

# Morgan L. Turner, PhD

*Postdoctoral Associate and CRA/CCC/NSF Computing Innovation Fellow  
Department of Computer Science and Engineering, University of Minnesota*

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## Academic Interests

locomotor evolution, vertebrate foot structure and function, paleontology, ichnology, evolutionary biology, biomechanics, animation, reconstruction of *in-vivo* skeletal kinematics, interactive data visualization, data visualization for motion analysis.

## Education

- Dec 2020 **Ph.D., Ecology and Evolutionary Biology**, Brown University  
Thesis: Internal and external foot kinematics at the animal-substrate interface  
Advisor: Stephen M. Gatesy  
Committee: Elizabeth L. Brainerd, Thomas J. Roberts, David H. Laidlaw
- May 2018 **Sc.M. Ecology and Evolutionary Biology**, Brown University
- June 2013 **B.A. Biological Anthropology**, University of Washington  
Paleobiology minor

## Professional Appointments

- 2021 - 2023 **University of Minnesota. Minneapolis, MN**  
Postdoctoral Associate and CRA/CCC/NSF Computing Innovation Fellow  
Department of Computer Science and Engineering

## Awards

- 2021 **Alfred Sherwood Romer Prize Finalist**, Society of Vertebrate Paleontology
- 2018 **Best Poster Award**, “Developing Virtual Reality Visualizations of Dinosaur Track Creation with Scientific Sketching”, IEEE VIS
- 2016 **Graduate Research Fellowship Program Honorable Mention**, NSF

## Grants

- 2021 **Leadership Development Grant**, Office of Postdoctoral Initiatives, University of Minnesota
- 2020 **Grant in Aid for Research**, “The impact of interdigital substrate flow on theropod dinosaur footprint diversity”, Society of Integrative and Comparative Biology
- 2019 **Doctoral Dissertation Enhancement Grant**, “Postural Grades and Foot Function Gradients in Archosaurs”, Brown University, Department of Ecology and Evolutionary Biology

## Peer-Reviewed Publications

9. Cieri RL, **Turner ML**, Carney RM, Falkingham PL, Kirk AM, Wang T, Jensen B, Novotny J, Tveite J, Gatesy SM, Laidlaw DH, Kaplan H, Moorman AFM, Howell M, Engel B, Cruz C, Smith A, Gerichs W, Lian Y, Schultz JT, Farmer C. (2021). *Virtual and Augmented Reality: new tools for visualizing, analyzing, and communicating complex morphology*. Journal of Morphology.

8. **Turner ML** and Gatesy SM. (2021). *Alligators employ intermetatarsal reconfiguration to modulate plantigrade ground contact*. The Journal of Experimental Biology. 224, jeb242240.
7. Falkingham PL, **Turner ML**, and Gatesy SM. (2020). *Constructing and testing hypotheses of dinosaur foot motions from fossil tracks using digitization and simulation*. Palaeontology.
6. **Turner ML**, Falkingham PL, Gatesy SM. (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: 20200309.
5. 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(2), 288-304.
4. Novotny J, Tveite J, **Turner ML**, Gatesy SM, Drury F, Falkingham P, Laidlaw DH. (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.
3. Farlow JO, Robinson NJ, **Turner ML**, Black J, Gatesy SM. (2018). *Footfall Pattern of a Bottom-Walking Crocodile (Crocodylus acutus)*. Palaios 33(9):406-413.
2. **Turner ML** and Sidor CA (2017). *Pathology in a Permian Parareptile: Congenital Malformation of Sacral Vertebrae..* Journal of Zoology.
1. **Turner ML**, Tsuji LA, Ide O, Sidor CA (2015). *The vertebrate fauna of the Upper Permian of Niger—IX. The appendicular skeleton of Bunostegos akokanensis (Parareptilia: Pareiasauria)*. Journal of Vertebrate Paleontology 35, e994746.

