

CURRICULUM VITAE
Stephen Miles Gatesy
February 2023

1. Name, Position, Academic Department:

Stephen Miles Gatesy, Professor of Biology, Department of Ecology, Evolution, and Organismal Biology; Professor of Medical Science, Section of Medical Education.

2. Education:

- 1983 B.A. Magna Cum Laude with Honors in Biology, Minor in Geology, Colgate University.
- 1989 A.M. Department of Organismic and Evolutionary Biology, Harvard University.
- 1989 Ph.D. Department of Organismic and Evolutionary Biology, Harvard University, dissertation title “Archosaur Neuromuscular Evolution”.

3. Professional Appointments:

- 1989-1991 Postdoctoral Research Associate, Department of Anatomy and Cell Biology, Emory University School of Medicine.
- 1991-1992 Postdoctoral Research Associate, Division of Biological Sciences, University of Montana.
- 1992-1993 Postdoctoral Research Associate, Museum of Comparative Zoology and Department of Organismic and Evolutionary Biology, Harvard University.
- 1993-1995 Assistant Professor, Department of Biology, Wake Forest University.
- 1994-2012 Research Associate, Museum of Comparative Zoology, Harvard University.
- 1995-2001 Assistant Professor, Department of Ecology and Evolutionary Biology, Division of Biology and Medicine, Brown University.
- 1996-2001 Joukowsky Family Assistant Professor of Biology, Brown University.
- 2001-2009 Associate Professor, Department of Ecology and Evolutionary Biology, Division of Biology and Medicine, Brown University.
- 2009-2021 Professor of Biology, Department of Ecology and Evolutionary Biology, Division of Biology and Medicine, Brown University.
- 2015-pres. Professor of Medical Science, Section of Medical Education, Division of Biology and Medicine, Brown University.
- 2021-pres. Professor, Department of Ecology, Evolution, and Organismal Biology, Division of Biology and Medicine, Brown University.

4. Completed Publications:

b. chapters in books;

Gatesy, S.M. 1995. Functional evolution of the hind limb and tail from basal theropods to birds. p. 219-234 in J.J. Thomason, ed., Functional Morphology in Vertebrate

- Paleontology. Cambridge: Cambridge University Press.
- Hutchinson, J.R. and Gatesy, S.M. 2000. Bipedalism. in Encyclopedia of Life Sciences.
- Gatesy, S.M. 2001. The evolutionary history of the theropod caudal locomotor module. p. 333-350 in J. Gauthier and J.F. Gall, eds., New Perspectives on the Origin and Early Evolution of Birds. New Haven: Peabody Museum of Natural History.
- Gatesy, S.M. 2002. Locomotor evolution on the line to modern birds. p. 432-447 in L. Chiappe and L. Witmer, eds., Mesozoic Birds: Above the Heads of Dinosaurs. Berkeley: University of California Press.
- Gatesy, S.M. and Middleton, K.M. 2007. Skeletal adaptations for flight. p. 269-283 in B.K. Hall, ed., Fins into Limbs: Evolution, Development, and Transformation. Chicago: University of Chicago Press.
- Gatesy, S.M. and Baier, D.B. 2015. Skeletons in motion: an animator's perspective on vertebrate evolution. p. 303-315 in K.P. Dial, N. Shubin and E.L. Brainerd, eds., Great transformations in vertebrate evolution. University of Chicago Press.
- Gatesy, S.M. and Ellis, R.G. 2016. Beyond surfaces: a particle-based perspective on track formation. pp. 82-91 in P.L. Falkingham, D. Marty, and A. Richter, eds., Dinosaur Tracks: The Next Steps. Indiana University Press.
- Falkingham, P.L. and Gatesy, S.M. in press. Formation and preservation of dinosaur footprints in the Connecticut Valley. Farlow, J.O. and Hyatt, J.A., eds. Connecticut Dragons: The Dinosaurs of Dinosaur State Park (Rocky Hill, Connecticut) and Their World. Indiana University Press.

c. refereed journal articles;

