

Kathleen A. Ritterbush, Ph.D.

Assistant Professor

University of Utah, Department of Geology and Geophysics
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Appointments

Assistant Professor, University of Utah Department of Geology and Geophysics. 2015 – Present.
NASA Postdoctoral Researcher, University of Chicago, 2014 – 2015
Provost's Ph.D. Fellowship, University of Southern California, 2008 – 2013
USC Wrigley & Sonosky Family Ph.D. Summer Fellowships, 2008 – 2010

Education

University of Southern California, Department of Earth Sciences, Doctor of Philosophy, December 2013

Advisor: David J. Bottjer

Thesis Title: Benthic and pelagic marine ecology following the Triassic/Jurassic mass extinction

California Lutheran University: Bachelor of Science, Environmental Science, 2006

Research Grants

2016	American Chemical Society Petroleum Research Fund Doctoral New Investigator	\$110k
	Utah Research Opportunities for Undergraduates: 4 semester projects, 1 travel grant	\$4,900
2013	NSF Earth-Life Transitions: <i>Linked geochemical/biotic response to massive volcanic CO2 injection during the Triassic-Jurassic mass extinction</i>	\$1M
	PIs: F. Corsetti, D. Bottjer, A. J. West, W. Berelson, T. Becker, N. Lavine	
	<i>Contributing Author:</i> K. Ritterbush	
2012	Charles A. and June R. P. Ross Research Award, Geological Society of America (GSA)	\$2,500
	Luis and Clark Fund, American Philosophical Society	\$4,000
	Student Research Grant, Society for Sedimentary Geology (SEPM)	\$1,500
	Martin Van Couvering Award, American Association of Petroleum Geologists (AAPG)	\$ 250
	D. Worthington Family Grant, American Association of Petroleum Geologists (AAPG)	\$ 500
2010	Learner Grey Fund Grant, American Museum of Natural History (AMNH)	\$1,500
2009	Theodore Roosevelt Memorial Fund Grant (AMNH)	\$1,750
	Student Research Grant, Society for Sedimentary Geology (SEPM)	\$ 500

Peer-Reviewed Publications

Pietsch, C., **K.A. Ritterbush**, J.R. Thompson, E. Petsios, D.J. Bottjer, In Press. Evolutionary Models in the Early Triassic Marine Realm. **Palaeogeography, Palaeoclimatology, Palaeoecology.**

Adiya, T., C. Johnson, M. Loewen, **K.A. Ritterbush**, K. Constenius, C. Dinter, In Press. Microbial-caddisfly bioherm association from the Lower Cretaceous Shinekhudag Formation, Mongolia: Earliest record of plant armoring in fossil caddisfly cases. **PLOS One.**

Ritterbush, K.A., Foote, M. 2017. Association between geographic range and initial survival of Mesozoic marine animal genera: circumventing the confounding effects of temporal and taxonomic heterogeneity. **Paleobiology** 43(2):209-223.

Thibodeau, A.M., **Ritterbush, K.A.**, Yager, J.A., West, J., Ibarra, Y., Bottjer, D., Berelson, W., Bergquist, B., Corsetti, F. 2016. Mercury anomalies, volcanism, and timing of biotic recovery following the end-Triassic mass extinction. **Nature Communications** 7:11147, doi:10.1038/ncomms11147

Ritterbush, K.A., Ibarra, Y., Tackett, L.S., 2016. Post-extinction biofacies on the first carbonate ramp of the Early Jurassic (Sinemurian) in NE Panthalassa (New York Canyon, Nevada, USA). **Palaios** 31:141-160.

Foote, M., **Ritterbush, K.A.**, Miller, I.A., 2016. Geographic ranges of genera and their constituent species: structure, evolutionary dynamics, and extinction resistance. **Paleobiology** 42:269-288.

Ritterbush, K.A. Ibarra, Y., Bottjer, D.J., Corsetti, F.A., Rosas, S., West, J.A., Berelson, W.B., Yager, J.A. (2015). Marine Ecological State Shifts Following the Triassic-Jurassic Mass Extinction, *In* P.D. Polly, J.J. Head, and D.L. Fox (eds.), *Earth-Life Transitions: Paleobiology in the Context of Earth System Evolution*. **The Paleontological Society Papers** 21. Yale Press, New Haven, CT.

