

# Akinobu Watanabe

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## Research Interests

1. Timing and tempo of character evolution across bird-line dinosaurs.
2. Phenotypic interplay between anatomical changes along developmental and evolutionary time scales.
3. Practice and theory of phylogenetics and geometric morphometrics.

## Education

2016 (expected)	<b>PhD Comparative Biology</b> Richard Gilder Graduate School at the AMNH. Thesis: “Reconciling evolutionary transformations & intraspecific variation along dinosaur-bird transition”
2012	<b>MSc Biological Science</b> Florida State University. Thesis: “The ontogeny of cranial morphology in extant crocodylians & its phylogenetic utility: a geometric morphometric approach”
2009	<b>BA Biological Sciences Geophysical Sciences; Music Minor</b> University of Chicago

## Publications

In review	<b>Watanabe, A.</b> , M.E.L. Gold, S.L. Brusatte, R.B.J. Benson, J. Choiniere, A. Davidson, M.A. Norell. Vertebral pneumaticity in the ornithomimosaur <i>Archaeornithomimus</i> (Dinosauria: Theropoda) revealed by computed tomography imaging and reappraisal of axial pneumaticity in Ornithomimosauria. <i>PLoS ONE</i> .  Marugan-Lobon, J., <b>A. Watanabe</b> , S. Kawabe. Studying encephalization using geometric morphometrics. <i>Journal of Anatomy</i> . Invited Submission.
2015	<b>Watanabe, A.</b> The impact of poor sampling of polymorphisms on cladistic analysis. <i>Cladistics</i> . doi: <a href="https://doi.org/10.1111/cla.12130">10.1111/cla.12130</a>
2014	<b>Watanabe, A.</b> , D.E. Slice. The utility of cranial ontogeny for phylogenetic inference: a case study in crocodylians using geometric morphometrics. <i>Journal of Evolutionary Biology</i> 27: 1078–1092. doi: <a href="https://doi.org/10.1111/jeb.12382">10.1111/jeb.12382</a>
2013	Brusatte, S.L., M. Vremir, Z. Csiki, M.A. Norell, A.H. Turner, <b>A. Watanabe</b> , G.M. Erickson. The osteology of <i>Balaur bondoc</i> , an island-dwelling dromaeosaurid (Dinosauria: Theropoda) from the Late Cretaceous of Romania. <i>Bulletin of the American Museum of Natural History</i> 374:1–100. <a href="http://hdl.handle.net/2246/6419">http://hdl.handle.net/2246/6419</a>  <b>Watanabe, A.</b> , G.M. Erickson, P.S. Druckenmiller. An ornithomimosaur from the Upper Cretaceous Prince Creek Formation of Alaska. <i>Journal of Vertebrate Paleontology</i> 33:1169–1175. doi: <a href="https://doi.org/10.1080/02724634.2013.770750">10.1080/02724634.2013.770750</a>  Brusatte, S.L., M. Vremir, <b>A. Watanabe</b> , Z. Csiki-Sava, D. Naish, G. Dyke, G.M. Erickson, M.A. Norell. An infant ornithopod dinosaur tibia from the late Cretaceous of Sebeş, Romania. <i>Terra Sebus: Acta Musei Sabesiensis</i> 5:627–644. <a href="#">PDF</a>
In prep.	<b>Watanabe, A.</b> R2D3 and C3PO: companion tool for assessing the fidelity of two-dimensional geometric morphometric data of three-dimensional structures.  <b>Watanabe, A.</b> How many landmarks are enough to characterize shape and size?  Barta, D.E., <b>A. Watanabe</b> , M. Vremir, R. Totoianu, M.A. Norell. The first dinosaur eggs from a new vertebrate locality in the Upper Cretaceous Sebeş Formation, Romania

Mallison, H., M. Pittman, **A. Watanabe**. The range of motion and musculature of the tail of *Citipati osmolskae* (Theropoda: Oviraptorosauria).

