

# ARMITA RAZIEH MANAFZADEH

*Ar-MEE-tuh Rah-zee-EH Man-off-ZAH-deh*

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## EDUCATION

In progress PhD, Ecology and Evolutionary Biology, Brown University      Advisor: Stephen Gatesy  
2019 ScM, Ecology and Evolutionary Biology, Brown University  
2016 BA, Integrative Biology, University of California, Berkeley

## HONORS AND AWARDS

2020, 2021 [Mimi A. R. Koehl and Steven Wainwright Award](#) Finalist, Society for Integrative and Comp. Biol.  
2019 [Winifred Goldring Award](#), Association for Women Geoscientists and Paleontological Society  
2016-2022 [Presidential Fellowship](#), Brown University  
2016-2021 [Graduate Research Fellowship](#), National Science Foundation  
2016 [Award in Natural History](#) (formerly the Joseph LeConte Award), UC Berkeley  
2016 [High Distinction in General Scholarship](#) and [Highest Honors in Integrative Biology](#), UC Berkeley  
2012-2016 [College of Letters and Science Dean's Honors](#), UC Berkeley

## PEER-REVIEWED PUBLICATIONS

[Google Scholar](#): 65 citations; h-index = 3; i10-index = 2      \* denotes equal contribution; § denotes mentee

- Manafzadeh AR**, Kambic RE, Gatesy SM. 2021. A new role for joint mobility in reconstructing vertebrate locomotor evolution. *Proceedings of the National Academy of Sciences*, 118:e2023513118.
- Manafzadeh AR**. A practical guide to measuring *ex vivo* joint mobility using XROMM. 2020. [Integrative Organismal Biology](#), obaa041.
- Manafzadeh AR**, Gatesy SM. 2020. A coordinate-system-independent method for comparing joint rotational mobilities. *Journal of Experimental Biology*, jeb.227108.
- Laurence-Chasen JD, **Manafzadeh AR**, Hatsopoulos NG, Ross CF, Arce-McShane FI. 2020. Integrating XMALab and DeepLabCut for high-throughput XROMM. *Journal of Experimental Biology*, jeb.226720.
- Weller HI, Olsen AM, Camp AL, **Manafzadeh AR**, Hernandez LP, Brainerd EL. 2020. An XROMM study of food transport and swallowing in the channel catfish. *Integrative Organismal Biology*, obaa018.
- Bhullar B-AS\*, **Manafzadeh AR\***, Miyamae JA, Hoffman EA, Brainerd EL, Musinsky C, Crompton AW. 2020. Reply to: Jaw roll and jaw yaw in early mammals. *Nature*, 582:E9-E12.
- Tsai HP, Turner ML, **Manafzadeh AR**, Gatesy SM. 2020. Contrast-enhanced XROMM reveals *in vivo* soft tissue interactions in the hip of *Alligator mississippiensis*. *Journal of Anatomy*, 236:288-304.
- van Meer NMME§, Weller HI, **Manafzadeh AR**, Kaczmarek EB, Scott B, Gussekloo SWS, Wilga CD, Brainerd EL, Camp AL. 2019. Intra-oropharyngeal food transport and swallowing in white-spotted bamboo sharks. *Journal of Experimental Biology*, 222:jeb201426.
- Bhullar B-AS\*, **Manafzadeh AR\***, Miyamae JA, Hoffman EA, Brainerd EL, Musinsky C, Crompton AW. 2019. Rolling of the jaw is essential for mammalian chewing and tribosphenic molar function. *Nature*, 566:528-532.
- Manafzadeh AR**, Padian K. 2018. ROM mapping of ligamentous constraints on avian hip mobility: implications for extinct ornithodirans. *Proceedings of the Royal Society B*, 285:1879.

