William Gearty

Lerner-Gray Postdoctoral Research Fellow
Richard Gilder Graduate School
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EDUCATION

Ph.D. in Geological Sciences 2014 – 2019
Stanford University, Stanford, CA
Research Advisor: Jonathan Payne
Thesis Title: Physiological Constraints of Aquatic Invasions in Tetrapods

B.S. with Honors in Geology and Geophysics 2010 – 2014
Yale University, New Haven, CT
Research Advisor: Jacques Gauthier
Thesis Title: Resolving the Relationships of the Squamate Tree of Life: An Assessment of New Approaches and Problems

RESEARCH AND WORK EXPERIENCE

Postdoctoral Research Fellow 2022 – present
American Museum of Natural History, New York, NY
Research Advisor: John Flynn

Postdoctoral Research Fellow 2019 – 2022
University of Nebraska-Lincoln, Lincoln, NE
Research Advisors: Kate Lyons and Peter Wagner

Graduate Research Assistant 2014 – 2019
Stanford University, Stanford, CA
Research Advisor: Jonathan Payne

Research Intern 2012
Summer Undergraduate Research in Geoscience and Engineering
Stanford University, Stanford, CA
Research Advisor: Jonathan Payne

Undergraduate Research Assistant 2011 – 2014
Yale University, New Haven, CT
Research Advisors: Jacques Gauthier and Elisabeth Vrba

Student Collections Assistant/Student Researcher 2011 – 2014
Marsh Dinosaur Collection, Fossil Mammals, and Invertebrate Paleontology
Peabody Museum of Natural History, New Haven, CT

PUBLICATIONS AND PRESENTATIONS

*co-first authors ^undergraduate student co-author #graduate student co-author

Peer Reviewed Publications:

11) **Gearty, W.**, Tomé, C.P., Smith, Q.#, Smith, F.A., Shizuka, D., Lyons, S.K. *in prep*. The introduction of large mammals has not remedied the ecological impact of the Late Pleistocene extinctions.
10) **Gearty, W.**, Uricchio, L., Lyons, S.K. *in prep*. Human impacts indirectly drive mammal body size homogenization among communities.
9) Cooke, R.*, **Gearty, W.***, Chapman, A.S.A., Dunic, J.^, Edgar, G.J., Lefcheck, J.S., Rilov, G., McClain, C.R., Stuart-Smith, R.D., Lyons, S.K., and Bates, A.E. 2022. Anthropogenic disruptions to longstanding patterns of trophic-size structure in vertebrates. *Nature Ecology & Evolution*. doi: 10.1038/s41559-022-01726-x.
8) Benson, R.B.J., Godoy, P., Bronzati, M., Butler, R., and **Gearty, W.** 2022. Reconstructed evolutionary patterns for crocodile-line archosaurs demonstrate impact of failure to log-transform body size data. *Communications Biology*, 5, 171. doi: 10.1038/s42003-022-03071-y.
7) Monarrez, P.M., Zimmt, J.B., Clement, A.M., **Gearty, W.**, Jacisin, J.J., Jenkins, K.M., Kusnerik, K.M., Poust, A.W., Robson, S.V., Sclafani, J.A., Stilson, K.T., Tennakoon, S.D., and Thompson, C.M. 2021. Our past creates our present: A brief overview of racism and colonialism in Western paleontology. *Paleobiology*. doi: 10.1017/pab.2021.28.
6) **Gearty, W.**, Carrillo, E.^, and Payne, J.L. 2021. Ecological filtering and exaptation in the evolution of marine snakes. *The American Naturalist*, 198(4), 506-521. doi: 10.1086/716015.
5) Boag, T.H.*, **Gearty, W.***, and Stockey, R.G.* 2021. Metabolic tradeoffs control biodiversity gradients through geological time. *Current Biology*, 31(13), 2906-2913. doi: 10.1016/j.cub.2021.04.021.
4) **Gearty, W.** and Payne, J.L. 2020. Physiological constraints on body size distributions in Crocodyliformes. *Evolution*, 74(2), 245–255. doi: 10.1111/evo.13901.
3) **Gearty, W.**, McClain, C.R., and Payne, J.L. 2018. Energetic tradeoffs control the size distribution of aquatic mammals. *Proceedings of the National Academy of Sciences*, 115(16), 4194-4199. doi: 10.1073/pnas.1712629115.
2) Racicot, R.A., **Gearty, W.**, Kohno, N., and Flynn, J.J. 2016. Comparative anatomy of the bony labyrinth of extant and extinct porpoises (Cetacea: Phocoenidae). *Biological Journal of the Linnean Society*, 119(4), 831-846. doi: 10.1111/bij.12857.
1) Field, D.J., D'Alba, L., Vinther, J., Webb, S., **Gearty, W.**, Shawkey, M.D. 2013. Melanin concentration gradients in modern and fossil feathers. *PLoS ONE* 8(3), e59451. doi: 10.1371/journal.pone.0059451. **[Winner of the G.G. Simpson Prize]**