## Software

- 2015 (expected) | **R2D3: Run 2D or 3?** R script to statistically test fidelity of 2D shape data of 3D structures.  
**LaMDA: LandMark Data Analysis** R package for simulating shapes & assessing the robustness of landmark sampling.
- 2015 | **PERDA: Permutational Entry Replacement Data Analysis** TNT script to evaluate the impact of poor sampling of polymorphisms on resulting tree topology.
- 2014 | **PermuTree**, Python script to perform permutational regression analysis on phylogenetic trees. <http://datadryad.org/resource/doi:10.5061/dryad.14fn1>.
- | **Tree Comparison Test (SPR)** TNT script to test the significance of topological differences between phylogenetic trees. <http://datadryad.org/resource/doi:10.5061/dryad.14fn1>.

## Research Grants

- 2015 | NSF DEB Research Grant (PI: Amy Balanoff): “Unraveling the Deep History of Avian Neurological Complexity: Implications for the Origins of Flight and Organization of the Modern Avian Brain.” (\$521,296)  
Mary R. Dawson Predoctoral Fellowship Grant (\$3,000)  
Jurassic Foundation Grant (\$2,566)
- 2014 | NSF Doctoral Dissertation Improvement Grant: “Five-dimensional Analysis of Alligator and Bird Encephalization: Integrating Changes in Brain Shape Along Developmental and Evolutionary Timelines.” (\$20,137)
- 2012 | ExxonMobil Geosciences Grant (\$7,500)
- 2011 | NSF Graduate Research Fellowship (\$121,500)  
Sigma Xi Grants-in-Aid of Research (\$400)  
Jackson School of Geosciences Travel Grant (\$400)  
Robert B. Short Zoology Scholarship, Florida State University (\$150)
- 2010 | Conference Presentation Grant, Florida State University (\$300)  
Academic Conference Support Grant, Florida State University (\$150)

## Presentations

### Invited Lectures

- 2015 (expected) | Stony Brook University, Stony Brook, NY
- 2015 | Oklahoma State University Center for Health Sciences, Tulsa, OK
- 2014 | National Evolutionary Synthesis Center, Durham, NC
- 2013 | Department of Organismic and Evolutionary Biology, Harvard University, Cambridge, MA  
Metropolitan Society of Natural Historians Darwin Symposium, New York, NY

## Platform

\*presenting author

- 2015 \***A. Watanabe**. How many landmarks are enough? Identifying adequate sampling of landmarks for capturing the shape of specimens. Society of Vertebrate Paleontology Annual Meeting, Dallas, TX.
- \***A. Watanabe**. Tree building on Noah's Ark: the impact of poor sampling of polymorphism on phylogenetic inference. Evolution Meeting, Guarujá, Brazil.
- Barta, D.E., **A. Watanabe**, M. Vremir, R. Totoianu, M.A. Norell. The first dinosaur eggs from a new vertebrate locality in the Upper Cretaceous Sebeş Formation, Romania. International Symposium on Paleohistology, Bonn, Germany.
- 2014 \***Watanabe, A.** R2D3 and C3PO: A companion tool for testing the fidelity of two-dimensional geometric morphometric data in a three-dimensional world of vertebrate crania. Society of Vertebrate Paleontology Annual Meeting, Berlin, Germany.
- Gold, M., Balanoff, A., **Watanabe, A.**, Norell, M. Endocast shape differences in coelurosauria (Dinosauria: Theropoda) reflect phylogeny and locomotor mode across the evolution of flight. Society of Vertebrate Paleontology Annual Meeting, Berlin, Germany.
- \***Watanabe, A.**, A.M. Balanoff, M.A. Norell. From *Archaeopteryx* to modern Aves: testing the impact of allometry and phylogeny in shaping bird brain evolution. Society of Integrative and Comparative Biology Meeting, Austin, TX.
- 2013 \***Watanabe, A.**, M.A. Norell. Tree building from Noahs Ark: The impact of poor sampling within species on phylogenetic reconstruction. Society of Vertebrate Paleontology Annual Meeting, Los Angeles, CA. *Journal of Vertebrate Paleontology* 33 (supp. to 3):235A.
- \***Watanabe, A.** R2D3 and C3PO: companion tools for assessing the viability of two-versus three-dimensional morphometric data. Comparative Biology Program 2nd Year Student Symposium, New York, NY.
- \***Watanabe, A.**, D.E.Slice. Shape shifting through ontogeny: testing the phylogenetic signal of allometric growth in crocodylians using geometric morphometrics. New York Institute of Technology Annual Vertebrate Morphology Conference, Old Westbury, NY.
- 2012 \***Watanabe, A.**, D.E. Slice. The ontogeny of cranial morphology in crocodylians and its phylogenetic significance: a geometric morphometric approach. Society of Vertebrate Paleontology Annual Meeting, Raleigh, NC. *Journal of Vertebrate Paleontology* 32(supp. to 3):191A.
- 2010 \***Watanabe, A.**, P.C. Sereno, P. C. A large short-snouted dromaeosaurid (Theropoda: Maniraptora) from Inner Mongolia. Society of Vertebrate Paleontology Annual Meeting, Pittsburgh, PA. *Journal of Vertebrate Paleontology* 30(supp. to 3):184A.