Ritterbush, K.A., 2015. Interpreting drag consequences of ammonoid shells by comparing studies in Westermann Morphospace. **Swiss Journal of Palaeontology**. 1-14. DOI: 10.1007/s13358-015-0096-8

**** Top 15 most-downloaded article from Palaeo³ for 2015****

Ritterbush, K. A., Rosas, S., Bottjer, D.J., Corsetti, F. A., West, A. J., 2015. Andean sponges reveal long-term benthic ecosystem shifts following the end-Triassic mass extinction. **Palaeogeography, Palaeoclimatology, Palaeoecology**, 420: 193-209.

Corsetti, F.A., **Ritterbush, K.A.**, Bottjer, D.J., Greene, S., Ibarra, Y., Yager, J.A., West, A.J., Berelson, W.M., Rosas, S., Becker, T.W., Levine, N.M., Loyd, S.J., Martindale, R.C., Petryshyn, V.A., Carroll, N.R., Petsios, E., Piazza, O., Pietsch, C., Stellmann, J.L., Thompson, J.R., Washington, K.A., Wilmeth, D.T., 2015. Investigating the Paleoeological Consequences of Supercontinent Breakup: Sponges Clean Up in the Early Jurassic. **The Sedimentary Record**, 13: 4-10.

Forcino, F., **Ritterbush, K.A.**, Stafford, E., 2015. Evaluating the effectiveness of the Mantel test and Procrustes Randomization test for exploratory ecological similarity among paleocommunities. **Palaeogeography, Palaeoclimatology, Palaeoecology**, 426: 199-208.

Ritterbush, K. A., S. Rosas, D.J. Bottjer, F.A. Corsetti, 2014. New evidence on the role of siliceous sponges in ecology and sedimentary facies development in eastern Panthalassa following the Triassic/Jurassic mass extinction. **Palaios**. 29 (12): 652-668.

Ritterbush, K. A., R. Hoffmann, and A. Lukeneder, K. De Baets, 2014. Pelagic Paleoeology: Recent constraints on ammonoid paleobiology and life history. **Journal of Zoology**, 292: 229-241.

Ritterbush, K. A., and D. J. Bottjer, 2012. Westermann Morphospace displays ammonoid shell shape and hypothetical paleoecology. **Paleobiology**, 38 (3): 442-446.

Greene, S. E, R. C. Martindale, **K. A. Ritterbush**, D. J. Bottjer, F. A. Corsetti, and W. M. Berelson, 2012. Recognizing ocean acidification in deep time: An evaluation of the evidence for acidification across the Triassic-Jurassic boundary. **Earth Science Reviews**, 113:72-93.

Technical Reports

Aronson E.L. et al., 2015, Geoscience 2020: Cyberinfrastructure to reveal the past, comprehend the present, and envision the future, EarthCube Working Paper, ECWP-2015-1, 19 p.

<http://dx.doi.org/10.7269/>

In Review

Ritterbush, K. A. Sponge meadows and glass ramps: State shifts and regime change. **Palaeogeography, Palaeoclimatology, Palaeoecology**.

Hoffmann, R. **KA Ritterbush**; J Koelen, N. Luebke, MM Joachimski, A. Immenhauser. A novel multiproxy approach to reconstruct the paleoecology of extinct ammonoids. **Gondwana Research**.

Selected Published Abstracts (= grad advisee; *=undergraduate advisee)**

Ritterbush, K.A., N. Hebdon,** O. Jenkins, 2017. Ammonites were successful slackers after the Triassic/Jurassic mass extinction. Geological Society of America *Abstracts with Programs*. Vol. 49, No. 6

Hebdon, N.**, **K.A. Ritterbush**, O. Jenkins, 2017. 3D modeling of Ammonite hydrodynamics. Geological Society of America *Abstracts with Programs*. Vol. 49, No. 6

Hood, S.** & **K.A. Ritterbush**, 2017. Paleoecology of glass ramps: Non-actualistic shallow marine spiculites from the Permian of Northwestern Utah. Geological Society of America *Abstracts with Programs*. Vol. 49, No. 6