## GRANTS

2020	<a href="#">Jackson School of Geosciences Travel Grant</a> , Society of Vertebrate Paleontology	<i>Declined.</i>
2020	<a href="#">Doris O. and Samuel P. Welles Research Fund Grant</a> , UC Museum of Paleontology	<i>Declined.</i>
2019	<a href="#">Steven Cohen Award for Student Research</a> , Society of Vertebrate Paleontology	\$3,000
2019	<a href="#">Grant-in-Aid of Research</a> , Sigma Xi Scientific Honors Society	\$993
2019	<a href="#">Doris O. and Samuel P. Welles Research Fund Grant</a> , UC Museum of Paleontology	\$743
2019	Dissertation Enhancement Grant, Bushnell Graduate Research and Education Fund	\$12,343
2017	<a href="#">Grant-in-Aid of Research</a> , Sigma Xi Scientific Honors Society	\$371
2015	<a href="#">Academic Opportunity Fund Award</a> , Associated Students of the University of California	\$250
2014	<a href="#">Research Experience for Undergraduates Scholarship</a> , National Science Foundation	\$6,250
2012	<a href="#">Exemplary Student Research Program Grant</a> , Argonne National Laboratory	\$1,500

## INVITED TALKS

### Research Talks

2021	Bangor University, Behaviour, Ecology, and Physiology Seminar Series [ <i>Upcoming.</i> ]
2021	Burke Museum of Natural History and Culture, Paleo Lunch Seminar
2020	Royal Veterinary College, Structure and Motion Lab
2020	California State University Fresno, Department of Biology,
2020	Harvard Museum of Comparative Zoology, ‘Virt’ Paleo Seminar Series
2020	University of Calgary, Comparative Biomechanics Discussion Group
2020	University of Akron, Astley Lab
2020	University of Chicago, Ross Lab (‘Mandible Meeting’)
2020	University of Missouri, Holliday Lab
2015, 2019-2020	UC Museum of Paleontology, Seminar in Paleontology
2016, 2019-2020	Brown University, Department of Ecology and Evolutionary Biology ‘Brown Bag’ Seminar
2016-2017	UC Museum of Paleontology, Seminar in Vertebrate Evolution and Paleontology

### Public Talks

2020	Nerd Nite, Providence, RI
2019	PaleoFest, Burpee Museum of Natural History

## CONFERENCE PRESENTATIONS

§denotes mentee

- Manafzadeh AR**, Gatesy SM. 2021. All six degrees of freedom are essential to reconstructions of articular function. Society for Integrative and Comparative Biology 2021 Annual Meeting (Virtual): [Abstract BSP-2-8](#). (Mimi A. R. Koehl and Steven Wainwright Award Session Finalist.)
- Manafzadeh AR**, Gatesy SM. 2021. A coordinate-system-independent method for comparing joint rotational mobilities. Society for Integrative and Comparative Biology 2021 Annual Meeting (Virtual): [Abstract P33-6](#).
- Herbst EC, Eberhard E, **Manafzadeh AR**, Richards C, Hutchinson JR. 2021. New methods support the possibility of a salamander-like walk in the Permian tetrapod *Eryops*. Society for Integrative and Comparative Biology 2021 Annual Meeting (Virtual): [Abstract BSP-11-4](#). (D. Dwight Davis Award Session Winner.)