## Poster

\*presenting author

- 2011 \***Watanabe, A.**, G.M. Erickson. Arctic dinosaur histology: osteological growth in an arc-tometatarsalian theropod from the late Cretaceous Prince Creek Formation of Alaska. Southeastern Association of Vertebrate Paleontologists Annual Meeting, Gainesville, FL.
- \***Watanabe, A.** Bone histology of an Alaskan ornithomimosaur: implications for polar dinosaurian physiology. Society of Vertebrate Paleontology Annual Meeting, Las Vegas, NV. *Journal of Vertebrate Paleontology* 31(supp. to 3):212A.

- 2009 | \***Watanabe, A.**, P.C. Sereno. The forelimb of a new Tyrannosauridae (Dinosauria: Theropoda) from China and its implications for forelimb evolution in tyrannosaurids. Society of Vertebrate Paleontology Annual Meeting, Bristol, UK. *Journal of Vertebrate Paleontology* 29(supp. to 3):200A.
- 2008 | \***Watanabe, A.** *Stegosaurus*: hands, feet, and footprints. Society of Vertebrate Paleontology Annual Meeting, Cleveland, OH. *Journal of Vertebrate Paleontology* 28(supp. to 3):158A.

## Teaching

### Mentorship

- 2014– | **Mentor**, Isabelle Brenes, Saint Francis Preparatory School, Fresh Meadows, NY.

### Courses

- 2015 | **Invited Lecturer**, Geometric Morphometrics, NY Consortium in Evolutionary Primatology  
**Invited Lecturer**, Geometric Morphometrics, Richard Gilder Graduate School
- 2014 | **Invited Lecturer**, Systematics & Biogeography, Richard Gilder Graduate School
- 2013 | **Lab Instructor**, Systematics & Biogeography, Richard Gilder Graduate School
- 2011 | **Lab Instructor**, Comparative Vertebrate Anatomy, Florida State University  
**Lab Instructor**, Human Anatomy & Physiology I, Florida State University
- 2010 | **Lab Instructor**, Vertebrate Structure & Function, University of Chicago  
**Teaching Assistant**, Dinosaur Science, University of Chicago

### Workshops

\*organizer/instructor

- 2015 (expected) | \**geomorph* R package Workshop, Society of Vertebrate Paleontology Meeting, Dallas, TX
- 2015 | Scientific Teaching Workshop, American Museum of Natural History
- 2011 | \*NSF Graduate Research Fellowship Workshop, Florida State University
- 2010 | Teaching Workshop, Florida State University

## Service

### Professional

- | **Peer Reviewer**, *Acta Zoologica*, *Palaeoworld*, *Paleobiology*, *Journal of Morphology*, *PeerJ*, *PLoS ONE* (2), *Nature Scientific Reports*.
- 2015 | **Organizer**, Conference Symposium: “Shape of Things to Come: Geometric Morphometrics in Vertebrate Paleontology”, Society of Vertebrate Paleontology Meeting, Dallas, TX
- 2014 | **Invited Scientific Member**, AMNH Digital Learning Working Group, New York, NY