For links to articles, see <https://morganlturner.com/publications/>

## Presentations

### Invited Seminars

- June 2021 Bell Museum of Natural History Endotherm Researchers Meeting
- Dec 2020 DinoFest Jurassic Roadshow
- July 2020 Beneski Museum of Natural History and Culture
- Nov 2019 Burke Museum of Natural History and Culture
- Oct 2019 CCV-Con, Center for Computation and Visualization, Brown University
- Feb 2019 Ecology and Evolutionary Ecology Brown Bag Seminar, Brown University
- Sept 2018 Ecology and Evolutionary Ecology Brown Bag Seminar, Brown University
- Jan 2018 Initiative to Maximize Student Development, Brown University
- April 2017 Scientific Visualization Group, Department of Computer Science, Brown University
- Feb 2016 Ecology and Evolutionary Ecology Brown Bag Seminar, Brown University

### Panels

- June 2021 Careers in Biomechanics, at International Women in Biomechanics.
- July 2019 Summit for Women in STEM, at Wheaton College.

### Workshops

- Aug 2021 Motion and Animation: Unity for the Interactive Visualization Lab Workshop series.
- July 2019 Virtual Morphology (VirtMorph) symposium, at the International Congress of Vertebrate Morphology conference, Prague, Czechia.

## Invited and Contributed Conference Presentations

‡undergraduate mentee

28. **Turner ML.** (2021). *Inside the “Black Box” of the Crurotarsal Ankle and Insights into the Pedal Origins of Locomotor Diversity in Archosaurs.* Society of Vertebrate Paleontology Annual Meeting [virtual]. **Alfred Sherwood Romer Prize Finalist.**
27. †Deibert C, **Turner ML,** and Keefe DF. (2021). *An exploratory visualization tool for linking 2D and 3D biomechanical motion data.* REU Virtual Poster Symposium [virtual].
26. **Turner ML,** and Gatesy SM. (2021). *Intermetatarsal mobility in the American alligator.* Society of Integrative and Comparative Biology Annual Meeting [virtual].
25. Capano JG, Kaczmarek EB, Lomax JJ, **Turner ML,** Brainerd EL, and Ryerson WG. (2021). *Reticulated pythons roll their hemimandibles and splay their quadrates to engulf enormous prey.* Society of Integrative and Comparative Biology Annual Meeting [virtual].
24. **Turner ML** and Gatesy SM. (2020). *Intermetatarsal mobility and grades of foot contact in the American alligator: building a new perspective on archosaurian foot evolution.* Society of Vertebrate Paleontology Annual Meeting [virtual].
23. Gatesy SM and **Turner ML.** (2020). *Dinosaurs in disguise: substrate flow accounts for unusual Early Jurassic tracks.* Society of Vertebrate Paleontology Annual Meeting [virtual].
22. **Turner ML** and Gatesy SM. (2020). *Looking inside the sole: intermetatarsal mobility in the American alligator.* Society of Integrative and Comparative Biology Annual Meeting.
21. Capano JG, Brainerd EL, **Turner ML,** Ryerson WG. (2019). *Cranial Kinesis During Prey Ingestion in the Reticulated Python.* Northeastern Regional Meeting of the Society of Integrative and Comparative Biology Division of Vertebrate Morphology and Comparative Biomechanics.
20. **Turner ML,** Novotny J, Falkingham PL, Laidlaw DH, Gatesy SM. (2019). *Where does footprint morphology come from? Developing virtual reality visualizations for exploring dinosaur track formation.* International Congress of Vertebrate Morphology. **Invited symposium talk.**
19. Falkingham PL, **Turner ML,** Gatesy SM. (2019). *Generating and Testing Hypotheses of Dinosaur Foot Motions Using 3D-Digitized Tracks and Large-Scale Granular Simulations.* International Congress of Vertebrate Morphology.
18. Novotny J, Tveite JJ, **Turner ML,** Gatesy SM, Falkingham PL, Laidlaw, DH. (2018). *Developing a Virtual Reality Application for Unsteady Flow Analysis in Dinosaur Track Creation.* IEEE VIS. **Best Poster Award.**
17. **Turner ML,** Falkingham PL, Gatesy SM. (2018). *Where does footprint morphology come from? Integrating 3D methods for exploring dinosaur track formation.* Society of Vertebrate Paleontology Annual Meeting. **Invited symposium talk.**
16. Tsai HP, **Turner ML,** Manafzadeh AR, Gatesy SM. (2018). *Contrast-enhanced XROMM reveals in vivo soft tissue interaction in the hip of Alligator mississippiensis: implications for pseudosuchia.* Society of Vertebrate Paleontology Annual Meeting.
15. Farlow JO, Robinson NJ, **Turner ML,** Black J, Gatesy SM. (2018). *Footfall Pattern of a Bottom-Walking Crocodile (*Crocodylus acutus*).* Society of Vertebrate Paleontology Annual Meeting.
14. **Turner ML,** Gatesy SM. (2018). *Intra-foot kinematics of the American alligator.* Northeastern Regional Meeting of the Society of Integrative and Comparative Biology Division of Vertebrate Morphology and Comparative Biomechanics.

