

Akinobu Watanabe

Assistant Professor of Anatomy

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Research Program

1. Archosaur paleobiology, including brain and skull evolution and development in non-avian and avian dinosaurs.
2. Advances in phenomic characterization of biological forms, from protein shapes to gross anatomy.
3. Computational tools to evaluate the theory and practice of phylogenetic and morphometric methods.

Education

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| 2016 | Ph.D. in Comparative Biology Richard Gilder Graduate School at the American Museum of Natural History. Dissertation: “Variations on the theme of morphological characterization, development and evolution, featuring computed tomography imaging, geometric morphometrics, phylogenetics and Archosauria.” (Advisor: Mark A. Norell) |
| 2012 | M.Sc. in Biological Science Florida State University. Thesis: “The ontogeny of cranial morphology in extant crocodylians and its phylogenetic utility: a geometric morphometric approach.” (Advisor: Gregory M. Erickson) |
| 2009 | B.A. in Biological Sciences, Geophysical Sciences; Minor in Music University of Chicago. Thesis: “The manus and pes of <i>Stegosaurus</i> and implications for trackway analysis.” (Advisor: Paul C. Sereno) |

Professional Appointments

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| 2018–Current | Assistant Professor Department of Anatomy, New York Institute of Technology College of Osteopathic Medicine. |
| 2018–Current | Scientific Associate Department of Life Sciences–Vertebrates Division, Natural History Museum, London. |
| 2016–Current | Research Associate Division of Paleontology, American Museum of Natural History. |
| 2018–2020 | Associate Editor <i>Data in Brief</i> |
| 2017 | Postdoctoral Research Associate Natural History Museum, London (PI: Anjali Goswami) |
| 2016–2017 | Postdoctoral Research Associate University College London (PI: Anjali Goswami) |

Peer-Reviewed Publications

*mentees

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| In Review | Cerio, D.G., C.J. Llera, A. Hogan, A.M. Balanoff, A. Watanabe , G.S. Bever. Differential growth of the adductor muscles and brain in the chick <i>Gallus gallus</i> with comments on the fossil record of stem-group birds. |
| | Goswami, A., E. Noirault, E.J. Coombs, J. Clavel, A.-C. Fabre, T.J.D. Halliday, M. Churchill, A. Curtis, A. Watanabe , N.B. Simmons, B. Beatty, J.H. Geisler, D.L. Fox, R.N. Felice. Development and ecology underlie mosaic evolution of the placental skull. <i>Philosophical Transactions of the Royal Society B</i> . |
| | Yu, C., A. Watanabe , Z. Qin, J.L. King, L.M. Witmer, Q. Ma, X. Xu. Convergent avialan brain morphology in <i>Sinovenator</i> (Troodontidae, Theropoda). <i>Communications Biology</i> . |

Balanoff, A.M., E. Ferrer, L. Saleh, P. Gignac, M.E. Gold, J. Marugán-Lobón, M. Norell, D. Ouellette, M. Salerno, **A. Watanabe**, S. Wei, G.S. Bever, P.Vaska. Brain activity and the evolution of avian powered flight.

Molnar, J., **A. Watanabe**. Morphological and functional regionalization of trunk vertebrae as an adaptation for arboreal locomotion in chameleons. *Proceedings of the Royal Society B*.

Santos, B.F., **A. Watanabe**, M. Tsuchiya. Placing fossils in total evidence phylogenies: simulating fossilization to assess uncertainty in tip-dating approaches. *Molecular Phylogenetics and Evolution*.