- Gatesy, S.M. 1990. Caudofemoral musculature and the evolution of theropod locomotion. *Paleobiology* 16(2):170-186.
- Gatesy, S.M. and Biewener, A.A. 1991. Bipedal locomotion: effects of speed, size and limb posture in birds and humans. *Journal of Zoology, London* 224:127-147.
- Gatesy, S.M. 1991. Hind limb scaling in birds and other theropods: implications for terrestrial locomotion. *Journal of Morphology* 209(1):83-96.
- Gatesy, S.M. 1991. Hind limb movements of the American alligator (*Alligator mississippiensis*) and postural grades. *Journal of Zoology, London* 224:577-588.
- Gatesy, S.M. and Dial, K.P. 1993. Tail muscle activity patterns in walking and flying pigeons (*Columba livia*). *Journal of Experimental Biology* 176:55-76.
- Gatesy, S.M. and English, A.W. 1993. Evidence for compartmental identity in the development of the rat lateral gastrocnemius muscle. *Developmental Dynamics* 196:174-182.
- Gatesy, S.M. 1994. Neuromuscular diversity in archosaur deep dorsal thigh muscles. *Brain, Behavior and Evolution* 43(1):1-14.
- Jenkins, F.A. Jr., Shubin, N.H., Amaral, W.W., Gatesy, S.M., Schaff, C.R., Clemmensen, L.B., Downs, W.R., Davidson, A.R., Bonde, N. and Osbaeck, F. 1994. Late Triassic continental vertebrates and depositional environments of the Fleming Fjord Formation, Jameson Land, East Greenland. *Meddelelser om Gronland, Geoscience* 32:1-25.
- Gatesy, S.M. and Dial, K.P. 1996. Locomotor modules and the evolution of avian flight. *Evolution*. 50(1):331-340.

- Gatesy, S.M. and Dial, K.P. 1996. From frond to fan: *Archaeopteryx* and the evolution of short-tailed birds. *Evolution* 50(5):2037-2048.
- Jenkins, F.A.J., Jr., Gatesy, S.M., Shubin, N.H. and Amaral, W.W. 1997. Haramiyids and Triassic mammalian evolution. *Nature* 385:715-718.
- Gatesy, S.M. and Middleton, K.M. 1997. Bipedalism, flight and the evolution of theropod locomotor diversity. *Journal of Vertebrate Paleontology* 17(2):308-329.
- Gatesy, S.M. 1997. An electromyographic analysis of hindlimb function in *Alligator* during terrestrial locomotion. *Journal of Morphology* 234(2):197-212.
- Gatesy, S.M. 1999. Guineafowl hind limb function I: cineradiographic analysis and speed effects. *Journal of Morphology* 240: 115-125.
- Gatesy, S.M. 1999. Guineafowl hind limb function II: electromyographic analysis and motor pattern evolution. *Journal of Morphology* 240: 127-142.
- Gatesy, S.M., Middleton, K.M., Jenkins, F.A. Jr. and Shubin, N.H. 1999. Three-dimensional preservation of foot movements in Triassic theropod dinosaurs. *Nature* 399:141-144.
- Gatesy, S.M. and Middleton, K.M. 1999. Theropod hind limb disparity revisited: a response. *Journal of Vertebrate Paleontology* 19(3):606.
- Middleton, K.M. and Gatesy, S.M. 2000. Theropod forelimb design and evolution. *Zoological Journal of the Linnean Society* 128:149-187.
- Hutchinson, J.R. and Gatesy, S.M. 2000. Adductors, abductors, and the evolution of archosaur locomotion. *Paleobiology* 26(4):734-751.
- Farlow, J.O., Gatesy, S.M., Holtz, T.R., Jr., Hutchinson, J.R. and Robinson, J.M. 2000. Theropod locomotion. *American Zoologist* 40:640-663.
- Gatesy, S.M. 2001. Skin impressions in Triassic theropod tracks as records of foot movement. *Bulletin of the Museum of Comparative Zoology* 156(1):137-149.
- Jenkins, F.A. Jr., Shubin, N.H., Gatesy, S.M. and Padian, K. 2001. A diminutive pterosaur (Pterosauria: Eudimorphodontidae) from the Greenlandic Triassic. *Bulletin of the Museum of Comparative Zoology* 156(1):151-170.
- Bimber, O., Gatesy, S.M., Witmer, L.M., Raskar, R. and Encarnacao, L.M. 2002. Merging fossil specimens with computer-generated information. *IEEE Computer Graphics and Applications*. 35(9):25-30.
- Gatesy, S.M. 2003. Direct and indirect track features: what sediment did a dinosaur touch? *Ichnos* 10:91-98.
- Gatesy, S.M. and Baier, D.B. 2005. The origin of the avian flight stroke: a kinematic and kinetic perspective. *Paleobiology* 31(3):382-399.
- Gatesy, S.M., Shubin, N.H. and Jenkins, F.A., Jr. 2005. Anaglyph stereo imaging of dinosaur track morphology and microtopography. *Palaeontologia Electronica* Vol. 8, Issue 1; 10A: 10p, ; http://palaeo-electronica.org/paleo/2005_1/gatesy10/issue1_05.htm
- Baier, D.B., Gatesy, S.M. and Jenkins, F.A., Jr. 2006. A critical ligamentous mechanism in the evolution of avian flight. *Nature* Advanced Online Publication doi:10.1038/nature05435; print version 2007. *Nature* 445:307-310.
- Keefe, D.F., O'Brien, T.M., Baier, D.B., Gatesy, S.M., Brainerd, E.L. and Laidlaw, D.H. 2008. Exploratory visualization of animal kinematics using instantaneous helical axes. *Eurographics/ IEEE-VGTC Symposium on Visualization* 27(3):1-8.
- Jenkins, F.A., Jr., Shubin, N.H., Gatesy, S.M. and Warren, A. 2008. *Gerrothorax*

