

Katharine M. Loughney
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CURRENT POSITION

NSF Postdoctoral Fellow, Department of Geology, University of Georgia

EDUCATION

University of Michigan Ann Arbor, Michigan
Ph.D., Paleontology 2018
Dissertation: Paleoenvironments and taphonomy of the middle Miocene Barstow Formation, Mojave Desert, California

University of Rhode Island Kingston, Rhode Island
M.S., Sedimentology, Stratigraphy, Paleontology 2010
Thesis: Taphonomy in blue paleosols from the Petrified Forest National Park, AZ, and its implications for vertebrate biostratigraphy in the Chinle Formation

Beloit College Beloit, Wisconsin
B.S., cum laude, Geology and French 2006
Thesis: Paleoenvironmental and depositional setting of two dinosaur-bone-bearing quarries in the Morrison Formation (Upper Jurassic) of Wyoming

RESEARCH & FIELD EXPERIENCE

Postdoctoral Fellow 2018 – 2020
Department of Ecology & Evolutionary Biology, University of Michigan

- Analyzed mammal diversity of western North America in relation to sedimentary record and landscape evolution through the Cenozoic
- Organized and helped lead a four-day field trip for working group members through California and Nevada

Dissertation research 2013 – 2018
University of Michigan and Mojave Desert, California

- Characterized facies and stratigraphy of the Miocene Barstow Formation
- Interpreted paleoenvironments using phytolith, soil organic matter, and compound-specific biomarker analyses
- Evaluated taphonomic features of mammal-fossil bones and characterized faunal assemblages
- Interpreted environmental changes through the evolution of the sedimentary basin

Paleontological Society Stratigraphic Paleobiology Field Course July 2014
Tobacco Root Mountains and Missouri Breaks, Montana

- Analyzed sequence-stratigraphic architecture and documented faunal distribution through facies
- Modeled ecological and environmental associations of observed fauna using R

M.S. Thesis research 2007 – 2010
University of Rhode Island and Petrified Forest National Park, Arizona

- Characterized depositional settings of fossil localities in the Late Triassic Chinle Formation
- Described paleopedology of fossil localities in the field and with thin sections
- Analyzed vertebrate-fossil preservation bias among depositional settings

Hope College Dinosaur Research Experience for Undergraduates Summer 2005
Shell, Wyoming, and Holland, Michigan

- Excavated bones from two dinosaur quarries in Wyoming
- Prepared bones in the lab
- Characterized depositional setting of the quarries for senior thesis

Howard Hughes Fellowship

Summer 2002

Beloit College, Beloit, Wisconsin

- Surveyed red-winged blackbird nests, weighed and tagged red-wing blackbird chicks
- Modeled spatial and temporal distribution of red-winged blackbird nests using ArcGIS

ADDITIONAL PROFESSIONAL EXPERIENCE**Curatorial Assistant, Museum of Zoology**

January – April 2016

University of Michigan, Ann Arbor, MI

- Revised taxonomic identifications of rodent skins and skulls in the Museum collection
- Reorganized specimens by taxonomy and geography
- Filled loan requests and updated specimen loan status using Specify database software
- Collected tissue samples from rodent specimens for tissue sample loan requests

Guest Scientist/Paleontologist, GeoCorps America

May 2011 – July 2012

Chesapeake & Ohio Canal National Historical Park, DC, MD, WV

- Established the first management plan and monitoring program for paleontological resources in the Park
- Documented occurrences of paleontological resources in the Park; assessed condition of resources and vulnerability to theft or damage
- Established procedures for locality documentation, specimen collection and curation
- Created and maintained a Microsoft Access database of paleontological localities and specimens collected in the Park
- Worked with colleagues to oversee and manage natural and cultural resources in the Park
- Assisted researchers from West Virginia University in surveying and mapping cave and karst resources in the Park
- Presented to elementary school groups, Park volunteers and staff about the paleontology and geology of the Park

Paleontologist, GeoCorps America

June – September 2010

Gunnison Gorge National Conservation Area, Montrose, CO

- Prospected for fossil resources within field area, documented and mapped fossil localities
- Created maps in ArcGIS of prospected areas with locations of fossil resources

Volunteer, Paleobiology and Fish Departments, Smithsonian Institution

June – August 2003

National Museum of Natural History, Washington, D.C.

