

Brendan Matthew Anderson, Ph.D.

**Postdoctoral Researcher, Petsios Lab
Department of Geosciences
Baylor University**

Previous Affiliations:

West Virginia University Department of Geology and Geography Postdoctoral Researcher Adjunct Professor	01/2019-06/2020
Paleontological Research Institution Research Associate	08/2013-12/2018

Education:

Cornell University , Ithaca, NY Ph.D. degree in Geology, concentrating in paleontology Advisor: Warren D. Allmon	08/2013-08/2018
University of Kansas , Lawrence, KS M.S. degree in Geology, concentrating in paleontology Advisor: Alison Olcott Marshall	08/2011-08/2013
Dartmouth College , Hanover, NH B.A. Biological Sciences, concentrating in paleobiology, and Religion, concentrating in Philosophy of Religion. Earth Sciences minor. Graduated with High Honors in Biology Advisor: Kevin J. Peterson	09/2005-06/2009

Research Interests:

My general interests are in macroevolution and diversity and the influence of geologic processes on both. I am a Paleobiologist whose work has always been cross-disciplinary. I work with a wide range of techniques available in modern paleontology including genetic sequencing, geochemical techniques (e.g. stable isotope sclerochronology, Raman spectroscopy, XRD), SEM and nano-CT imaging, and traditional paleoecological techniques to answer a variety of paleobiological questions.

My doctoral research focused on Neogene gastropods, specifically the evolution of the uncoiled *Vermicularia* within the Turritellidae. I am interested in the patterns of evolution and diversity dynamics exhibited by this group as the closure of the Central American Seaway impacted the environment in the Caribbean and isolated Pacific and Atlantic populations. This research includes constructing a molecular phylogeny of turritellidae, a combined morphological and molecular phylogeny of fossil and extant *Vermicularia* and understanding the ontogeny of these species using oxygen isotopic sclerochronology to gain insight into their evolution.

Macroevolutionary trends towards repeated evolution of features through convergence, parallelism, or as spandrels of selected features are an additional theme of my research. Projects touching upon this theme include a study on extreme parietal calluses in gastropods, development of strong spiral chords/keels on turritellines, and a study on septation in high spired gastropods.

Publications:

^U designates undergraduate co-author. *Indicates corresponding author, if not first author.

Friend, D.S., **Anderson, B.M.**, and Allmon, W.D. *in revision*. Geographic contingency, not species sorting, dominates macroevolutionary dynamics in an extinct clade of neogastropods (*Volutispina*; Volutidae). *Paleobiology. Phylogenetic Paleoecology special issue*.

Anderson, B.M., Herleman, K.C., Ebey, C., and Haas, D. *in revision*. Consider the following: Evaluating the effectiveness of a climate science educational television program. *Journal of Geoscience Education*.

Shin, C.P., Allmon, W.D., **Anderson, B.M.**, Kelly, B.T., Hiscock, K., and Shin, P.K.S. *accepted manuscript*. Distribution and abundance of turritelline gastropods (Cerithioida: Turritellidae) in Hong Kong: Implications for a characteristic fossil assemblage. *Journal of the marine biological association of the United Kingdom*.

Pietsch, C., **Anderson, B.M.**, Maistros, L.M., Paladino, E.^U, and Allmon, W.D. *in press*. Convergent and parallel evolution of extreme parietal callusing in diverse Cenozoic gastropod clades. *Paleobiology. Phylogenetic Paleoecology special issue*.

Scholz, S.R., Petersen, S.V., Escobar, J., Jaramillo, C., Hendy, A.J.W., Allmon, W.D., Curtis, J.H., **Anderson, B.M.**, Hoyos, N., Restrepo, J.C., and Perez, N. 2020. Isotope sclerochronology indicates enhanced precipitation seasonality in northern Colombia during the mid-Miocene climatic optimum. *Geology*. 48: 668-672 DOI: 10.1130/G47235.1

Anderson, B.M. and Allmon, W.D. 2020. High calcification rates and inferred metabolic trade-offs in the largest turritellid gastropod, *Turritella abrupta* (Neogene). *Palaeogeography Palaeoclimatology Palaeoecology*. 544: 109623 DOI: 10.1016/j.palaeo.2020.109623.

Sang, S.^U, Friend, D.S., and Allmon, W.D., **Anderson, B.M.*** 2019. Protoconch enlargement in western Atlantic turritelline gastropod species following the closure of the Central American Seaway. *Ecology and Evolution*. 9: 5309-5323. DOI: 10.1002/ece3.5120

Anderson, B.M. and Allmon, W.D. 2018 When domes are spandrels: On septation in turritellids and other gastropods. *Paleobiology*. 44 (3): 444-459.