Invited Presentations:

10) **Gearty, W.** 2022. Body Mass Constraints on Aquatic Invasions in Tetrapods. Pal(a)eoPERCS (Pal(a)eo EaRly Career Seminar).
9) **Gearty, W.** 2021. The Energetics of Biodiversity. University of Nebraska-Lincoln Ecology and Evolutionary Biology Seminar.
8) **Gearty, W.** 2020. Physiological Constraints of Aquatic Invasions in Tetrapods. Southeastern Louisiana University Biological Sciences Seminar.
7) **Gearty, W.** 2020. Physiological Constraints of Aquatic Invasions in Tetrapods. University of Washington Paleolunch Seminar.

6) **Gearty, W.** 2019. Physiological Constraints of Aquatic Invasions in Tetrapods. University of Nebraska-Lincoln Ecology and Evolutionary Biology Seminar.
5) **Gearty, W.** 2019. So, you want to live in the water? A tale of why aquatic mammals are so big. University of California Museum of Paleontology Annual Short Course.
4) **Gearty, W.** 2019. ggplot: Making Publication Quality Figures in R. Stanford Earth SkillShare Series.
3) **Gearty, W.** 2019. Introduction to R. Stanford Earth SkillShare Series.
2) **Gearty, W.** 2018. Energetically driven convergence and other dynamics of the body size evolution of secondarily aquatic vertebrates. University of California Museum of Paleontology Fossil Coffee.
1) **Gearty, W.** 2017. Using CT Data to Score Taxa for Phylogenetic Analyses. iDigBio Workshop on Using Digitized Paleontological Data in Research.

Conference and Workshop Presentations and Posters:

23) **Gearty, W.**, 2022. The complex history of extinction and origination selectivity in Crocodylomorpha. *Journal of Vertebrate Paleontology*, Program and Abstracts, 2022.
22) **Gearty, W.**, 2022. Selective extinction and random origination drove the short-lived nature of large and marine crocodylomorph clades. *Geological Society of America* Abstracts with Programs. Vol 54, No. 6.
21) Lyons, S.K., Tomé, C.P., Freymueller, N.[#], **Gearty, W.**, Keller, J[#], Pardi, M.I., Elliott Smith, E.A., Smith, F.A., Smith, Q.[#], Wagner, P.J. 2022. Changes in small mammal abundance distributions following the loss of large mammal ecosystem engineers at the terminal Pleistocene. 2022. *Geological Society of America* Abstracts with Programs. Vol 54, No. 6.
20) Smith, Q[#], Shizuka, D., Tomé, C.P., **Gearty, W.**, Smith, F.A., Lyons, S.K. 2022. Changes in mammalian networks across the Pleistocene-Holocene transition as a result of the megafaunal extinction. *Geological Society of America* Abstracts with Programs. Vol 54, No. 6.
19) **Gearty, W.**, Carrillo, E.^, and Payne, J.L. 2021. Ecological filtering and exaptation in the evolution of marine snakes. *Geological Society of America* Abstracts with Programs. Vol 53, No. 6.
18) Boag, T.H., **Gearty, W.**, and Stockey, R.G. 2021. Metabolic tradeoffs control biodiversity gradients through geological time. *Geological Society of America* Abstracts with Programs. Vol 53, No. 6.
17) **Gearty, W.** 2020. Body size and habitat extinction selectivity in Crocodyliformes. *Geological Society of America* Abstracts with Programs. Vol 52, No. 6.
16) **Gearty, W.** and Payne, J.L. 2019. Pathways to the marine realm in Serpentes. *Geological Society of America* Abstracts with Programs. Vol. 51, No. 5.
15) Carrillo, E.^, **Gearty, W.**, and Payne, J.L. 2019. Factors that predict reproductive mode in snakes. *Evolution 2019*.
14) Boag, T.**, Gearty, W.**, and Stockey, R. 2019. Exploring the role of ecophysiology and metabolism in governing marine latitudinal biodiversity gradients during past icehouse and greenhouse climates. *11th North American Paleontological Conference* Program with Abstracts. *Paleobios*, 36.
13) **Gearty, W.** and Payne, J.L. 2019. Energetics drives convergent gigantism in marine Crocodyliformes. *11th North American Paleontological Conference* Program with Abstracts. *Paleobios*, 36.