- Rehoused and organized historic documents, photographs, maps, and artwork for permanent storage in Fish and Paleobiology Departments
- Scanned documents, photographs, and slides for digital archiving
- Designed content and layout for Paleobiology Department website

TEACHING & MENTORING**Undergraduate Research Mentor**

2016 – 2018

University of Michigan

- Advised student through senior thesis research on sedimentary charcoal analysis of Miocene sediment samples
- Worked with student in developing laboratory procedures for charcoal extraction and analysis
- Advised student through all stages of the project, met regularly to read and discuss research papers

Teaching Assistant, Paleontological Society Stratigraphic Paleobiology Field Course

July 2017

Tobacco Root Mountains and Missouri Breaks, Montana

- Guided students through describing lithology, characterizing facies, and measuring stratigraphic sections

Undergraduate Research Mentor

September – April 2015

Undergraduate Research Opportunity Program, University of Michigan

- Instructed student in making thin sections, preparing and analyzing soil organic matter samples
- Advised student through all stages of the project and met weekly to read and discuss research papers

University of Michigan Department of Earth & Environmental Sciences

Graduate Student Instructor, Introductory Geology	Fall 2016
Graduate Student Instructor, Ecosystem Science in the Rockies	Summer 2016
Graduate Student Instructor, Geobiology	Fall 2015
Graduate Student Instructor, Introductory Geology	Fall 2014
Graduate Student Instructor, Evolution and Extinction	Spring 2014
Graduate Student Instructor, Environmental Geography	Fall 2013

University of Rhode Island Department of Geosciences

Head Graduate Assistant, Understanding the Earth	Fall 2009
Graduate Assistant, Understanding the Earth	2007 – 2009

Beloit College Geology Department

Teaching Assistant, Paleontology	Fall 2005
Teaching Assistant, Evolution of the Earth	Spring 2005

Girls and Women in Science, Beloit College

▫ Developed and taught a hands-on geology lab for 6 th grade girls	2005, 2006
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GRANTS & AWARDS

Earth Sciences Postdoctoral Fellowship No. 1952643 <i>National Science Foundation</i>	2020
Ermine Cowles Case Student Award <i>University of Michigan Museum of Paleontology</i>	2017
Scott Turner Award <i>Department of Earth & Environmental Sciences, University of Michigan</i>	2013 – 2017
Evolving Earth Student Grant <i>Evolving Earth Foundation</i>	2014
Paleontological Society Student Grant <i>Paleontological Society</i>	2014
Rackham Spring/Summer Research Grant <i>Rackham Graduate School, University of Michigan</i>	2014
PALAIOS 2011 Honorable Mention Paper <i>Society for Sedimentary Geology (SEPM)</i>	2012

PROFESSIONAL SOCIETIES

Geological Society of America	<i>member since 2005</i>
Paleontological Society	<i>member since 2005</i>
Society of Vertebrate Paleontology	<i>member since 2005</i>

SERVICE & OUTREACH**Science Communication Fellows Program** 2019*University of Michigan Museum of Natural History*

- Developed hands-on activity about fossil preservation for children and families
- Presented activity at UMMNH-sponsored events in Ann Arbor
- Advised UMMNH outreach staff on developing programs on fossil preservation for museum visitors

Organizing Committee, Early Career Scientists Symposium November 2019 – March 2019*University of Michigan Department of Ecology & Evolutionary Biology*

- Solicited nominations and invited speakers
- Organized schedule of talks and logistics for visiting speakers

Graduate Student Ombudsperson 2017*University of Michigan Museum of Paleontology***INVITED TALKS & PARTICIPATION**

September 22, 2019 Phoenix, AZ

Invited presentation: The environmental context of changing mammal diversity through the Middle Miocene Climatic Optimum in the Barstow Formation, Mojave Desert, California. Topical Session 121: Landscape Responses to Neogene Climate Change, Geological Society of America Annual Meeting.

