unroofing of the Central Menderes Metamorphic Complex, Southwestern Turkey*. PI Catlos with Co-PIs Cemen, Kohn, Amount: \$216,917.
- 8/1/02-8/31/05: NSF, International, *International: Investigation of activity along the Himalayan Main Central Thrust: Present Geomorphology and past Slip, Garhwal, NW India* PI Catlos with Co-PIs Marston, Dubey. Amount: \$36,000.
- 6/1/02-5/31/05, NSF, Astronomy. *Subcontract from New Frontiers-Research Experience for Undergraduates in the Space and Planetary Sciences* PI: Marston with Co-PI Catlos, Subcontract from Award 0138942. Amount: \$70,770.

#### Funded Internal

- 2020: VPR Research, Special Research Grant proposal titled “Vertebrate lies; arthropods were the first land animals.” Amount, \$1,000.00.
- 2019: Faculty DIY Award: *Creating Videos on Site (at a dig in the UK) for an Introductory Geology Course* UT Austin Faculty Innovation Center. Amount, \$500.
- 2018-2019: Faculty Innovation Grant: *Incorporating electron microbeam technology into geosciences undergraduate education*. UT Austin Faculty Innovation Center. Amount \$9,100.
- 2018-2019: *Global Classrooms Curriculum Integration Grant*: UT Austin, International Office, with Axel Schmitt, Heidelberg University. Amount \$6,500
- 2014: Jackson School Seed Grant: *Ion microprobe stable isotope analyses of fracture-filling cement—implications for basin structural and pore fluid evolution in unconventional oil and gas reservoirs*. PI Catlos with Eichhubl. Amount \$20,173.

- 2014: Jackson School of Geosciences Equipment Matching Program: *Funds for the Repair of the Dept. of Geological Sciences Bench-Top Cathodoluminescence System*. PI Catlos, Kyle, Milliken, Martindale, Kerans, Breecker, Quinn. Amount, \$11,387.
- 2012: Jackson School of Geosciences Equipment Matching Program: *Funds for the Repair of the Dept. of Geological Sciences Bench-Top Cathodoluminescence System*. PI Catlos with Kyle and Milliken. Amount, \$6,718.

#### Student Funding

- UT Austin, Center for Planetary Habitability, Hector Garza, graduate student. Support for one semester, travel and research (\$35K).
- Geological Society of America South-Central Section Undergraduate Research Grants (\$1,300 total): Kimberly Aguilera (\$500); Stephanie Suarez (\$500), Daniel Lizzardo-McPherson (\$300); Gabriel Villasenor (\$300).
- UT Austin Undergraduate Research Fellowships with match from the Jackson School (~\$2000 each): 2020: Shania Goodwin; 2019: Gabriel Villasenor; 2018: Theresa Perez; 2016: Emily Pease; 2015: Colin Sturrock; 2014, Bridget Pettit, Colin Sturrock, Abby Kenigsberg; 2012: Lindsey German, Pamela Speciale, 2010: Tim Shin
- UT Austin Center for Eastern European Studies: Daniel Campos (\$1000)
- UT Austin International Office, Global Research Fellowship: Thomas Etzel (\$5000)

#### PUBLICATIONS

##### Peer-reviewed publications

<sup>u</sup> author is an undergraduate student under my direct supervision

<sup>g</sup> author is a graduate student under my direct supervision

	<u>all</u>	<u>Since 2014</u>
Citations	3487	1160
h-index	22	19
i10-index	35	28

1. **Catlos, E.J.** (2021). Records of Himalayan Metamorphism and Compressional Tectonics in the central Himalayas (Daroni Khola, Nepal). AGU Books project Volume II. Compressional Tectonics: Plate Convergence to Mountain Building. <https://doi.org/10.1002/essoar.10508670.1>
2. **Catlos, E.J.**, Çemen, I. (2021). A Review of the Dynamics of Subduction Zone Initiation in the Aegean Region. Volume II. Compressional Tectonics: Plate Convergence to Mountain Building. <https://doi.org/10.1002/essoar.10508919.1>
3. **Catlos, E.J.**, Etzel, T.M. <sup>g</sup>, Çemen, I. (2021) Extensional Tectonics in Western Anatolia, Turkey: Eastward continuation of the Aegean Extension. AGU Books project Volume I. Extensional Tectonics: Continental Breakup to Formation of Oceanic Basins. <https://doi.org/10.1002/essoar.10508671.1>
4. Etzel, T.M. <sup>g</sup>, & **Catlos, E.J.** (2021). Garnet chemical zoning based thermobarometry: Method evaluation and applications in the Menderes Massif, Western Turkey. Geosciences, <https://doi.org/10.3390/geosciences11120505>
5. Brookfield, M.E., **Catlos, E.J.**, Suarez, S.E. <sup>u</sup> (planned January 2022) Vertebrate lies; arthropods were the first land animals. Geology Today (UK).
6. Brookfield, M.E., **Catlos, E.J.**, Suarez, S. <sup>u</sup> (2021) Myriapod divergence times differ between molecular clock and fossil evidence: U/Pb zircon ages of the earliest fossil millipede-bearing sediments. Historical Biology. <https://doi.org/10.1080/08912963.2020.1762593>
7. Brookfield, M.E., Couto, H., **Catlos, E.J.**, Schmitt, A.K. (2021) U-Pb SIMS zircon ages for Ordovician rocks, Valongo Anticline, northwestern Portugal. Journal of Mediterranean Earth Sciences. <https://doi.org/10.13133/2280-6148/17274>
8. Villaseñor, G. <sup>u</sup>, **Catlos, E.J.**, Broska, I., Kohút, M., Hraško, L., Aguilera, K. <sup>u</sup>, Etzel, T.M. <sup>g</sup>, Kyle, J.R., Stockli, D.F. (2021) Evidence for widespread mid-Permian magmatic activity related

