Rachel M. Keeffe, PhD

Personal Information

Biology Department
Trinity College
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LinkedIn Profile

Education & Training

Mount Holyoke College, South Hadley, MA — 2022 - 2025
Postdoctoral Research Fellow – PI: Patricia Brennan

University of Florida, Gainesville, FL — 2017 – 2022
PhD, Zoology – Advisor: David C. Blackburn

University of Massachusetts, Amherst, MA — 2013 – 2017
BS, Biology – Minor, Studio Art

Employment

Assistant Professor, Trinity College (Hartford, CT) — 2025 - present

Teaching Assistant, University of Florida (Gainesville, FL) — 2018 – 2021

NSF REU Intern, Clemson University (Clemson, SC) — 2016

NSF REU Intern, Oregon State University (Corvallis, OR) — 2015

Intern, Dept. of Conservation & Recreation (West Boylston, MA) — 2015

Summer Camp Councilor, Mass Audubon Society (Princeton, MA) — 2014

Substitute Teacher, Houghton Elementary School (Sterling, MA) — 2013 – 2016

Intern, Museum of Science (Boston, MA) — 2011

Awards & Grants (~$112,299)

1. Charlotte Mangum Student Support Program ($150) — 2021
2. FLMNH Fall 2021 Travel Award ($1,000) — 2021
3. Carl Gans Travel Award ($1,780) — 2019
4. Brian Riewald Memorial Fund Research Grant ($300) — 2019
5. Carl Gans Travel Award ($1,380) — 2018
6. Graduate Research Fellowship at the University of Florida — 2017
7. NSF Graduate Research Fellowship Program ($102,000) — 2017
8. Outstanding Student in Biology Award: UMass Amherst — 2017
9. UMASS Natural History Collections Summer Research Scholarship ($2,975) — 2017
10. Rocky Mountain Biological Laboratory Travel Grant ($1,000) — 2016
11. Dean's List Honors at UMass Amherst — 2014 – 2017
12. John and Abigail Adams Scholarship ($1,714) — 2014 – 2017

Teaching Experience

Vertebrate Anatomy Mount Holyoke College — 2022 – 2025
Lecture and Laboratory, 4 credits
2024 – Present: Primary Instructor
2022 – 2023: Co-taught with Dr. Brennan

Herpetology University of Florida — 2019
Laboratory TA, 4 credits
Course led by Drs. David Blackburn and Harvey Lillywhite

Vertebrate Biodiversity University of Florida — 2018 & 2020

Laboratory TA, 4 credits
Course led by Dr. Nicole Gerlach

Publications

1. **Keeffe RM**, Hedrick B, Bartoszek I, Easterling I, Brennan PLR (2025) Morphological Variation in the Genitalia of the Burmese Python. *Journal of Morphology* 286:e70045 — 2025
2. Fernandes CC, **Keeffe RM**, Pinilla CE (2024) *Microsternarchus schonmanni*, a new species of weakly electric fish (Gymnotiformes: Hypopomidae, Microsternarchini) from the Mamoré-Guaporé River Basin, Brazil. *Proceedings of the Academy of Natural Sciences of Philadelphia* 168: 237-249. — 2024
3. **Keeffe RM**, Brennan PLR (2023) Vaginas. *Current Biology*, 33(12), R670-R674. — 2023
4. Osorno-Muñoz M, Gutiérrez-Lamus, DL, Lynch J, **Keeffe RM**, Caicedo-Portilla JR, Chan KN, Tonini JFR. De Sá RO (2023) Three new species of the *Synapturanus rabus* complex (Microhylidae: Otophryninae) in Colombia with a review of the genus *Synapturanus*. *Zootaxa*, 5258(2), 151-196. — 2023
5. **Keeffe RM**, Blob RW, Blackburn DC, Mayerl CJ (2022) XROMM analysis of feeding mechanics in toads: interactions of the tongue, hyoid, and pectoral girdle. *Integrative Organismal Biology*, obac045. — 2022
6. **Keeffe RM**, Blackburn DC (2022) Diversity and function of the fused anuran radioulna. *Journal of Anatomy*, 241(4), 1026-1038. — 2022
7. Paluh DJ, Riddell K, Early CM, Hantak MM, Jongsma GF, **Keeffe RM**, Silva FM, Nielsen SV, Vallejo-Pareja MC, Stanley EL, Blackburn DC (2021) Rampant tooth loss across 200 million years of frog evolution. *eLife*, 10:e66926. — 2021
8. **Keeffe RM** & Blackburn DC (2020) Comparative morphology of the humerus in forward-burrowing frogs. *Biological Journal of the Linnean Society*, 131(2), 291-303. — 2020
9. Blackburn DC, **Keeffe RM**, Vallejo-Pareja MC, Vélez-Juarbe J (2020) The earliest record of Caribbean frogs: a fossil coquí from Puerto Rico. *Biology Letters*, 16(4), 20190947. — 2020
10. Bemis K, **Keeffe RM** (2019) *Pantherophis alleghaniensis* (Eastern Ratsnake) hunting *Archilochus colubris* (Ruby-throated Hummingbird) at a hummingbird feeder in James City County, Virginia, USA. *Herpetological Review*. — 2019
11. Matthews T, **Keeffe RM**, Blackburn DC (2019) An identification guide to fossil frog assemblages of southern Africa based on ilia of extant taxa. *Zoologischer Anzeiger*, 283, 46-57. — 2019
12. Blob R, Lagarde R, Diamond K, **Keeffe RM**, Bertram R, Ponton D, Shoenfuss H (2019) Functional diversity of evolutionary novelties: Insights from waterfall-climbing kinematics and — 2019