- Laurence-Chasen JD, **Manafzadeh AR**, Hatsopoulos NG, Ross CF, Arce-McShane FI. 2021. XROMM Tools for DeepLabCut: Bringing deep learning to XROMM marker tracking. Society for Integrative and Comparative Biology 2021 Annual Meeting (Virtual): [Abstract P33-7](#).
- Herbst EC, Eberhard E, **Manafzadeh AR**, Richards C, Hutchinson JR. 2020. Was the early tetrapod *Eryops* capable of a salamander-like walk? Developing new methods to test paleontological hypotheses about posture and gait. 18<sup>th</sup> Swiss Geoscience Meeting (Virtual). (Swiss Commission of Palaeontology Prize Winner.)
- Manafzadeh AR**, Gatesy SM. 2020. From bones to mobility to locomotion: reconstructing hindlimb poses in extant archosaurs. Society of Vertebrate Paleontology, 80<sup>th</sup> Annual Meeting (Virtual), [Meeting Program and Abstracts, p. 181](#).
- Bhullar B-AS, **Manafzadeh AR**, Miyamae JA, Hoffman EA, Brainerd EL, Musinsky C, Crompton AW. 2020. Mammalian chewing depends on rolling of the jaw and deep conservation of tooth form and function. Society of Vertebrate Paleontology, 80<sup>th</sup> Annual Meeting (Virtual), [Meeting Program and Abstracts, p. 23](#).
- Manafzadeh AR**, Kambic RE, Gatesy SM. 2020. How informative is joint mobility? A 3-D analysis of potential versus realized joint poses in archosaurs. Society for Integrative and Comparative Biology 2020 Annual Meeting: [Abstract 14-1](#). (Mimi A. R. Koehl and Steven Wainwright Award Session Finalist.)
- Bhullar B-AS, **Manafzadeh AR**, Miyamae JA, Hoffman EA, Brainerd EL, Musinsky C, Crompton AW. 2020. The origin of chewing in mammals required rolling of the jaw and involved broad continuity in molar form and function. Society for Integrative and Comparative Biology 2020 Annual Meeting: [Abstract S3-9](#).
- Manafzadeh AR**, Gatesy SM. 2019. What assumptions do paleontologists make about how joints work (and how can we test them)? Northeast Regional Meeting of the Society for Integrative and Comparative Biology, Divisions of Vertebrate Morphology and Comparative Biomechanics.
- Manafzadeh AR**, Kambic RE, Gatesy SM. 2019. How informative is joint mobility? A 3-D analysis of potential versus realized joint poses in archosaurs. The 12<sup>th</sup> International Congress of Vertebrate Morphology, Prague: [Abstract S172](#).
- Tsai HP, Turner ML, **Manafzadeh AR**, Gatesy SM. 2019. Contrast-enhanced XROMM reveals *in vivo* soft tissue interactions in the hip of *Alligator mississippiensis*. The 12<sup>th</sup> International Congress of Vertebrate Morphology, Prague: [Abstract S230](#).
- Weller HI, Olsen AM, Camp AL, Hernandez LP, **Manafzadeh AR**, Brainerd EL. 2019. 3-D intra-oral prey trajectories indicate distinct phases in how channel catfish (*Ictalurus punctatus*, Siluriformes: Ictaluridae) swallow food. The 12<sup>th</sup> International Congress of Vertebrate Morphology, Prague: [Abstract S237](#).
- Weller HI, **Manafzadeh AR**, Olsen AM, Hernandez LP, Camp AL, Brainerd EL. 2019. An XROMM study of intra-oral transport and swallowing in catfish. Society for Integrative and Comparative Biology 2019 Annual Meeting: [Abstract 17-8](#).
- van Meer NMME,<sup>§</sup> Weller HI, **Manafzadeh AR**, Kaczmarek EB, Scott B, Gussekloo SWS, Wilga CD, Brainerd EL, Camp AL. 2019. Food capture, transport, and swallowing in white-spotted bamboo sharks (*Chiloscyllium plagiosum*). Society for Integrative and Comparative Biology 2019 Annual Meeting: [Abstract 129-3](#).
- Manafzadeh AR**, Padian K. 2018. Could pterosaurs and basal maniraptorans adopt a batlike hip pose? An analysis using “ROM Mapping,” a new method for comparing joint mobilities. Society of Vertebrate Paleontology, 78<sup>th</sup> Annual Meeting, Albuquerque, New Mexico, [Meeting Program and Abstracts, p. 175](#).
- Tsai HP, Turner ML, **Manafzadeh AR**, Gatesy SM. 2018. Contrast-enhanced XROMM reveals *in vivo* soft tissue interactions in the hip of *Alligator mississippiensis*: implications for Pseudosuchia. Society of Vertebrate Paleontology, 78<sup>th</sup> Annual Meeting, Albuquerque, New Mexico, [Meeting Program and Abstracts, p. 229](#).
- Tsai HP, Turner ML, **Manafzadeh AR**, Gatesy SM. 2018. Contrast-enhanced XROMM reveals *in vivo* soft tissue interactions in the hip of *Alligator mississippiensis*: implications for Archosauria. Midwest Regional

Meeting of the Society for Integrative and Comparative Biology, Divisions of Vertebrate Morphology and Comparative Biomechanics.