- to rifting following the Variscan orogeny (Western Carpathians). *Lithos*, <https://doi.org/10.1016/j.lithos.2021.106083>
9. Villaseñor, G.<sup>u</sup>, **Catlos, E.J.**, Broska, I., Kohút, M., Hraško, L., Aguilera, K.<sup>u</sup>, Etzel, T.M.<sup>g</sup>, Kyle, J.R., Stockli, D.F. (2021) Western Carpathian mid-Permian Magmatism: Petrographic, Geochemical, and Geochronological Data. Data-in-Brief, <https://doi.org/10.1016/j.lithos.2021.106083>
  10. **Catlos, E. J.**, Perez, T.J.<sup>u</sup>, Lovera, O.M., Dubey, C.S., Schmitt, A.K., Etzel, T.M.<sup>g</sup> (2020). High-resolution P-T-Time paths across Himalayan faults exposed along the Bhagirathi transect NW India: Implications for the construction of the Himalayan orogen and ongoing deformation. *Geochemistry, Geophysics, Geosystems*, 21, e2020GC009353, <https://doi.org/10.1029/2020GC009353>
  11. **Catlos, E.J.**, Mark, D.F., Suarez, S.E.<sup>u</sup>, Brookfield, M.E., Miller, C.G., Schmitt, A.K., Gallagher, V., Kelly, A. (2020) Late Silurian zircon U–Pb ages from the Ludlow and Downton bone beds, Welsh Basin, UK. *Journal of the Geological Society*, 178, jgs2020-107, <https://doi.org/10.1144/jgs2020-107>
  12. Etzel, T.M.<sup>g</sup>, **Catlos, E.J.**, Cemen, I., Ozerdem, C.<sup>g</sup>, Oyman, T., Miggins, D. (2020) Documenting exhumation in the central and northern Menderes Massif (western Turkey): New insights from garnet-based P-T estimates and K-feldspar 40Ar/39Ar geochronology. *Lithosphere*, 1, 8818289, <https://doi.org/10.2113/2020/8818289>
  13. **Catlos, E.J.**, Pease, E.C.<sup>u</sup>, Dygert, N., Brookfield, M., Schwarz, W.H., Bhutani, R., Pande, K., Schmitt, A. (2019) Nature, age and emplacement of the Spongtang ophiolite, Ladakh, NW India. *Journal of the Geological Society* 176 (2), 284-305, <https://doi.org/10.1144/jgs2018-085>
  14. Etzel, T.M.<sup>g</sup>, **Catlos, E.J.**, Atakturk, K.<sup>g</sup>, Kelly, E.D., Lovera, O.M., Cemen, I., Diniz, E., Stockli, D. (2019) Implications for thrust-related shortening punctuated by extension from P-T paths and geochronology of garnet-bearing schists. *Tectonics* 38 (6), 1974-1998, <https://doi.org/10.1029/2018TC005335>
  15. **Catlos, E.J.**, Lovera, O.M., Kelly, E.D., Ashley, K.T., Harrison, T.M., Etzel, T.M.<sup>g</sup> (2018) Modeling High-resolution Pressure-Temperature Paths across the Himalayan Main Central Thrust (central Nepal): Implications for the Dynamics of Collision. *Tectonics*, 37, 2363-2388, <https://doi.org/10.1029/2018TC005144>
  16. **Catlos, E.J.**, Miller, N.R. (2017) Speculations Linking Monazite Compositions to Origin: Llallagua Tin Ore Deposit (Bolivia). For Special Issue “Criticality of the Rare Earth Elements: Current and Future Sources and Recycling.” *Resources*, 6(3), 36, <https://doi.org/10.3390/resources6030036>
  17. Suarez, S.E.<sup>u</sup>, Brookfield, M., **Catlos, E.J.**, Stockli, D. (2017). A U-Pb zircon age constraint on the oldest-recorded air-breathing land animal. *PLoS One* 12 (6), e0179262, <https://doi.org/10.1371/journal.pone.0179262>
  18. Sturrock, C.P.<sup>u</sup>, **Catlos, E.J.**, Miller, N.R., Akgun, A., Fall, A., Gabtov, R., Yilmaz, I.O, Larson, T., Black, K.<sup>g</sup> (2017) Fluids along the North Anatolian Fault, Nixsar Basin, north central Turkey: Insight from stable isotopic and geochemical analysis of calcite veins. *Journal of Structural Geology*, 101, 58-79, <https://doi.org/10.1016/j.jsg.2017.06.004>
  19. **Catlos, E.J.**, Miller, N.M. (2016) Ion microprobe <sup>232</sup>Th-<sup>208</sup>Pb ages from the high common Pb Amelia pegmatite monazite, Virginia: Implications for Alleghanian tectonics. *American Journal of Science*, 316, 470-503, <https://doi.org/10.2475/05.2016.03>
  20. **Catlos, E.J.**, Reyes, E.<sup>u</sup>, Brookfield, M., Stockli, D.F. (2016) Age and Emplacement of the Permian- Jurassic Menghai Batholith, Western Yunnan, China. *International Geology Review*, p. 1-27, <https://doi.org/10.1080/00206814.2016.1237312>
  21. **Catlos, E.J.**, Friedrich, A.M., Lay, T., Elliott, J., Carena, S., Upreti, B.N., DeCelles, P., Tucker, B., Bendick, R. (2016) Nepal at Risk: Interdisciplinary Lessons Learned from the April 2015 Nepal (Gorkha) Earthquake and Future Concerns. *GSA Today*,