June 24, 2019 Riverside, CA

Invited presentation: Regional patterns of mammal diversity through Basin and Range extensional history, 36 Ma to present. Symposium 20: Stratigraphic Paleobiology, North American Paleontological Convention.

May 12–17, 2019 Tonopah, NV, and Zzyzx, CA

Invited participant: North American Rodents: Landscape, Ecology, and Evolution Research Coordination Network workshop and field trip.

July 23–25, 2018 Ann Arbor, MI

Invited participant: Mammalian Diversification and Distribution Dynamics on Evolving Landscapes. North American Rodents: Landscape, Ecology, and Evolution Research Coordination Network workshop.

March 23, 2018 University of Georgia

Invited speaker: Depositional and environmental influences on mammal taphonomy and turnover in the middle Miocene Barstow Formation, southern California. University of Georgia Department of Geology Colloquium.

October 26–26, 2017 Seattle, WA

Invited participant: Dynamic Landscapes and Mammal Evolution. North American Rodents: Landscapes, Ecology, and Evolution Research Coordination Network workshop.

PEER-REVIEWED PUBLICATIONS

Holland, S.M., and **Loughney, K.M.**, 2021. The stratigraphic paleobiology of nonmarine systems: Elements of Paleontology, Cambridge, Cambridge University Press, 80 p. doi: 10.1017/9781108881869.

Loughney, K.M., and Badgley, C., 2020. The influence of depositional environment and basin history on the taphonomy of mammalian assemblages from the Barstow Formation (Middle Miocene), California: *PALAIOS*, v. 35, no. 4, p. 175–190.

Loughney, K.M., Hren, M.T., Smith, S.Y., and Pappas, J., 2020. Vegetation and habitat change in southern California through the Middle Miocene Climatic Optimum: Paleoenvironmental records from the Barstow Formation, Mojave Desert: *Geological Society of America Bulletin*, v. 132, p. 113–129. doi: 10.1130/B35061.1.

Loughney, K.M., and Badgley, C., 2017. Facies, environments, and fossil preservation in the Barstow Formation, Mojave Desert, California: *PALAIOS*, v. 32, no. 6, p. 396–412.

Loughney, K.M., Fastovsky, D.E., and Parker, W.G., 2011. Vertebrate fossil preservation in blue paleosols from Petrified Forest National Park, Arizona, with implications for vertebrate biostratigraphy in the Chinle Formation: *PALAIOS*, v. 26, p. 700–716.

OTHER PUBLICATIONS

Loughney, K., Reynolds, R.E., Whistler, D., and Takeuchi, G.T., 2020. Changing facies: The road log, *in* Miller, D.M., ed., *Changing Facies: 2020 Desert Symposium Field Guide and Proceedings*, p. 7–33.

Loughney, K., and Hardy, F., 2020. Fossil-bearing facies of extensional basins: Examples from the Miocene Barstow and Dove Spring formations, Mojave region, California, *in* Miller, D.M., ed., *Changing Facies: 2020 Desert Symposium Field Guide and Proceedings*, p. 60–67.

Loughney, K.M., and Smiley, T.M., 2019. The middle Miocene in southern California: Mammals, environments, and tectonics of the Barstow, Crowder, and Cajon Valley formations—Field Trip of the North American Paleontological Convention, June 22, 2019: *PaleoBios*, v. 36, Suppl. 3, p. 1–25.

Loughney, K.M., and Badgley, C., eds., 2019. Guide to the western transect: 30 million years \pm 2 kilometers: NSF Research Coordination Network Mammal Diversification in Dynamic Landscapes field trip and workshop, Guidebook, 177 p.

Loughney, K.M., 2017. Environments of the Barstow Formation in the Mud Hills, southeastern California, *in* Reynolds, R.E., ed., *ESCZ Does It: 2017 Desert Symposium Field Guide and Proceedings*, California State University Desert Studies Consortium, Zzyzx, California, p. 235–238.