Wistort, Z., A.A. Ekdale, **K.A. Ritterbush**, 2017. Silicified trace fossils and ichnofabrics in the Permian of northwest Utah. Geological Society of America *Abstracts with Programs*. Vol. 49, No. 6

Corsetti, F.A., J. Yager, **K.A. Ritterbush**, Y. Ibarra, A.M. Thibodeau, B.A. Bergquist, J.A. West, D.J. Bottjer, W.M. Berelson, S. Rosas, 2017. Timing and alternate ecosystem states following the end-Triassic mass extinction (Nevada, Peru, England): Insights from Hg anomalies and their relationship to the Central Atlantic Magmatic Province. Geological Society of America *Abstracts with Programs*. Vol. 49, No. 6

Ritterbush, K.A., S. Hood, Z. Wistort, 2017. Investigating cherts of Utah at the leading edge of the Permian Spiculite Belt. Geological Society of America *Abstracts with Programs* 49, Paper 8-3.

Hood, S.** and **K.A. Ritterbush**, 2017. Paleoecology of siliceous sponges in coastal marine settings along eastern Pangea using depositional models from Permian cherts of northwestern Utah. Geological Society of America *Abstracts with Programs* 49, paper 4-1.

Baer, J.* and **Ritterbush, K.A.**, 2016. Deposition and preservation of spicules within biosiliceous glass ramps. Geological Society of America *Abstracts with Programs*. (Paper 162-80).

- Rosas, S., **Ritterbush, K.A.**, Bottjer, D., Corsetti, F., West, J., Berelson, W., and Yager, J. 2016. Profundización sedimentaria solo en parte de la Cuenca Pucará (Peru Central) durante el Hettangiano-Sinemurio. XVIII Congreso Peruano de Geología (August 2016).
- Wistort, Z., Ekdale, A.A., and **Ritterbush, K.A.**, 2016. Recognition and interpretation of silicified trace fossils in Permian strata of Northern Utah. Geological Society of America *Abstracts with Programs*. (Paper 82-19).
- Tsolmon, T., Johnson, C., Loewen, M., and **Ritterbush, K.A.**, and Constenius, K. 2016. Microbial-caddisfly bioherm association from the Lower Cretaceous Shinehudag Formation, Mongolia: Earliest Record of plant armoring in fossil caddisfly cases. Geological Society of America *Abstracts with Programs*. (Paper 262-44).
- Ritterbush, K.A.**, Foote, M. 2015. Initial survival of Mesozoic marine genera: A role for geographic range beyond temporal and taxonomic heterogeneity. Geological Society of America *Abstracts with Programs*. (Paper 265-2).
- Ritterbush, K.A.**, Loyd, S., Corsetti, F.A., Bottjer, D.J., Berelson, W. 2015. Examining early-diagenetic processes as a chief sink for carbonate in the aftermath of the Triassic-Jurassic crisis: Hettangian concretions of Muller Canyon, NV, USA. American Geophysical Union.
- Foote, M., **Ritterbush, K.A.**, Miller, A. 2015. Hierarchical decomposition of geographic range and its implications for understanding extinction resistance in marine animal genera. Geological Society of America *Abstracts with Programs*. (Paper 78-8).
- Thibodeau, A.M., Corsetti, F.A., **Ritterbush, K.A.**, Yager, J.A., West, A.J., Ibarra, Y., Bottjer, D.J., Berelson, W., and Bergquist, B.A. 2015. Mercury concentrations and isotopes as tracers of CAMP in Triassic-Jurassic strata from Muller Canyon, Nevada. Geological Society of America *Abstracts with Programs*. (Paper 19-11).
- Corsetti, F.A., Thibodeau, A.M., **Ritterbush, K.A.**, West, A.J., Yager, J.A., Ibarra, Y., Bottjer, D.J., Berelson, W., and Bergquist, B.A. 2015. Recovery of Carbonate Ecosystems Following the End-Triassic Mass Extinction: Insights from Mercury Anomalies and Their Relationship to the Central Atlantic Magmatic Province. American Geophysical Union.
- Ritterbush, K.A.**, West, A.J., Berelson, W.B., Rosas, S.A., Bottjer, D.J., Yager, J.A., Corsetti, F.A., 2014. Influence of climate change and marine chemistry on ecological shifts following the Triassic/Jurassic mass extinction. American Geophysical Union PP14A-01.
- Ritterbush, K. A.**, Foote, M., Miller, A., 2014. Influence of geographic range on taxonomic survivorship: Comparison of analyses at different hierarchical levels (Poster). Geological Society of America *Abstracts with Programs*. Vol. 46, No. 6.
- Ritterbush, K. A.**, 2014. Studies compared in Westermann Morphospace with the goal of understanding ammonoid life mode. 9th International Symposium: Cephalopods Past and Present, Zurich (September).
- Ritterbush, K. A.**, Corsetti, F.A., Berelson, W.M., West, A.J., Rosas, S., Bottjer, D.J., Yager, J.A., 2014. High resolution paleoecology and geochemistry across the Triassic/Jurassic mass extinction interval and the importance of biosiliceous “glass ramps”. Geological Society of America *Abstracts with Programs*. Vol. 46, No. 6.