- <https://doi.org/10.1130/GSATG278GW.1>
22. Azizi, H., Najari, M., Asahara, Y., **Catlos, E.J.**, Shimizu, M., Yamamoto, K. (2015) U-Pb zircon ages and geochemistry of Kangareh and Taghiabad mafic bodies in northern Sanandaj-Sirjan Zone, Iran: Evidence for intra-oceanic arc and back-arc tectonic regime in Late Jurassic. *Tectonics*, <https://doi.org/10.1016/j.tecto.2015.08.008>
  23. Speciale, P.<sup>u</sup>, **Catlos, E.J.**, Yildiz, G.O.<sup>u</sup>, Shin, T.A.<sup>u</sup>, Black, K.N.<sup>g</sup> (2014) Zircon Ages of the Beypazari Granitoid Pluton (North Central Turkey): Tectonic Implications. *Geodinamica Acta*. <https://doi.org/10.1080/09853111.2013.858955> [INVITED]
  24. **Catlos, E.J.**, Huber, K.<sup>g</sup>, Shin, T.A.<sup>u</sup> (2013) Geochemistry and geochronology of meta-igneous rocks from the Tokat Massif, north-central Turkey: implications for Tethyan reconstructions. *International Journal of Earth Sciences*. <https://doi.org/10.1007/s00531-013-0918-0>
  25. Shin, T.A **Catlos, E.J.**, Jacob, L.<sup>g</sup>, Black, K.<sup>g</sup> (2013) Relationships between very high pressure subduction complex assemblages and intrusive granitoids in the Tavşanlı Zone, Sivrihisar Massif, central Anatolia. *Tectonophysics*, 595-596:183-197, <https://doi.org/10.1016/j.tecto.2012.07.012> [INVITED]
  26. Black, K.N.<sup>g</sup>, **Catlos, E.J.**, Oyman, T. (2013) Timing Aegean extension: Evidence from in situ U-Pb geochronology and cathodoluminescence imaging of granitoids from NW Turkey (Special Issue: Geodynamics and Magmatism). *Lithos*. <https://doi.org/10.1016/j.lithos.2013.09.001>
  27. **Catlos, E.J.** (2013) Generalizations about monazite: Implications for geochronologic studies. *American Mineralogist* (Impact Factor: 2.2). 01/2013; 98:819-832. <https://doi.org/10.2138/am.2013.4336> [INVITED, Notable Paper Award]
  28. **Catlos, E.J.**, Jacob, L.<sup>g</sup>, Oyman, T., Sorensen S.S. (2012) Long-term exhumation of an Aegean metamorphic core complex granitoids in the northern Menderes Massif, western Turkey. *American Journal of Science*, 312, 534-571. <https://doi.org/10.2475/05.2012.03>
  29. **Catlos, E.J.**, Baker, C.<sup>g</sup>, Sorensen, S.S., Jacob, L.<sup>g</sup>, Cemen, I. (2011) Linking microcracks and mineral zoning of detachment-exhumed granites to their tectonomagmatic history: Evidence from the Salihli and Turgutlu plutons in western Turkey (Menderes Massif), *Journal of Structural Geology*, 33, 951- 969, <https://doi.org/10.1016/j.jsg.2011.02.005>
  30. **Catlos, E.J.**, Sayit, K., Sivasubramanian, P., Dubey, C.S. (2011) Geochemical and geochronological data from charnockites and anorthosites from India's Kodaikanal-Palani Massif, Southern Granulite Terrain, India. In: *Topics in Igneous Petrology: a tribute to Prof. Mihir K. Bose, Ray,J., Sen, G., Ghosh, B. (Eds.)*, Springer, p. 383-417, [https://doi.org/10.1007/978-90-481-9600-5\\_15](https://doi.org/10.1007/978-90-481-9600-5_15)
  31. **Catlos, E.J.**, Baker, C.<sup>g</sup>, Sorensen, S.S., Cemen, I., Hancer, M. (2010) Geochemistry, geochronology, and cathodoluminescence imagery of the Salihli and Turgutlu granites (central Menderes Massif, western Turkey): Implications for Aegean tectonics. *Tectonophysics*, 488, 110-130, <https://doi.org/10.1016/j.tecto.2009.06.001>
  32. Belley, F., Ferre, E.C., Martin-Hernandez, F., Jackson, M.J., Dyar, M.D., **Catlos, E.J.** (2009) The magnetic properties of natural and synthetic (Fex, Mg1-x)2 SiO4 olivines. *Earth and Planetary Science Letters*, 284, 516-526, <https://doi.org/10.1016/j.epsl.2009.05.016>
  33. **Catlos, E.J.**, Baker, C.B.<sup>g</sup>, Cemen, I., Ozerdem, C.<sup>g</sup> (2008) Whole rock major element influences on monazite growth: examples from igneous and metamorphic rocks in the Menderes Massif, western Turkey. *Mineralogia*, 38, 5-18, <https://doi.org/10.2478/v10002-008-0002-8> [INVITED PAPER for first issue of the journal]
  34. **Catlos, E.J.**, Dubey, C.S., Sivasubramanian, P. (2008) Monazite ages from carbonatites and high- grade assemblages along the Kambam Fault Southern Granulite Terrain, South India. *American Mineralogist*, 93, 1230-1244, <https://doi.org/10.2138/am.2008.2712>
  35. **Catlos, E.J.**, Baker, C.B.<sup>g</sup>, Sorensen, S.S., Cemen, I., Hancer, M. (2008) Monazite geochronology, magmatism, and extensional dynamics within the Menderes Massif, western Turkey. *IOP Conference Series, Earth and Environmental Sciences*, 2, 012013, <https://doi.org/10.1088/1755-1307/2/1/012013>