- pulcherrimus* from the Upper Triassic Fleming Fjord Formation of East Greenland and a reassessment of the contribution of head lifting to feeding in Temnospondyls. *Journal of Vertebrate Paleontology* 28(4):935-950.
- Gatesy, S.M., Bäker, M. and Hutchinson, J.R. 2009. Constraint-based exclusion of limb poses for reconstructing theropod dinosaur locomotion. *Journal of Vertebrate Paleontology* 29(2):535–544.
- Gatesy, S.M., Baier, D.B., Jenkins, F.A. and Dial, K.P. 2010. Scientific rotoscoping: a morphology-based method of 3-D motion analysis and visualization. *Journal of Experimental Zoology* 313A:244–261.
- Brainerd, E.L., Baier, D.B., Gatesy, S.M., Hedrick, T.L., Metzger, K.A., Gilbert, S.L. and Crisco, J.J. 2010. X-ray reconstruction of moving morphology (XROMM): precision, accuracy and applications in comparative biomechanics research. *Journal of Experimental Zoology* 313A:262–279.
- Gatesy, S.M. and Pollard, N.S. 2011. Apples, oranges, and angles: comparative kinematic analysis of disparate limbs. *Journal of Theoretical Biology* 282:7-13.
- Ellis, R.G. and Gatesy, S.M. 2013. A biplanar X-ray method for three-dimensional analysis of track formation. *Palaeontologia Electronica* 16 (1):16p.
- Baier, D.B., Gatesy, S.M. and Dial, K.P. 2013. Three-dimensional, high-resolution skeletal kinematics of the avian wing and shoulder during ascending flapping flight and uphill flap-running. *PLoS ONE* 8(5):16p.
- Pittman, M., Gatesy, S.M., Upchurch, P., Goswami, A. and Hutchinson, J.R. 2013. Shake a tail feather: the evolution of the theropod tail into a stiff aerodynamic surface. *PLoS ONE* 8(5):19p.
- Baier, D.B. and Gatesy, S.M. 2013. Three-dimensional skeletal kinematics of the shoulder girdle and forelimb in walking *Alligator*. *Journal of Anatomy* 223:462-473.
- Kambic, R.E., Roberts, T.J. and Gatesy, S.M. 2014. Long-axis rotation: a missing degree of freedom in avian bipedal locomotion. *Journal of Experimental Biology* 217:2770-2782.
- Falkingham, P.L. and Gatesy, S.M. 2014. The birth of a dinosaur footprint: Subsurface 3D motion reconstruction and discrete element simulation reveal track ontogeny. *Proceedings of the National Academy of Sciences* 111:18279-18284.
- Kambic, R.E., Roberts, T.J. and Gatesy, S.M. 2015. Guineafowl with a twist: asymmetric limb control in steady bipedal locomotion. *Journal of experimental biology* 218:3836-3844.
- Luo, Z.X., Gatesy, S.M., Jenkins, F.A., Amaral, W.W. and Shubin, N.H. 2015. Mandibular and dental characteristics of Late Triassic mammaliaform *Haramiyavia* and their ramifications for basal mammal evolution. *Proceedings of the National Academy of Sciences*, 112:E7101-E7109.
- Panagiotopoulou, O., Rankin, J.W., Gatesy, S.M., Abraha, H.M., Janzekovic, J. and Hutchinson, J.R. 2016. A preliminary case study of the effect of shoe-wearing on the biomechanics of a horse's foot. *PeerJ* 4:e2164.
- Knörlein, B.J., Baier, D.B., Gatesy, S.M., Laurence-Chasen, J.D. and Brainerd, E.L. 2016. Validation of XMALab software for marker-based XROMM. *Journal of Experimental Biology* 219(23): 3701-3711.
- Gatesy, S.M. and Falkingham, P.L. 2017. Neither bones nor feet: track morphological

