

## **CURRICULUM VITAE**

### **David P. Moecher, EES Endowed Alumni Professor**

University of Kentucky

Department of Earth and Environmental Sciences

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## **EDUCATION**

Ph.D. 1988 (Geology) University of Michigan

M.S. 1984 (Geology) University of Wisconsin-Madison

B.S. 1979 (Geology) University of Wisconsin-Madison

## **PROFESSIONAL EXPERIENCE**

07/12-6/19 Chair, UK Dept. Earth and Environmental Sciences

07/12- Professor, UK Dept. Earth and Environmental Sciences

2/11-5/ Visiting Faculty, School of Earth and Environment, University of Western Australia, Perth, WA

7/09-6/12 Associate Chair, Dept. Earth and Environmental Sciences

1/06-7/06 Interim Chair, Dept. Geological Sciences

1/01-6/01 Visiting Scientist, James Cook University, Townsville, Queensland, Australia

9/98-6/12 Director of Undergraduate Studies, Dept. Geological Sciences

9/99-1/14 Editorial Review Board, Journal of Metamorphic Geology

5/97-7/12 Associate Professor, University of Kentucky

8/91-5/97 Assistant Professor, University of Kentucky.

7/89, 7/92 Instructor, University of Michigan Geology Field Camp

9/89-7/91 Research Associate & Adjunct Prof. SUNY-Stony Brook (Manager of Electron Microprobe Analysis Lab)

9/88-8/89 National Research Council Post-Doctoral Fellow, U.S. Geological Survey, Reston, VA.

9/83-8/88 Research and Teaching Assistant, University of Michigan.

6/82-8/82 Exploration Geologist, ARCO Exploration Co., Denver, CO.

9/81-5/83 Teaching Assistant, University of Wisconsin-Madison

9/79-9/80 Well Site Geologist, Petrograph Inc., Giddings, TX.

## **AWARDS**

2021-2022 Fulbright Scholar, Ireland

2019 Fellow Geological Society of America

2015-2021 UK EES Alumni Endowed Professor

11-2014 Terry Mobley Development Service Award, UK Office of Development (awarded to a faculty or staff member for whom development is not a required component of their DOE)

4-2013 UK Ken Freedman Outstanding Advising Award (Faculty)

10-2013 NACADA National Academic Advising Association Outstanding Faculty Advisor Award, Region 3.

## PUBLICATIONS

### Refereed Research Journal Articles (published or in press; listed reverse chronologically; \* = UK graduate student advisee)

59. **Moecher, D.P.**, Tohver, E., Samson, S.D., 2022, Potential Terrane Relationships Between Laurentia and Amazonia during the Grenville Orogenic Cycle: A Synthesis of the U-Pb Zircon and Pb Isotope Records. Accepted pending revisions, *Geological Society America Memoir: Assembling Laurentia*.
58. Clay\*, J.M., **Moecher, D.P.**, Bowersox, J.R., 2021, Detrital Zircon U-Pb Geochronology of the Late Mesoproterozoic Middle Run Formation, (Kentucky – Ohio, U.S.A.): Implications for Grenvillian Orogenesis and Foreland Basin Evolution in the North American Midcontinent. *Precambrian Research*, v. 364, 106332.
57. Makovsky, K., Samson, S., **Moecher, D.**, and Amidon, W., 2021, Timing of Grenville magmatism in the French Broad Massif, southern Blue Ridge, North Carolina, USA: New in situ zircon U-Pb geochronology and implications for timing of Rodinian Orogenesis in eastern Laurentia. *Precambrian Research*, v. 363, 106313.
56. **Moecher, D.P.**, McCulla\*, J.K., Massey\*, M.A., 2021, Zircon and monazite geochronology in the Palmer Zone of Transpression, south-central New England, U.S.A.: Constraints on timing of deformation, high-grade metamorphism and lithospheric foundering during late Paleozoic oblique collision in the northern Appalachian Orogen: *Geological Society of America Bulletin*, v. 133, p. 1021-1038, [doi.org/10.1130/B35744.1](https://doi.org/10.1130/B35744.1)
55. **Moecher, D.P.**, Harris\*, F., Larkin\*, E.A., Walsh\*, K.B., Quinn\*, R.J., Anderson\*, E.D., Satkoski, A.M., Samson, S.D., Tohver, E., 2020, Zircon U-Pb geochronology and Nd-Pb isotope geochemistry of Blue Ridge basement in the eastern Great Smoky Mountains, U.S.A.: Implications for the Proterozoic tectonic evolution of southeastern Laurentia: *American Journal of Science*, v. 320, p. 677-729.
54. Zotto\*, S.C., **Moecher, D.P.**, Niemi, N.A., Thigpen, J.R., Samson, S.D., 2020, Persistence of Grenville dominance in Laurentian detrital zircon age systematics explained by sedimentary recycling: Evidence from detrital zircon double-dating and detrital monazite textures and geochronology: *Geology*, v. 48, p. 792-797.
53. **Moecher, D.P.**, Kelly\*, E.M., Hietpas, J., Samson, S.D., 2019, Proof of recycling in clastic sedimentary systems from textural analysis and geochronology of detrital monazite: Implications for detrital mineral provenance analysis. *Geological Society of America Bulletin*, v. 131, p. 1115-1132.
52. Samson, S.D., **Moecher, D.P.**, Satkoski, A., 2018, Inherited, enriched, heated, or recycled? Examining potential causes of Earth's most zircon fertile magmatic episode. *Lithos*, v. 314-315, p. 350-359.
51. **Moecher, D.P.**, Bowersox, J.R., Hickman, J.B., 2018, Zircon U-Pb geochronology of two basement cores (Kentucky, U.S.A.) and implications for Late Mesoproterozoic sedimentation and tectonics in the eastern Midcontinent. *Journal of Geology*, v. 126, p. 25-39.
50. Massey\*, M.A., **Moecher, D.P.**, Walker\*, T.B., O'Brien\*, T., Rohrer\*, L.P., 2017, The role and extent of dextral transpression and lateral escape on the post-Acadian tectonic evolution of south-central New England. *American Journal of Science* v. 317, p. 34-94.
49. Leib\*, S.E, **Moecher, D.P.**, Steltenpohl, M.G., Andresen, A., 2016, Thermobarometry of metamorphosed pseudotachylyte and associated mylonite: Constraints on dynamic co-seismic rupture depth attending Caledonian extension, north Norway. *Tectonophysics*, v. 682, p. 85-95.