36. Baker, C.B. <sup>§</sup>, **Catlos, E.J.**, Sorensen, S.S., Cemen, I., Hancer, M. (2008) Evidence for polymetamorphic garnet growth in the Cine (southern Menderes) Massif, Western Turkey. IOP Conference Series, Earth and Environmental Sciences, 2, 012020, <https://doi.org/10.1088/1755-1307/2/1/012020>.
37. Cemen, I., **Catlos, E.J.**, Gogus, O., Diniz, E., Hancer, M. (2008) Cenozoic extensional tectonics of the Western Anatolia Extended Terrane, Turkey. IOP Conference Series Earth and Environmental Science, 2, 012009. <https://doi.org/10.1088/1755-1307/2/1/012009>
38. **Catlos, E.J.**, Dubey, C.S., Marston, R.A., Harrison, T.M. (2007) Geochronologic constraints across the Main Central Thrust shear zone, Bhagirathi River (NW India): Implications for Himalayan tectonics. In: Convergent Margin Terranes and Associated Regions: A tribute to W. G. Ernst. Geological of America Special Paper, (Eds.) M. Cloos, W. D. Carlson, M. C. Gilbert, J. G. Liou, and S. S. Sorensen. Vol. 419, pp. 135-151, [https://doi.org/10.1130/2006.2419\(07\)](https://doi.org/10.1130/2006.2419(07)) [INVITED]
39. Cemen, I., **Catlos, E.J.**, Gogus, O., Ozerdem, C. <sup>§</sup> (2006) Post-Collisional Extensional Tectonics and Exhumation of the Menderes Massif in the Western Anatolia Extended Terrane, Turkey. In: Post- collisional Tectonics and Magmatism in the Eastern Mediterranean Region. Geological Society of America's Special Paper, (Ed.) Y. Dilek., 409, 353-379, [https://doi.org/10.1130/2006.2409\(18\)](https://doi.org/10.1130/2006.2409(18))
40. Dubey, C.S., **Catlos, E.J.**, Sharma, B.K. (2005) Modeling P-T-t paths constrained by mineral chemistry and monazite dating of metapelites ion relationship to MCT activity in Sikkim, eastern Himalayas. In: H. Thomas (ed.) Metamorphism and Crustal Evolution: Papers in Honor of Prof. R.S. Sharma, Atlantic Publishers and Distributors, 250-282.
41. **Catlos, E.J.**, Cemen, I. (2006) Reply to Whitney and Regnier's comments regarding "Monazite Ages and the Evolution of the Menderes Massif, western Turkey" (Int J Earth Sci 94:204-217). International Journal of Earth Sciences, 95, 352-354, <https://doi.org/10.1007/s00531-006-0069-7>
42. **Catlos, E.J.**, Cemen, I. (2005) Monazite ages and the evolution of the Menderes Massif, western Turkey. International Journal of Earth Sciences, 94, 204-217, <https://doi.org/10.1007/s00531-005-0470-7>
43. **Catlos, E.J.**, Dubey, C.S., Harrison, T.M., Edwards, M.A. (2004) Late Miocene Movement within the Himalayan Main Central Thrust Shear Zone, Sikkim, NE India. Journal of Metamorphic Geology, 22, 207-226, <https://doi.org/10.1111/j.1525-1314.2004.00509.x>
44. Bollinger, L., Avouac, J.P., Beyssac, O., **Catlos, E.J.**, Harrison, T.M., Grove, M., Goffe, B., Sapkota, S. (2004) Thermal structure and exhumation history of the lesser Himalaya in central Nepal. Tectonics, 23, Art. No. TC5015, <https://doi.org/10.1029/2003TC001564>
45. Robinson, D.M., DeCelles, P.G., Garizone, C.N., Pearson, O.N., Harrison, T.M., **Catlos, E.J.** (2003) Kinematic model for the Main Central Thrust in Nepal. Geology, 31, 359-362, [https://doi.org/10.1130/0091-7613\(2003\)031<0359:KMFTMC>2.0.CO;2](https://doi.org/10.1130/0091-7613(2003)031<0359:KMFTMC>2.0.CO;2)
46. Robinson, D.M., DeCelles, P.G., Garizone, C.N., Pearson, O.N., Harrison, T.M., **Catlos, E.J.** (2003) Kinematic model for the Main Central Thrust in Nepal:Reply. Geology, 31, e41, <https://doi.org/10.1130/0091-7613-31.1.e41>
47. **Catlos, E.J.**, Sorensen, S.S. (2003) Phengite-based chronology of K- and Ba-rich fluid flow within two paleosubduction zones. Science, 299, 92-95, <https://doi.org/10.1126/science.1076977>.
48. **Catlos, E.J.**, Gilley, L.D., Harrison, T.M. (2002) Interpretation of monazite ages obtained via in situ analysis. Chemical Geology, 188, 193-215, [https://doi.org/10.1016/S0009-2541\(02\)00099-2](https://doi.org/10.1016/S0009-2541(02)00099-2)
49. **Catlos, E.J.**, Harrison, T.M., Manning, C.E., Grove, M., Rai, S.M., Hubbard, M.S., Upreti, B.N. (2002) Records of the evolution of the Himalayan orogen from in situ Th-Pb ion microprobe dating of monazite: Eastern Nepal and Garhwal. Journal of Asian Earth Sciences, 20, 459-479, [https://doi.org/10.1016/S1367-9120\(01\)00039-6](https://doi.org/10.1016/S1367-9120(01)00039-6)
50. Harrison, T.M., **Catlos, E.J.**, Montel, J-M. (2002) U-Th-Pb Dating of Phosphate Minerals. In: J.M. Hughes, M. Kohn, J. Rakovan (Eds.) Phosphates: Geochemical, Geobiological and