Loughney, K.M., and Smith, S.Y., 2015. Phytoliths of the Barstow Formation through the Middle Miocene Climatic Optimum: Preliminary findings, *in* Reynolds, R.E., ed., *Mojave Miocene: 2015 Desert Symposium Field Guide and Proceedings*, California State University Desert Studies Consortium, Zzyzx, California, p. 51–58.

Badgley, C., Smiley, T.M., and **Loughney, K.M.**, 2015. Miocene mammal diversity of the Mojave region in the context of Great Basin mammal history, *in* Reynolds, R.E., ed., *Mojave Miocene: 2015 Desert Symposium Field Guide and Proceedings*, California State University Desert Studies Consortium, Zzyzx, California, p. 34–43.

Loughney, K.M., and Santucci, V.L., 2014. Management plan for paleontological resources of Chesapeake & Ohio Canal National Historical Park, District of Columbia, Maryland, and West Virginia, Natural Resource Report NPS/CHOH/NRR—2014/759, National Park Service, Fort Collins, Colorado.

CONFERENCE ABSTRACTS

Loughney, K.M., Badgley, C., Bahadori, A., Holt, W.E., and Rasbury, E.T., 2020. Mammal richness and tectonic history of the Basin and Range since 36 Ma: Society of Vertebrate Paleontology Annual Meeting.

Bahadori, A., Holt, W.E., Rasbury, E.T., **Loughney, K.M.**, and Badgley, C., 2020. A 4-D geodynamic model of the lithosphere: The coupled influence of tectonics and surface processes on crustal deformation, basin development, and drainage evolution in southwestern North America since the Late Eocene: American Geophysical Union Fall Meeting, EP028-0002.

Methner, K., Chamberlain, C.P., Badgley, C., Bajnai, D., Fiebig, J., Krsnik, E., Löffler, N., **Loughney, K.M.**, and Mulch, A., 2020. Middle Miocene continental temperature and precipitation changes recorded in paleosol carbonates (a transatlantic approach): American Geophysical Union Fall Meeting, PP027-05.

Loughney, K.M., Hren, M.T., Smith, S.Y., Pappas, J.L., and Harkness, A.K., 2019. The environmental context of changing mammal diversity through the middle Miocene Climatic Optimum in the Barstow Formation, Mojave Desert, California: Geological Society of America Abstracts with Programs, v. 51, no. 5. doi: 10.1130/abs/2019AM-335836.

Loughney, K.M., Badgley, C., Bahadori, A., and Holt, W., 2019. Regional patterns of mammal diversity through Basin and Range extensional history, 36 Ma to present: North American Paleontological Convention, Riverside, California.

Holland, S.M., and **Loughney, K.M.**, 2019. Predictions for the stratigraphic paleobiology of continental systems: North American Paleontological Convention, Riverside, California.

Badgley, C., Smiley, T.M., and **Loughney, K.M.**, 2019. Landscape processes and diversity dynamics of North American mammals: Society of Vertebrate Paleontology Annual Meeting, Brisbane, Australia.

Smiley, T., Badgley, C., Bahadori, A., Feng, R., Holt, W.E., **Loughney, K.M.**, and Terry, R.C., 2019. Diversity responses to landscape change in the Basin and Range Province: Tectonics influence macroevolutionary dynamics and faunal structure in mammals over the Neogene (Invited): American Geophysical Union Fall Meeting, EP53A-02.

Loughney, K.M., 2018. Preservation and faunal change of mammals in the Barstow Formation, southern California, and their implications for turnover at the Hemingfordian-Barstovian boundary: Romer Session, Society of Vertebrate Paleontology Annual Meeting, Albuquerque, New Mexico.

Loughney, K.M., and Badgley, C., 2018. Preservation and faunal change in the Barstow Formation, southern California: Implications for turnover at the Hemingfordian-Barstovian boundary: Geological Society of America Abstracts with Programs, v. 50, no. 6. doi: 10.1130/abs/2018AM-323581.