### Public

- 2013–2015 | **Invited Speaker**, Museum Workshop for NYU Science, Health, Education & Environmental Reporting Graduate Program, New York, NY
- 2014, 2015 | **Invited Speaker**, Adventures in Science Workshop, New York, NY (Grades 2-4)
- 2015 | **Co-Developer & Invited Speaker**, AMNH Hackathon, New York, NY

- Twitter Working Group**, Richard Gilder Graduate School, New York, NY
- Scientific Contributor**, Museum Exhibit “Dinosaurs Among Us”, AMNH, New York, NY
- Invited Scientist for Q&A**, Science Alliance “Science and Scientists at the AMNH” Program, New York, NY
- Invited Speaker**, Meet the Scientist Program, AMNH, NY (Age 7+)
- Guide**, Saint Ann’s School Science Program, New York, NY (Grades 6, 7)
- Invited Speaker**, Greenwich Series at The Bitter End, New York, NY.
- 2014 **Invited Participant**, DARPA Art & Science Workshop, Washington, D.C.
- Host Scientist**, AMNH Educators Evening, New York, NY (300+ attendees)
- Invited Speaker**, New York City Science & Engineering Fair Finals, New York, NY (High School Competitors, Friends & Family)
- Invited Scientist**, Museum Identification Day, AMNH, New York, NY
- 2013 **Invited Speaker**, TEDxYouth Day, New York, NY
- Google Glass beta-tester**, video project in collaboration with AMNH Media and Communications Departments <[YouTube](#)><[io9 Article](#)><[Smithsonian](#)>
- Co-Developer & Co-Instructor**, Capturing Dinosaurs 3D Scanning & Printing Workshop, AMNH, New York, NY (High School) <[YouTube](#)><[Gizmodo](#)>
- Host Scientist**, World Maker Faire, Brooklyn, NY
- Guest Scientist**, Museum workshop for New York University Science, Health, Education, and Environmental Reporting Graduate Program, New York, NY
- Judge**, Urban Barcoding Project Poster Session, New York, NY (High School Competitors)
- 2011 **Guide**, SciGirls Camp Fossil Collecting Field Trip, Tallahassee, FL (Grade 9)
- Judge**, Tri-Beta Biology Undergraduate Society Poster Session, Florida State University
- Judge**, Capital Regional Science & Engineering Fair, Tallahassee, FL (Grades 7-12)
- 2010 **Invited Lecturer**, Japanese Society for Humanistic Studies, Detroit Metro, MI (Age 10+; presented in Japanese)
- 2009 **Invited Lecturer**, Project Exploration, Chicago, IL

## Fieldwork

- 2014 Joint Cluj-Bucharest-AMNH Expedition, Sebeş, Romania
- 2013 Joint AMNH-Mongolian Academy of Sciences Expedition, Mongolia
- 2011 Bite Force Measurements, St. Augustine Alligator Farm, FL
- 2010 Herpetological Fieldwork, Apalachicola Region, FL
- Plant & Marine Life Survey, St. Marks Wildlife Refuge, FL
- University of Chicago paleontological excavation, Shell, WY
- 2009 Project Exploration paleontological fieldwork, Wibaux, MT
- 2008 University of Chicago paleontological excavation, Shell, WY

## Membership

### Professional

- 2011– Society of Integrative and Comparative Biology
- 2010– Willi Hennig Society
- 2008– Society of Vertebrate Paleontology

### Miscellaneous

- 2012– **Violin I**, New Amsterdam Symphony Orchestra, New York, NY
- 2010–2012 **Assistant Concertmaster**, Big Bend Community Orchestra, Tallahassee, FL
- 2005–2010 **Violin I**, University of Chicago Symphony Orchestra, Chicago, IL

## Recommenders

### Mark A. Norell, PhD (PhD Supervisor)

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Division of Paleontology  
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### Gregory M. Erickson, PhD (MSc Supervisor)

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### John J. Flynn, PhD

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