13. **Turner ML**, Falkingham PL, Gatesy SM. (2018). *Avian subsurface foot kinematics on deformable substrates*. Society for Integrative and Comparative Biology Annual Meeting.
12. Gatesy SM, **Turner ML**, Falkingham, PL. (2018). *CT Imaging of Dinosaur Footprints: Hidden Topography and the Origin of Track Diversity*. Society for Integrative and Comparative Biology Annual Meeting.
11. Napoli JG, 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 Annual Meeting.
10. 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 Annual Meeting.
9. **Turner ML**, Falkingham PL, Gatesy SM. (2017). *Sub-Surface Foot-Trajectories and Fossil Dinosaur Tracks*. Last Days of Pangea Triassic-Jurassic Research Symposium.
8. 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.
7. **Turner ML**, Falkingham PL, Gatesy SM. (2016). *The morphology of motion in sub-surface foot trajectories and fossil dinosaur tracks*. Northeastern Regional Meeting of the Society of Integrative and Comparative Biology Division of Vertebrate Morphology and Comparative Biomechanics.
6. Tsai HP, **Turner ML**, Manafzadeh AR, Gatesy SM. (2016). *Hip joint kinematics of Alligator mississippiensis: Significance of articular soft tissues for interpreting hind limb function*. Northeastern Regional Meeting of the Society of Integrative and Comparative Biology Division of Vertebrate Morphology and Comparative Biomechanics.
5. **Turner ML**, Falkingham PL, Gatesy SM. (2016). *The morphology of motion in sub-surface foot trajectories and fossil dinosaur tracks*. Society of Vertebrate Paleontology Annual Meeting.
4. **Turner ML**, Falkingham PL, Gatesy SM. (2016). *The morphology of motion: sub-surface foot trajectories and fossil tracks*. Society of Vertebrate Paleontology Annual Meeting.
3. **Turner ML**, Sidor CA, Tsuji LA. (2015). *Removing assumptions of anatomical orientation from cladistic characters: an example from pareiasaurs*. Society of Vertebrate Paleontology Annual Meeting.
2. **Turner ML**, Tsuji LA, Sidor CA. (2014). *Evidence for the earliest evolution of a fully parasagittal quadruped*. Society of Vertebrate Paleontology Annual Meeting.
1. **Turner ML**, Tsuji LA, Sidor CA. (2013). *The Ontogeny of the Scapulocoracoid of the Pareiasaur Bunostegos akokanensis (Amniota: Parareptilia) from the Permian of Niger*. Undergraduate Research Symposium, University of Washington.

## Teaching

### Brown University, Warren Alpert Medical School

Spring 2019 BIOL3655: Human Anatomy II, Special Projects TA.

Fall 2018 BIOL3644: Human Anatomy I, Special Projects TA.

Spring 2018 BIOL3655: Human Anatomy II, TA.

Fall 2017 BIOL3644: Human Anatomy I, TA.

Spring 2017 BIOL3655: Human Anatomy II, TA.

Fall 2016 BIOL3644: Human Anatomy I, TA.

## Brown University and Rhode Island School of Design

Fall 2017 CSCI1370 / ILLUS3340: Virtual Reality Design for Science, Guest Lecturer and Science Contributor.

Fall 2015 CSCI1370 / ILLUS3340: Virtual Reality Design for Science, Guest Lecturer and Science Contributor.

## University of Washington

Spring 2014 BIOL 443: Evolution of Mammals and their Ancestors, Peer TA.