Holland, S.M., and **Loughney, K.M.**, 2018. The stratigraphic paleobiology of continental systems: Initial considerations: Geological Society of America Abstracts with Programs, v. 50, no. 6. doi: 10.1130/abs/2018AM-318038.

Loughney, K.M., and Badgley, C., 2017. Taphonomy of mammal fossils in the Barstow Formation (middle Miocene), southern California, in relation to facies and paleoenvironments: Geological Society of America Abstracts with Programs, v. 49, no. 6. doi: 10.1130/abs/2017AM-303704.

Loughney, K.M., 2017. Taphonomy of mammal fossils in the Barstow Formation, southern California, in relation to facies and environment: Society of Vertebrate Paleontology Annual Meeting, Calgary, Alberta, Canada.

Loughney, K.M., Hren, M., and Smith, S.Y., 2016. Paleoenvironmental reconstruction of the Barstow Formation, southern California, through the middle Miocene Climatic Optimum: Geological Society of America Abstracts with Programs, v. 48, no. 7. doi: 10.1130/abs/2016AM-286252.

Loughney, K.M., and Badgley, C., 2015. Facies control on fossil preservation in the Barstow Formation, Mojave Desert, California: Geological Society of America Abstracts with Programs, v. 47, no. 7, p. 827.

Loughney, K.M., and Smith, S.Y., 2015. Phytolith assemblages of the Barstow Formation (middle Miocene), southeastern California, through the middle Miocene Climatic Optimum: Society of Vertebrate Paleontology Annual Meeting, Dallas, Texas.

Loughney, K.M., Jarochofska, E., Keller, A.L., Kimmig, J., Larina, E., Singer, A., McMullen, S.K., Christie, M., Holland, S.M., and Patzkowsky, M.E., 2014. Sequence stratigraphic architecture drives biofacies distribution of the Mississippian Lodgepole Formation in south-central Montana: Geological Society of America Abstracts with Programs, v. 46, no. 6, p. 754.

Loughney, K.M., Fastovsky, D.E., and Parker, W.G., 2013. Vertebrate fossil preservation in blue paleosols from the Petrified Forest National Park, Arizona, and its implications for vertebrate biostratigraphy and preservation in the Colorado Plateau: Geological Society of America Abstracts with Programs, v. 45, no. 7, p. 735.

Loughney, K.M., Santucci, V.L., and Carter, M., 2012. Managing and monitoring fossil resources: Results of the first paleontologic resource surveys in Chesapeake & Ohio Canal National Historical Park, DC, MD, WV: Geological Society of America Abstracts with Programs, v. 44, no. 7, p. 614.

Tudek, J., Vesper, D., and **Loughney, K.**, 2012. Resurvey of the caves in the Chesapeake and Ohio Canal National Historical Park: Geological Society of America Abstracts with Programs v. 44, no. 7, p. 404.

Loughney, K.M., Parker, W.G., and Fastovsky, D.E., 2008. Taphonomy in blue paleosols and its implications for the biostratigraphy of vertebrate taxa in the Petrified Forest National Park, Arizona, USA: Geological Society of America Abstracts with Programs, v. 40, no. 6, p. 370.

Loughney, K.M., Demko, T.M., Bodenbender, B.E., 2006. Paleoenvironmental and depositional setting of two dinosaur bone-bearing quarries in the Morrison Formation (Upper Jurassic) of Wyoming: Geological Society of America Abstracts with Programs, v. 38, no. 4, p. 75.

Cartwright, A.M., Cleland, T.P., Derby, S.F., Ergas, E.E., Fay, H.I., **Loughney, K.M.**, Riedel, J.A., Rocheford, M.K., Scott, C.L., and Skaggs, K.L., 2006. Aspects of the paleontology and stratigraphy of the Lower Triassic-Lower Cretaceous strata of the eastern Bighorn Basin, WY: Geological Society of America Abstracts with Programs, v. 37, no. 7, p. 302.