12) **Gearty, W.** 2019. Physiological constraints on body size distributions in Crocodyliformes. *NorCal Paleo Conference.*
11) **Gearty, W.** and Payne, J.L. 2018. Dynamics of the body size evolution of crocodyliformes. *Geological Society of America* Abstracts with Programs. Vol. 50, No. 6.
10) Ormsby, C.^, **Gearty, W.**, and Payne, J.L. 2018. The effect of habitat on diversification rate in snakes. *Geological Society of America* Abstracts with Programs. Vol. 50, No. 6.
9) **Gearty, W.** and Payne, J.L. 2018. Convergent body size evolution of crocodyliformes upon entering the aquatic realm. *Society of Integrative and Comparative Biology 2018*.
8) **Gearty, W.,** McClain, C.R., and Payne, J.L. 2017. Energetics both promote and limit aquatic mammal gigantism. *Geological Society of America* Abstracts with Programs. Vol. 49, No. 6.
7) **Gearty, W.** and Payne, J.L. 2017. Convergent body size evolution of crocodyliformes upon entering the aquatic realm. *Evolution 2017*. **[Honorable mention for Ruth Patrick Student Poster Award]**
6) **Gearty, W.,** McClain, C.R., and Payne, J.L. 2016. The evolution of aquatic mammals toward a nearly universal large size? Evidence from phylogenetics and fossils. *Geological Society of America* Abstracts with Programs. Vol. 48, No. 7.
5) Benjamin, M.^, **Gearty, W.**, Payne, J.L. 2015. Evolution of Larger Body Length during Transitions from Terrestrial to Aquatic Habitats in Snakes (Suborder Serpentes). Stanford Bio-X Interdisciplinary Initiatives Symposium.
4) **Gearty, W.** and Payne, J.L. 2015. Phylogenetic and fossil evidence for a common body size attractor in marine mammals. *Geological Society of America* Abstracts with Programs. Vol. 47, No. 7. **[Honorable mention for GBGM Division Student Awards]**
3) **Gearty, W.** and Gauthier, J. 2014. Resolving the Relationships of the Squamate Tree of Life: An Assessment of New Approaches and Problems. *Journal of Vertebrate Paleontology,* Program and Abstracts, 2014, 136.
2) **Gearty, W.**, D'Alba, L., Vinther, J., Shawkey, M., Field, D. 2013. Melanin concentration gradients in modern and fossil feathers. *Journal of Vertebrate Paleontology*, Program and Abstracts, 2013, 132.
1) **Gearty, W.** and Payne, J.L. 2012. Assessing the completeness of the fossil record using brachiopod Lazarus taxa. Fall Meeting, *American Geophysical Union* San Francisco, Calif., 3-7 Dec. Abstract B11A-0387.