performance of juvenile gobiid fishes. *Integrative Organismal Biology*, 1(1), obz029.

13. Spoelhof J, **Keeffe RM**, McDaniel S (2019) Does reproductive assurance explain the incidence of polyploidy in plants and animals? *New Phytologist*, 227(1), 14-21. 2019

14. **Keeffe RM**, Hilton EJ, Thome-Souza M, Fernandes CC (2019) Cranial morphology and osteology of the sexually dimorphic electric fish, *Compsaraia samueli* Albert Crampton (Apteronotidae, Gymnotiformes), with comparisons to *C. compsa* (Mago-Leccia). *Zootaxa*, 4555(1), 101-112. 2019

Books

1. Forward JS, **Keeffe RM**, McLaurin V (2019) *The Anthropology of Dragons: A Global Perspective*. Austin, TX: Sentia Publishing. 2019

Art Commissions

1. Brennan P (2024) Anatomical figure; In: Clark CJ, Brennan PLR (2024) Observations on the bill-drumming display of Ruddy Duck (*Oxyura jamaicensis*), *The Wilson Journal of Ornithology*. 2023
2. Blackburn DC (2023) *Herpele squalostoma* illustration.
3. Smith-Vaniz WF (2019-2022) Jawfish cranial and infraorbital inkings; In: Smith-Vaniz WF (2023) Review of Indo-West Pacific jawfishes (*Opistognathus*: Opistognathidae), with descriptions of 18 new species. Zootaxa, 5252(1), 1-180. 2023
4. Lillywhite H (2019) Anatomical figures; In: *How Snakes Work: Structure, Function, and Behavior of the World's Snakes*. 2019
5. Ziegler M (2019) Montbrook fossil site landscape illustration; 2019 Thesis, University of Florida. 2019

Invited Speaker

Smithsonian Seminar Series (Washington, D.C.) 2025
Hidden Forms Most Beautiful: Understanding the Evolution of Cryptic Features of Vertebrate Animals through Biomechanics and Morphology

Holy Cross Biology Dept. Seminar Series (Worcester, MA) 2024
Snake Genitalia: Evolutionary Morphology and Mechanics

USD Biology Dept. Graduate Seminar Series (Vermillion, SD)
Snake Genitalia: Evolutionary Morphology and Mechanics

UMASS Department of Organismal & Evolutionary Biology Seminar (Amherst, MA) 2022
XROMM Analysis of Feeding Mechanics in Anurans: Interactions of the Tongue, Hyoid Apparatus, and Pectoral Girdle

Conference Presentations

SICB Northeast Regional Meeting (Cambridge, MA) 2024
Morphological Variation in the Genitalia of the Burmese Python, *Python bivittatus*

3rd Joint Congress on Evolutionary Biology (Montreal, QC) 2024
Evolutionary Morphology of Snake Hemipene Spines Informed by Puncture Mechanics