- Manafzadeh AR**, Gatesy, SM. 2018. How informative is joint mobility? A 3-D analysis of potential versus actualized joint poses. Northeast Regional Meeting of the Society for Integrative and Comparative Biology, Divisions of Vertebrate Morphology and Comparative Biomechanics.
- Manafzadeh AR**. 2018. Post-hatching development of hind limb articular morphology in the common quail. Society for Integrative and Comparative Biology 2018 Annual Meeting: [Abstract P3-177](#).
- Napoli JG,<sup>§</sup>, Tsai HP, Turner ML, **Manafzadeh AR**, Gatesy SM. 2018. In- and ex vivo analysis of the kinematics and function of the tendon of Sutton in *Alligator mississippiensis*. Society for Integrative and Comparative Biology 2018 Annual Meeting: [Abstract P2-228](#).
- Tsai HP, Turner ML, **Manafzadeh AR**, Gatesy SM. 2018. Significance of hip kinematics for interpreting articular soft tissue function in *Alligator mississippiensis*. Society for Integrative and Comparative Biology 2018 Annual Meeting: [Abstract P2-227](#).
- Tsai HP, Turner ML, **Manafzadeh AR**, Gatesy SM. 2017. Significance of hip kinematics for interpreting articular soft tissue function in *Alligator mississippiensis*: evolutionary and biomechanical implications for Saurischia. Last Days of Pangea Triassic-Jurassic Research Symposium.
- Manafzadeh AR**, Padian K. 2016. Could pterosaurs adopt a batlike hindlimb pose?: Ground-truthing ligamentous limits on ornithodiran hip mobility. Northeast Regional Meeting of the Society for Integrative and Comparative Biology, Divisions of Vertebrate Morphology and Comparative Biomechanics.
- Tsai HP, Turner ML, **Manafzadeh AR**, Gatesy SM. 2016. Hip joint kinematics of *Alligator mississippiensis*: Significance of articular soft tissues for interpreting hindlimb function. Northeast Regional Meeting of the Society for Integrative and Comparative Biology, Divisions of Vertebrate Morphology and Comparative Biomechanics.
- Manafzadeh AR**, Padian K. 2016. Could pterosaurs adopt a batlike wing pose?: Implications of a functional analysis of the avian hip ligaments for the evolution of ornithodiran stance and gait. Society of Vertebrate Paleontology, 76<sup>th</sup> Annual Meeting, Salt Lake City, Utah, [Meeting Program and Abstracts, p. 182](#).
- Manafzadeh AR**, Holroyd PA, Rankin BD. 2016. Modeling fragmentary jaws as beams to test hypotheses of differing diets. [The 11<sup>th</sup> International Congress of Vertebrate Morphology](#), Washington, D. C.
- Padian K, Cunningham JR, Langston WA, Conway J, **Manafzadeh AR**. 2016. How the largest known flying animal, the pterosaur *Quetzalcoatlus*, walked on land. [The 11<sup>th</sup> International Congress of Vertebrate Morphology](#), Washington, D. C.
- Manafzadeh AR**, Holroyd PA, Rankin BD. 2016. Using the geometric properties of jaws to constrain dietary reconstructions of phylogenetically ambiguous taxa. Society for Integrative and Comparative Biology 2016 Annual Meeting: [Abstract P2-168](#).
- Manafzadeh AR**, Holroyd PA, Rankin BD. 2015. Using the geometric properties of jaws to constrain dietary reconstructions of Eocene faunivores. Society of Vertebrate Paleontology, 75<sup>th</sup> Annual Meeting, Dallas, Texas, [Meeting Program and Abstracts, p. 173](#).
- Manafzadeh AR**, Angielczyk KD. 2015. Morphological integration in the mandibles of living reptiles and fossil synapsids. Society for Integrative and Comparative Biology 2015 Annual Meeting: [Abstract 2.4](#).
- Manafzadeh AR**, Angielczyk KD. 2014. Morphological integration in the mandibles of living reptiles and fossil synapsids. 6th Annual Chicagoland Undergraduate Research Symposium Abstract Volume: p. 7.
- Venkatesan N, Tae K, **Manafzadeh AR**, Choudhary T, Zhao KT, Noblett T, Dera P. 2012. Effect of chemical treatment on the structure of graphene. Argonne National Laboratory Advanced Photon Source Users Meeting, [Program & Abstracts Volume: p. 97](#).

