

## Karen A. Koy

Missouri Western State University, Department of Biology  
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### Professional Preparation

Bowling Green State University	Paleobiology	B.S. 2001
Indiana University, Indianapolis	Geology	M.S. 2005
University of Illinois at Chicago	Earth & Environmental Sciences	Ph.D. 2008

### Teaching Experience

Associate Professor, Department of Biology, Missouri Western State University, 2008 – ongoing.  
Courses taught include: Physical Geology, Introduction to Meteorology, Introduction to Biology laboratory (introductory non-majors). Courses developed for MWSU include: Introduction to Paleontology (upper-level majors), Honors Colloquium on Science & Pseudoscience.

### Research Goals

Examination of the taphonomy of vertebrate carcasses in temperate regions and how it affects the retention of information by the fossil record.

Understanding how the evolution of patch foraging behavior relates to changes in resource distribution on the level of the individual organism during the Cambrian substrate revolution.

Improving student involvement and learning in the geosciences through laboratory- and field-based activities.

Analysis of plant/soil interactions in the Loess Hills of Missouri.

### Undergraduate Student Research Mentorship

Alyra Krugh, senior, Missouri Western State University.

PORTAL, 2019. **Projects:** Taphonomy and fossilization potential of modern domestic avifaunal remains; Taphonomy of extant avian dinosaurs; progressive taphonomy of vertebrates in a temperate terrestrial setting.

Gordon Wells, senior, Missouri Western State University.

PORTAL, 2016. **Projects:** Pressure-induced carbonization of organic matter; Taphonomy of extant avian dinosaurs; progressive taphonomy of vertebrates in a temperate terrestrial setting.

Matt Dear, junior, Missouri Western State University.

William Walker, senior, Missouri Western State University.

Ashley Schultze, junior, Missouri Western State University.

Phil Mueller, junior, Missouri Western State University.

Introduction to Paleontology, 2012. **Project:** How does the decomposition of terrestrial organisms vs. aquatic organisms affect the water chemistry of freshwater environments?

Salena Pottebaum and Emilie Hoover, juniors, Missouri Western State University.

PORTAL, 2015. **Projects:** Progressive taphonomy of vertebrates in a temperate terrestrial setting.

Justin Berry, junior, Missouri Western State University.

PORTAL, 2014 - 2015. **Projects:** Progressive taphonomy of vertebrates in a temperate terrestrial setting.

Natassja Hanntula, junior, Missouri Western State University.

PORTAL, 2012 - 2013. **Projects:** Progressive taphonomy of vertebrates in a temperate terrestrial setting.

Zane Helwig, senior, Missouri Western State University.

PORTAL, 2012. **Projects:** Taphonomy of vertebrates in a temperate terrestrial setting: a time-transgressive sequence.

Matt Dear, junior, Missouri Western State University.

William Walker, senior, Missouri Western State University.

Ashley Schultze, junior, Missouri Western State University.

Phil Mueller, junior, Missouri Western State University.

Introduction to Paleontology, 2012. **Project:** How does the decomposition of terrestrial organisms vs. aquatic organisms affect the water chemistry of freshwater environments?

Leslie Sagun, junior, Missouri Western State University.

Dane Coffee, junior, Missouri Western State University.

Jacob Grimes, senior, Missouri Western State University.

Trevor Cole, junior, Missouri Western State University.

Introduction to Paleontology, 2012. **Project:** Does heat, moisture, or both affect the decay of an amphibian in a tropical environment?

Allison Gienapp, junior, Missouri Western State University.

Arthur Heinrich, junior, Missouri Western State University.

Alesha Matthes, junior, Missouri Western State University.

Introduction to Paleontology, 2012. **Project:** Will pH affect the rate of decomposition on mice in an aqueous environment?

Krista Hughes, sophomore, Missouri Western State University.

Cody Barta, senior, Missouri Western State University.

Chuck Lauritzen, Missouri Western State University.

Introduction to Paleontology, 2012. **Project:** How does predation effect the degradation of shells a mechanically recreated environment?

Nicole Wallace, junior, Missouri Western State University.

Summer Research Institute, 2011. **Projects:** Taphonomy of vertebrates in a mid-latitude temperate forest/prairie setting.

Amber Gilbert, senior, Missouri Western State University.

Summer Research Institute, 2010. **Projects:** Vertebrate optimal and patch foraging behaviors, taphonomy of juvenile pig carcasses in a temperate zone.