Book Reviews:

Gearty, W. 2020. "Nature's Giants: The Biology and Evolution of the World's Largest Lifeforms by Graeme D. Ruxton". *The Quarterly Review of Biology* 95, no. 2, pg. 141.
Gearty, W. 2019. "The Rise of Marine Mammals by Annalisa Berta". *Fossil News.*
Gearty, W. 2018. "Exploration & Discovery: Treasures of the Yale Peabody Museum of Natural History by David K. Skelly and Thomas J. Near". *The Quarterly Review of Biology* 93, no. 2, pg. 128.
Gearty, W. 2016. "The Worst of Times: How Life on Earth Survived Eighty Million Years of Extinctions by Paul B. Wignall". *The Quarterly Review of Biology* 91, no. 4, pg. 500.

Other Published Writing:

Gearty, W. 2019. "Physiological constraints of aquatic invasions in tetrapods". *Thesis*, Stanford Univ. Dept. of Geological Sciences.

Gearty, W. 2014. "Resolving the relationships of the squamate tree of life: An assessment of new approaches and problems". *Thesis*, Yale Univ. Dept. of Geology and Geophysics.

PUBLISHED SOFTWARE

- **deeptime (R package)**: Tools to help with plotting data over long time intervals. doi: 10.5281/zenodo.2723127. (source: https://github.com/willgearty/deeptime)
- **pcmtools (R package)**: Various tools to help with performing phylogenetic comparative methods and curating/visualizing the results. doi: 10.5281/zenodo.3477539. (source: https://github.com/willgearty/pcmtools)
- **palaeoverse (R package)**: A community-driven toolkit to support palaeobiological analyses (source: https://github.com/palaeoverse-community/palaeoverse)
- **ESP-Website**: A website to help manage the logistics of large short-term educational programs (source: https://github.com/learning-unlimited/ESP-Website)

FELLOWSHIPS AND LARGE GRANTS

Lerner-Gray Postdoctoral Research Fellowship ($64,000/year)	2022-2024
Population Biology Program of Excellence Postdoctoral Fellowship ($45,000/year)	2019 – 2022
ARCS Foundation Scholar Award ($42,400)	2018 – 2019
Richard and Megumi Strathmann Endowed Fellowship, Friday Harbor Labs ($1,600)	2015
Yale College Dean's Research Fellowship in the Sciences ($3,300)	2013
Richter Summer Fellowship for Independent Study or Research ($1,000)	2013
Karen Von Damm '77 Undergraduate Research Fellowship ($2,000)	2013

OTHER GRANTS

UNL Postdoc Travel Grant	2021
NAPC Student Travel Grant	2019
GSA Annual Meeting Student Travel Grant (Cordilleran Section)	2015, 2016, 2018
Jackson School of Geosciences SVP Student Member Travel Grant	2013

HONORS AND AWARDS

Centennial Teaching Assistant Award, Stanford University	2019
Yale Club of New Haven Gregory Yamanaka Ph.D. '76 B.A. Senior Essay Prize	2014
William R. Belknap Prize for Excellence in Geological Studies	2014

TEACHING EXPERIENCE

University of Nebraska-Lincoln:

Phylogenetic Comparative Methods 2020

- Taught seminar course for graduate students on recent developments of methods and their applications

Stanford University:

GS 128/228 – Evolution of Terrestrial Ecosystems — Winter 2017-2018
- Head teaching assistant, revised lab exercises that I co-developed during the previous year, co-taught lab sections

GS 123/223B – Evolution of Marine Ecosystems — Fall 2017-2018
- Developed and taught a new lab curriculum focused on hands-on learning with fossil specimens and statistical programming exercises

GS 128/228 – Evolution of Terrestrial Ecosystems — Winter 2016-2017
- Co-developed and co-taught a new lab curriculum focused on hands-on learning with zoological and paleontological specimens and data analysis exercises

GS 4 – Coevolution of Earth and Life — Autumn 2016-2017, Autumn 2018-2019
- Head teaching assistant and lecturer