- Materials Importance. Mineralogical Society of America, Washington D.C., pp. 523-558, <https://doi.org/10.2138/rmg.2002.48.14>
51. Kohn, M.J., **Catlos, E.J.**, Ryerson, F.J., Harrison, T.M. (2002) P-T-t path discontinuity in the MCT Zone, central Nepal: Reply. *Geology*, 30, 480-48, [https://doi.org/10.1130/0091-7613\(2002\)030<0480:R>2.0.CO;2](https://doi.org/10.1130/0091-7613(2002)030<0480:R>2.0.CO;2)
  52. **Catlos, E.J.**, Harrison, T.M., Kohn, M.J., Grove, M., Ryerson, F.J., Manning, C.E., Upreti, B.N. (2001) Geochronologic and thermobarometric constraints on the evolution of the Main Central Thrust, central Nepal Himalaya. *Journal of Geophysical Research*, 106, 16177-16204, <https://doi.org/10.1029/2000JB900375>
  53. Kohn, M.J., **Catlos, E.J.**, Ryerson, F.J., Harrison, T.M. (2001) P-T-t path discontinuity in the MCT Zone, central Nepal. *Geology*, 29, 571-574, [https://doi.org/10.1130/0091-7613\(2001\)029<0571:PTTPDI>2.0.CO;2](https://doi.org/10.1130/0091-7613(2001)029<0571:PTTPDI>2.0.CO;2)
  54. **Catlos, E.J.**, Sorensen, S.S., Harrison, T.M. (2000) Th-Pb ion-microprobe dating of allanite. *American Mineralogist* 85, 633-648, <https://doi.org/10.2138/am-2000-5-601>
  55. Harrison, T.M., Grove, M., Lovera, O.M., **Catlos, E.J.**, D'Andrea, J. (1999) The origin of Himalayan anatexis and inverted metamorphism: Models and constraints. *Journal of Asian Earth Sciences* 17, 755-772, [https://doi.org/10.1016/S1367-9120\(99\)00018-8](https://doi.org/10.1016/S1367-9120(99)00018-8)
  56. Harrison, T.M., Grove, M., Lovera, O.M., **Catlos, E.J.** (1998) A model for the origin of Himalayan anatexis and inverted metamorphism. *Journal of Geophysical Research* 103, 27017-27032, <https://doi.org/10.1029/98JB02468>
  57. Harrison, T.M., Ryerson, F.J., Le Fort, P., Yin, A., Lovera, O.M., **Catlos, E.J.** (1997) A Late Miocene-Pliocene origin for Central Himalayan inverted metamorphism. *Earth and Planetary Science Letters* 146, E1-E7, [https://doi.org/10.1016/S0012-821X\(96\)00215-4](https://doi.org/10.1016/S0012-821X(96)00215-4)

#### Edited Volumes and Books

1. **Catlos, E.J.**, Cemen, I. (2021, in preparation) AGU Books project Compressional Tectonics: Plate Convergence to Mountain Building - Volume 2.
2. Cemen, I., **Catlos, E.J.**, (2021, in preparation) AGU Books project Extensional Tectonics: Continental Breakup to Formation of Oceanic Basins - Volume 1
3. **Catlos, E.J.** (2020) GEO 416K Earth Materials Lab Guide, 2<sup>nd</sup> edition. Kendall Hunt Publishing, <https://he.kendallhunt.com/product/geo-416k-earth-materials-lab-guide> (online)
4. **Catlos, E.J.** (2016) Physical Geology Lab Manual. Great River Learning. ISBN: 9781680751291, <https://www.greatriverlearning.com/product-details/984>
5. Hunt, B.B., **Catlos, E.J.** (2013) Late Cretaceous to Quaternary Strata and Fossils of Texas: Field Excursions Celebrating 125 Years of GSA and Texas Geology, GSA South-Central Section Meeting, Austin, Texas, April 2013. GSA Field Guides 30, 2013. <https://doi.org/10.1130/9780813700304>
6. **Catlos, E.J.** (2013) GEO 416K Earth Materials Lab Guide. Kendall Hunt Publishing, 196pp. ISBN- 10: 1465219102.
7. **Catlos, E.J.** (2008) Donald D Harrington Symposium on the Geology of the Aegean. IOP Conference Series Earth and Environmental Sciences, 2, <https://doi.org/10.1088/1755-1315/2/1/011001>

#### INVITED PRESENTATIONS (since 2008 only)

##### *Universities*

- 2021 University of New Mexico, Dept. of Earth and Planetary Sciences
- 2020 UT Austin, Faculty Innovation Center, Bringing the Field into Introductory Geosciences Classrooms  
UT Austin, Faculty Innovation Center, Plans for moving forward: Recovering from derailment
- 2019 UCLA, Dept of Earth and Space Sciences
- 2018 University of Houston, Dept. Earth and Atmospheric Sciences  
UT Austin, Planetary Habitability Pop-Up Institute

- 2017 Heidelberg University, Institute of Earth Sciences  
Ludwig Maximilian University of Munich, Dept. Earth and Environmental Sciences 2013  
Louisiana State University, Dept. Geology and Geophysics
- 2011 UT Austin, Dept. Geological Sciences, Undergraduate Geological Society
- 2010 Pennsylvania State University, Geosciences Department (departmental talk)  
Pennsylvania NASA Space Grant Consortium (general talk to broader community)
- 2008 University of Arkansas, Department of Geology  
University of Texas at Austin, Texas Earth Science Revolution program

*Conferences*

- 2019 American Geophysical Union, AGU Topical Session, **Catlos, E.J.**, Etzel, T.M., Cemen, I., Lovera, O.M. (2019) Extensional dynamics of the Menderes Massif, western Turkey (Invited) Abstract T42B-02 presented at 2019 AGU Fall Meeting, San Francisco, CA 9-13 Dec., <https://agu.confex.com/agu/fm19/meetingapp.cgi/Paper/518254>.
- 2018 American Geophysical Union, AGU Topical Session, **Catlos, E.J.**, Etzel, T.M., Dubey, C.S., Kelly, E.D., Marston, R.A., Perez, T.J., Schmitt, A.K. (2018) Deciphering the exhumation history of the crystalline core of the Himalayas: new insight from garnet-bearing assemblages (Invited). Abstract (T43C-04) presented at 2018 AGU Fall Meeting, Washington, D.C., 10-14 Dec., <https://www.researchgate.net/publication/339513715>.
- 2016 Geological Society of America GSA Topical Session, **Catlos, E.J.**, Etzel, T.M., Kelly, E.D., Ashley, K.T., Çemen, I., Oyman, T. (2016) Response to slab roll-back: Revealing the geodynamic history of western Turkey from the Biga Penninsula to the Menderes Massif (Invited Presentation). Geological Society of America Abstracts with Programs. Vol. 48, No. 7, <https://doi.org/10.1130/abs/2016AM-281551>.
- 2015 Geological Society of America GSA Topical Session, **Catlos, E.J.**, Shin, T.A. (2015) Timing subduction processes via in situ (in thin section) zircon and baddeleyite geochronology: Examples from northern Turkey. Geological Society of America Abstracts with Programs. Vol. 47, No. 7, p.432. INVITED oral presentation in session T168. Subduction, Fluids, Accessory Minerals, and Trace Elements: A Celebration of Sorena Sorensen's Career, <https://gsa.confex.com/gsa/2015AM/webprogram/Paper263129.html>.
- 2005 15th Annual V.M. Goldschmidt Conference Abstracts, Accessory Minerals Geochemistry, **Catlos E.J.**, Dubey, C., Marston, R. Harrison, T.M. (2005) Monazite Records of Deformation within the Himalayan Main Central Thrust Shear Zone, NW India. Geochimica et Cosmochimica Acta, 69(10) Supplement 28, <https://goldschmidtabstracts.info/abstracts/abstractView?id=2005002117>