Joshua Kalin, junior, Missouri Western State University.

Eric McCreary, junior, Missouri Western State University.

Eric Nold, junior, Missouri Western State University.

Introduction to Paleontology, 2009. **Project:** Taphonomy of vertebrate carcasses in still versus running water.

Kristen Bibb, senior, Missouri Western State University.

Kelly McGinnis, senior, Missouri Western State University.

Katherine Mick, senior, Missouri Western State University.

Introduction to Paleontology, 2009. **Project:** Taphonomy of vertebrate carcasses in forest versus prairie settings.

Candi Sykes, junior, Missouri Western State University.

Adam Spencer, junior, Missouri Western State University.

Introduction to Paleontology, 2009. **Project:** Taphonomy of vertebrate carcasses in dry versus wet sandy substrates.

Mickey Sigmon, junior, Missouri Western State University.

Adam Spencer, sophomore, Missouri Western State University.

Dylan Leeson, incoming freshman, Missouri Western State University.

Summer Research Institute, 2009. **Project:** Relationship between soil type and vegetative ecosystem in the Loess Hills of northwest Missouri.

## Research Experience

*Current:* Missouri Western State University, Department of biology, 2008 – ongoing. *Projects:* Taphonomy and fossilization potential of modern domestic avifaunal remains, taphonomy of vertebrate carcasses, vertebrate foraging and ichnofossil creation, invertebrate paleoecology.

*Previous research:* University of Illinois at Chicago, Departments of Earth and Environmental Sciences and Biological Sciences and University of Washington Friday Harbor Marine Laboratories, 2004 – 2008. *Projects:* Changes in resource availability and the evolution of foraging behavior, giving-up densities of marine predatory gastropods, shell loss in the marine snail *Nucella lamellosa*, and a field survey of marine intertidal fauna.

## Publications

*Published or in press*

Plotnick, R. and **K. Koy**. 2019. The Anthropocene Fossil Record of Terrestrial Mammals. *Anthropocene* <https://doi.org/10.1016/j.ancene.2019.100233>

**Koy, K.**, 2012. The Taphonomy Project: introducing science process skills into the classroom using an applied learning assignment. *The Paleontological Society Special Publication* 12: 199 – 220.

**Koy, K.** and R. Plotnick, 2010. Ichnofossil morphology as a response to resource distribution: insights from modern invertebrate foraging. *Palaeogeography, Palaeoclimatology, Palaeoecology* 292: 272 – 281.

**Koy, K.** and R. Plotnick, 2008. Effect of the odorant of the predatory flatworm *Dugesia gonocephala* on the foraging behavior of *Caenorhabditis elegans*. *Journal of Nematode Research* 40(4): 286 – 289.

**Koy, K.** and R. Plotnick, 2007. Theoretical and experimental ichnology of mobile foraging. In: William Miller III, (ed.), *Trace Fossils: Concepts, Problems and Prospects*. Elsevier. Pp. 419 – 432.

**Koy, K.**, 2007. Shell-less *Nucella lamellosa* (Gmelin) from the rocky intertidal of San Juan Island, WA. *Journal of Shellfish Research* 26 (1): 1 – 3.

## Presentations – peer-reviewed

**Koy, K.** and T. Eckdahl, 2019. "An undergraduate PORTAL to success." *Geological Society of America National Meeting* Phoenix, AZ. September 24, 2019.

Plotnick, R. and **K. Koy**, 2018. "The future fossil record of the Anthropocene." *The Geological Society of America 130th Annual Meeting*, Indianapolis, IN on November 7, 2018.

**Koy, K.** and J. Berry, 2017. "Isolating abiotic factors in vertebrate bone taphonomy: a pilot study," *Geological Society of America National Meeting* Seattle, WA. October 23, 2017.

**Koy, K.**, 2016. "Can I see myself doing this? Minority representation in introductory geology textbooks," *Geological Society of America National Meeting* Denver, CO. September 26, 2016.

**Koy, K.**, 2016 "Is Punxsutawney Phil accurate? Using pop culture to teach undergraduates data analysis techniques," *National Association of Geoscience Teachers Earth Educators Rendezvous* Madison, WI. July 19, 2016.