GS 123/223 – Paleobiology — Spring 2015-2016
- Teaching assistant, ran lab sections

GS 4 – Coevolution of Earth and Life — Spring 2014-2015, Winter 2015-2016
- Teaching assistant and lecturer

MENTORING EXPERIENCE

Elizabeth Millsap, Undergraduate Student (University of Nebraska-Lincoln)	2020 – 2022
Niza Contreras, Undergraduate Student (Stanford University)	2018 – 2020
Christianne Ormsby, Undergraduate Student (San Diego State University)	2018
Elsie Carrillo, Middle School Teacher (San Jose, CA)	2018
Adam Kazerounian, High School Student (Danville, CA)	2017
Margaret Deng, Undergraduate Student (University of California, San Diego)	2016
Alexander Ivanov, High School Student (Palo Alto, CA)	2016
Matthew Benjamin, Undergraduate Student (Stanford University)	2015 – 2016

PROFESSIONAL DEVELOPMENT

Advancing Learning Through Evidence-Based STEM Teaching	2022
Inclusive STEM Teaching Project	2021
Transforming Your Research Into Teaching, UNL/CIRTL	2021
NextProf Science, University of Michigan LSA	2021
Writing Winning Grant Proposals (UNL and Grant Writers' Seminars & Workshops)	2021
Pedagogy and Technology in the Modern Paleontology Classroom (Paleontological Society Short Course)	2018
Preparing Future Professors, Stanford University VPGE	2017 – 2018

SERVICE AND OUTREACH

Social Media Coordinator, Paleontological Society	2021 – Present
Web Team Lead, Learning Unlimited Inc.	2018 – Present
Volunteer, Geokids Program	2016 – 2019
Field Trip Leader, Summer Undergraduate Research in Geoscience and Engineering	2016
President, Graduate Students Advisory Committee	2016 – 2018

Co-Director, Stanford Splash	2016
Geological Sciences Representative, Graduate Students Advisory Committee	2015 – 2018
Technology and Web Chair, Stanford Splash	2015 – 2019
New Graduate Student Orientation Coordinator, Geological Sciences Dep't	2015 – 2017
Social Events Coordinator, Stanford School of Earth, Energy, and Env. Sciences	2014 – 2018
Communications Chair, Stanford Splash	2014 – 2018
Volunteer Teacher of Evolution and Geology, Splash @ Yale/Stanford Splash	2013 – 2019
Beat Reporter, Yale Scientific Magazine	2012 – 2014
President, Club Geo, Yale University	2012 – 2013
"Meet the Scientist" Paleontology Educator, Yale Peabody Museum	2012 – 2013
Science and Math Tutor and Science Fair Tutor and Judge, New Haven Public Schools	2011 – 2012

PEER REVIEW EXPERIENCE

Biology Letters
Cambridge Elements
Current Biology
Evolution
Global Ecology and Biogeography
Nature Communications
Nature Ecology & Evolution
Proceedings of the Royal Society B: Biological Sciences
Science Advances
Systematic Biology
The American Naturalist
The R Journal

SKILLS

- Programming, data analysis, data visualization
  - R and Python (advanced)
  - SAS, C/C++, and Fortran (proficient)
- Phylogenetic and cladistic analysis, systematics, phylogenetic comparative methods
- Paleobiology, macroecology, historical geology, comparative biology
- Fossil preparation, conservation, and preservation in the field and the lab
- CT Scan analysis (fossil and modern specimens) using VG Studio MAX
- Computer processing (Microsoft Office, etc.), audio/video editing, Adobe Photoshop

MEMBERSHIPS

Society of Vertebrate Paleontology	2022 – Present
American Society of Naturalists	2017 – Present
Society of Systematic Biologists	2014 – Present
Society for the Study of Evolution	2014 – Present
The Paleontological Society	2011 – Present
Geological Society of America	2011 – Present

CAREER GOALS

- Professor of paleobiology, evolutionary biology, macroecology, or related field
- Continued research, teaching, and outreach
- Advisement of graduate and undergraduate students