Johnson, E.H.^U, **Anderson, B.M.**, and Allmon, W.D. 2017. What can we learn from all those pieces? Obtaining data on drilling predation from fragmented high-spired gastropod shells. *Palaeos*. 32 (5): 271-277.

Anderson, B.M., Hendy, A., Johnson, E.H.^U, and Allmon, W.D. 2017. Paleoecology and paleoenvironmental implications of turritelline gastropod dominated assemblages from the Gatun Formation (Upper Miocene) of Panama. *Palaeogeography Palaeoclimatology Palaeoecology*. 470: 132-146.

Anderson, B. M., A. Moore, G. Lewis, and W. D. Allmon. 2014. Fossils of the Western US. Pages 81-124, in: *The Teacher-Friendly Guide to the Earth Science of the Western US*, M. D. Lucas, R. M. Ross, & A. N. Swaby (eds). Paleontological Research Institution (Special Publication 47), Ithaca, NY.

Rothschild, B.M., Martin, L.D., **Anderson, B.**, Olcott Marshall, A., and Marshall, C.P. 2013. Raman spectroscopic documentation of Oligocene bladder stone. *Naturwissenschaften* 100: 8 789-794.

Anderson, B.M., Pisani, D., Miller, A.I., and Peterson, K.J. 2011. The environmental affinities of marine higher taxa and possible biases in their first appearances in the fossil record. *Geology* 39: 971-974.

Presentations:

^u designates undergraduate co-author.

Invited talks:

Anderson, B.M. 2019. Paleobiological, paleoecological, and evolutionary applications of isotopic sclerochronology. Department of Geology, Colgate University, Hamilton, NY.

Anderson, B.M. 2019. Paleoecological and evolutionary applications of isotopic sclerochronology. Department of Biology, Franciscan University of Steubenville, Steubenville, OH.

Anderson, B.M. 2019. Stable Isotope data from an organismal perspective: Paleobiological, paleoecological, and evolutionary applications of isotopic sclerochronology. West Virginia University Department of Geology and Geography Colloquium, Morgantown, WV.

Anderson, B.M. Miller, J.W. ^u, Allmon, W.D. 2018. When theoretical morphology gets real: 3-D printing of idealized turritellid gastropod shells to better understand the function of sculpture and whorl shape. Geological Society of America Annual Meeting, Indianapolis, IN.

Conference Presentations:

Anderson, B.M., Pietsch, C., Petsios, E., and Allmon, W.D. Leveraging paleoclimate data to evaluate the evolutionary history of growth and lifespan in the Turritellidae (Caenogastropoda): Challenges and opportunities. Geological Society of America Annual Meeting (held via GSA connects).

Pietsch, C., **Anderson, B.M.**, Maistros, L.M., Padalino, E.C., and Allmon, W.D. Convergence, parallelism, and function of extreme parietal callus in marine gastropods. Geological Society of America Annual Meeting (held via GSA connects).

Anderson, B.M., Lamsdell, J.C., Falk, A.R., and Congreve, C.R. 2020. Quantifying neglect of research for non-commercial marine species and the potential dangers of generalizing from limited ecological data. American Malacological Society Annual Meeting (held via zoom).

Pietsch, C. **Anderson, B.M.**, Maistros, L.M., Agelvis, M. ^u, and Allmon, W.D. 2020. Convergence, parallelism, and function of extreme parietal callus in marine gastropods. Geological Society of America Cordilleran Section Meeting. (Conference cancelled due to Covid-19). Abstract available at: doi: 10.1130/abs/2020CD-347575

Anderson, B.M., Herleman, K.C., Ebey, C. and Duggan-Haas, D. 2019. Consider the following: evaluating the effectiveness of a climate science educational television program. Geological Society of America Annual Meeting, Phoenix, AZ.

Johnson, E.H., **Anderson, B.M.** and Allmon, W.D. 2019. An empirical test of 3D printed turritelline shells: Does differential distribution of ornamentation increase shell strength? Geological Society of America Annual Meeting, Phoenix, AZ.

Anderson, B.M., Waldman, E.K. ^U, Miller, J. ^U, and Allmon, W.D. 2019. Applications of 3-D printing to testing functional hypotheses of turritellid gastropod shell morphologies and sculpture. North American Paleontological Convention, Riverside, CA.

Pietsch, C. **Anderson, B.M.**, Maistros, L.M., Agelvis, M. ^U, and Allmon, W.D. 2019. Testing convergence and function of extreme parietal callus in marine gastropods. North American Paleontological Convention, Riverside, CA.