**TEACHING PHILOSOPHY**

My teaching objectives are for my students to learn fundamental geoscience contents and to develop their computational, writing, and critical thinking skills. I aim to help my students function as successful geologists, or in the case of non-majors, help them understand how society is affected by geology.

**Courses Taught at UT Austin (scale is 5 highest)**

Semester	Enrollment	Course Rating Average	Instructor Average Rating	Interested in Teaching	Class Participation Encouraged	Instructor Knowledge
<b>Undergraduate Courses</b>						
<b>GEO416K Earth Materials</b>						
Fall 2010	81	4.1	4.3	4.5	-	4.5
Fall 2012	98	4.1	4.2	-	-	-
Fall 2014	95	4.2	4.4	4.7	4.7	4.6
Fall 2016	61	4.1	4.0	4.4	4.5	4.5
Fall 2018	48	3.8	3.9	4.3	4.2	4.5

Fall 2020- COVIDonline	6	5.0	5.0	5.0	5.0	5.0
Fall 2020- COVIDhybrid	40	4.3	4.5	4.9	4.6	4.9
<b>GEO302K Geology of National Parks</b>						
Fall 2019	21	4.1	4.3	4.5	4.6	4.7
Fall 2020- COVIDonline	42	4.1	4.1	4.6	4.4	4.5
Fall 2021	56	4.4	4.5	4.8	4.5	4.7
Spring 2021	48	4.5	4.6	4.9	4.9	4.8
<b>GEO401: Physical Geology</b>						
Spring 2014	231	4.1	4.4	4.7	-	4.7
Spring 2015	152	4.2	4.6	4.8	4.7	4.8
Spring 2016	136	4.2	4.4	4.7	4.6	4.6
Sum 2017	4	3.6	4.2	5.0	4.8	4.6
First *						
Sum 2017	10	3.7	4.0	4.6	4.6	4.3
First *						
Spring 2018	126	4.0	4.4	4.7	4.8	4.7
Spring 2020- COVIDonline transition	164	4.3	4.5	-	-	-
<b>GEO303: Introduction To Geology</b>						
Spring 2010 *	195	3.8	3.7	4.1	4.0	-
<b>UGS 302 (Rocks &amp; Water Of The Middle East)</b>						
Fall 2011 *	18	3.6	4.3	-	-	-
Fall 2013	18	4.1	4.0	-	-	-
<b>GEO171T International Learning Seminar</b>						
Spring 2016	3	4.0	4.3	4.7	5.0	5.0
Spring 2018	5	5.0	5.0	5.0	5.0	5.0
<b>Graduate Courses</b>						
<b>GEO386: Metamorphic Petrology</b>						
Spring 2015	4	5.0	5.0	5.0	5.0	5.0
Spring 2017	7	4.0	4.2	4.5	4.8	4.5
<b>GEO390R: Analytical Methods: Electron Microbeam Technology</b>						
Spring 2021	5	5.0	5.0	5.0	5.0	5.0
<b>GEO391: Thermodynamics of Petrological Systems</b>						
Fall 2018*	11	3.4	3.6	4.3	4.7	4.5
<b>GEO391: Geology Of The Middle East</b>						
Spring 2011	7	4.6	4.7	4.9	-	4.7
Spring 2012	5	4.2	4.6	4.8	-	4.6

\* team-taught the course; "--" criteria not measured that year

#### **Courses Elsewhere**

*Middle East Technical University, Dept. of Geological Engineering (2008-2009)*

GEOE105: Introduction to Geological Engineering; GEOE213: Mineralogy; GEOE210: Petrography  
*Oklahoma State University (2001-2007)*

GEOL1014: Geology and Human Affairs; GEOL2254: Practical Mineralogy; GEOL2364:

Elementary Petrology; GEOL5263: Electron Microprobe Analysis; GEOL4990: Planetary Geology  
(team taught)

#### **STUDENT RESEARCH ADVISED:**

**Primary graduate supervisor, UT Austin**

2020-present, Hector Garza, PhD

2019-present, Daniel Campos, MS

Theses available at Texas Scholar Works, <https://repositories.lib.utexas.edu/>

2020, Thomas M Etzel, PhD, Garnet chemical zoning thermobarometry: method evaluation and application in the Menderes Massif, Turkey

2017, Andrew Parisi, MS, Geochronological Constraints on the Timing of Proposed Ordovician Meteorite Event Impact Structures in North America

2014, Kate Ataktürk, MS, Deciphering the P-T-t conditions of garnet-bearing metamorphic rocks in the Southern Menderes Massif, SW Turkey

2013, co-supervised Tim Shin, MS, Tectonic evolution of Aegean metamorphic core complexes, Andros and Tinos Islands, Greece