**Koy, K.**, Berry, J., Hanttula, N., Hoover, E., Pottebaum, S., *Geological Society of American National Meeting*, "Differential Decay within Vertebrate Skeletal Elements," Geological Society of America, Baltimore, MD. November 2, 2015.

**Koy, K.**, Berry, J. *Geological Society of American North-Central Sectional*, "Comparative taphonomy of buried versus exposed vertebrate remains," Geological Society of America, Madison, WI. May 19, 2015.

**Koy, K.**, Helwig, Z., 2013 Taphonomy of vertebrates in a temperate forest setting: a time-transgressive sequence. *Geological Society of America, North-Central Sectional Annual Meeting*. Kalamazoo, MI. May 1 – 3.

Wallace, N., **Koy, K.**, 2012 Taphonomy of vertebrate bones in a mid-latitude temperate forest/prairie setting for one year. *Geological Society of America, North-Central Sectional Annual Meeting*. Dayton, OH. April 20 – 23.

Sykes, C., **Koy, K.**, 2011. Taphonomy of small vertebrates in dry versus wet sandy substrates. *Geological Society of America, combined Northeastern and North-Central Sectional Annual Meeting*. Pittsburgh, PA. March 20 – 22.

**Koy, K.**, 2010b. Will it rot? Developing undergraduate science process skills in the classroom. *Geological Society of America National Meeting*. Denver, CO, October 31 – November 3.

**Koy, K.**, 2010a. Ichnology: so much more than worms in dirt! *Geological Society of America, combined North- and South-Central Sectional Annual Meeting*. Branson, MO, April 11 – 13.

Rushin, J., D. Ashley, J. Baker, C. Chevalier, M. Daggett, T. Eckdahl, K. Hartman, **K. Koy**, M. Mills, K. Walton, 2010. Using two-week learning cycle blocks (LCBs) in General Studies Biology: Pros and cons. *5th Annual Conference on Applied Learning in Higher Education*. Missouri Western State University. St. Joseph, MO.

Rushin, J., D. Ashley, J. Baker, C. Chevalier, M. Daggett, T. Eckdahl, K. Hartman, **K. Koy**, M. Mills, K. Walton, 2009. Using two-week learning cycle blocks (LCBs) in General Studies Biology: Pros and cons. *National Association of Biology Teachers Professional Development Conference*. National Association of Biology Teachers.

- Koy, K.**, 2009b. An opisthobranch out of water or, how I survived my first year as new faculty and the only earth scientist on campus. *Geological Society of America National Meeting*. Portland, OR, October 18 – 23.
- Hartman, K., **K. Koy**, M. Voltz, M. Sigmon, and D. Ashley, 2009. Comparison of soil properties containing the white fringed prairie orchid (*Platanthera praeclara*) in northwest Missouri prairies and adjacent agricultural fields. *Geological Society of America National Meeting*. Portland, OR, October 18 – 23.
- Koy, K.**, D. Leeson, M. Sigmon and A. Spencer, 2009b. The Summer Research Institute: Recruiting high school students through collaborative research projects. *Geological Society of America National Meeting*. Portland, OR, October 18 – 23.
- Koy, K.**, 2009a. Creating engaging outdoor geology labs in a non-geologic setting. *Geological Society of America, North-Central Section 43<sup>rd</sup> Annual Meeting*. Chicago, IL, April 2 – 3.
- Rushin, J., D. Ashley, J. Baker, C. Chevalier, M. Daggett, T. Eckdahl, K. Hartman, **K. Koy**, M. Mills, K. Walton, 2009. Two-Week Long Learning Cycle Blocks (LCB's) in General Studies Biology: Pros and Cons. *ACUBE 53<sup>rd</sup> Annual Meeting, Promoting Undergraduate Research*. Rockhurst University, Kansas City, MO.
- Rushin, J., C. Chevalier, D. Ashley, J. Baker, M. Daggett, T. Eckdahl, K. Hartman, **K. Koy**, K. Walton, 2009. Assessing Science Process Skills in a First Year College General Biology for Non-majors Laboratory Setting: The Effect of Two-week Long Learning Cycle Blocks (LCBs) on the Development of Science Processes Skills. *Missouri Academy of Science Annual Meeting*. Northwest Missouri State U., Maryville, MO.
- Koy, K.** and R. Plotnick, 2008b. Shared responses to resource heterogeneity and the origins of foraging behavior. *Geological Society of America National Meeting*. Houston, TX, October 5 – 9.
- Koy, K.**, 2008. Cross-phylum behavioral adaptations to heterogeneous distribution of resources in the substrate. *Geological Society of America, North-Central Section 42<sup>nd</sup> Annual Meeting*. Evansville, Indiana, April 24 – 25.
- Plotnick, R. and **K. Koy**, 2007. Evolution and coevolution of odor landscapes and chemoreception. *Geological Society of America National Meeting*. Denver, Colorado, October 28 – 31.
- Koy, K.** and R. Plotnick, 2006. The Cambrian Substrate Revolution and the evolution of foraging behavior: insights from experimental neoichnology. *Geological Society of America National Meeting*. Philadelphia, Pennsylvania, October 22 – 25.
- Plotnick, R. and **K. Koy**, 2005. Let us prey: simulations of grazing traces in the fossil record. *Proceedings, GeoComputation 2005: 8<sup>th</sup> International Conference on GeoComputation*. Ann Arbor, Michigan, August 3.
- Koy, K.**, L. Tedesco, M. Savarese, J. Pachut and K. Licht, 2003. Changes in Late Holocene coastal paleoenvironments in southwest Florida as reflected in reef-associated macrofauna. *Geological Society of America National Meeting*, Seattle, Washington, November 2 – 5.
- Tedesco, L. P., M. Savarese, **K. A. Koy** and D. Derrickson, 2002. Late Holocene vermetiform gastropod and oyster reef development and their relation to coastal evolution in Southwest Florida. *Geological Society of America National Meeting*. Denver, Colorado, October 27 – 30.
- Koy, K. A.** and M. M. Yacobucci, 2001. Terror in Miniature: trophic interactions in a shelly fauna of the Pennsylvanian of Southern Ohio. *Geological Society of America National Meeting*. Boston, Massachusetts, November 1 – 10.