Anderson, B.M., Sang, S., Friend, D.S., and Allmon, W.D. 2018. Protoconch enlargement in Western Atlantic turritelline gastropod species following the closure of the Central American Seaway. Geological Society of America Annual Meeting, Indianapolis, IN.

Anderson, B.M. and Allmon, W.D. 2018 All power to shields: The growth and ecology of *Turritella abrupta* (Miocene), the largest, heaviest-shelled turritellid gastropod. Geological Society of America Annual Meeting, Indianapolis, IN. (Poster)

Pietsch, C., Gigliotti, M. ^U, **Anderson, B.M.**, and Allmon, W.D. 2018 Patterns and processes in the history of body size in turritelline gastropods, Jurassic-to-Recent. Geological Society of America Annual Meeting, Indianapolis, IN.

Khan, T.M. ^U, **Anderson, B.M.**, Allmon, W.D., and Stilwell, J.D. 2018. Paleoenvironmental interpretation of turritellid gastropod-dominated assemblages (TDAs) from the La Meseta Formation (Middle to Upper Eocene), Seymour Island, Antarctica. Geological Society of America Annual Meeting, Indianapolis, IN.

Scholz, S.R., Petersen, S.V., Escobar, J., Jaramillo, C., Hendy, A., Allmon, W.D., Moreno, F., Curtis, J.H., **Anderson, B.M.**, Hoyos, N., Restrepo, J.C., and Perez, N. 2018. Isotope sclerochronology and tropical seasonality during the Mid Miocene Climatic Optimum. Goldschmidt Abstracts, Boston, MA.

Anderson, B.M. and Allmon, W.D. 2017. Evolution and diversification of the “Vermiculariinae” (Gastropoda: Turritellidae). Geological Society of America Annual Meeting, Seattle, WA.

Herleman, K.C., **Anderson, B.M.**, and Duggan-Haas, D. 2017. Teaching techniques in climate science television programming: Evaluating the quality of learning outcomes in “edutainment”. Geological Society of America Annual Meeting, Seattle, WA.

Pietsch, C. **Anderson, B.M.**, Maistros, L.M., Agelvis, M. ^U, and Allmon, W.D. 2017 Evaluating ecological function and convergent evolution of extreme parietal callus in marine gastropods. Geological Society of America Annual Meeting, Seattle, WA. (Poster)

Khan, T.M. ^U, **Anderson, B.M.**, Allmon, W.D., and Stilwell, J.D. 2017. Paleoenvironmental interpretation of turritelline gastropod-dominated assemblages from the La Meseta Formation (Upper Eocene), Seymour Island, Antarctica. Geological Society of America Annual Meeting, Seattle, WA.

Escobar, J.H., Hendy, A., Jaramillo, C., Petersen, S., Curtis, J., Moreno, F., **Anderson, B.**, Allmon, W., Scholz, S. 2017. Isotope sclerochronology and clumped isotopes of Miocene molluscs from the Guajira Peninsula, Colombia. XVI Congreso Colombiano de Geología, 2017, Santa Marta, Colombia.

Anderson, B.M. and Allmon, W.D. 2017. *Turritella abrupta*: The bizarre biology and ecology of the largest known turritellid gastropod. Western Society of Malacologists Annual Meeting. Los Angeles, CA.

Anderson, B.M. and Allmon, W.D. 2016. When Domes are Spandrels: On Septation in Turrnellids and Other Gastropods. Geological Society of America Annual Meeting, Denver, CO.

Waldman, E.K.^U, **Anderson, B.M.**, Allmon, W.D. 2016. The Effect of Shell Morphology on Sediment Retention in Turrnelline Gastropods. Geological Society of America Annual Meeting, Denver, CO. (Poster)

Allmon, W., Khan, T.M.^U, Escobar, J.H., Hendy, A.J.W., Stiles, E., **Anderson, B.M.** 2016. Biogeographic and Evolutionary Significance of Turrnellid Gastropods from the Miocene of Northern Colombia. Geological Society of America Annual Meeting, Denver, CO. (Poster)

Anderson, B.M. and Allmon, W.D. 2015. Multiple Forms of Heterochrony Result in Rapid Growth and Vermiform Morphology in *Vermicularia* (Turrnellidae). Geological Society of America Annual Meeting, Baltimore, MD.