2012, Karen Black, MS, Geochemical and geochronological relationships between granitoid plutons of the Biga Peninsula, NW Turkey

2011, Kathryn Huber, MS, Geochemistry and geochronology of meta-igneous rocks from the Tokat Massif, north-central Turkey

2011, Lauren Jacob, MS, Remote sensing, geochemistry, geochronology, and cathodoluminescence imaging of the Egrigoz, Koyunoba, and Alacam plutons, Northern Menderes Massif, Turkey

### **Oklahoma State University (direct supervision only, OSU had MS-program only)**

Theses available at ShareOk, <https://shareok.org/handle/11244/10460>

2009, Courtney Baker, MS, Deciphering the Evolution History of the Sahili and Turgutlu Granites, Menderes Massif, Western Turkey Using the Electron Microprobe, Ion Microprobe and Cathodoluminescence

2004, Cenk Ozerdem, MS, Thermobarometric Constraints on the Evolution of the Menderes Massif (Western Turkey): Insights into the Metamorphic History of a Complexly deformed Region

### **Served, Graduate Committees (UT Austin only)**

2020 Liam Norris, Ph.D.

2019 Scott Eckley, Ph.D.

2017 Natchanan (Mint) Doungkaew, PhD., Patrick D Boyd, M.S.

2015 Ahmed Alnahwi, PhD, Mehmet O. Gurbuz, M.S.

2014 Menal Gupta, PhD

2013 Migdalys Salazar, PhD., and Corinne Wong, PhD.

2012 Jessica Errico, MS

2011 Autumn Kaylor, MS

### **Undergraduate Student Research Supervision, start dates**

*UT Austin only*

<sup>h</sup>Jackson School Honor's Research Program Student

2020 Rebekah January (Austin Community College), David Keith

2019 Shania Goodwin, Leah Lievrouw, Jackson Phillips

2018 Gabriel Villasenor, Thomas Quintero

2017 Xiafei Zhao, Tyler Fu, Theresa Perez

2016 Emily Pease, Zoe Yin, Ashley Zare, Saloni Tandon

2015 Enrique Reyes, Kimberly Aguilera, Stephanie Suarez, Daniel Lizzardo-McPherson

2014 Colin Sturrock<sup>h</sup>, Bridget Pettit, Chelsea H Jones

2013 Pamela Speciale<sup>h</sup>, Isis Garber

2012 Lindsey German<sup>h</sup>, Abby Kenigsberg<sup>h</sup>, Tyson McKinney

2011 Tim Shin<sup>h</sup>, Heather Flynn

### **POST-DOCTORAL RESEARCH COLLABORATIONS**

Dr. Kyle Ashley (former Visiting Assistant Professor, Department of Geology and Environmental

Science, University of Pittsburgh): inclusion barometry; metamorphic petrology; garnet-bearing assemblages; focus on Turkey and Himalayan tectonics.

Dr. Nick Dygert (Assistant Professor, Department of Earth and Planetary Sciences, University of Tennessee Knoxville): geochronology and geochemistry; focus on Himalayan ophiolites.

Dr. Eric Kelly (Senior Data Scientist, SparkCognition): Theriak-Domino P-T-t modeling; ongoing collaboration; focus on Turkey and Himalayan tectonics.

## **SERVICE/OUTREACH:**

### **Funding Agencies**

#### *NASA*

- 2017 served on 2 Review Panels (PSTAR and Solar System Workings)
- 2013-2016 LEAD Science Reviewer, Standing Review Board for NASA Mars Organic Molecule Analyzer–Mass Spectrometer (MOMA-MS).
- 2011 served on NASA’s panel for Mars Science Laboratory Participating Scientist Program.
- 2010 served on the NASA ROSES 2010 Solicitation for the Astrobiology Science and Technology for Exploring Planets (ASTEP) panel.  
served on an Independent Review Team for the MOMA- LDMS
- 2007 served on NASA’s panel for the instruments UREY and MOMA served on NASA’s PIDDP Peer Review Panel
- 2005 LEAD Science Reviewer for NASA’s PIDDP Peer Review Panel  
LEAD Science Reviewer for Mars Science Laboratory/Sample Analysis at Mars  
served on NASA’s Interdisciplinary Exploration Science Review Panel
- 2004 served on NASA’s Mars Science Laboratory Panel.
- 2003 served on NASA’s Mars Instrumentation and Development Panel

#### *National Science Foundation*

- 2010 INVITED participant of NSF’s Office of International Science and Engineering Workshop Planning activity to highlight best practices that integrate across multiple dimensions of university internationalization, particularly in science and engineering.
- 2002 served on NSF’s Tectonics Panel
- 2000-present routinely review proposals from Tectonics, Petrology and Geochemistry, International, Continental Dynamics, Sedimentary Geology and Paleobiology, and Geography and Regional Science Divisions.

#### *Others*

- 2001-present Routinely review proposals for the Austrian Science Fund and Research Grants Council of Hong Kong
- 2009 reviewer, NIH Challenge Grants in Health and Science Research

### **Professional Organizations**

#### *Conference organization*

- 2019 Chair, European Union-IN-TIME RISE: Workshop on geochronology and Mars exploration: April 8-12.
- 2013 Chair, Geological Society of America-South Central Section Meeting in Austin TX 2008, Chair “The Donald D. Harrington Symposium on the Geology of the Aegean”

#### *Selected Geological Society of America (since 2011 only)*

- 2013-2017 ELECTED Councilor  
Liaison, Mineralogy, Geochemistry, Petrology, Volcanology Division  
Liaison, Structural Geology and Tectonics Division  
Liaison, Student Advisory Council

