

Stephanie Marie Smith

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Current position

Distinguished Bass Postdoctoral Fellow

Negaunee Integrative Research Center, Field Museum of Natural History
Proposal: "Living small in the clouds: Body size and bone microstructure in Philippine cloud forest rodents."

Education

2017: Ph.D., Biology. University of Washington, Seattle, Washington

2012: B.A., Biology. Johns Hopkins University, Baltimore, Maryland

Publications

* = student collaborator

Smith, S.M., Angielczyk, K.D. 2022. A shrewd inspection of vertebral regionalization in large shrews (Soricidae: Crocidurinae). *Integrative Organismal Biology* 4: 1-17. doi: 10.1093/iob/obac006

*Zack, E.H., **Smith, S.M.**, Angielczyk, K.D. 2021. Effect of captivity on the vertebral bone microstructure of xenarthran mammals. *The Anatomical Record*. doi: 10.1002/ar.24817

Smith, S.M., Stayton, C.T., Angielczyk, K.D. 2021. How many trees to see the forest? Assessing the effects of morphospace coverage and sample size in performance surface analysis. *Methods in Ecology and Evolution* 00: 1- 14. doi: 10.1111/2041-210X.13624

Crofts, S.B., **Smith, S.M.**, Anderson, P.S.L. 2020. Beyond description: the many facets of dental biomechanics. *Integrative and Comparative Biology* 60: 594-607 icaa103. doi: 10.1093/icb/icaa103

Miller, S.E., Barrow, L.N., Ehlman, S.M., Goodheart, J.A., Greiman, S.E., Lutz, H.L., Misiewicz, T.M., **Smith, S.M.**, Tan, M., Thawley, C.J., Cook, J.A., Light, J.E. 2020. Building natural history collections for the 21st century and beyond. *Bioscience* biaa069. doi: 10.1093/biosci/biaa069

Smith, S.M., Angielczyk, K.D. 2020. Deciphering an extreme morphology: bone microarchitecture of the hero shrew backbone (Soricidae: *Scutisorex*). *Proceedings of the Royal Society B: Biological Sciences* 287: 20200457. doi: 10.1098/rspb.2020.0457

Grossnickle, D.M., **Smith, S.M.**, Wilson, G.P. 2019. Untangling the multiple ecological radiations of early mammals. *Trends in Ecology and Evolution*. doi: 10.1016/j.tree.2019.05.008

Smith, S. M., Angielczyk, K.D., Schmitz, L., Wang, S.C. 2018. Do bony orbit dimensions predict diel activity pattern in sciurid rodents? *The Anatomical Record* 301:1774-1787. doi: 10.1002/ar.23900

Smith, S.M., Sprain, C.J., Clemens, W.A., Lofgren, D.L., Renne, P., Wilson, G.P. 2018. Early mammalian recovery after the end-Cretaceous mass extinction: A high-resolution view from McGuire Creek area, Montana, USA. *Geological Society of America Bulletin* 130:2000–2014. doi: 10.1130/B31926.1

Smith, S. M., Wilson, G.P. 2016. Species discrimination of co-occurring small fossil mammals: A case study of the Cretaceous-Paleogene multituberculate genus *Mesodma*. *Journal of Mammalian Evolution* 24: 147–157. doi: 10.1007/s10914-016-9332-2

Selected Meeting Abstracts

* = student collaborator

Smith, S.M., Angielczyk, K.D., Heaney, L.R. Submitted (2023). Multi-scale morphological effects of body size in a fully arboreal clade of rodents (Muridae: Phloeomyini). Society for Integrative and Comparative Biology Meeting 2023, Austin, Texas.

*Ayersman, M., **Smith, S.M.**, *Zack, E.H., Angielczyk, K.D. Submitted (2023). Unearthing the influences of body size, ecology, and phylogeny in claw morphology of digging mammals. Society for Integrative and Comparative Biology Meeting 2023, Austin, Texas.