Foote, M., **Ritterbush, K.A.**, Miller, A.I., 2014. Dynamics of geographic range within marine animal genera: Relative importance of species range and number of species. *Geological Society of America Abstracts with Programs*. Vol. 46, No. 6.

Rosas, S., **Ritterbush, K.A.**, Bottjer, D.J., 2014. The basal Jurassic Aramachay Formation in Central Peru: Facies Distribution, Palaeoecology and its relation to Ore Formation. SPG.

Bottjer, D.J., Pietsch, C., **Ritterbush, K.A.**, Petsios, E., Thompson, J.R., 2014. Evolution in the Early Triassic. *Geological Society of America Abstracts with Programs*. Vol. 46, No. 6.

Ritterbush, K. A., Rosas, S., Bottjer, D.J., Corsetti, F. A., West, A. J., 2013. Andean evidence for a long-term state shift in benthic ecology following the Triassic/Jurassic mass extinction. *Geological Society of America Abstracts with Programs*. Vol. 45, No. 7, p. 305.

Pietsch, C., **Ritterbush, K.A.**, and Bottjer, D.J., 2013. High temperature events and low oxygen conditions effect benthic and pelagic recovery dynamics differently during the Early Triassic. International Geoscience Program 572: Restoration of Marine Ecosystems following the Permian-Triassic Mass Extinction, Wuhan, Peoples Republic of China.

Ritterbush, K.A., Pietsch, C.A., and Bottjer, D.J., 2012. Big Comeback: Rapid and Resilient Niche Occupation in Early Triassic Ammonoids. *Geological Society of America Abstracts with Programs*. Vol. 44, No. 7, p.165

Ritterbush, K.A. and Bottjer, D.J., 2012. Westermann Morphospace: Ammonoid Shells, Locomotion, and Metabolism. *Geological Society of America Abstracts with Programs*. Vol. 44, No. 7, p.271

Pietsch, C.A., **Ritterbush, K.A.** and Bottjer, D.J., 2012. Contrasting trends in the early Triassic ecological recovery of benthic and pelagic fauna. *Geological Society of America Abstracts with Programs*. Vol. 44, No. 7, p.165

Greene, S. E, Martindale, R.C, **Ritterbush, K.A.**, Bottjer, D.J., Corsetti, F. A. and W. M. Berelson, 2012. A deep time perspective on ocean acidification. *Geological Society of America Abstracts with Programs*. Vol. 44, No. 7, p.190.

Greene, S. E, Bottjer, D.J., Corsetti, F. A. and Martindale, R.C, **Ritterbush, K.A.**, Berelson, W.M., 2012. An Early Diagenetic carbonate factory across the Triassic-Jurassic transition. *Geological Society of America Abstracts with Programs*, Vol. 43, No. 5, p. 211.

Ritterbush, K.A. and Bottjer, D.J., 2011. Paleoecology of disaster fauna sponges after the end-Triassic mass extinction. *Geological Society of America Abstracts with Programs*, Vol. 43, No. 5, p. 211.

Ritterbush, K.A. and Bottjer, D.J., 2010. Westermann Morphospace displays ammonoid shell shape and hypothetical paleoecology. *Geological Society of America Abstracts with Programs*, Vol. 42, No. 5, p.142.