48. **Moecher, D.P.**, McDowell, S.M., Samson, S.D., Miller, C.F., 2014, Ti-in-zircon thermometry and crystallization modeling support “hot” Grenville granite hypothesis. *Geology*, v. 42, p. 362-365.
47. Hietpas, J., Samson, S., Speir, J., **Moecher, D.** 2014, Assessing detrital garnet chemical composition as a quantitative provenance tool: A multivariate statistical approach. *Journal of Sedimentary Research*, v. 83, p. 1181-1197.
46. Hower, J.C., Groppo, J.G., Joshi, P., Dai, S., **Moecher, D.P.**, Johnston, M.N., 2013 Location of cerium in coal-combustion fly ashes: Implications for recovery of lanthanides. In press, *Coal Combustion and Gasification Products* v. 5, p. 73-78, doi: 10.4177/CCGP-D-13-00007.1.
45. Massey\*, M.A., **Moecher, D.P.** 2013, Transpression, extrusion, partitioning, and lateral escape in the middle crust: significance of structures, fabrics, kinematics, and geochronology in the Bronson Hill zone, southern New England, U.S.A. *Journal of Structural Geology*, v. 55, p. 62-78.
44. Chakraborty, S.\*, **Moecher, D.P.**, Samson, S.D., 2012, Provenance of the lower Ocoee Supergroup, eastern Great Smoky Mountains: *Geological Society of America Bulletin*, v. 124, p. 1278-1292.
43. **Moecher, D.P.**, Steltenpohl, M.G., 2011, Petrologic evidence for seismogenic slip in extending middle to lower continental crust: Heier’s zone of pseudotachylyte, North Norway: in “Geology of the Earthquake Source - a Volume in Honour of Rick Sibson”, *Geological Society, London, Special Publication 359*, p. 169-186.
42. Hietpas, J., Samson, S.D., **Moecher, D.P.**, 2011, Assessing the utility of detrital monazite as a provenance indicator: Examples from six Appalachian foreland basin clastic units: *Earth and Planetary Science Letters*, v. 310, p. 488-497.
41. Steltenpohl, M.G., **Moecher, D.P.**, Andresen, A., Ball, J., Mager, S., 2011, The Eidsfjord shear zone: an Early Devonian, paleoseismogenic low-angle normal fault exposed in Lofoten-Vesterålen, north Norway: *Journal of Structural Geology*, v. 33, p. 1023-1043: doi:10.1016/j.jsg.2011.01.017.
40. Massey\*, M.A., Prior, D.J., **Moecher, D.P.**, 2011, Microstructure and crystallographic preferred orientation of polycrystalline micro-garnet aggregates developed during flattening, grain boundary sliding, and diffusion creep: *Journal of Structural Geology*, v. 33, 713-730. doi: 10.1016/j.jsg.2010.12.009. Paper was basis for 2011 “Student Paper of the Year Award” as judged by the Editorial Board of the Journal of Structural Geology.
39. **Moecher, D.P.**, Hietpas, J., Samson, S.D., and Chakraborty, S.\*, 2011, Insights into southern Appalachian tectonic history from ages of detrital monazite and zircon in modern alluvium and bedrock sources: *Geosphere*, v. 7, 494-512. doi: 10.1130/GES00615.1
38. Hietpas, J., Samson, S., **Moecher, D.**, Chakraborty, S.\*, 2011, Enhancing tectonic and provenance information from detrital zircon studies: Assessing terrane-scale sampling and grain-scale characterization: *Journal of the Geological Society-London*, v. 168, p. 309-318. doi: 10.1144/0016-76492009-163.
37. Saha, A., Dhang, A., Ray, J., Chakraborty, S.\*, and **Moecher, D.P.**, 2010, Complete preservation of ophiolite suite from south Andaman, India: A mineral-chemical perspective. *Journal of Earth System Science*, v. 119, p. 1-16.
36. Hietpas, J., Samson, S., **Moecher, D.**, and Schmitt, A., 2010, Recovering tectonic events from the sedimentary record: detrital monazite plays in high fidelity. *Geology*, v. 38, p. 167-170.

35. **Moecher, D.P.**, and Steltenpohl, M.G., 2009, Calculation of rupture depth for an exhumed paleoseismogenic fault from mylonitic pseudotachylyte. *Geology*, v. 37, p. 999-1002.
34. Anderson, E.D.\*, **Moecher, D.P.**, 2009. Formation of high-pressure metabasites in the southern Appalachian Blue Ridge via continental subduction beneath the Laurentian margin. *Tectonics*, v. 28, TC4012, doi:10.1029/2008TC002319.
33. Clemons, K.M.\*, **Moecher, D.P.**, 2009. Re-interpretation of the deformation history of the Greenbrier Fault, Great Smoky Mountains: Petrologic, structural, and geochemical constraints: *Geological Society of America Bulletin*, v. 120, p. 1108-1122.
32. Clemons, K.M.\*, **Moecher, D.P.**, 2008. Re-interpretation of the deformation history of the Greenbrier Fault, Great Smoky Mountains: critical assessment of previous work. *Southeastern Geology*, v. 45, p. 203-224.
31. Anderson, E.D.\*, **Moecher, D.P.**, 2007. Omphacite breakdown reactions and relation to eclogite exhumation rates. *Contributions to Mineralogy and Petrology*, v. 153, 253-277, DOI 10.1007/s00410-007-0192-x.
30. **Moecher, D.P.**, Samson, S.D., 2006. Differential zircon fertility of source terranes and natural bias in the detrital zircon record: implications for sedimentary provenance analysis. *Earth and Planetary Science Letters*, v. 247, p. 252-266.
29. Massey\*, M.A., **Moecher, D.P.**, 2005. Metamorphic, structural, and fabric evolution of a segment of the Eastern Blue Ridge-Western Blue Ridge boundary in central Western North Carolina. *Tectonics*, v. 24, TC5010, doi: 10.1029/2004TC001643.
28. Berg\*, C.A., **Moecher, D.P.**, 2005. Apparent oxygen isotope equilibrium during progressive foliation development and porphyroblast growth in metapelites: implications for stable isotope and conventional thermometry. *Journal of Metamorphic Geology*, v. 23, p. 471-487.
27. **Moecher, D.P.**, Sharp, Z.D., 2004. Stable isotope and chemical systematics of pseudotachylyte and wall rock, Homestake Shear Zone, CO, USA: Meteoric fluid or rock-buffered conditions during coseismic fusion. *Journal of Geophysical Research*, v. 109, B12, doi:10.1029/2004JB003045.
26. **Moecher, D.P.**, Brearley, A.J., 2004. Mineralogy and petrology of a mullite-bearing pseudotachylyte: constraints on the temperature of coseismic frictional fusion. *American Mineralogist*, v. 89, p. p. 1485-1496.
25. **Moecher, D.P.**, Samson, S.D., Miller, C.F., 2004. Precise time and conditions of peak Taconian granulite facies metamorphism in the southern Appalachian orogen, U.S.A., with implications for zircon behavior during crustal melting events. *Journal of Geology*, v. 112, p. 289-304.
24. Haynes\*, E.A., **Moecher, D.P.**, Spicuzza, M.J., 2003. Oxygen isotope composition of carbonates, silicates, and oxides in carbonatites: Constraints on crystallization temperatures of carbonatite magmas. *Chemical Geology*, v. 193, p. 43-57.
23. Hower, J.C., Williams, D.A., Eble, C.F., Sakulpitakphon\*\*, T., **Moecher, D.P.**, 2001. Brecciated and mineralized coals in Union County, Western Kentucky coal field. *Int. J. Coal Geol.* v. 47, p. 223-234.
22. **Moecher, D.P.**, Sharp, Z.D., 1999. Comparison of conventional and garnet-aluminosilicate-quartz O isotope thermometry: Insights for mineral equilibration in metamorphic rocks. *American Mineralogist*, v. 84, p. 1287-1303.