*Zack, E.H., **Smith, S.M.**, Angielczyk, K.D. Submitted (2023). From Fairies to Giants: impacts of body size and ecology on trabecular bone of Xenarthran vertebrae. Society for Integrative and Comparative Biology Meeting 2023, Austin, Texas.

Smith, S.M., Angielczyk, K.D., Heaney, L.R. 2022. Phylogenetic signal in trabecular bone of the Philippine endemic earthworm-mouse *Chrotomys*. *Integrative and Comparative Biology* 61: Supplement_1.

Smith, S.M., Heaney, L.R., Angielczyk, K.D. 2021. Living small in the clouds: body size and bone microstructure in Philippine cloud forest rodents. American Society of Mammalogists Virtual Meeting 2021.

Smith, S.M., Angielczyk, K.D. 2021. A deep-learning approach to reduce subjectivity in segmentation of natural history museum skeletal specimens. Tomography for Scientific Advancement North America (ToScANA) Virtual Meeting 2021.

Smith, S.M., Angielczyk, K.D. 2021. Adventures inside shrew vertebrae: Trabecular bone morphology and regionalization in Soricidae. Society for Integrative and Comparative Biology Virtual Meeting 2021.

Smith, S.M., Angielczyk, K.D., Kerbis Peterhans, J.C. 2020. Vertebral number and spinal regionalization in large shrews (Soricidae). *Integrative and Comparative Biology* 60: Supplement_1.

Crofts, S.B., **Smith, S.M.**, Anderson, P.S.L. 2020. Crushing and puncturing: biomechanics of tooth shape. *Integrative and Comparative Biology* 60: Supplement_1.

*Zack, E.H., **Smith, S.M.**, Angielczyk, K.D. 2020. Zoo versus wild: Trabecular bone architecture in captive and wild Xenarthra. *Integrative and Comparative Biology* 60: Supplement_1.

Smith, S.M., Angielczyk, K.D., Heaney, L.R., Kerbis Peterhans, J.C., Luo, Z-X. 2019. Functional morphology of trabecular bone in the lumbar spine of shrews (Mammalia: Soricidae). International Congress of Vertebrate Morphology, Prague, Czechia. *Journal of Morphology* 280: S220. doi: 10.1002/jmor.21003

Smith, S.M. 2019. Non-destructive destructive sampling: The uses and limitations of computed tomography (CT) for traditionally destructive investigations. Society for the Preservation of Natural History Collections, Chicago, IL.

Smith, S.M., Wilson, G.P. 2018. Teeth through time: Quantitative mammalian dental morphology across the Cretaceous-Paleogene boundary. Symposium Presentation: Mammals Across the Ages Symposium, American Society of Mammalogists, Manhattan, KS.

Smith, S. M., *Aranoff, G., Wilson, G.P. 2016. Quantitative dental ecomorphology reveals a wide range of mammalian dietary ecologies in the first one million years following the Cretaceous-Paleogene mass extinction. *Journal of Vertebrate Paleontology*, Program and Abstracts: 228; *Integrative and Comparative Biology* 56:E373.

Smith, S. M., Angielczyk, K. D., Schmitz, L., Wang, S. C. 2012. How well do orbit dimensions predict diel activity in sciurid rodents? *Integrative and Comparative Biology* 52:E163.

Funding and Awards

Pending:

National Science Foundation

2022: Biological Sciences Directorate, Integrative Organismal Systems full proposal, Physiological and Structural Systems program; “The challenges of living small: functional tradeoffs in the vertebral bone structure of diminutive mammals”. PIs: **S.M. Smith**, K.D. Angielczyk (Field Museum), C.T. Stayton (Bucknell University).

2022: Biological Sciences Directorate, Integrative Organismal Systems full proposal; “Bones and Burrowing: Mechanoadaptation in phylogeny, ontogeny, and ecology of *Peromyscus* (Rodentia, Cricetidae).” PI*: S. J. Shefelbine (Northeastern University); **S.M. Smith** coauthored, and is named as postdoctoral researcher. *Northeastern University does not allow postdoctoral fellows to serve as PIs for grant proposals.