Joint Meeting of Ichthyologists & Herpetologists (Pittsburgh, PA) 2024

Evolutionary Morphology of Snake Hemipene Spines Informed by Puncture Mechanics

Society for the Study of Amphibians & Reptiles (Ann Arbor, MI) 2024
Evolutionary Morphology of Snake Hemipene Spines Informed by Puncture Mechanics

Society for Integrative & Comparative Biology (Seattle, WA) 2024
Evolutionary Morphology of Snake Hemipene Spines Informed by Puncture Mechanics

SICB Northeast Regional Meeting (Medford, MA) 2023
Evolutionary Morphology of Snake Hemipene Spines Informed by Puncture Mechanics

International Congress of Vertebrate Morphology (Cairns, AUS) 2023
Shape Differences in the Hemipenes of Rattlesnakes in a Hybrid Zone

Joint Meeting of Ichthyologists & Herpetologists (Norfolk, VA) 2023
Female and Male Genital Shape of Invasive Burmese Pythons in the Florida Everglades

Society for Integrative & Comparative Biology (Phoenix, AZ) 2023
Shape Differences in the Hemipenes of Rattlesnakes in a Hybrid Zone

Society for Integrative & Comparative Biology (Phoenix, AZ) 2022
XROMM Analysis of Feeding Mechanics in Anurans: Interactions of the Tongue, Hyoid Apparatus, and Pectoral Girdle

Joint Meeting of Ichthyologists & Herpetologists (Spokane, WA) 2022
Finite Element Modelling of Limb Bone Fusion in Anurans

Joint Meeting of Ichthyologists & Herpetologists (Phoenix, AZ) 2021
XROMM Analysis of Feeding Mechanics in Anurans: Interactions of the Tongue, Hyoid Apparatus, and Pectoral Girdle

oVert Teacher's Workshop (Gainesville, FL) 2021
Working with Live Animals: An XROMM Example

UF ZOO 6927 PopBio Seminar Series 2019
Does Reproductive Assurance Explain the Incidence of Polyploidy in Plants and Animals?

International Congress of Vertebrate Morphology (Prague, CZ) 2019
Characterizing Forward-Burrowing Frogs with Pectoral Girdle and Humerus Morphology

oVert Teacher's Workshop (Gainesville, FL) 2019
Using CT Data in the Classroom

Society for Integrative & Comparative Biology (Tampa, FL) 2019
Characterizing Forward-Burrowing Frogs with Pectoral Girdle and Humerus Morphology

Joint Meeting of Ichthyologists & Herpetologists (Rochester, NY) 2018

	Characterizing Forward-Burrowing Frogs with Pectoral Girdle and Humerus Morphology	
	41st Annual Herpetology Conference (Gainesville, FL) Characterizing Forward-Burrowing Frogs with Pectoral Girdle and Humerus Morphology	2018
	Joint Meeting of Ichthyologists & Herpetologists (Austin, TX) Sexual Dimorphism in the Amazonian Electric Knifefish *Compsaraia samueli*	2017
	Society for Integrative & Comparative Biology (New Orleans, LA) Comparative Waterfall Climbing Kinematics of Goby Fishes from Hawai'i and Réunion: Are Recently Evolved Behaviors Less Variable?	2017
Undergraduate Mentees	**Mount Holyoke College Independent Research Students**: Catherine Paredes Amaya, Grace Thompson, Sonia Ramanathan, Summer Sit, Autumn Lee, Jennifer Garcia-Israel, Arin Rinvelt, Ella Barton, Alice Kris, Maeesha Tansmin, Jaime Myong, Valeria Serna-Solis, Aida Anaglo, Joanita Young, Emma Juvan, Moss Beeler, Maddie Machado	2022 - Present
	University of Florida: Amber Singh	2017 – 2022
Memberships	**Member** of the American Society of Ichthyologists & Herpetologists	
	Member of the Society for the Study of Amphibians and Reptiles	
	Member of the Society for the Study of Evolution	
	Member of the Society for Integrative & Comparative Biology	
Professional Service	**Board of Governors** for the American Society of Ichthyologists & Herpetologists, Class of 2026	2022 - Present
	Peer reviewer for *Herpetological Conservation Biology*	*since* 2024
	Peer reviewer for *Proceedings of the Royal Society B*	*since* 2024
	Peer reviewer for *Evolution and Development*	*since* 2024
	Peer reviewer for *Paleobiology*	*since* 2023
	Peer reviewer for *Zoology*	*since* 2023
	Peer reviewer for *Journal of Experimental Biology Part A*	*since* 2022
	Peer reviewer for *Journal of Morphology*	*since* 2021
	Peer reviewer for *Biological Journal of the Linnean Society*	*since* 2020
	Peer reviewer for *Integrative Organismal Biology*	*since* 2019
Volunteer Experience	**Docent**: Florida Museum of Natural History (Gainesville, FL) • Interpreted and taught visitors about Florida natural history • Integrated personal research and classwork into education	2018
	Nature Camp Counselor: Mass Audubon Wachusett Meadow Wildlife Sanctuary (Princeton, MA) • Educated campers about diversity of New England wildlife	2013
	Docent: Museum of Science (Boston MA)	2010 – 2013