21. **Moecher, D.P.**, 1999. The distribution, style, and intensity of Alleghanian metamorphism in south-central New England: Petrologic evidence from the Pelham and Willimantic domes. *Journal of Geology*, v. 107, p. 449-471.
20. Yang, Xin-Yue, O'Hara, K.D., **Moecher, D.P.**, 1998. Distinction between tectonic mixing and mass transfer in a ductile shear zone. *Journal of Structural Geology*, v. 20, p. 1089-1103.
19. Kane, J., Ng, K.-W., **Moecher, D.P.**, 1998. Effects of lead doping on  $T_c$  and energy gap of  $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_8$  by tunneling spectroscopy. *Physica C*, v. 294, p. 176-182.
18. **Moecher, D.P.**, Anderson\*, E.D., Cook\*, C.A., and Mezger, K., 1997. Petrogenesis of metamorphosed carbonatites in the Grenville Province, Ontario. *Canadian Journal of Earth Sciences*, v. 34, p. 1185-1201.
17. **Moecher, D.P.**, Cosca, M.A., Hanson, G.N., 1997. Ar isotope and petrologic constraints on the middle to late Paleozoic thermotectonic history of the southern Connecticut Valley Zone, New England Appalachians. *Geological Society of America Bulletin*, v. 109, p. 164-175.
16. O'Hara, K.D., Sharp, Z.D., **Moecher, D.P.**, Jenkin, G.R.T., 1997, The effect of deformation on oxygen isotope exchange in quartz and feldspar and significance of isotopic temperatures in mylonites. *Journal of Geology*, v. 105, p. 193-204.
15. Komada, N., **Moecher, D.P.**, Westrum, E.F., Jr., Hemingway, B.S., Zolotov, M.Yu., Semenov, Y.V., Khodakovskiy, I.L., 1996. Thermodynamics properties of scapolites from temperatures of 10 to 1000 K. *Journal of Chemical Thermodynamics* v. 28, p. 941-973.
14. O'Hara, K.D., Kirschner, D.L., **Moecher, D.P.**, 1995. Petrologic constraints on the source of fluid during mylonitization in the Blue Ridge province, North Carolina and Virginia, U.S.A. *Journal of Geodynamics*, v. 19, p. 271-287.
13. **Moecher, D.P.**, Wintsch, R.P., 1994. Deformation induced reconstitution and resetting of mineral equilibria in polymetamorphic gneisses: tectonic and metamorphic implications. *Journal of Metamorphic Geology* v. 12, p. 523-538.
12. **Moecher, D.P.**, Valley, J.W., Essene, E.J, 1994. The carbon isotopic composition of the deep crust: evidence from scapolite-bearing granulites and xenoliths. *Geochemica et Cosmochimica Acta* v. 58, p. 959-967.
11. Sharp, Z.D., **Moecher, D.P.**, 1994. Oxygen isotope variations in a porphyroclastic meta-anorthosite: diffusion effects and "false" isotherms. *American Mineralogist* v. 79, p. 951-959.
10. **Moecher, D.P.**, 1993. Scapolite phase equilibria and carbon isotopes: constraints on the nature and distribution of  $\text{CO}_2$  in the lower continental crust. *Chemical Geology* 108, p. 163-174.
9. **Moecher, D.P.**, Essene, E.J., Valley, J.W., 1992. Stable isotopic and petrologic constraints on scapolitization of the Whitestone meta-anorthosite, Grenville Province, Ontario. *Journal of Metamorphic Geology* 10, p. 745-762.
8. Kendziora, C., Forro, L., Mandrus, J., Hartge, P., Stephens, P., Mihaly, L., Reeder, R., **Moecher, D.**, Rivers, M., Sutton, S., 1992. Composition, structure and elastic properties of  $\text{Bi}_2\text{Sr}_2\text{Ca}_{1-y}\text{Y}_y\text{Cu}_2\text{O}_8$ : a single crystal study. *Physical Review B*, 13025-13034.

7. Lamb, W.M., **Moecher, D.P.**, 1992. CO<sub>2</sub>-rich fluid inclusions in the Whitestone Anorthosite: retrograde formation and subsequent modification. *Journal of Metamorphic Geology*, 10, p. 763-776.
6. **Moecher, D.P.**, E.J. Essene, 1991. Calculation of CO<sub>2</sub> activities from scapolite equilibria, and constraints on the presence and composition of a fluid phase during high grade metamorphism. *Contributions to Mineralogy and Petrology* 108, p. 219-240.
5. **Moecher, D.P.**, I-Ming Chou, 1990. Hydrothermal investigation of andradite and hedenbergite equilibria at 600-860°C and 2 kbar: resolution of previous discrepancies and new estimates of  $\Delta_{m,f}G_{298}$  for andradite and hedenbergite. *American Mineralogist* 75, p. p. 1327-1341.
4. **Moecher, D.P.**, E.J. Essene, 1990. Phase equilibria for calcic scapolite, and implications of variable Al-Si disorder for P-T, T-X<sub>CO<sub>2</sub></sub>, and a-X relations. *Journal of Petrology* 31, p. 997-1024.
3. **Moecher, D.P.**, E.J. Essene, 1990. Scapolite phase equilibria: additional constraints on the role of CO<sub>2</sub> in granulite genesis. In Vielzeuf, D., and Vidal, P. (eds.) *Granulites and Crustal Evolution*, Kluwer Academic Publishers, p. 385-396.
2. **Moecher, D.P.**, E.J. Essene, L.M. Anovitz, 1988. Calculation of clinopyroxene-garnet-plagioclase-quartz geobarometers: evaluation and application to high grade metamorphic rocks. *Contributions to Mineralogy and Petrology*, v. 100, p. 92-106.
1. **Moecher, D.P.**, D. Perkins III, P.J. Leier-Englehardt, L.G. Medaris, Jr., 1986. Metamorphic conditions of late Archean high-grade gneisses, Minnesota River Valley, U.S.A. *Canadian Journal of Earth Sciences*, v. 23, p. 633-645.

#### ***Refereed Article Dealing with Pedagogy***

**Moecher, D.P.**, 2004. Characterization and identification of mineral unknowns: A mineralogy term project. *Journal of Geoscience Education*, v. 52, p. 5-9.

#### ***Manuscripts in Submission/Review/Revision***

Hislop\*, A., Powell, R., **Moecher, D.**, Bemis, S., New bedrock evidence for cumulative offset across N-S dextral faults in the northern Little San Bernardino Mountains: Implications for fault kinematics and historic seismicity in the context of an evolving fault system. In revision, *Geosphere*.

Haley, M., McLeod, C.L., Angi-O'Brien, E., **Moecher, D.P.**, Shaulis, B., Tronnes, R.G., Evaluating the origin of intra-plate granitic magmas in the Oslo Rift, Norway through the major element chemistry of major and minor rock-forming minerals, in review *Minerals*.

Zotto\*, S.C., **Moecher, D.P.**, Samson, S.D., Detrital Monazite and Zircon provenance analysis for Lower Pennsylvanian clastic sequences, Central Appalachian Basin: The critical role of recycling in Appalachian-sourced Laurentian pancontinental river systems. In revision, *Journal of Geology*.

#### ***Manuscripts in Preparation***

McCulla\*, J.K., **Moecher, D.P.**, Massey\*, M.A., Temporal evolution of a real partitioned transpression system: Constraints from monazite U-Th-Pb (EPMA) geochronology linked to fabric evolution, northern Appalachian orogen, USA. To be submitted to *Tectonics*.

Harris\*, F.R., **Moecher, D.P.**, Tohver, E., Samson, S.D., Assessment of Laurentian Grenville-age clastic influx onto Amazonia using U/Pb detrital zircon geochronology: Implications for Rodinian paleogeography. To be submitted to *Journal of South American Earth Science*.

Makovsky, K., Samson, S.D., Moecher, D.P., Valley, J.W., Evaluation of the eastern Laurentia – western Amazonia Mesoproterozoic transfer hypothesis: Zircon U-Pb and Hf isotope composition of 1.4-1.0 Ga granitoids in the southeastern U.S.A. and southern Colombia. To be submitted to *Earth and Planetary Science Letters*.

### **Edited Field Trip Guidebook Chapters and Geologic Maps**

**Moecher, D.P.**, Anderson\*, E.D., Loughry\*, D.F., Jr., Quinn\*, R.J., Larkin\*, E.A., Walsh\*, K.B., Samson, S.D., Satkoski, A., and Tohver, E., 2018, Evolution of the Blue Ridge Basement Complex in the Eastern Great Smoky Mountains: Evidence from Zircon U-Pb Geochronology of Basement Gneisses, in Engel, A.S., and Hatcher, R.D., Jr., eds., *Geology at Every Scale: Field Excursions for the 2018 GSA Southeastern Section Meeting in Knoxville, Tennessee: Geol. Soc. Am. Field Trip Guide 50*, p. 121-139, [https://doi.org/10.1130/2018.005\(08\)](https://doi.org/10.1130/2018.005(08)).