2015 Member, Ad hoc committee focused on interest groups and divisions 2014-2017 Councilor/Conferee, Diversity in the Geosciences Committee  
 2014-2016 Councilor, Doris M. Curtis Memorial Fund for Women in Science Committee 2009-present Member, Management Board of the South Central Section  
 2012-2015 Member-At-Large, Committee for the Donath Medal (Young Scientist Award) Selection 2013-2016 Councilor/Chair, Arthur L. Day Medal Awards Committee  
 2012-2013 Vice Chair and Chair, Management Board of the South Central Section  
 2011 INVITED to participate in the GSA Council Retreat: Strategic Planning Sessions

*Conference Session co-Chair*

2021 Co-Chair, AGU Tectonic, Topographic, and Exhumation History of the Himalaya-Tibetan Orogen AGU Fall 2021, with Rasoul Sorkhabi (University of Utah).  
 2020 Co-Chair, GSA South Central Section Meeting “The Role of Geochronology in Constraining the Development of Earth’s Lithosphere: Focus on the U.S. South-Central Region, Mexico, and Beyond.” With Rita Economos and J. Douglas Walker  
 2017 Co-Chair, GSA South Central Section Meeting “Advances in Understanding Precambrian to Cenozoic Magmatic and Metamorphic Processes and their Bearing on Lithospheric Evolution of Southern Laurentia” with Michael DeAngelis and Richard Hansen  
 2016 Co-Chair, GSA Annual Meeting “Rates in Metamorphism and Tectonism: From Mineral Growth to Orogenesis” with Thomas M. Etzel, Eric D. Kelly, and Kyle T. Ashley  
 2015 Co-Chair, GSA Annual Meeting “Special Nepal (Gorkha) Earthquake Session” with Anke Friedrich  
 2012 Co-Chair, “Advances in Mineralogy and Petrology.” GSA Annual Meeting

**UT Austin Service (selected responsibilities)**

*University*

2010-present UT Austin Fulbright Student Review Committee  
 2018 UT Austin Provost’s Task Force on the Future of UT Libraries  
 2013 Review of the Faculty Activities Report (FAR) electronic system  
 2013 Served, Selection Committee for UT Austin Faculty-Led Programs for Summer Abroad  
 2014-2017 Member Jackson School Equipment Committee

*Department and school*

2020-present Dept. of Geological Sciences, Structural Geology Associate Professor Search Committee  
 2020-present Dept. of Geological Sciences, DGS Postdoctoral Search Committee  
 2019-present Graduate School Admissions Committee  
 2019-present Jackson School Ad Hoc Committee on graduate admissions, Graduate Studies Committee  
 2018-2021 Jackson School Diversity Committee  
 2015-2021 Organize Dept. DeFord Seminar Series (GEO193T)  
 2015-2021 Organize Jackson School’s Master’s Saturday Events for graduating MS student presentations.  
 2015-present Faculty Supervisor of the Dept. of Geological Sciences Electron Microbeam Facility; have since served as the head to two committees to search for a Facility Manager  
 2015-present Jackson School Library Advisory Committee  
 2015 Jackson School Ad Hoc Committee on Strategic Planning for MS and MA Degrees  
 2017 Search committee for Dept. Geological Sciences Office Manager  
 2016-2018, 2019- Member, Dept. Geological Sciences Awards Committee  
 2012-2013 Undergraduate Advisor for the Dept. of Geological Sciences Undergraduate

Committee, Undergraduate Curriculum Review Committee, Undergraduate Academic Affairs Committee, Undergraduate Advisor for Environmental Science Institute Environmental Science program, Dept. Representative for the ESI-EVS admissions committee

- 2010 Member, Faculty Search Committee for a position in Tectonics and Geochronology  
 2010 Member, Faculty Search Committee for a position in Structural Geology and Tectonics  
 2010 Supervised the Dept. Petrography Contest

### **Mentoring Organizations**

- 2013 Workshop for Early Career Geoscience Faculty, On the Cutting Edge  
 2013 Presenter for GirlTalk, to promote STEM education/careers for girls  
 2009-present UT Austin Campus Representative for the Fulbright Program  
 2010-2017 ELECTED Vice President, Austin Chapter of the Fulbright Alumni Association  
 2010-2014 Lead Instructor for GeoFORCE, Jackson School Outreach Program

### **Textbook Reviews**

- 2019 McGraw Hill to review two chapters in an introductory geoscience textbook  
 2011, 2014 Pearson Education to a focus group for MasteringGeology™  
 2009 Reviewed art for each chapter of “*Living with Earth*,” AGI, Prentice Hall Publishers.  
 2009 Developed testbank questions for each chapter of “*Living with Earth*”  
 Reviewed critical thinking questions for Prentice Hall Publishers.  
 Prentice Hall to a focus group on media and assessment in the classroom Reviewed of  
 Prentice Hall’s basic skills website application

### **Manuscript Reviews**

- 2017-202 (only) Top Reviewer for University of Texas at Austin (2<sup>nd</sup> overall in Earth and Planetary Sciences) by publons. Reviewed for: *Geology* (2), *Plos One*, *Journal of Geology*, *Earth and Planetary Science Letters* (3), *GSA Today*, *Journal of Geoscience Education*, *Lithosphere*, *Tectonics*, *Journal of Geophysical Research: Solid Earth*, *Minerals*, *Lithos*

### **Other service**

- 2020- Associate Co-Editor of AGU Books project Volume II. *Compressional Tectonics: Plate Convergence to Mountain Building*.  
 AGU Books project Volume I. *Extensional Tectonics: Continental Breakup to Formation of Oceanic Basins*.  
 2017- Editorial Board Member for journal *Episodes*  
 2015- Editorial Board Member for *Geodinamica Acta*, now *All Earth* (Taylor and Francis)  
 2010 Expert Witness, deposed, 93<sup>rd</sup> Judicial District, Hidalgo Country, Texas

### **MEMBERSHIPS IN PROFESSIONAL SOCIETIES:**

- |                               |                                  |
|-------------------------------|----------------------------------|
| Geological Society of America | Mineralogical Society of America |
| European Geosciences Union    | American Geophysical Union       |
| Microscopy Society of America |                                  |