Ritterbush, K.A. and Bottjer, D.J., 2009. Selected by Ocean Acidification? Earliest Jurassic Bivalves of Nevada (USA). *Geological Society of America Abstracts with Programs*, Vol. 41, No. 7, p. 633

Ritterbush, K.A. and Bottjer, D.J., 2009. Characterizing Paleoecology across the end-Triassic Mass Extinction: Survival and Extinction during Global Crisis” 9th North American Paleontological Convention Abstracts, p. 91.

Professional Development

Workshop for Early Career Geoscience Faculty, NAGT and NSF, July 2016

6th Annual Analytical Paleobiology Workshop, Macquarie University, Australia, 2010

Teaching Positions

University of Utah: Assistant Professor

World of Dinosaurs (1040)	Fall 2017
Mass Extinctions (5920/6920)	Fall 2016
Paleobiology (3180; team taught w/Ekdale)	Spring 2016
Graduate Seminar: Biomineralization & the Birth of Carbonates (6920)	Fall 2015

Pontifical Catholic University of Peru: Lecturer, 2 week Earth History Short Course March 2014

University of Southern California: Teaching Assistantships

Sedimentology	GEOL 320	Dr. Frank Corsetti	Fall 2013
Paleontology	GEOL 333	Dr. David Bottjer	Fall 2012
Earth History (Bio)	GEOL 125	Dr. Frank Corsetti	Spring 2012, '13
Earth History (Chem)	GEOL 125	Dr. Doug Hammond	Fall 2011
Planet Earth	GEOL 105	Drs. Thomas Jordan, John Platt	Spring 2009
Crisis of a Planet	GEOL 108	Dr. Lawford Anderson	Fall 2008

USC Wrigley Institute for Environmental Studies: Education Assistant, Jan 2007 – Aug 2008

Sea Education Association (CA): Teaching Assistant, Summers 2006 & 2007

Wilderness Outdoor Leadership Foundation (CA): Educator, 2006

Rapture Marine Expeditions (CA, HI): Educator, Seasonal 2002-2006, Full Time 2004

Invited Lectures

- 2018 DinoFest Salt Lake City, Natural History Museum of Utah
Keynote Speaker, Ensign Elementary STEM Night
- 2017 DinoFest Los Angeles, LA Museum of Natural History, CA
1st Conference of the Geobiology Society, Banff, Alberta, Canada
Utah Geological Association, Department of Natural Resources, Salt Lake City, UT
- 2016 Utah Friends of Paleontology, Salt Lake City, UT
Science Seminar, Weber State University, Ogden, UT
- 2015 University of Washington, Department of Earth and Space Sciences, Seattle, WA
University of Wisconsin Milwaukee, Department of Geosciences, Milwaukee, WI
University of Utah, Department of Geology and Geophysics, Salt Lake City, UT
- 2014 Miami University, Department of Geology and Environmental Earth Science, Oxford, OH
University of California, Riverside, Department of Earth Sciences, Riverside, CA
Pontifical Catholic University of Peru, Department of Engineering Geology, Lima
University of New Mexico, Department of Earth and Planetary Science, Albuquerque, NM
- 2013 Volcan Mining Company, Department of Exploration Geology, San Christobal, Peru
Pontifical Catholic University of Peru, Department of Mining Engineering, Lima
University of Texas at Austin, Department of Geological Sciences, Austin, TX
- 2012 Geological Society of Peru, Lima

Hosted Symposium

- 2017 From Bacteria to Dinosaurs: Geobiology on a Dynamic Planet. Research Symposium during National Conference of the Society for the Advancement of Chicanos and Native Americans in Science.