## **Presentations – other**

**Koy, K.,** Helwig, Z., 2012 Progressive taphonomy of vertebrates in a temperate forest setting: a time-transgressive sequence. *Multidisciplinary Research Symposium*, Missouri Western State University.

Wallace, N., **Koy, K.**, 2011 Taphonomy of vertebrates in a mid-latitude temperate forest/prairie setting. *Multidisciplinary Research Symposium*, Missouri Western State University.

Gilbert, A., **Koy, K.**, 2010. Zebrafish patch foraging behavior and the effect of relative risk. *Multidisciplinary Research Symposium*, Missouri Western State University.

**Koy, K.**, D. Leeson, M. Sigmon and A. Spencer, 2009a. Relationship between soil type and vegetative ecosystem in the Loess Hills of northwest Missouri. *Summer Research Institute Symposium*. Missouri Western State University.

## **Funding**

Missouri Western State University, PORTAL Grant, 2019. \$3000.

**Project:** Taphonomy and fossilization potential of modern domestic avifaunal remains.

Missouri Missouri Western State University, PORTAL Grant, 2016. \$3000.

**Project:** Actupaleontological replication of pressure carbonization.

Missouri Missouri Western State University, PORTAL Grant, 2015. \$3000.

**Project:** Progressive taphonomy of vertebrates in a temperate terrestrial setting: a time-transgressive sequence.

Missouri Missouri Western State University, PORTAL Grant, 2014. \$3000.

**Project:** Progressive taphonomy of vertebrates in a temperate terrestrial setting: a time-transgressive sequence.

Missouri Missouri Western State University, PORTAL Grant, 2013. \$3000.

**Project:** Progressive taphonomy of vertebrates in a temperate terrestrial setting: a time-transgressive sequence.

Missouri Western State University, Summer Research Institute Grant, 2010. \$4100.

**Projects:** Vertebrate optimal and patch foraging behaviors, taphonomy of juvenile pig carcasses in a temperate zone.

Missouri Western State University, Summer Research Institute Grant, 2009. \$5500.

**Project:** Relationship between soil type and vegetative ecosystem in the Loess Hills of NW MO.

## **Awards**

Governor's Award for Excellence in Education, 2012. Missouri Governor Jay Nixon.

Distinguished Professor in Teaching, 2011. The Missouri Western State University Board of Governors.

## **Professional Development**

Workshop, "The Forensic Taphonomy of Texas," Forensic Anthropology Center at Texas State. Austin, TX, June 16 – 18, 2017. Learning to identify insect, animal and plant traces on remains as well as calculate time of death from insect activity and decomposition stages.