Massey\*, M.S., Walker\*, T.B., Rohrer\*, L.P., O'Brien\*, T.M., McCulla\*, J., **Moecher, D.P.**, 2015, The role of Carboniferous mid-crustal transpression and lateral escape in the tectonic development of south-central New England: Insights from bedrock mapping, structural analysis, and geochronology. Guidebook for Field Trips in Connecticut and Massachusetts: *New England Intercollegiate Geological Conference 107<sup>th</sup> Annual Meeting*, p. 269-308.

Massey, M.A.\*, **Moecher, D.P.**, 2008, Preliminary bedrock geologic map of the Palmer quadrangle, Massachusetts: Office of the Massachusetts State Geologist Open File Report OFR-08-02. Scale 1:24,000. 1 sheet and digital product: Adobe PDF and ESRI ArcGIS database. PDF available at [http://www.geo.umass.edu/stategeologist/frame\\_maps.htm](http://www.geo.umass.edu/stategeologist/frame_maps.htm).

Massey, M.A.\*, **Moecher, D.P.**, 2008, Deep crustal partitioned transpression and ductile extrusion of the Monson orthogneiss, Bronson Hill-Central Maine boundary zone, south-central Massachusetts, in, Van Balen, M.R. (ed.), *Guidebook to field trips in the Massachusetts and adjacent regions of Connecticut and New York: New England Intercollegiate Geological Conference 100<sup>th</sup> Annual Meeting*, Trip A2, 29 pp.

**Moecher, D.P.**, Massey\*, M.A., Tracy, R.J., 2005. Timing and Pattern of Metamorphism in the Western and Central Blue Ridge, TN and NC: Status and Outstanding Problems. In, Hatcher, R.D., Jr., Merschat, A.J., (eds.) *Blue Ridge Geology Geotraverse East of the Great Smoky Mountains National Park, Western North Carolina: North Carolina Geological Survey, Carolina Geological Society Field Trip Guidebook, 2005 Annual Meeting*, p. 57-66.

Allen, J.L., O'Hara, K.D., **Moecher, D.P.**, 2002, Structural geometry and thermal history of pseudotachylyte from the Homestake Shear Zone, Sawatch Range, Colorado. *Geological Society of America Field Trip Guidebook*, Annual Meeting, Denver, CO 2002.

### **FUNDED RESEARCH GRANTS (\$1.71M in total external funding to-date)**

(D.P. Moecher is PI, unless noted otherwise. All funds are those awarded to UK)

NSF Tectonics EAR 1624663 “*Collaborative Research: “Double-Double Dating” using Detrital Monazite and Detrital Zircon: Quantifying Sediment Recycling in Tectonic Studies*”: \$213,371, 08-01-16 to 07-31-19, no-cost extension through 2021.

U.S.G.S. EDMAP: “*Bedrock Geologic Map of part of the Joshua Tree South 7.5 Minute Quadrangle, southern California*”. \$17,467, 8/1/16-7/31/17.

NSF/Instrumentation and Facilities EAR 1551342: “*Acquisition of a Scanning Electron Microscope for Earth Science Research and Training of the Next Generation of Geoscientists*”: \$149,602, 3/01/2016 to 2/28/2018.

NSF/Petrology and Geochemistry EAR 1447605: “*Collaborative Research: Use and abuse of zircon thermometry – integrating modeling, trace element chemistry and isotopes to maximize the use, limit the abuse*”; \$153,805, 4/1/15-3/31/17.

U.S.G.S. EDMAP: “*Bedrock Geologic Map of the North Half of the Hazelwood 7.5 Minute Quadrangle, Western North Carolina*”: \$17,461, 5/7/14-5/6/15.

NSF/Tectonics EAR1322047: “*Dating Transpression and Extrusion at Mid-Crustal Depths*”; \$260,001, 1/15/14-1/14/16.

U.S.G.S. EDMAP: “*Bedrock Geologic Map of the West Half of the Petersham 7.5 Minute Quadrangle, central Massachusetts*”: \$14,354, 5/13/13-5/12/14.

U.S.G.S. EDMAP: “*Bedrock Geologic Map of the Cove Creek Gap 7.5 Minute Quadrangle, western North Carolina*”: \$17,143, 6/1/12-5/31/13

U.S.G.S. EDMAP: “*Bedrock Geology of the East Brookfield 7.5’ quadrangle, south-central Massachusetts*”; \$16,714, 5/1/10-4/30/11.

NSF/EAR/Instrumentation and Facilities: Supplemental Request to EAR-0824714: “*Upgrade of the University of Kentucky ARL-SEMQ electron microprobe*”: \$33,730.

NSF/Equipment and Facilities EAR-0824714: “*Upgrade of the University of Kentucky ARL-SEMQ electron microprobe*”: \$168,500; 12/03/08-12/02/08. \$25,000 matching from office of UK Vice-President of Research; 12-03-08 to 12-02-09.

U.S.G.S. EDMAP: “*Bedrock Geology of the Southern Winchendon 7.5’ quadrangle, North-central Massachusetts*”; \$13,933. 3/1/08-2/28/09.

NSF/Tectonics EAR-0635688 “*Identifying the Limitations and Expanding the Utility of Detrital Mineral U-Pb Geochronology to Tectonic Studies*”: 01/01/07-12/31/09: \$146,297.

USGS EDMAP: “*Geologic Mapping and Kinematic/Geochronologic Analysis of the Bronson Hill-Central Maine terrane Boundary (Palmer 7.5’ quad), South-Central Massachusetts*”; 05/01/06—04/30/07; \$11,750.

NSF/International Division, Supplement to EAR9814991: *Collaborative Research in Cloncurry and Robertson River, Queensland, Australia*; \$27,486.

NSF/Instrumentation and Facilities EAR0001322 “*Upgrade of the University of Kentucky Electron Probe Microanalyzer*”; 8/01/00-7/31/02; \$95,827.

NSF/Petrology and Geochemistry EAR9814991: “*Oxygen Isotope Systematics in Polymetamorphic Rocks: The Effects of Multiple Periods of Deformation and Mineral Growth*”; 05/01/99 to 04/30/01; \$98,000.

NSF/Tectonics EAR9507982: “*Stable Isotope Geochemistry of Pseudotachylite: Constraints on the Conditions and Mechanism of Frictional Fusion During Brittle Faulting*”; Co-PI with K.D. O’Hara; 06/01/95 to 05/31/97; \$110,000.



NSF/Tectonics EAR9316954: “*Chemical Changes in Retrograde Mylonites as a Function of Metamorphic Grade and Deformation Behavior of the Major Rock-Forming Minerals*”; Co-PI with K.D. O’Hara; 02/01/94 to 07/31/96; \$90,000.

NSF/Equipment and Facilities EAR9219691: “*Upgrade of the University of Kentucky ARL-SEM/EDS electron microprobe*”: \$75,000, 3/1/93 to 8/31/95.

### **Other Successful Research Grant Proposals**

UK Research Committee Grants, 1992, 1996, 2002, 2005, 2008

UK Summer Research Fellowships, 1992, 1994

NRC Post-Doctoral Research Fellowship, U.S. Geological Survey 1988-1989

### **UK Graduate Student Advisees**

David Clay Seckinger, M.S. candidate x2021

John Mitchell Clay, Ph.D. candidate x2022

Felicia Harris, M.S., 2020: “*A tale of 3000 zircons: An investigation of Grenville sedimentation in Amazonia using U/Pb detrital zircon geochronology*”.

Steven Zotto, M.S. 2019: “*Testing for sedimentary recycling using detrital monazite geochronology, zircon “double dating” and textures in Pennsylvanian arenites of the Central Appalachian Basin, eastern Kentucky: Implications for single mineral sedimentary provenance analysis*”.