Awarded:

Argonne National Laboratory Advanced Photon Source (APS)

2021: General User Proposal (GUP) 75346, “Pathological calcification in the backbone of captive anteaters”. Awarded 12 shifts (8hr each) of beam time to conduct energy dispersive diffraction (EDD) on crystalline structure of pathological anteater bone. Collaborators: S.R. Stock (Northwestern University), J-S. Park (APS), K.D. Angielczyk (Field Museum), and E.H. Zack (University of Chicago)

Field Museum of Natural History

2022: Distinguished Bass Postdoctoral Fellowship

2020: Women in Science Postdoctoral Fellowship

2011: NSF Research Experience for Undergraduates Fellowship

National Science Foundation

2018: Postdoctoral Research Fellowship in Biology, Research Using Biological Collections [NSF DBI-1811627]

2014: Graduate Research Fellowship Program, Honorable Mention

Society of Vertebrate Paleontology

2017: Jackson School of Geosciences Student Travel Grant

University of California Museum of Paleontology

2015 and 2017: Doris O. and Samuel P. Welles Fund

American Philosophical Society

2014: Lewis and Clark Fund for Exploration and Field Research

American Society of Mammalogists

2014: ASM Grants-In-Aid of Research

University of Washington

2017: Burke Museum Vertebrate Paleontology Collections Fellowship

2016: Snyder Award for Vertebrate Zoology

2016: Stephen and Ruth Wainwright Endowed Fellowship for Functional Morphology

2014: Iuvo Award

2012: Graduate Top Scholar Fellowship

Teaching Experience**Workshop Development**

February 2021: Developed and taught two-session online workshop for Principal Investigators and students/colleagues associated with FuncQEE digitization project [NSF PEN-1902105]. Topics: segmentation, manipulation, and 3D modeling of reconstructed μ CT data from natural history specimens.

University of Chicago: Guest lectures

BIOS 23262: Mammalian Evolutionary Biology (two or three 50-minute lectures per quarter; Autumn 2019, 2020, 2021)

University of Washington: Teaching Assistant positions

* denotes contribution of original lab materials or content

Biology 220: Animal and Plant Physiology (3 quarters)*

Biology 434: Invertebrate Zoology (1 quarter)*

Biology 440: General Mycology (5 quarters)*

Biology 442: Mushrooms and Related Fungi (1 quarter)

Biology 443: Evolution of Mammals (2 quarters)*

Biology 438: Quantitative Methods in Paleobiology (2 quarters)*

Biology 448: Mammalogy (1 quarter)*

Biology 475: Paleontological Field Methods (2 quarters)*

University of Washington: Teaching Associate positions

Biology 200: Introductory Molecular and Cellular Biology (1 quarter)*

University of Washington: Guest lectures

Biology 443: Evolution of Mammals (two 90-minute lectures)

Biology 448: Mammalogy (one 90-minute lecture)

Biology 438: Quantitative Methods in Paleobiology (three 90-minute lectures per quarter, 2 quarters)

Biology 439: Functional Morphology (one 90-minute lecture)

University of Washington: Reader/Grader positions

Biology 401: Advanced Cell Biology (1 quarter)

Mentorship

2021-present: **M. Ayersman** (DePaul University)
Project title: "Ecomorphology of keratinous claw sheaths across fossorial mammals"
Funding: \$2500 (to MA) from DePaul University Internship Plus Scholarship Program

2019-present: **E.H. Zack** (University of Chicago)
Project title: "Does spinal bone morphology vary among captive and wild-caught xenarthrans?"
Funding: \$2000 (to EHZ) from UC University Careers in STEM
\$6500 (to EHZ) from UC Biological Sciences Collegiate Division.
Products: Honors thesis in Ecology and Evolution (EHZ, 2021); Zack et al. 2021 (see Publications, above)

2021: **N. Dachota** (U.S. Air Force Academy)
Three-week internship conducting research on bone morphology of Philippine endemic cloud forest rodents, including cleaning and segmenting μ CT scans, producing printable 3D models, and taking morphological measurements on rodent vertebral columns.