Workshop, "From Passive to Active: Classroom Makeovers that Improve Teaching and Learning," National Association of Geoscience Teachers. Branson, MO, April 11, 2010. Learning to increase the active learning component of undergraduate courses.

Workshop, "Teaching Paleontology in the 21st Century," On The Cutting Edge. Ithaca, NY, July 30, 2009 – August 5, 2009. Developing a paleontology class and activities.

Workshop, "Early Career Faculty Workshop: Teaching, Research, and Managing Your Career," On the Cutting Edge. Williamsburg, VA, June 14, 2009 – June 20, 2009. Developing a plan to successfully navigate academia as a career.

Catalysis Meeting, "Origins and Evolution of Chemoreception", National Evolutionary Synthesis Center, 2007. Participated in an interdisciplinary workshop on the evolution of chemoreception.

### **Professional Service**

Chair, Paleontological Society student research grant committee, 2018 - ongoing. Coordinated the reviewing of over one hundred student grant applications for the Society.

Acted as a reviewer of student grant applications for the Sigma Delta Epsilon Graduate Women in Science National Fellowship Program, 2017.

Created and ran a session for the North-Central Sectional meeting of the Geological Society of America, May 2013. *Paleontology as a murder mystery: how the study of predation and taphonomy reveals the means, motives and opportunities of ancient perpetrators and their victims.* Solicited and organized abstracts, chaired half-day session.

Representative, North-Central Section of the Paleontological Society, 2009 – 2012. Represent north-central US states at the Paleontological Society business meetings, organize & conduct sessions at the Geological Society of America sectional meetings, organize recruitment and social gatherings during meetings.

Reviewer, PALAIOS, 2012. Manuscript, "Fractal analysis of graphoglyptid trace fossils," First submission and resubmission.

Reviewer, National Science Foundation, 2011. REU proposal, "Latinos into Scientists: Culture and Field Work in Yucatan, Mexico."

Reviewer, Textbook, Pearson publishers, 2011. Wrote chapter reviews and checked test bank for accuracy, for a popular introductory text, "Essentials of Geology 3<sup>rd</sup> Edition".

Reviewer, National Science Foundation, 2010. REU proposal, "A 3 MY record of environmental change and faunal response in the Caribbean: engaging future paleontologists and sedimentary geologists."

Reviewer, Textbook, Pearson publishers, 2009. Wrote a chapter-by-chapter review of a popular laboratory manual, "Applications and Investigations in Earth Science".

Reviewer, Transactions of the Missouri Academy of Sciences, 2009. Manuscript, "A possible heat island effect from a small rural community."

Reviewer, Transactions of the Missouri Academy of Sciences, 2008. Manuscript, "Estimating water flow in drainage pipes."

### **Institutional Service**

Chair, General Studies Committee, Missouri Western State University, 2016 – 2018. Review and accept or reject general studies proposals, review general studies policies.

Member, General Studies Committee, Missouri Western State University, 2013 – ongoing. Review and accept or reject general studies proposals, review general studies policies.

Member, Subcommittee Chair, University Undergraduate Curriculum Committee, Missouri Western State University, 2009 – 2013. Review and present primary curriculum proposals.

Member, Remington Art & Science Display committee, Missouri Western State University, 2009 – ongoing. Represented biology faculty in choosing art and science displays for the new Remington Hall.

Member, Chancellor's Committee on Sustainability, University of Illinois at Chicago, 2007 – 2008. Helped organize and write official recommendations for the 'greening' of the UIC campus.

Chair of Student Subcommittee, Chancellor's Committee on the Status of Women, University of Illinois at Chicago, 2007 – 2008. Organized subcommittee meetings, representing student interests, and coordinated effort to solve issues created by repeal of government-subsidized health care at the student health center.

President, Secretary, University of Illinois at Chicago Terra Society, 2004 – 2008. Designed and led paleobiology workshops for underprivileged children in the Chicago Public School system.

### **Professional memberships**

The Paleontological Society

SEPM Society for Sedimentary Geology

Sigma Xi

The Geological Society of America

National Association of Geoscience Teachers

National Center for Science Education

Association for Women Geoscientists

Sigma Delta Epsilon/Graduate Women in Science

Phi Kappa Phi National Honor Society

Phi Beta Kappa National Honor Society