*Tharakan, S., *N. Shepherd, R. Felice, A. Goswami, D. Gower, E. Stanley, **A. Watanabe** Intraspecific cranial integration in *Anolis carolinensis* and *Natrix helvetica* mirrors squamate-wide macroevolutionary pattern. *Integrative Organismal Biology*

Watanabe, A., *S.S. Marshall, P.M. Gignac. Dumbbell-shaped brains of Polish crested chickens as a model system for the evolution of novel brain morphologies. *Journal of Anatomy*

2022 Goswami, A., E. Noirault, E.J. Coombs, J. Clavel, A.-C. Fabre, T.J.D. Halliday, M. Churchill, A. Curtis, **A. Watanabe**, N.B. Simmons, B. Beatty, J.H. Geisler, D.L. Fox, R.N. Felice. Attenuated evolution of mammals through the Cenozoic. *Science* 378:377–383

2021 **Watanabe, A.**, A.M. Balanoff, P.M. Gignac, M.E.L. Gold, M.A. Norell. Novel neuroanatomical integration and scaling define avian brain shape evolution and development. *eLife* 10:e68809. <https://doi.org/10.7554/eLife.68809>. Press Coverage: [AMNH](#)

2020 Felice, R.F., **A. Watanabe**, A.R. Cuff, M. Hanson, B.-A.S. Bhullar, E.R. Rayfield, L.M. Witmer, M.A. Norell, A. Goswami. Decelerated dinosaur evolution at the origin of birds. *PLoS Biology* 18(8):e3000801. <https://doi.org/10.1371/journal.pbio.3000801>. Press Coverage: [Scientific American](#), [NHMUK](#)

Ksepka, D.T., A.M. Balanoff, N.A. Smith, G.S. Bever, B.-A. Bhullar, E. Bourdon, E.L. Braun, J.G. Burleigh, J.A. Clarke, M.W. Colbert, J.R. Corfield, F.J. Degrange, V.L. de Pietri, C.M. Early, D.J. Field, P.M. Gignac, M.E.L. Gold, E.D. Jarvis, R.T. Kimball, S. Kawabe, L. Lefebvre, J. Marugán-Lobón, C.S. Mongle, A. Morhardt, M.A. Norell, R.C. Ridgely, R.P. Scofield, C.P. Tambussi, C.R. Torres, M. van Tuinen, S.A. Walsh, **A. Watanabe**, L.M. Witmer, A.K. Wright, L.E. Zanno, J.B. Smaers. Tempo and pattern of avian brain size evolution. *Current Biology* 30:1–11. doi: [10.1016/j.cub.2020.03.060](https://doi.org/10.1016/j.cub.2020.03.060). Press Coverage: [CNN](#), [UK Daily Mail](#), [ScienceDaily](#)

Hogan, A.V.C., **A. Watanabe**, A.M. Balanoff, G.S. Bever. Comparative growth in the olfactory system of the developing chick with considerations for evolutionary studies. *Journal of Anatomy* 237:225–240. doi: [10.1111/joa.13197](https://doi.org/10.1111/joa.13197)

2019 **Watanabe, A.**, A.-C. Fabre, R.N. Felice, A. Maisano, J. Müller, A. Herrel, A. Goswami. Ecomorphological diversification in squamates from conserved pattern of cranial integration. *Proceedings of National Academy of Sciences USA* 116:14688–14697. doi: [10.1073/pnas.1820967116](https://doi.org/10.1073/pnas.1820967116). Press Coverage: [NHMUK](#), [NYIT](#)

Bardua, A., R.N. Felice, **A. Watanabe**, A.-C. Fabre, A. Goswami. A practical guide to sliding and surface semilandmarks in morphometric analyses. *Integrative Organismal Biology* 1(1):obz016. doi: [10.1093/iob/obz016](https://doi.org/10.1093/iob/obz016)

Goswami, A., **A. Watanabe**, R.N. Felice, C. Bardua, A.-C. Fabre, P.D. Polly. High-density morphometric analysis of shape and integration: The good, the bad, and the not-really-a-problem. *Integrative and Comparative Biology* 59:669–683. doi: [10.1093/icb/icz120](https://doi.org/10.1093/icb/icz120)

Felice, R.N., **A. Watanabe**, A.R. Cuff, E. Noirault, D. Pol, L.M. Witmer, M.A. Norell, P.M. O'Connor, A. Goswami. Evolutionary integration and modularity in the archosaur cranium. *Integrative and Comparative Biology* 59:371–382. doi: [10.1093/icb/icz052](https://doi.org/10.1093/icb/icz052)

