

CURRENT POSITION

Postdoctoral Fellow, Department of Geology, University of Georgia

Since 2020

EDUCATION

University of Michigan

Ph.D., Paleontology

Ann Arbor, Michigan

2018

Dissertation: Paleoenvironments and taphonomy of the middle Miocene Barstow Formation, Mojave Desert, California

University of Rhode Island

M.S., Sedimentology, Stratigraphy, Paleontology

Kingston, Rhode Island

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

B.S., *cum laude*, Geology and French

Beloit, Wisconsin

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 sedimentation history and landscape evolution through the Cenozoic
- Worked with UMMNH staff to design a temporary exhibit centered around a fossil rodent specimen
- 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 occurrences through marine 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 differences in vertebrate-fossil preservation 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 and 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

Spring 2016

University of Michigan, Ann Arbor, Michigan

- 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
- Worked with colleagues to oversee and manage natural and cultural resources in the Park
- Represented the Park at the National Fossil Day event on the National Mall
- 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, Colorado

- 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 Paleobiology and Fish Departments
- Scanned documents, photographs, and slides for digital archiving
- Designed content and layout for Paleobiology Department website

TEACHING & MENTORING

UGA Women in Science Mentor

Fall 2021–Spring 2022

University of Georgia

- Met regularly with Ph.D. student to discuss academic and career goals, manuscript and grant writing strategies, and the job application process

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, 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 sediment samples for soil organic matter analyses
- 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

American Geophysical Union	<i>member since 2021</i>
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

- Review panelist** 2021
National Science Foundation Division of Earth Sciences
- Moderator, GeoClub Museum Career Panel** February 2020
University of Michigan Department of Earth & Environmental Sciences
- 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
- Student poster judge, Michigan Geophysical Union** April 2019
University of Michigan Department of Earth & Environmental Sciences
- Organizing Committee, Early Career Scientists Symposium** November 2018–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

PEER-REVIEWED PUBLICATIONS

- Bahadori, A., Holt, W.E., Feng, R., Austermann, J., **Loughney, K.M.**, Salles, T., Moresi, L., Beucher R., Lu, N., Flesch, L.M., Calvelage, C.M., Rasbury, E.T., Davis, D.M., Potochnik, A.R., Ward, W.B., Hatton, K., Haq, S.S.B., Smiley, T.M., Wootton, K.M., and Badgley, C., 2022. Coupled influence of tectonics, climate, and surface processes on landscape evolution in southwestern North America: *Nature Communications*, v. 13, 4437. doi: 10.1038/s41467-022-31903-2.
- Loughney, K.M.**, Badgley, C., Bahadori, A., Holt, W.E., and Rasbury, E.T., 2021. Tectonic influence on Cenozoic mammal richness and sedimentation history of the Basin and Range, western North America: *Science Advances*, v. 7, no. 45, eabh4470. doi: 10.1126/sciadv.abh4470.
- 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.

FIELD GUIDES & 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 ± 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., and Holland, S.M., 2022. Simulating spatial and temporal patterns of architecture and fossil preservation across nonmarine extensional basins: *Geological Society of America Abstracts with Programs*, v. 54, no. 5, 10.1130/abs/2022AM-379266.

Schulman, R., **Loughney, K.M.**, and Abbey, A., 2022. Provenance and stratigraphic analysis of the Stewart Valley, Nevada: *Geological Society of America Abstracts with Programs*, v. 54, no. 5, 10.1130/abs/2022AM-382057.

Holt, W.E., Bahadori, A., Feng, R., Rasbury, T.E., **Loughney, K.M.**, and Ward, B., 2022. Dynamics of the SW Cordillera, landscape evolution, and tests for the timing of Grand Canyon incision: *Geological Society of America Abstracts with Programs*, v. 54, no. 5, 10.1130/abs/2022AM-383438.

Bahadori, A., Holt, W., Austermann, J., Rasbury, T.E., Feng, R., **Loughney, K.M.**, Hatton, K., Flesch, L.M., Calvelage, C.M., Davis, D.M., Smiley, T., Badgley, C., Ward, W.B., and Wootton, K., 2022. Deciphering the landscape history in southwestern North America since the Late Eocene using the coupled influence of tectonics, climate, and surface processes: *Geological Society of America Abstracts with Programs*, v. 54, no. 5, 10.1130/abs/2022AM-382934.

Loughney, K.M., and Holland, S.M., 2021. The eight architectural zones of nonmarine basins: *American Geophysical Union Fall Meeting*, EP25A-03.

Loughney, K.M., Badgley, C., Feng, R., Bahadori, A., Holt, W.E., and Rasbury, E.T., 2021. Large- and small-mammal richness of the Basin and Range through changing climate since 36 Ma: *Society of Vertebrate Paleontology Annual Meeting*.

Feng, R., and **Loughney, K.M.**, 2021. Sensitivity of South American precipitation to Miocene CO₂ variations and eastern Antarctic glaciation: *Geological Society of America Abstracts with Programs*, v. 53, no. 6, doi: 10.1130/abs/2021AM-368439.

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.**, Jarochovska, 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.