- variation and ‘preservation quality’. *Journal of Vertebrate Paleontology* 37(3): e1314298.
- Allen, V.R., Kambic, R.E., Gatesy, S.M. and Hutchinson, J.R., 2017. Gearing effects of the patella (knee extensor muscle sesamoid) of the helmeted guineafowl during terrestrial locomotion. *Journal of Zoology* 303(3): 178-187.
- Kambic, R.E., Roberts, T.J. and Gatesy, S.M. 2017. 3-D range of motion envelopes reveal interacting degrees of freedom in avian hind limb joints. *Journal of Anatomy* 231(6): 906-920.
- Falkingham, P.L., Bates, K.T., Avanzini, M., Bennett, M., Bordy, E.M., Breithaupt, B.H., Castanera, D., Citton, P., Díaz-Martínez, I., Farlow, J.O. and Fiorillo, A.R., Gatesy, S.M., et al., 2018. A standard protocol for documenting modern and fossil ichnological data. *Palaeontology* 61(4): 469-480.
- Farlow, J.O., Robinson, N.J., Turner, M.L., Black, J. and Gatesy, S.M. 2018. Footfall Pattern of a Bottom-Walking Crocodile (*Crocodylus acutus*). *Palaios*, 33(9): 406-413.
- Hatala, K.G., Perry, D.A. and Gatesy, S.M. 2018. A biplanar X-ray approach for studying the 3D dynamics of human track formation. *Journal of Human Evolution* 121: 104-118.
- Novotny, J., Tveite, J., Turner, M., Gatesy, S., Drury, F., Falkingham, P.L. and Laidlaw, D.H. 2019. Developing Virtual Reality Visualizations for Unsteady Flow Analysis of Dinosaur Track Formation using Scientific Sketching. *IEEE Transactions on Visualization and Computer Graphics* 25(5): 2145-2154.
- Tsai, H.P., Turner, M.L., Manafzadeh, A.R., and Gatesy, S.M. 2020. Contrast-enhanced XROMM reveals in vivo soft tissue interactions in the hip of *Alligator mississippiensis*. *Journal of Anatomy* 236(2): 288-304.
- Turner, M.L., Falkingham P.L. and Gatesy, S.M. 2020. It’s in the loop: shared subsurface foot kinematics in birds and other dinosaurs shed light on a new dimension of fossil track diversity. *Biology Letters* 16(7): 20200309.
- Falkingham, P.L., Turner, M.L. and Gatesy, S.M. 2020. Constructing and testing hypotheses of dinosaur foot motions from fossil tracks using digitization and simulation. *Palaeontology* 63, 6: 865–880.
- Gatesy, S.M. and Falkingham, P.L. 2020. Hitchcock’s Leptodactyli, penetrative tracks, and dinosaur footprint diversity. *Journal of Vertebrate Paleontology* 40(3): e1781142.
- Manafzadeh, A.R. and Gatesy, S.M. 2020. A coordinate-system-independent method for comparing joint rotational mobilities. *Journal of Experimental Biology* 223(18): jeb227108.
- Falkingham, P.L. and Gatesy, S.M. 2020. Discussion: Defining the morphological quality of fossil footprints. Problems and principles of preservation in tetrapod ichnology with examples from the Palaeozoic to the present by Lorenzo Marchetti et al. *Earth Science Reviews* 208: p.103320.
- Manafzadeh, A.R., Kambic, R.E. and Gatesy, S.M., 2021. A new role for joint mobility in reconstructing vertebrate locomotor evolution. *Proceedings of the National Academy of Sciences* 118(7).
- Turner, M. L. and Gatesy, S. M. 2021. Alligators employ intermetatarsal reconfiguration to modulate plantigrade ground contact. *Journal of Experimental Biology* 224(11): jeb242240.
- Manafzadeh, A.R. and Gatesy, S.M., 2021. Paleobiological reconstructions of articular