## TEACHING AND MENTORSHIP

### Certificates

- 2020 [Graduate Certificate in Teaching Consulting](#), Sheridan Center, Brown University  
2020 [Graduate Certificate in Course Design](#), Sheridan Center, Brown University  
2017 [Graduate Certificate in Reflective Teaching](#), Sheridan Center, Brown University

### Teaching Positions

Term	School	Course Title	Course Code	Role	Enrollment	Mean Evaluation
S 2021	Brown University	Human Anatomy & Biomechanics	BIOL 1885	Laboratory TA	60	–
F 2020	Brown University	Reflective Teaching	–	Facilitator	8	–
F 2020	Brown University	Evolutionary Biology	BIOL 0480	Co-Designer and Head TA	71	4.93/5
S 2019	Warren Alpert School of Medicine	Human Anatomy II	BIOL 3655	TA	146	4.81/5
F 2018	Warren Alpert School of Medicine	Human Anatomy I	BIOL 3644	TA	146	4.81/5
F 2017	Brown University	Evolutionary Biology	BIOL 0480	TA	82	4.83/5
S 2013	UC Berkeley	Introduction to Robotics	CS 98	Co-Instructor	30	–

### Guest Lectures

- 2020 Animal Structure and Motion (BIO 5550), California State University San Bernardino  
2018, 2020 Comparative Biology of the Vertebrates (BIOL 1880), Brown University (x2)  
2017-2020 Evolutionary Biology (BIOL 0480), Brown University (x4)  
2019 Human Anatomy II (BIOL 3655), Warren Alpert School of Medicine  
2018 Human Anatomy I (BIOL 3644), Warren Alpert School of Medicine  
2017 Biological Design (BIOL 0400), Brown University  
2016 The Age of Dinosaurs (IB 24), UC Berkeley  
2013 Introduction to Robotics (CS 98), UC Berkeley

### Curriculum Development

- 2013-2020 Contributor to *Understanding Global Change*, [ugc.berkeley.edu](http://ugc.berkeley.edu)  
2019 *Evo in the News* Resource: [“Reconstructing locomotion with fossils, footprints, and... robots?”](#), evolution.berkeley.edu  
2019 *Evo in the News* Resource: [“How did early mammals chew?”](#), evolution.berkeley.edu

### Other

- 2020 Remote Learning Conversion Assistant, University of Illinois at Chicago

2019 Evolutionary Biology Curriculum Advisor, Neuqua Valley High School, Naperville, IL  
 2017- K-College Tutor, Kaplan Tutoring Services, Barrington, RI  
 2017 Grader, Diversity of Life (BIOL 0210), Brown University  
 2014-2016 K-12 Tutor, Classroom Matters, Berkeley, CA  
 2013-2016 Educational Resource Development Intern, National Center for Science Education, Oakland, CA  
 2012-2013 Mentorship Coordinator, Pioneers in Engineering, Berkeley, CA

## SELECTED SERVICE

### To the Profession

SICB = Society for Integrative and Comparative Biology; SVP = Society of Vertebrate Paleontology

2021 Guest Assistant Editor, *Integrative and Comparative Biology*  
 2021 Mentor, Women of Color in Ecology and Evolutionary Biology Mentoring Program  
 2021 Mentor, Broadening Participation Mentorship Program, SICB  
 2021 Session Chair, SICB Annual Meeting  
 2020- Outreach/Social Media Team Member, International Womxn in Biomechanics  
 2020-2024 Student and Postdoctoral Liaison Committee Member, SVP  
 2020-2023 Student/Postdoctoral Affairs Committee Rep., Division of Comparative Biomechanics, SICB  
 2020-2021 Planning Committee Member, Womxn in STEM (WiSTEM) Symposium  
 2020 Code of Conduct Ally, SICB  
 2019- Preprint Editorial Team Member/Paleontology Section Leader, *Proceedings of the Royal Society B*  
 2018- Outreach Associate and Social Media Co-Coordinator, *Integrative Organismal Biology*  
 2018 Platform Session Moderator, SVP Annual Meeting  
 2016 Platform Session Moderator, The 11<sup>th</sup> International Congress of Vertebrate Morphology  
 2015-2018 Student Volunteer (Charlotte Mangum Student Support Program), SICB

Peer Reviewer for: *Scientific Reports, Current Biology, Palaeontologia Electronica, Journal of Anatomy*