2015–2016: **G. Aranoff** (University of Washington)
Project title: "Quantitative Dental Ecomorphology of Early Paleocene Archaic Ungulates"
Funding: \$5000 in funding (to GA) from Mary Gates Research Fund (UW)
Products: oral presentation, UW Undergraduate Research Symposium

Fieldwork

2021-present: Small mammal survey across elevational transect in Santa Catalinas Mountains, southeastern Arizona (pilot data for larger Madrean Sky Islands biogeography and diversity project). PIs: Dakota Rowsey and Nathan Upham (Arizona State University Mammal Collections).

2018: Small mammal trapping survey to determine conservation status of *Sorex merriami* in eastern Washington. PI: Kathryn Stancheck (University of Washington Biology).

2015, 2016: Field assistant to Leith Leiser-Miller and Sharlene Santana (University of Washington Biology), mist netting and collection of morphological, tissue, fecal, and behavioral data from neotropical bats. La Selva, Costa Rica.

2012–2016: Cretaceous-Paleogene vertebrate fossil collections and prospecting. Hell Creek/Tullock Formations, Montana. PI: Gregory Wilson.

2010: Eocene vertebrate fossil collections and prospecting. Willwood Formation, Wyoming. PI: Kenneth D. Rose.

Invited Lectures

2022: Department seminar, The Ohio State University Department of Ecology, Evolution, and Organismal Biology.

2021: "Virt" Paleo Seminar, Harvard Museum of Comparative Zoology.

2020: A. Watson Armour Seminar Series, Field Museum of Natural History.

2019: University of Chicago Evolutionary Morphology Seminar Series (EvMorph).

Educational Outreach

June 2021: Invited scientist, Summer teacher workshop using 3D vertebrates conducted by oVert TCN (NSF DBI-1701714)/University of Florida. Worked with middle and high school teachers to develop in-classroom learning activities based on my research and use of oVert open-access 3D models of vertebrate anatomy.

March 2021: Invited presenter, Field Museum Elementary (K-5) Scientist Chat series; online presentation and Q and A with elementary school students, about small mammal adaptations and being a scientist; <https://www.youtube.com/watch?v=qAOuuKPuyP0>

March 2021: Invited guest, Field Museum Discovery Adventures: “What are the weirdest animals in the world?”; online discussion and Q and A about weird animals in conjunction with virtual exhibit visit; 619 viewers during live broadcast alone; https://youtu.be/9Hi_0oJ23Bs?t=598

October 2020: Invited presenter, Field Museum Meet a Scientist Online (with E.H. Zack); discussion and Q and A about bone functional morphology and mentorship within the museum community; 2,900 views

September 2020: Guest on “A Scientist Walks Into A Bar” podcast with Kate Golembiewski; discussion of bones, vertebrate morphological diversity, and hard tissue functional morphology

September 2020: Invited presenter, Daystar Academy Virtual Field Trip; presentation and Q and A with Chicago second graders about bone morphology, evolution, and function

May 2020: Invited presenter, Field Museum Instagram Live; discussion and Q and A about soricid natural history, biology, and ecology; 480 viewers during live broadcast alone

January 2020: Invited presenter, Field Museum “Field Ambassadors” professional development program in museum- and object-based learning for K-12 educators

October 2018–Present: Mammals educator, Field Museum of Natural History’s Behind the Scenes tours, ID Day, Members’ Night, and Field Associates Young Professionals events

August 2012–2016: Field instructor, Discoveries in Geoscience (DIG) Field School. Hell Creek and Tullock Formations, Montana; digfieldschool.org

November 2012–2018: Mammals educator, Burke Museum of Natural History and Culture’s “Meet the Mammals”, Behind the Scenes, and “Night Life” events

Service

2021: Panelist, NSF Integrative Organismal Systems Physiological Mechanisms and Biomechanics review panel.

References

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