Anderson, B.M. and Allmon, W.D. 2015. Septa Aren't Rare in Gastropods! Geological Society of America Annual Meeting, Baltimore, MD. (Poster)

Johnson, E.^U, **Anderson, B.M.** and Allmon, W.D. 2015. Applying the Theoretical Apex System and Calculating Minimum Numbers of Individuals within a Bulk Sample of Fragmented Turrnelline Gastropod Shells. Geological Society of America Annual Meeting, Baltimore, MD. (Poster)

Anderson, B.M. 2015. The interior castles of turrnelline gastropods. 9th Annual Summer Symposium, Museum of the Earth, Ithaca, NY, 1 August 2015

Anderson, B.M. and Allmon, W.D., and Hendy, A.J.W. 2014. Sclerochronological Comparison of *Turrnellia altilira* from Within and Without Turrnelline-Dominated Assemblages in the Gatún Formation (Miocene), Panama. Geological Society of America Annual Meeting. Vancouver, Canada

Allmon, W.D., **Anderson, B.M.**, Friend, D.S., Onofryton, K.^U and Sang, S.^U. 2014. Toward a phylogeny of Western Atlantic Neogene Turrnelline gastropods. North American Paleontological Convention. Gainesville, FL.

Anderson, B.M. and Olcott Marshall, A. 2013. Global geologic, biologic and geochemical influences on the formation of Phanerozoic marine *Konservat-Lagerstätten*. Paleontological Research Institution Summer Symposium. Ithaca, NY

Anderson, B.M., and Olcott Marshall, A. 2012. A New Dataset of Phanerozoic Marine *Konservat-Lagerstätten*: Patterns in secular distribution. Geological Society of America Annual Meeting. Charlotte, NC.

Anderson, B., Peterson, K.J., Miller, A.I. 2009. Estimating the divergence times of "missing" open-ocean taxa of the Paleozoic: A molecular clock approach. North American Paleontological Convention. Cincinnati, OH. (Poster)

Anderson, B.M., Peterson, K.J., Miller, A.I. and Pisani, D. 2009. Estimating the divergence times of "missing" open-ocean taxa of the Paleozoic: a molecular clock approach. Sigma Xi Wetterhahn Undergraduate Science Symposium. (Poster)

Professional Societies:

General Science: Sigma Xi, AAAS

Paleobiology/Geology: Geological Society of America, Palaeontological Association, Paleontological Society, Pan-American Society for Evolutionary Developmental Biology, Association for Women Geoscientists

Malacology: Conchologists of America, American Malacological Society, Western Society of Malacologists

Education: National Association of Geoscience Teachers

Museum Experience:

Paleontological Research Institution and the Museum of the Earth 2013-2018

Collections: At PRI I have assisted with the curation of modern and fossil molluscan material and provided taxonomic opinions, especially for gastropods. In addition, I have experience with professional photographic equipment and software.

Public Events: I have participated in fossil ID and outreach days and have given lectures on geologic history and evolution for the museum. I have also run an annual research symposium 3 times, assisting with the event 3 additional years.

Teaching Experience:

Adjunct Professor of Geology- West Virginia University 01/2020-06/2020

Planet Earth (Introduction to physical geology), Instructor of Record. In person and adapted online delivery.

Graduate TA Development Consultant- Cornell College of Engineering 06/2016-05/2018

Graduate TA Development consultants are responsible for TA training for the College of Engineering. We develop and facilitate workshops to prepare new TAs, both undergraduate and graduate, for their roles.

TA- University of New Hampshire/Cornell: Shoals Marine Laboratory 06-07/2017

Evolution of Marine Diversity- As TA of this 4-credit course taught in 15 days I oversaw preparations and cleanup for daily laboratory and field work, graded student assignments and held office hours daily to assist students in keeping up with the fast pace of the material.

TA- Cornell University Department of Earth and Atmospheric Sciences 08/2013-05/2018

Introduction to Oceanography Lecture Coordinator 2013

Lab Instructor 2014, 2015

Evolution of the Earth and Life		2014, 2017, 2018
The Earth System	Lab Instructor	2015, 2017
Earthquake!		2016
Evolution of the Earth System	Lab Instructor	2016, 2017
Paleobiology	Lab Instructor	2018
GTA- University of Kansas Geology Department		08/2011-5/2013
Geology Fundamentals Laboratory	Instructor of Record	2011, 2012
Prehistoric Life: DNA to Dinos		
Introduction to Geology		
Earthquakes and Natural Disasters-	Lead TA	
History of the Earth/ Historical Geology		
McNair Scholars Program Tutor		04/2012-05/2012
TA- Dartmouth College Religion Department		01/2009-03/2009
Patterns of Religious Experience		

Professional Development

Diversity, equity, and inclusion in paleontology, PRI symposium 2020)		8/2020
Paleo Society Short Course: Teaching Paleo in the 21 st Century, GSA 2018		11/2018
Teaching in Higher Education- Cornell University		01/2014- 05/2014
Science Communication Workshop- Cornell University		2/28/2014-3/2/2014