

## CURRENT POSITION

Postdoctoral Research Fellow, Department of Ecology and Evolutionary Biology, University of Michigan

## 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

- NSF Postdoctoral Fellow** 2020–2022  
*Department of Geology, University of Georgia*  
▫ Modeled stratigraphy and fossil preservation in nonmarine basins  
▫ Characterized the stratigraphic distribution of fossil-bearing facies in Stewart Valley, Nevada
- 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, stress management, and the job application process
- Undergraduate Research Mentor** 2016–2018  
*University of Michigan*
- Advised student through senior thesis research analyzing Miocene sedimentary charcoal
  - 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** 2005, 2006  
 ▫ Developed and taught a hands-on geology lab for 6<sup>th</sup> grade girls

## GRANTS &amp; AWARDS

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

## PROFESSIONAL SOCIETIES

- American Geophysical Union *member since 2021*  
 Geological Society of America *member since 2005*  
 Paleontological Society *member since 2005*  
 Society of Vertebrate Paleontology *member since 2005*

## SERVICE &amp; 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

## PAPERS IN REVIEW

- Loughney, K.M.**, and Holland, S.M. The eight architectural zones of nonmarine basins: *in review at Geosphere*.
- Loughney, K.M.**, Harkness, A.K., and Badgley, C. Middle Miocene fire activity and C<sub>4</sub> vegetation expansion in the Barstow Formation, California: *in review at Geology*.

## PAPERS IN PRESS

- Holland, S.M., **Loughney, K.M.**, and Cone, M. Preferential preservation of low-elevation biotas in the nonmarine fossil record: *Geology, in press*. doi: 10.1130/G50579.1.

## 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., Wooton, 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 (Invited): *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 CO<sub>2</sub> 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 (Invited): 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 (Invited): 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.**, Jarochowska, 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.