Ann Hislop, Ph.D. 2019: “*Fault evolution in the northwest Little San Bernardino Mountains, southern California: A reflection of tectonic linkage between the San Andreas Fault and the Eastern California Shear Zone*”.

Kevin Walsh, M.S. 2018: “*Geochronological and geochemical constraints on the origin of the Cartoogechaye Terrane, western North Carolina: Implications for the late Precambrian to early Paleozoic evolution of the eastern Laurentian margin*”.

Samantha Burk, M.S. 2017: “*Zircon as a proxy for “taking the temperature” of granites: An example using zircon thermometry applied to Grenvillian mid-crustal magmas in the Blue Ridge Province, Virginia*”.

Emma Larkin, M.S. 2016: “*Field, geochronologic, and geochemical constraints on late Precambrian to early Paleozoic terrane accretion in the southern Appalachian Blue Ridge province*”.

James McCulla, M.S. 2016: “*Dating Deformation in the Palmer Zone of Transpression, Central Massachusetts: Temporal Constraints on Models for Progressive Deformation in the Middle Crust*”.

Lucas Rohrer, M.S. 2015: “*Bedrock Geologic Mapping and Structural Analysis of the Western Half of the Petersham Quadrangle, Central Massachusetts: Further Tests of the Model for Middle to Late Paleozoic Ductile Transpression, Vertical Extrusion, and Lateral Escape in the Northern Appalachians*”.

Daniel F. Spaulding, M.S. 2014: “*Geology of the West Half of the Cove Creek Gap Quadrangle and Adjacent Area, Western North Carolina: Insights into Western Great Smoky Mountains Tectonometamorphism*”

Evan Kelly, M.S. 2014: “*Age of the Walden Creek Group, western Blue Ridge Province: Resolving a Decades-Old Controversy via Detrital Mineral Geochronology and Sedimentary Provenance Analysis*”

Gabriel E. Richarde, M.S. 2013: “*Geothermobarometric Evolution of the Liverpool Land Eclogites, East Greenland Caledonides*”.

Susan Leib, M.S. 2013: “*Thermobarometry of Metamorphosed Pseudotachylyte and Determination of Co-Seismic Slip Depth during Devonian Caledonian Extension, North Norway*”.

Ryan J. Quinn, M.S. 2012: “*The Evolution of Grenville Basement in the Eastern Great Smoky Mountains; Constraints from U-Pb Zircon Geochronology, Whole Rock Sm-Nd, and Feldspar Pb Geochemistry*”.

Eric D. Anderson, Ph.D. 2011: “*Petrologic, Geochemical, and Geochronologic Constraints on the Tectonic Evolution of the Southern Appalachian Orogen, Blue Ridge Province of Western North Carolina*”

Thomas. B. Walker, M.S., 2011: “*Bedrock Geology and Tectonic Evolution of the Western Central Maine Zone, South Central Massachusetts*”

Matthew A. Massey, Ph.D., 2010: “*Significance of Structures, Fabrics, and Kinematics in the Southern New England Appalachians, Massachusetts and Connecticut, USA: Evidence for Late Paleozoic Transpression, Extrusion, and Deformation Partitioning*”

Suvankar Chakraborty, Ph.D., 2010: “*Provenance of the Ocoee Supergroup, Eastern Great Smoky Mountains*”

Donald F. Loughery, Jr., M.S. 2010: “*Origin of Blue Ridge Basement Rocks, Dellwood Quad, western NC: New evidence from U-Pb Zircon Geochronology and Whole Rock Geochemistry*”

Timothy O’Brien, M.S. 2009: “*Bedrock Mapping of the Winchendon (1:25000) Quadrangle (MA-NH): Evidence for Discontinuous Deformation Along the Bronson Hill-Central Maine Boundary Zone*”

Kit Clemons, M.S. 2006: “*Petrofabric and Geochemical Analysis of the Great Smoky-Snowbird Group Contact, Western Blue Ridge, North Carolina and Tennessee*”

Lois Yoksouljian, M.S. 2006: “*Geochemical Investigation of the Diamond-Barren Kimberlites of Elliott County, Kentucky, USA: Application to Kimberlite Emplacement Conditions and Diamond Survival*”

Matthew A. Massey, M.S. 2003: “*Metamorphic, Fabric, and Structural Evolution of Rocks Defining the Eastern Blue Ridge-Western Blue Ridge Boundary, Western North Carolina: Implications for the Hayesville Fault*”

Christopher A. Berg, M.S., 2001: “*Oxygen Isotope and Major Element Systematics in Multiply-Deformed Metamorphic Rocks: Assessment of Oxygen Isotope and Major Element Equilibrium*”

Elizabeth A. Haynes, M.S. 2000: “*Oxygen Isotope Composition of Carbonates, Silicates, and Oxides in Carbonatites: Constraints on Crystallization Temperatures of Carbonatite Magmas*”

Eric D. Anderson, M.S. 1996: “*Stable Isotope and Chemical Composition of Calcite from Calcite-Apatite-Biotite Rocks, Marble, and Skarn, Southwestern Grenville Province, Ontario: Constraints on the Origin of Potential Meta-Carbonatites*”

#### **Other Advisees**

Hannah Utterback, M.S. candidate 2016 (withdrew from program for health issues)

Julie Floyd, M.S. candidate (withdrew from program 2012; returned in another field)

Kate Adank, M.S. candidate 2007 (changed fields)

Jeffery Crevier, M.S. candidate 2000-2002 (did not finish)

Claudia A. Cook, M.S. candidate 1995-1997 (withdrew from program for health reasons)

Bryant Ramirez, M.S. candidate 1992-1993 (withdrew from program to pursue medical school)

### **Graduate Student Thesis Committee Member or Service**

William Swanger, M.S. candidate, UK Dept. Earth & Env. Sciences  
Elizabeth Straub, Ph.D. candidate, UK Dept. Anthropology  
Brandon Spencer, Ph.D. candidate, UK Dept. Earth & Env. Sciences  
Shayna Lindquist, Ph.D. candidate, UK Dept. Anthropology  
Stephanie Sparks, M.S. candidate, UK Dept. Earth & Env. Sciences  
Karen Stevens, Ph.D. candidate, UK Dept. Anthropology  
Nicholas Powell, M.S. 2021, UK Dept. Earth & Env. Sciences  
Kyle Makovsky, Ph.D. 2021, Syracuse Univ. Dept. Earth Sciences  
Rachel Hoar, M.S. 2019, UK Dept. Earth & Env. Sciences  
Cosmas Kujjo, Ph.D. 2019, UK Dept. Earth & Env. Sciences  
Bailey Hodelka, M.S. 2018, UK Dept. Earth & Env. Sciences  
Zachary Perlman, M.S. 2017, UK Dept. Earth & Env. Sciences  
Patrick Whalen, M.S., 2017, UK Dept. Earth & Env. Sciences  
Anne Fendick, M.S. 2016, UK Dept. Earth & Env. Sciences  
Patrick Baldwin, M.S. 2016, UK Dept. Earth & Env. Sciences  
Olaf Jaime-Riveron, Ph.D. 2016, UK Dept. Anthropology  
Melissa Ditty, M.S. 2015, UK Dept. Earth & Env. Sciences  
Kenneth Brown, Ph.D. 2015, Miami Univ. Dept. Geology and Environmental Earth Sciences (external member)  
Philip Mink, Ph.D. 2015, UK Dept. Anthropology outside examiner  
Christopher Gunn, Ph.D. 2015, UK Dept. Anthropology  
Mahnaz Sepehrmanesh, M.S. 2014 UK Dept. Earth & Env. Sciences  
Olivia Woodruff, M.S. 2014, UK Dept. Earth & Env. Sciences  
Sarah Federschmidt, M.S. 2014, UK Dept. Earth & Env. Sciences  
Rachel Hatch, M.S. 2013, UK Dept. Earth & Env. Sciences  
Nick Levitt, Ph.D. candidate, UK Dept. Earth & Env. Sciences (left UK 2013)  
Aaron Satkoski, Ph.D. 2013, Syracuse University Dept. Earth Sciences  
Jack Hietpas, Ph.D. 2012, Syracuse University Dept. Earth Sciences  
John Hickman, Ph.D. 2011, UK Dept. Earth & Env. Sciences  
Wesley Stoner, Ph.D. 2010, UK Dept. Anthropology  
Jack Hietpas, M.S. 2009, Syracuse University Dept. Earth Sciences  
Elizabeth Dodson, M.S. 2009, UK Dept. Earth & Env. Sciences  
Cora Anderson, M.S. 2008, UK Dept. Earth & Env. Sciences  
Mohan Bharara, Ph.D., UK Chemistry Dept. 2006 (Outside Examiner)  
Matthew Surlis, Ph.D. 2007, UK Dept. Geological Sciences  
Linda Martin, Ph.D., UK Geography Dept., 2006 (Outside Examiner)  
Thomas Becker, Ph.D. 2005, UK Dept. Geological Sciences  
William Andrews, Ph.D. 2004, UK Dept. Geological Sciences  
Clay Wilcox, M.S. 2005, UK Dept. Geological Sciences  
Christopher Gunn, M.S. 2002, UK Dept. Anthropology  
Timothy Keizer, Ph.D., UK Dept. Chemistry, 2002 (Outside Examiner)  
Jeffery Kane, Ph.D., UK Dept. Physics and Astronomy 1998  
Carrie Graff, M.S., Univ. Cincinnati Geology Dept. 1998  
E.K. Esawi, Ph.D., UK Dept. Geological Sciences 1997  
Christopher Toles, Ph.D., UK Dept. Geological Sciences 1996  
James Coble, Ph.D., UK Dept. Geological Science 1996  
Bryant Ramirez, M.S., Univ. Cincinnati Geology Dept. 1995  
Michelle Bell, M.S., UK Dept. Geological Sciences 1993