- function require all six degrees of freedom. *Journal of Anatomy* 239(6): 1516-1524.
- Hatala, K.G., Gatesy, S.M. and Falkingham, P.L. 2021. Integration of biplanar X-ray, 3-D animation, and particle simulation reveals details of human 'track ontogeny.' *Interface Focus* 11(5): 20200075.
- Cieri, R.L., Turner, M.L., Carney, R.M., Falkingham, P.L., Kirk, A.M., Wang, T., Jensen, B., Novotny, J., Tveite, J., Gatesy, S.M. and Laidlaw, D.H., 2021. Virtual and augmented reality: new tools for visualizing, analyzing, and communicating complex morphology. *Journal of Morphology*. 282(12): 1785-1800.
- Gatesy, S.M., Manafzadeh, A.R., Bishop, P.J., Turner, M.L., Kambic, R.E., Cuff, A.R. and Hutchinson, J.R. 2022. A proposed standard for quantifying 3-D hindlimb joint poses in living and extinct archosaurs. *Journal of Anatomy* 241(1): 101-118.
- Turner, M.L., Falkingham, P.L. and Gatesy, S.M. 2022. What is stance phase on deformable substrates? *Integrative and Comparative Biology* 62(5): 1357-1368.
- Manafzadeh, A.R. and Gatesy, S.M. 2022. Advances and challenges in paleobiological reconstructions of joint mobility. *Integrative and Comparative Biology* 62(5): 1369-1376.
- Griffin, C.T., Botelho, J.F., Hanson, M., Fabbri, M., Carney, R.M., Norell, M.A., Egawa, S., Gatesy, S.M., Nesbitt, S.J. and Bhullar, B.-A.S. 2022. The avian pelvis possesses ancestral dinosaurian morphology early in development. *Nature* 608(7922): 346-352.
- Turner, M.L. and Gatesy, S.M. 2022. Inner workings of the alligator ankle reveal the mechanistic origins of archosaur locomotor diversity. *Journal of Anatomy* 1-15.
- Hatala, K.G., Gatesy, S.M. and Falkingham, P.L. 2023. Arched footprints preserve the motions of fossil hominin feet. *Nature Ecology & Evolution* 7: 1-10.

d. non-refereed journal articles;

- Hutchinson, J.R. and Gatesy, S.M. 2006. Dinosaur locomotion: Beyond the bones. *Nature News and Views Feature* 440:292-294.
- Getty, P.R., Olsen, P.E., LeTourneau, P.M., Gatesy, S.M., Hyatt, J.A., Farlow, J.O., Galton, P.M., Falkingham, P.L., Winitch, M., 2017. Exploring a real Jurassic park from the dawn of the age of dinosaurs in the Connecticut Valley, Geological Society of Connecticut Field Guide No. 9. Hartford, CT.
- Falkingham, P.L. and Gatesy, S. M. 2019. Track formation mechanisms elucidated by computer simulation and bi-planar X-ray. *3rd International Conference of Continental Ichnology, abstract Volume & field trip guide* p24-29.

e. book reviews;

- Crompton, A.W. and Gatesy, S.M. 1989. Predatory Dinosaurs of the World, by Gregory Paul. *Scientific American* 260(1):110-113.
- Gatesy, S.M. 1992. Dinosaurs, Spitfires and Sea Dragons, by Christopher McGowan. *Creation/Evolution* 12(1):36-40.
- Gatesy, S.M. 1995. Handbook of Avian Anatomy, edited by J.J. Baumel. *Condor* 97:849-850.
- Gatesy, S.M. 1998. The Rise of Birds: 225 Million Years of Evolution, by Sankar Chatterjee. *Quarterly Review of Biology* 73(4):487.