- Interpreted and taught visitors about the museum
- Fostered a public interest in science and technology

Public Outreach

Volunteer Educator: Quashnet School STEAM Night (Mashpee, MA) — 2025
- Engaged (~300) elementary students and their families with live snakes and discussion of snake science

Invited Speaker: Quashnet School "Creature Club" Science Outreach (Mashpee, MA) — 2023 – 2024
- Taught third through sixth grade students at Quashnet School about the nature of science and experiments

Invited Speaker: Wachusett Regional School District Science Outreach (Sterling, MA) — 2020 – 2023
- Taught second grade classrooms at Houghton Elementary School about the nature of science and experiments

Invited Speaker: Shutesbury School District Science Outreach (Shutesbury, MA) — 2022 - Present
- Taught first through fifth grade classrooms at Shutesbury Elementary School about the nature of science and experiments

Invited Speaker: Scientist in Every Florida School (Gainesville, FL) — 2020 - Present
- Taught elementary-grade classrooms at Big Cypress Elementary School and Pine Island Elementary about the nature of science and experiments

Invited Panelist: Smithsonian Museum of Natural History's Deep Sea Animal Adaptations Summer Explorations (Washington DC) — 2020
- Guided (~450) campers virtually through how to create a scientific illustration

Volunteer Educator: Littlewood Elementary Science Night (Gainesville, FL) — 2018 – 2019

Volunteer Docent at the Florida Museum of Natural History Outreach Events (Gainesville, FL) — 2017 – 2019
- Battle of the Beasts: Crocs vs. Gators — 2019
- Crocodilian Exhibit Opening — 2019
- Ask a Scientist: Salamanders — 2019
- An Epoch Night at the Museum — 2019
- Ask a Scientist: Salamanders — 2018
- Can you Dig It? — 2018
- Drink with the Extinct — 2017
- 100th Anniversary Event — 2017

In the Media

Guest Speaker: AmphibiCast Podcast, Episode 125 — 2023

Science Respondent: KQED Deep Look Frog Feeding Video — 2023

	Publication highlighted: NSF Research News	2022
	Science Respondent: Florida Museum Research News	2022
	Publication highlighted: Mount Holyoke News	2022
	Science Respondent: NewScientist	2020
	Science Respondent: Florida Museum Research News	2020
	Science Respondent: Popular Science	2020
	Science Respondent: UF News *Game of Thrones* "dragon science"	2019
	Science Respondent: Sketchfab Science Spotlight	2019

Technical Skills

1. Coding – R, Python, HTML
2. Data analysis software – Excel, ImageJ
3. Ancestral State Reconstruction – RevBayes
4. Word processing software – Microsoft Word
5. µCT Scanning – Nano-CT-GE V|TOME|X M 240 & Bruker Skyscan 1276 uCT
6. Laser Scanning – Einscan and Space Spider 3D Scanners
7. 3D modeling software – 3D Slicer, VGSTUDIO MAX, Meshlab, Meshmixer, Blender
8. Leveraging online repositories such as MorphoSource, Sketchfab, Github
9. Biomechanics software – MAYA, XMALab, FEBio
10. Biomechanics hardware – Instron
11. Image processing software – Adobe Illustrator, Photoshop
12. Envisioning and rendering scientific illustrations in traditional and digital formats
13. Visualizing, rendering, and 3D-printing anatomical structures
14. Conceiving, drafting, and executing IACUC protocols
15. Experience in providing husbandry for reptiles and amphibians for over 15 years
16. Conducting aseptic surgery and anesthesia on amphibians
17. Performing Microfil® perfusion experiments on snakes
18. Dissection of vertebrate animals, preparation of museum specimens