Fall 2013 BIOL 453: Comparative Anatomy of Vertebrates, Peer TA.

## Advising

Current Kevin Bradt. University of Minnesota. Project: linked 2D-3D biomechanics visualizations

Current Rea Yoh. Brown University. Project: Bat wing interosseus.

2021 Cheyenne Deibert. Vanderbilt University. Project: linked 2D-3D biomechanics visualizations.

2018 - 2019 Eli Mitnik. Brown University. Project: track indenter experiments and analysis in R.

## Service

### Departmental Service

2021 - Inclusiveness, Diversity, Equity, and Advocacy Committee, Department of Computer Science and Engineering, University of Minnesota.

2021 - Diversity Equity and Inclusion Alliance, Department of Computer Science and Engineering, University of Minnesota.

2018 - 2020 Vice President, Ecology and Evolutionary Biology Grad Student Association, Brown University.

2017 Graduate Student Council Representative, Brown University.

### Organized Conference Panels

Oct 2021 Chair of panel on "Navigating Interdisciplinary Careers in Visualization", at IEEE VIS.

### Reviewing

ACM Conference on Human Factors in Computing Systems (CHI) 2021.

Anatomical Record.

Frontiers in Zoology.

IEEE Visualization Conference (VIS) 2021.

Integrative and Organismal Biology.

Zoological Journal of the Linnean Society.

## Outreach

### Museums and General Public

2021 Interactive VR demonstration at the Science Museum of Minnesota, MN.

2019 - 2020 Custom museum exhibit and website on fossil dinosaur track formation created for permanent display at the Beneski Museum of Natural History at Amherst College, MA.

2014 Behind the Scenes Night at the Burke Museum of Natural History and Culture, WA.

- 2012 - 2015 Dino Day at the Burke Museum of Natural History and Culture, WA.
- 2014 Dinosaurs and Cavemen at the Department of Pathology and Anatomical Sciences, University of Missouri, MO.

### Elementary and High School

- 2019 - 2020 Brown Junior Researcher Program at the Francis J Varieur Elementary, Pawtucket, RI.
- 2019 Judge, Rhode Island Science and Engineering Fair, Warwick, RI.
- 2018 Virtual Reality demonstrations, Brown University, RI.
- 2018 Scientist Guest Interview, Wild Ones, Providence, RI.
- 2017 - 2018 Brown Junior Researcher Program at the Boys and Girls Club, East Providence, RI.

## Museum Work and Illustration

### Positions

- 2014 - 2015 Casting and Molding Technician, Burke Museum of Natural History and Culture, WA.
- 2014 Artist in Residence, John Day Fossil Beds National Monument, OR.
- 2013 - 2016 Scientific Illustrator, Department of Biology at the University of Washington and Burke Museum of Natural History and Culture, WA.
- 2012 - 2015 Research Assistant (Dr. Christian Sidor, Dr. Linda Tsuji), University of Washington.
- 2009 - 2012 Volunteer Fossil Preparator, Burke Museum of Natural History and Culture, WA.

### Science + Art Shows

- May 2017 Discover: A Conversation Between Art and Science, Rhode Island School of Design and Brown University collaboration show.
- Nov 2016 Art of Science Exhibition, Brown University.
- May 2013 Natural Science Illustration Portfolio Show, Burke Museum of Natural History and Culture.

## Additional Education

### Certificates

- 2020 Course Design, Sheridan Center for Teaching and Learning, Brown University.
- 2017 Reflective Teaching, Sheridan Center for Teaching and Learning, Brown University.
- 2013 Natural Science Illustration, School Prof. and Cont. Education, University of Washington.

### Non-degree-bearing tertiary education

- 2021 Columbia University: Python Data Wrangling Boot Camp.
- 2009, 2012 Gage Academy of Art: Forensic Art for Fine Artists; Drawing from Observation.
- 2009 - 2010 Bellevue College: High School Running Start Program, 3.90 GPA, Dean's List.

## Affiliations

- 2020 - International Women in Biomechanics.
- 2016 - International Society of Vertebrate Morphology.
- 2016 - 2020 Graduate Women in Science.
- 2015 - Society for Integrative and Comparative Biology.
- 2014 - Society for Vertebrate Paleontology.