Gatesy, S.M. 2003. Principles of Animal Locomotion, by R. McNeill Alexander. *Nature* 422: 665-666.

g. invited lectures;

symposia 2010-present;

Three-dimensional X-ray Motion Analysis: Methods and Applications, 9th International Congress of Vertebrate Morphology, Punta del Este, Uruguay, July 2010.
Co-organizer: Limitations of computational reconstructions in functional studies of musculoskeletal evolution. 9th International Congress of Vertebrate Morphology, Punta del Este, Uruguay, July 2010.
Making Connections: The Evolution and Function of Joints in Vertebrates. Society of Vertebrate Paleontology, Pittsburgh, October 2010.
Dinosaur Track Symposium. Obernkirchen, Germany, April 2011.
To Fins, Limbs, Wings, and Back Again. Society of Vertebrate Paleontology, Las Vegas, November 2011.
Dynamic Walking, Pensacola, May 2012.
Function and Evolution of the Human Foot. George Washington University and National Museum of Natural History, Washington, DC, April 2013.
Evolution of Locomotion: Reciprocal Illumination from a Diversity of Approaches. 10th International Congress of Vertebrate Morphology, Barcelona, Spain, July 2013.
The Evolutionary Biomechanics of Animal Locomotion. World Congress of Biomechanics, Boston, July 2014.
The Influence of R. McNeill Alexander on Palaeobiological Inferences. Society of Vertebrate Paleontology, Berlin, Germany, 2014.
Virtual Paleontology. Geological Society of America, Denver, September 2016.
Triassic/Jurassic Research Symposium, Bruce Museum, Greenwich, CT, May 2017.
Keynote Speaker, Tomography for Scientific Advancement (ToScA), Austin, June 2017.
VIRTMORPH – Using Virtual Reality to Visualize and Analyze Vertebrate Morphology, International Congress of Vertebrate Morphology, Prague, July 2019

seminars 2010-present;

The Royal Veterinary College, University of London, England, September 2010.
Brown University, Department of Ecology and Evolutionary Biology Brown Bag Series, March 2013.
University of Chicago, Department of Organismal Biology and Anatomy, February 2014
Georgia Institute of Technology, Department of Physics, September 2014
Amherst College, Department of Geology, December 2014
University of Texas, Paleobiology Research Group, Department of Geology, March 2015
University of Connecticut, Center for Integrative Geosciences, April 2015
Yale University, Department of Geology and Geophysics, April 2016
Wesleyan University, Department of Earth and Environmental Sciences, March 2017
California State University at San Bernardino, Department of Biology, April 2017
The Royal Veterinary College, University of London, England, September 2018.

j. work in progress;

Manafzadeh, A.R., Gatesy, S.M. and Bhullar, B-A.S. in prep. Articular surface interactions distinguish dinosaurian locomotor poses.

Manafzadeh, A.R. and Gatesy, S.M. Extreme long-axis rotation: the functional consequences of fibular reduction in theropod dinosaurs.

Gatesy, S.M. and Falkingham, P.F. CT imaging of Early Jurassic dinosaur footprints.

5. Research Grants:

b. completed grants;

National Science Foundation, “Collaborative Research: X-Rays, 3D Animation, and Human Locomotion”, #BCS-1824821, \$145,000, 09/01/18-08/31/22, co-PI with Kevin Hatala (Chatham University).

Salomon Faculty Research Award, “Fibular Mobility and the Evolution of Avian Bipedalism”, Brown University, \$13,936, 2019.

National Science Foundation REU, “Collaborative Research: X-Rays, 3D Animation, and Human Locomotion”, #BCS-1824821, \$6,000, 06/19-12/19, co-PI with Kevin Hatala (Chatham University).

National Science Foundation, “Footprint Formation and Interpreting Fossil Dinosaur Tracks”, #EAR-1452119, \$284,118, 03/01/15-02/28/19, PI with Peter Falkingham (co-PI, Liverpool John Moores University).

National Science Foundation, “Collaborative Research: ABI Development: Integrated X-Ray Motion Analysis Software and Video Data Management for the Comparative Biomechanics Community”, \$906,192, 07/01/13-06/30/16, co-PI.