## **Department, University, and Professional Service**

2020- : NRES Major Steering Committee, EES representative  
2020- : Chair Recruitment, EES Alumni Development, Diversity, Equity, and Inclusivity Committee  
2019- : A&S Endowed Professors Committee  
2014-16: Chair of Search Committee, Director of Kentucky Geological Survey and Kentucky State Geologist  
2012-19: UK Arts & Sciences Council of Chairs  
2010-11: UK Arts & Sciences Living-Learning Community steering committee  
2009-10: UK Arts & Sciences, International Studies degree program review committee  
2009: General Education Reform, Natural Science Intellectual Inquiry learning outcomes committee  
2009-10: Geochemistry faculty search committee chair  
2006-2007, 2007-2008: Geophysics faculty search committee  
2006: Interim Department Chair  
2006: Science Library Faculty Advisory Committee  
2004-2005: A&S Educational Policy Committee; Area subcommittee Chair.  
2003-2004: Arts & Sciences College Council Rules Revision Committee  
2003-2005: Arts & Sciences College Council  
2003: Faculty Senate Ad-Hoc Committee on Program Termination  
2002-2003: Arts & Sciences Undergraduate Majors Committee  
1999-present: Editorial Review Board, Journal of Metamorphic Geology  
1998-2003: Associate Editor, Geological Society of America Bulletin  
1998-2012: Director of Undergraduate Studies, Dept. Geological Sciences  
1998-2000: Southeast Section Geological Society of America Student Research Grant Review Panel Chair  
2001-2002: Chair, Isotope Geochemistry Faculty Search Committee  
1998: Ad hoc UK Research Committee Grant Review Panel  
1997: UK Psychology Department 5 Year Review Panel  
1997: Chair, Geochemistry Faculty Search Committee  
1991-present: Director, UK Dept. Geological Sciences Electron Probe Microanalyzer Laboratory  
Numerous other Department committees and responsibilities (see below)

## **Miscellaneous Department Service**

### **Committee Memberships**

*Pioneer Professor in Stratigraphy search committee, '11-'12*

*Sedimentary Geology search committee Chair, '09-'10*

*Applied Geophysics faculty search committee '06-'07*

*Seminar Committee (Co-Chair '04-'06; Chair '06-'07; Fall '07):* arrange speakers, schedule visits including travel and lodging, serve as host for majority of speakers.

*Personnel and Budget Committee: ('05-'06, '06-'07)*

*Geological Sciences Alumni Advisory Board 2004-present*

*Undergraduate Studies 1998-Present:* Revise B.A. program; create new orientation course (GLY 295); SACS reviews; advise all junior-senior majors; undergraduate awards; maintain communication with majors regarding curriculum information and career development

*Technology:* organize upgrades and maintenance of college networked PCs; liaison for student computer lab; arrange acquisition of new hardware and software.

*Cultural and Social Activities:* Earth Science Week/A&S Week Dept. Open House; arrange for gifts, condolences; organize and run Dept. fall picnics and alumni receptions, etc.

*Field Camp Committee:* organize and teach field camp and field trip courses

*Resources and Safety:* maintain and arrange for servicing of rock preparation equipment and teaching microscopes; space assessment and allocation.

### **Director and Supervisor of Electron Probe Microanalysis Lab**

-Maintain and service the CAMECA SX50 electron probe microanalyzer and (as of August 2016) the JEOL JSM IT100 scanning electron microscope.

-Secure funding for instrument maintenance and expendable supplies  
-Instruct internal (faculty and grad students from UK Geol. Sci., Anthropology, Physics) and external researchers (EKU, WKU, U of L, Univ. Cincinnati, Miami Univ.) in use of the instrument

### **Invited Lectures in '03-'18**

Ohio University, Department of Geological Sciences, Oct. 3, 2003: *“Resolving the “controversy” on timing of mountain building in the southern Appalachians.”*

Eastern Kentucky University, Department of Geology and Geography, Sept. 29, 2004: *“Resolving the “controversy” on timing of mountain building in the southern Appalachians.”*

Syracuse University, Department of Earth Sciences, Nov. 16, 2006: *“Melting of wall rocks by frictional heating during earthquake-generating fault rupture: How hot, and how wet?”*

University of Tennessee, Department of Earth and Planetary Sciences, Jan. 11, 2007: *“Melting of wall rocks by frictional heating during earthquake-generating fault rupture: How hot, and how wet?”*

University of Dayton, Department of Geology, Jan. 26, 2007: *“Melting of wall rocks by frictional heating during earthquake-generating fault rupture: How hot, and how wet?”*, and *“Grenville Zircon Fertility, Baby Boom, and Baby Boom Echo: Implications for Appalachian Provenance Studies.”*

University of Cincinnati, Department of Geology, April 20, 2007: *“Melting of wall rocks by frictional heating during earthquake-generating fault rupture: How hot, and how wet?”*

Auburn University, Department of Geology, January 24, 2008: *“Fantastic Fables of Frictional Fusion on Faults: Implications for Pseudotachylyte Petrogenesis.”*

University of New Mexico, Department of Earth and Planetary Sciences, April 4, 2008: *“Melting of wall rocks by frictional heating during earthquake-generating fault rupture: How hot, and how wet?”*

University of Georgia, Department of Geology, February 26, 2009: *“Insights into processes attending continental seismicity from pseudotachylyte-bearing fault zones.”*

University of Nevada Las Vegas, Department of Geosciences, March 17, 2010: *“Earthquake Cold Case: a petrologist’s view of the seismogenic zone long after the crime has been committed.”*

Curtin University of Technology, School of Applied Geology, April 20, 2011: *“Grenville zircon fertility in eastern Laurentia: Origin and implications for detrital zircon provenance studies”.*