### To the Institution

Brown EEB = Brown University Department of Ecology and Evolutionary Biology

2020-2021 Diversity and Inclusion Action Plan Committee Student Representative, Brown EEB  
 2020 Graduate School and Career Discussion for Undergraduates Invited Panelist, Brown EEB  
 2019-2021 College Curriculum Council Student Representative, Brown University  
 2019-2020 Graduate Student Association Secretary, Brown EEB  
 2019 Discussion for Junior Graduate Students Invited Panelist, Brown University Biomedical Division  
 2019 GRE Elimination Committee Student Representative, Brown EEB  
 2018-2020 Graduate Student Peer Mentor, Brown EEB  
 2018-2019 Graduate Student Grievance Ad Hoc Committee Student Representative, Brown University  
 2018 External and Internal Departmental Review Student Representative, Brown EEB  
 2017- Ecology and Evolutionary Biology Book Club Organizer, Brown EEB  
 2017-2019 Ecology and Evolutionary Biology Brown Bag Seminar Organizer, Brown EEB  
 2017 *Form and Function* Reading Group Organizer, Brown University Morphology Group  
 2016 Morphology Reading Group Organizer, UC Museum of Paleontology  
 2014-2016 Curatorial Assistant, UC Museum of Paleontology

## To the Community

- 2020 Regional Science Olympiad Tournament Event Coordinator, Providence, RI  
2018-2019 Rhode Island Science and Engineering Fair Judge, Providence, RI  
2017- Correspondent, Letters to a Pre-Scientist  
2017-2018 Marine Biology Club Co-Leader, Paul Cuffee Upper School, Providence, RI  
2017- Visiting Science Instructor at: Vartan Gregorian Elementary School, Providence, RI; Wild Ones, Providence, RI; Neuqua Valley High School, Naperville, RI; Skype-a-Scientist; etc.  
2014-2016 Cal Day and Public Short Course Assistant/Open House Presenter, UC Museum of Paleontology  
2012-2013 Visiting Science Instructor at John Muir Elementary School, Berkeley, CA  
2012 Open House Presenter, Lawrence Hall of Science, Berkeley, CA

## **SELECTED SCIENCE COMMUNICATION AND MEDIA COVERAGE**

### Articles Written

*IOB Open* = Journal of Integrative Organismal Biology Blog

- 2020 [“How do birds keep their balance?”](#) *IOB Open*  
2020 [“What can the Industrial Revolution teach us about animal motion?”](#) *IOB Open*  
2020 [“Can beards protect against punches?”](#) *IOB Open*  
2019 [“What determines the force a muscle can produce?”](#) *IOB Open*  
2019 [“Do frogs really breathe with their eyes?”](#) *IOB Open*  
2019 [“How do owls fly so silently?”](#) *IOB Open*  
2019 [“Why do crocs eat rocks?”](#) *IOB Open*

### Media Coverage

- 2021 Manafzadeh et al., 2021 *PNAS* covered in [News from Brown](#)  
2020 Thesis work featured in university-wide research coverage, *Scene at Brown*  
2019 Bhullar & Manafzadeh et al., 2019 *Nature* covered in [Yale News](#)  
2018 Manafzadeh & Padian, 2018 *Proceedings of the Royal Society B* covered in [News from Brown](#), [Brown Medicine Magazine](#), [Parsing Science Podcast](#), [Gizmodo io9](#), [Atlas Obscura](#), [Daily Mail](#), etc.  
2017 Interviewed for and featured in illustrated English / Spanish children’s book about female paleontologists, [She Found Fossils / Ella Encontró Fósiles](#), by Gold, West, and Gardiner  
2015 Featured in national news coverage about UC Museum of Paleontology fossils, [“At UC Berkeley Bell Tower, Fossils Get a New Life”](#) *NBC Nightly News*

Interviewed for Expert Commentary by: *New York Times*, *Gizmodo*, *Live Science*, etc.

## **AFFILIATIONS**

- 2019- Association for Women Geoscientists; The Paleontological Society  
2018- American Association of Anatomists  
2016- International Society of Vertebrate Morphology; Sigma Xi Scientific Honors Society  
2015- Society of Vertebrate Paleontology  
2014- Society for Integrative and Comparative Biology