Salomon Faculty Research Award, “The Origin of Dinosaur Footprint Diversity”, Brown University, \$15,000, 2014.

National Science Foundation, “Kinematics and Kinetics of Long-axis Rotation in Avian Bipedal Locomotion”, #IOS- 0925077, \$422,979, 8/1/09-7/31/12, PI with T. Roberts (co-PI).

W.M. Keck Foundation, “A Proposal to Design and Build a Dynamic 3-D Skeletal Imaging System”, \$1,962,464, 2/01/07-5/31/11, co-PI.

National Science Foundation, “IDBR: Hardware and Software Development for 3D Visualization of Rapid Skeletal Motion in Vertebrate Animals”, #DBI-0552051, \$345,486, 6/1/06-5/31-09, co-PI.

Brown University, Research Seed Funding Award, "Development and Verification of CTX Imaging for Musculoskeletal Biomechanics Research", \$100,000, 1/06-12/06, co-PI.

National Science Foundation, “SGER: Scientific Rotoscoping: A Morphology-Based Method of Motion Analysis and Visualization”, #IOB-0532159, \$110,000, 9/1/05-8/31/07, PI.

National Science Foundation Dissertation Improvement Grant, “Evolution and Functional Morphology of the Theropod Foot”, #IBN-0073136, \$6,012, 7/1/00-1/31/03, acting PI

for doctoral student Kevin Middleton.

National Science Foundation, "Reconstructing Theropod Dinosaur Limb Movements Using 3D Computer-Animated Track Simulation", #DBI-9974424, \$172,706, 9/15/99-6/30/03, PI.

Salomon Faculty Research Award, "Analysis of Bird Wings by 3-Dimensional Computer Animation", Brown University, \$12,000, 1996.

National Science Foundation, "Avian Neuromuscular Diversity: The Evolution of Muscle Morphology, Function, and Development", #IBN-9407367, \$183,419, 7/1/94-6/30/99, PI.

6. Service:

(i) university;

Biology Concentration Advisor, 1997-2015, 2019-present.

Freshmen Advisor, 2019-2021.

Course Leader:

Biomed 181, Human Morphology course for first year medical students, 2002-2004.

Member:

Medical School Curriculum Committee, 1997-2003.

MSCC Grading and Evaluation Subcommittee, 1998-2003.

MSCC Preclinical Subcommittee, 1998-2003.

EEB Evolutionary Morphologist Search Committee, 2002-2003.

Graduate Council 2008-2012, 2019-2022.

Health Careers Advisory Committee (interviewing Brown premedical students) 2011-2012.

Faculty Animals User Committee 2007-2010.

Grievance Committee 2011-2013 (acting chair in 2013).

Biomed Space Policy Committee 2012-2014.

Institutional Animal Care and Use Committee 2013-present.

EEB Interim Vice Chair 2017-2018.

(ii) profession;

Manuscript Reviewer: *Nature*, *Science*, *Proceedings of the National Academy of Sciences*, *PloS one*, *Paleobiology*, *Journal of Experimental Biology*, *Journal of Morphology*, *American Naturalist*, *Journal of Anatomy*, *Anatomical Record*, *American Zoologist*, *Proceedings of the Linnean Society of London*, *Proceedings of the Royal Society of London*, *PeerJ*, *The Auk*, *Journal of Vertebrate Paleontology*, *Journal of Paleontology*, *Paleontology*, *Acta Anatomica*, *Lethaia*, *Palaios*, *Ichnos*, *Ardea*, *Naturwissenschaften*, *Special Publications of the Peabody Museum*, *Bulletin of the Museum of Comparative Zoology*, *New Mexico Museum of Natural History Bulletin*, *Canadian Journal of Zoology*, *Geology*, and several books.

Grant Reviewer: National Science Foundation Ecology and Evolutionary Physiology Program, Integrative Animal Biology Program, and Geology and Paleontology Program; Leverhulme Trust; European Young Investigator Award, Human Frontier Science

Program.