University of Nebraska-Lincoln, Department of Earth and Atmospheric Sciences, February 17, 2012: *“A petrologist’s view of the seismogenic zone.”*

Vanderbilt University, Department of Earth and Environmental Sciences, February 15, 2013: *“Grenville zircon fertility in Laurentia: Expression, origin, and implications for zircon provenance studies and zircon geothermometers.”*

University of Texas at Dallas, Department of Geosciences, Oct. 21, 2016: *“Sedimentary recycling and limits on accuracy of detrital zircon provenance analysis: Insights from detrital monazite geochronology and textures.”*

Colorado School of Mines, Dept. of Geology and Geological Engineering, Van Tuyl invited lecture, Jan. 28, 2017: *“Differential Zircon Fertility, Sedimentary Recycling, and other Problems for Detrital Zircon Geochronology in Provenance Studies: Detrital Monazite to the Rescue!”*

Appalachian State University, Dept. Earth and Environmental Sciences, Feb. 9, 2018 “*The Great Grenville Sedimentation Event: or Whatever Happened to all that Grenville Sediment?*”

**Abstracts of research presented at professional meetings** (\*UK student advisee; Moecher made presentations for which he is listed as first author)

- Spencer, B. Powell, N.E., Thigpen, J.R., **Moecher, D.P.**, Stowell, H.H., Merschat, A.J. 2021, Defining metamorphic timing, extent, and conditions in the southern Appalachian Blue Ridge and Inner Piedmont – insights from monazite xenotime geochemistry and geochronology: *Geol. Soc. Am. Abs. Progs.*, v. 53, No. 6 doi: 10.1130/abs/2021AM-370757.
- Moecher, D.P.**, 2021, The critical role of recycling in the evolution of detrital zircon age systematics in a long-lived basin and importance of a multi-proxy approach to provenance analysis: Evidence from eastern Laurentia: *Geol. Soc. Am. Abs. Progs.*, v. 53, No. 2, doi: 10.1130/abs/2021SE-362178.
- Moecher, D.P.**, 2021, U-Pb geochronologic and Pb isotopic evidence in support of the exotic Mars Hill Terrane-transfer hypothesis: Compelling links between southeastern Laurentia and the Paragua craton of southwestern Amazonia: *Geol. Soc. Am. Abs. Progs.*, v. 53, No. 2, doi: 10.1130/abs/2021SE-362180.
- Moecher, D.P.**, Tohver, E., Samson, S.D., 2020, The end of an era: how GEON 14 came to a close during GEON 13 with the approach of Amazonia and Rodinian collision – evidence from southeastern Laurentia and southwestern Amazonia: *Geol. Soc. Am. Abs. Progs.* v. 52, No. 6, 2020 doi: 10.1130/abs/2020AM-356305..
- Daniels, C.G., Indares, A., Goodge, J.W., **Moecher, D.P.**, 2020, Intro to Session: GEON 14 enigmas and advances in understanding crustal evolution and paleogeography of early Mesoproterozoic North America: *Geol. Soc. Am. Abs. Progs.* v. 52, No. 6, 2020 doi: 10/1130/abs/2020
- Harris\*, F.R., **Moecher, D.P.**, 2020, Was there a “Great Grenville Sedimentation Episode” (GGSE) across Amazonia following Rodinian assembly? Exploring the clastic record in southwestern Brazil using detrital zircon geochronology: *Geol. Soc. Am. Abs. Progs.* v. 52, No. 6, 2020 doi: 10.1130/abs/2020AM-358161.
- Powell, N., Thigpen, J.R., Stowell, H.D., **Moecher, D.P.**, 2020, Testing the applicability of the channel flow model in the southern Appalachian Inner Piedmont using integrated isochemical pseudosection modeling and geochronology: *Geol. Soc. Am. Abs. Progs.* v. 52, No. 6, 2020 doi: 10.1130/abs/2020AM-358198.
- Moecher, D.P.**, Samson, S.D., Tohver, E., 2020, Searching for Grenvillian linkages between Laurentia and Amazonia: Going down the rabbit hole and finding “that pesky wabbit” in the Great Smoky Mountains Basement Complex of southeastern Laurentia and Paragua Block in southwest Amazonia: *Geol. Soc. Am. Abs. Progs.* v. 52, No. 3 doi: 10.1130/abs/2020SE-344291.
- Moecher, D.P.**, Massey, M.A., 2020, Extreme Neo-Adian crustal shortening and vertical/lateral extrusion in New England due to oblique collision/transpression accommodated by lithospheric delamination: *Geol. Soc. Am. Abs. Progs.* v. 52, No. 3 doi: 10.1130/abs/2020SE-344284.
- Harris\*, F., **Moecher, D.P.**, Tohver, E., 2020, “The tale of 3000 detrital zircons”: An investigation of Grenville sedimentation in Amazonia during Rodinian assembly: *Geol. Soc. Am. Abs. Progs.* v. 52, No. 3 doi: 10.1130/abs/2020SE-344390.
- Willis, D., O’Farrell, K.A., **Moecher, D.P.**, 2019, Dynamics of a plume beneath Laurentia: AGU Fall Meeting 2019, paper 622979.
- Moecher, D.P.**, 2019, Eastern Laurentia Meso- to Neoproterozoic crustal evolution: Juvenile, reworked, exotic, rifted and almost rifted components, buried or barely exposed: *Geol. Soc. Am. Abs. Progs.* v. 51, No. 5.
- Moecher, D.P.**, Samson, S.D., 2019: Differential zircon fertility and sedimentary recycling: The Achilles heels of accurate detrital zircon provenance analysis – how detrital monazite and muscovite can help heal the heels: *Geol. Soc. Am. Abs. Progs.* v. 51, No. 5.
- Samson, S.D., Kittross, S., **Moecher, D.P.**, 2019, Beyond detrital zircon: Combining U-Th-Pb dating with Nd isotope composition of detrital monazite to further enhance sediment source information: *Geol. Soc. Am. Abs. Progs.* v. 51, No. 5.
- Makovsky, K.A., Samson, S.D., **Moecher, D.P.**, 2019, Magmatism during Grenville (1.14-1.05 Ga) orogenesis: Did some of Earth’s hottest granitoids form by melting of chemically primed crust? Evidence from Ti contents and Hf isotopes of zircon: *Geol. Soc. Am. Abs. Progs.* v. 51, No. 1.
- Moecher, D.P.**, 2019, Unraveling the protracted history (1800-450 Ma) of southeastern Laurentia recorded in metamorphic rocks of the Great Smoky Mountains Basement Complex (GSMBC): *Geol. Soc. Am. Abs. Progs.* v. 51, No. 3.
- Moecher, D.P.**, 2019, Searching for meaning in a mountain of detrital zircon and monazite ages and textures from southeastern Laurentia: *Geol. Soc. Am. Abs. Progs.* v. 51, No. 3.
- Clay\*, J.M., **Moecher, D.P.**, 2019, Potential tectonic relationships between the Grenville orogeny and Midcontinent rifting from new detrital zircon U-Pb geochronology of the Middle Run sequences in subsurface Kentucky and Ohio: *Geol. Soc. Am. Abs. Progs.* v. 51, No. 3.