Honors

- 2012 USC Earth Sciences Department Teaching Award (General Education Classes)
2011 USC Earth Sciences Department Teaching Award (General Education Classes)
USC Senator of the Month Award: April, Graduate and Professional Student Senate (GSSP)
USC Outstanding Committee Award: Finance Committee, GSSP
2010 Honorable Mention, National Science Foundation (NSF) Graduate Student Research Fellowship

Professional Activities and Service

- 2018 DinoFest at the Natural History Museum of Utah
- 2017 DinoFest Los Angeles: Featured Paleontologist at weekend event with 12,000 visitors
Reviewer for *Ameghiniana*, NSF Marine Geology and Geophysics
U. Utah GG Graduate Affairs Committee
U. Utah GG Curriculum Co-Chair: Evolving Earth
CMES Freshman Enrollment Committee
- 2016 Global Change and Sustainability Center, CMES Representative
Paleontological Society Nominations Committee
NSF STEM Ambassadors Program
School Visits: Ensign Elementary 1st Grade Class; Madeline Choir School 1st & 3rd Grades
Reviewer for *Geology*, *Sea Research*, *Peer-J*, and *Scientific Reports*
- 2015/6 U. Utah Geology and Geophysics Graduate Affairs Committee
U. Utah Geology and Geophysics Space Committee
U. Utah Geology and Geophysics Curriculum Sub-Committee: Geochemistry Core Revision
Substitute Natural History Museum of Utah and GG Sustaining Biodiversity Hiring Committee
- 2015 NSF EarthCube iSamples Early Career User Workshop, Baltimore, MD
NSF EarthCube Science and Technology Meeting, Berkeley, CA
NSF EarthCube Scope and Vision Workshop, Berkeley, CA
Graduate seminar co-chair: “Strategies for landing a post-doc or faculty job”, U. Chicago
Reviewer for *Swiss Journal of Paleontology*
- 2013 NSF EarthCube Summer Institute for Technology Exploration, San Diego Supercomputing Cen.
NSF EarthCube Sedimentology Workshop, University of Utah, Salt Lake City
- 2011 Planning Committee: Geobiology Symposium, University of Southern California
NSF Workshop on Paleo-Ocean Acidification, Catalina Island, California
Senator for Earth Sciences, USC Graduate Student Government
- 2010 Geological Society of America, Session Chair, Paleontology III: Morphometrics
Senator for Earth Sciences, USC Graduate Student Government, Finance Committee

Graduate Research Committees

PhD		Adviser
Nicholas Hebdon	<i>Hydrodynamic efficiency of ammonoid shells</i>	K. Ritterbush
Zackary Wistort	<i>Paleoecological Influence of Permian Glass Ramps</i>	K. Ritterbush
Courtney Weaver	<i>Magnetotactic bacteria and the PETM</i>	P. Lippert
Benjamin Breeden	<i>Earliest Triassic Ornithischians and Geochronology</i>	R. Irmis
Keegan Melstrom	<i>Mesozoic saurian teeth and diet</i>	R. Irmis

MS

Seana Hood	<i>Mapping spatial and temporal distribution of Permian spiculites</i>	K. Ritterbush
Kate Schwehr	<i>Cretaceous biostratigraphy & geochemistry of the N. Atlantic</i>	Ritterbush/Kunungo
Peter Steele	<i>Mesozoic continental carbonates</i>	M. Chan
Shawn Moore	<i>Argentine mudstones</i>	L. Birgenheier

Completed

2017

Zackary Wistort, MS, <i>Silicified Trace Fossils in Permian of Northwest Utah: Morphology and microfacies</i>	A. Ekdale
Tsolmon Adiya, MS, <i>Caddisfly bioherms of the Lower Cretaceous of Mongolia</i>	C. Johnson
Jessica Watson, MSST, <i>Teaching and human genetics</i>	E. Pritham
Scott Ripple, MSST, <i>The relationship between rodent communities and parasite infection in the Great Basin</i>	S. Bush
William Mathew Reynolds, MSST, <i>Parasite coinfection in North American deer mice in the Great Basin.</i>	S. Bush

Undergraduate Research Supervision (UROP-funded)

Jane Baer (Geo)	<i>Microscopy and microfacies determination of spiculite and carbonate surveys</i>
Olivia Jenkins (EAE)	<i>3D Modeling of Fossil and Idealized Ammonoid Geometry and Ornament</i>
Zachary Case (Geo)	<i>Fossil preparation and intraspecies variation in Cretaceous Anasaphites</i>
Hayden Strickwerda (Bio)	<i>Morphology and 3D scanning of ammonoid conch geometry</i>

Affiliations

Paleontological Society, GSA, SEPM, AGU, AAPG, SACNAS, Utah Friends of Paleontology, Friends of the Cephalopods