- Panelist: National Science Foundation Integrative Animal Biology Program, April 2002.
Scientific Advisor: Public exhibit “Dinosaurs Alive!: New Evidence From The Fossil Record”, Department of Vertebrate Paleontology, American Museum of Natural History; IMAX film “Dinosaurs Alive”, Department of Vertebrate Paleontology, American Museum of Natural History.
Member: Society of Vertebrate Paleontology Romer Student Paper Prize Committee, 1996-pres.; Society of Vertebrate Paleontology Membership Committee, 1997-2000; Society for Integrative and Comparative Biology Division of Vertebrate Morphology Graduate Student Poster Competition Committee, 1996.
Chair: Society for Integrative and Comparative Biology Division of Vertebrate Morphology Graduate Student Paper Competition Committee, 1997.
NSF Advisory Panelist, University of Texas High-Resolution X-ray CT Facility, Department of Geology, University of Texas, May 2016

(iii) community;

Guest Scientist

- Television documentary: “Feather Evolution,” January 2004.
American Museum of Natural History Video Display: “Dinosaurs Alive!: New Evidence From The Fossil Record,” 2005.
NOVA documentary: “The Four-Winged Dinosaur,” 2007.
National Geographic Explorer: “T. rex Tech,” 2008.

Seminar speaker

- Brown Community for Learning in Retirement, April 2006.
Stonington, CT High School Continuing Education, October 2006.
Touchstone Community School, Grafton, MA, December 2006.
Touchstone Community School, Grafton, MA, October 2007.
Touchstone Community School, Grafton, MA, April 2009.
Touchstone Community School, Grafton, MA, February 2010.
Geological Society of Connecticut field trip co-leader, April 2017.
Bruce Museum, Greenwich, CT, April 2017.
Jurassic Roadshow, virtual, December 2020.

Research Mentor

- Joshua Zimmt, High School Student, 2012-2013.

7. Academic Honors:

- Thomas J. Watson Fellowship, 1983-1984.
Jeffries Wyman Scholarship, Harvard University, 1986.
Romer Prize for best student paper, Society of Vertebrate Paleontology, 1987.
D. Dwight Davis Award for best student paper, Division of Vertebrate Morphology, American Society of Zoologists, 1989.

NSF-NATO Postdoctoral Fellowship in Science and Engineering (declined), 1989.
National Science Foundation Postdoctoral Fellowship in Environmental Biology,
1992-1993.
Joukowsky Family Assistant Professor of Biology, Brown University, 1996-2001.

8. Teaching 2010-present:

Fall 2010 Anatomy, BIOL 3644/3655, Human anatomy for medical students.
Fall 2011 Anatomy, BIOL 3644/3655, Human anatomy for medical students.
Fall 2011 Morphology, function, and evolution of vertebrate joints, BIOL 2430 EEB
graduate seminar.
2012-2013 Anatomy, BIOL 3644/3655, Human anatomy for medical students.
2013-2014 Anatomy, BIOL 3644/3655, Human anatomy for medical students.
2015-2016 Anatomy, BIOL 3644/3655, Human anatomy for medical students.
Fall 2015 Biology Collaborator: CS1370, Virtual Reality Design for Science.
Spring 2016 Marey, Motion Analysis, and 3-D Thinking, BIOL 2440 EEB graduate seminar.
2016-2017 Anatomy, BIOL 3644/3655, Human anatomy for medical students.
2017-2018 Anatomy, BIOL 3644/3655, Human anatomy for medical students.
Fall 2017 Biology Collaborator: CS1370, Virtual Reality Design for Science.
2018-2019 Anatomy, BIOL 3644/3655, Human anatomy for medical students.
Fall 2019 Biology Collaborator: CS1370, Virtual Reality Design for Science.
Spring 2020 Advanced XROMM Analysis and Visualization, BIOL 2440 EEB graduate
seminar.
2019-2020 Anatomy, BIOL 3644/3655, Human anatomy for medical students.
2020-2021 Anatomy, BIOL 3644/3655, Human anatomy for medical students.
2022-2023 Anatomy, BIOL 3644/3655, Human anatomy for medical students.

Advisor for 32 Independent Study students, 14 Honors thesis students, 3 postdoctoral
associates, 7 doctoral students, and 1 5th year Masters student.
Committee Member for 30 internal and 4 external graduate students.
Doctoral Thesis Examiner for 4 international graduate students.
Exchange Scholar Host for 1 graduate student.