- Seckinger\*, C., **Moecher, D.P.**, Etensohn, F.R., 2019, Detrital-zircon provenance analysis of Neo-Acadian glacial diamictites from the central Appalachian basin: Testing for Inner-Piedmont-Terrane dextral translation using clast geochronological and provenance analysis: *Geol. Soc. Am. Abs. Progs.* v. 51, No. 3.
- Zotto\*, S.C., 2019, **Moecher, D.P.**, Samson, S.D., 2019, Testing for sedimentary recycling using detrital monazite and zircon U-Th/Pb and U-th/He “double-double dating” in Pennsylvanian sandstones of the central Appalachian basin: *Geol. Soc. Am. Abs. Progs.* v. 51, No. 3.
- Moecher, D.P.**, Kelly\*, Evan A., Hietpas, J., Samson, S.D., 2018, Proof of recycling in clastic sedimentary systems from textural observations and Th-Pb SIMS geochronology of detrital monazite: Channeling one’s inner Bob Dott and implications for detrital mineral provenance studies: *Geol. Soc. Am. Abs. Progs.* v. 50, no. 6 doi:10.1130/abs/2018AM-320888.
- Moecher, D.P.**, Samson, S.D., Tohver, E., 2018, New zircon geochronology and Nd-Pb isotope geochemistry for Grenville basement rocks of the southern Appalachians and eastern Kentucky: Probing for the boundary between Amazonia and Laurentia during Rodinian assembly: *Geol. Soc. Am. Abs. Progs.* v. 50, no. 6, doi:10.1130/abs/2018AM-319720. (Invited)
- Clay\*, J.M., **Moecher, D.P.**, 2018, Detrital zircon U-Pb geochronology of the Middle Run sequence in KY and OH supports the spatiotemporal convergence of late Mesoproterozoic Grenville collisional and Midcontinent rifting processes, and the presence of a late Grenville foreland basin under central KY: *Geol. Soc. Am. Abs. Progs.* V. 50, No. 6, doi:10.1130/abs/2018AM-322907
- Haley, M.Y., McLeod, C., Brydon, R.J., Shaulis, B., **Moecher, D.P.**, Tronnes, R., 2018 Unravelling the magmatic architecture of rift-related granitic batholiths: Perspectives from amphibole and feldspar: *Geol. Soc. Am. Abs. Progs.* v. 50, no. 6, doi:10.1130/abs/2018AM-322107.
- Hickman, J.B., Bowersox, J.R., Moecher, D.P., 2018, Re-examining the nature and location of the Grenville Front in Ohio, Kentucky, and Tennessee: *Geol. Soc. Am. Abs. Progs.* v. 50, no. 6, doi:10.1130/abs/2018AM-321252.
- Kitross, S., Samson, S., Moecher, D.P., Hietpas, J., 2018, Insights from combined detrital monazite geochronology and Nd isotopic composition on recording tectonic events and quantifying sedimentary recycling: *AGU Ann. Mtng.* 2018, paper 374605.
- Makovsky, K.A., Samson, S.D., Moecher, D.P., 2018, Grenville granitoids in the southern Appalachians – further evidence of the “hot” granite hypothesis: *Geol. Soc. Am. Abs. Progs.* v. 50, no. 6, doi:10.1130/abs/2018AM-321790.
- Willis, D., O’Farrell, K., Moecher, D., 2018, Mantle contribution to post-collisional ultra-high temperature metamorphism: *Geol. Soc. Am. Abs. Progs.* v. 50, no. 6, doi:10.1130/abs/2018AM-323888
- Zotto\*, S.C., **Moecher, D.P.**, Samson, S.D., 2018. Testing for sedimentary recycling using detrital monazite and zircon U-Th/Pb and U-Th/He “double-double dating” in Pennsylvanian sandstones of the central Appalachian basin in eastern Kentucky. *Geol. Soc. Am. Abs. Progs.* 50, No. 3
- Moecher, D.P.**, Samson, S.D., Tohver, E., 2018. Evolution of the Blue Ridge basement complex in the eastern Great Smoky Mountains: Evidence from zircon U-Pb geochronology and Nd-Pb isotope geochemistry of basement gneisses. *Geol. Soc. Am. Abs. Progs.* 50, No. 3
- Makovsky, K.A., Samson, S.D., **Moecher, D.P.**, 2018. Evaluating zircon thermometry using high-Zr Grenville granitoids. *Geol. Soc. Am. Abs. Progs.* 50, No. 2.
- Moecher, D.P.**, Burk\*, S.R., Samson, S.D., 2017. Testing the “hot granite” hypothesis for high-Zr Grenville granites from eastern Laurentia using zircon thermometers. *Geol. Soc. Am. Abs. Progs.* 49, No. 6.
- Samson, S.D., **Moecher, D.P.**, 2017. Recycled or reused or hot and bothered? Exploring the extreme zircon fertility of Grenville (1.2 – 1.0 Ga) granites. *Geol. Soc. Am. Abs. Progs.* v. 49, No. 6.
- McCulla\*, J.K., Rohrer\*, L.P., Massey\*, M.A., **Moecher, D.P.**, 2017. Relationship of the Neo-Acadian mid-crustal transpression and extrusion with foreland basin development in the New England Appalachians: comparison of new monazite EPMA geochronology with the sedimentary record. *Geol. Soc. Am. Abs. Progs.* v. 49, No. 6.
- Burk\*, S.R., **Moecher, D.P.**, Samson, S.D., 2017. Zircon as a proxy for “taking the temperature” of granites: an example using zircon thermometry applied to Grenvillian mid-crustal magmas in the Blue Ridge Province, Virginia. *Geol. Soc. Am. Abs. Progs.* v. 49, No. 3.
- Hislop\*, A., Powell, R.E., **Moecher, D.P.**, Bemis, S.P., 2017, New bedrock evidence for overall offset on N-S dextral faults in the vicinity of historic earthquakes in the Little San Bernardino Mtns.; Implications for Interactions between the San Andreas Fault and the Eastern California Shear Zone. *Seismological Society of America Annual Meeting*, Denver, CO; *Seis. Res. Letts.* v. 88, no. 2B.
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## **Teaching History Since Tenure (with first term of academic years course was taught)**

**GLY 120** *Sustainable Planet: Geology of Earth Resources* (3 lec): survey course relating nature and distribution of earth resources to societies and economies; ~30 and 150 students ('98, '99).

**GLY/EES 151** *Earth Dynamics* (2 lec/1 rec): UK Core quantitative foundations requirement ('11).

**GLY/EES 230** *Fundamentals of Geology* (2 lec/1 lab): lab and field methods for geology and mining engineering majors; 20-30 students ('99-'02).

**GLY/EES 260/360** *Mineralogy* (3 lec/1 lab): chemistry, structure, stability, and occurrence of rock-forming minerals; prerequisite for GLY 450G and GLY 461; 10-15 students ('97, '98, '01, '03-'07, '09, '18).

**GLY/EES 295\*** *Orientation to Geosciences* (1 lec): professional development seminar requiring coordination of guest speakers and presentation of some course material; 30 students ('06, '08, '10, '12, '14, '16).

**GLY/EES 323/423\*** *Field Studies in Regional Geology* (6 field): intensive six-week field course based in Rocky Mountains involving application of classroom principles to regional geology ('98, '99, '03, '05, '07).

**GLY/EES 420G\*** *Structural Geology* (3 lec/1 lab): (sabbatical replacement) spatial relationships of rock bodies and deformation of Earth's crust; 10 students ('02, '10)

**GLY 461/EES \*** *Igneous and Metamorphic Petrology* (3 lec/1 lab): evolution of the crust and mantle; 10-15 students ('97-'20).

**GLY/EES 470** *Senior Seminar* (2 lec): formerly major-required, partially satisfied USP oral communication requirement; students make public presentations based on thematic topic; 20 students ('97, '98).

**GLY/EES 480/GLY/EES 782** *Regional Geology Field Trip* (1 lec/1 lab): Field trip course for graduate and undergraduates to selected regions in the eastern U.S. The course involves preview sessions, student presentations, and readings during the Spring term in preparation for the week-long field trip at the end of term; 20-30 students ('98, '99, '01, '03, '07, '08, '12, '14, '16)

**GLY/EES 645/730** *Isotope Geochemistry* (3 lec): principles of methods used to quantify the age of Earth-Moon system and evolution of the crust and mantle; 5 students ('99, '01, '13, '15, '17, '19).