Watanabe, A., P.M. Gignac, A.M. Balanoff, T.L. Green, N.J. Kley, M.A. Norell. Are endocasts good proxies for brain size and shape in archosaurs throughout ontogeny? *Journal of Anatomy*. doi: [10.1111/joa.12918](https://doi.org/10.1111/joa.12918). **Top 20 Most Downloaded Article of the Year in Journal of Anatomy (2018, 2019)**

- 2018 | Gold, M.E.L., **A. Watanabe**. Flightless birds are not neuroanatomical analogs of non-avian dinosaurs. *BMC Evolutionary Biology* 18:190. doi: [10.1186/s12862-018-1312-0](https://doi.org/10.1186/s12862-018-1312-0). Press Coverage: [AMNH](#), [Suffolk University](#)
- Watanabe, A.** How many landmarks are enough to characterize shape and size? *PLoS ONE* 13(6):e0198341. doi: [10.1371/journal.pone.0198341](https://doi.org/10.1371/journal.pone.0198341)
- 2016 | Marugán-Lobón, J., **A. Watanabe**, S. Kawabe. Studying avian encephalization using geometric morphometrics. *Journal of Anatomy* 229:191–203. Symposium on “Evolving approaches for studying the anatomy of the avian brain”. doi: [10.1111/joa.12476](https://doi.org/10.1111/joa.12476)
- Watanabe, A.** The impact of poor sampling of polymorphisms on cladistic analysis. *Cladistics* 32:317–334. doi: [10.1111/cla.12130](https://doi.org/10.1111/cla.12130)
- 2015 | **Watanabe, A.**, M.E.L. Gold, S.L. Brusatte, R.B.J. Benson, J. Choiniere, A. Davidson, M.A. Norell. Vertebral pneumaticity in the ornithomimosaur *Archaeornithomimus* (Dinosauria: Theropoda) revealed by computed tomography imaging and reappraisal of axial pneumaticity in Ornithomimosauria. *PLoS ONE* 10(12):e0145168. doi:[10.1371/journal.pone.0145168](https://doi.org/10.1371/journal.pone.0145168). Press Coverage: [Forbes](#), [AMNH](#)
- 2014 | **Watanabe, A.**, D.E. Slice. The utility of cranial ontogeny for phylogenetic inference: a case study in crocodylians using geometric morphometrics. *Journal of Evolutionary Biology* 27:1078–1092. doi: [10.1111/jeb.12382](https://doi.org/10.1111/jeb.12382)
- 2013 | Brusatte, S.L., M. Vremir, Z. Csiki, M.A. Norell, A.H. Turner, **A. Watanabe**, G.M. Erickson. The osteology of *Balaur bondoc*, an island-dwelling dromaeosaurid (Dinosauria: Theropoda) from the Late Cretaceous of Romania. *Bulletin of the American Museum of Natural History* 374:1–100. doi: [10.1206/798.1](https://doi.org/10.1206/798.1)
- Watanabe, A.**, G.M. Erickson, P.S. Druckenmiller. An ornithomimosaur from the Upper Cretaceous Prince Creek Formation of Alaska. *Journal of Vertebrate Paleontology* 33:1169–1175. doi: [10.1080/02724634.2013.770750](https://doi.org/10.1080/02724634.2013.770750)
- Brusatte, S.L., M. Vremir, **A. Watanabe**, Z. Csiki-Sava, D. Naish, G. Dyke, G.M. Erickson, M.A. Norell. An infant ornithomimid dinosaur tibia from the late Cretaceous of Sebeş, Romania. *Terra Sebus: Acta Musei Sabesiensis* 5:627–644. [PDF](#)

Books

- 2020 | **Watanabe, A.** (Editor, Co-Author), Y. Yang, Z. Chuang. *Tyrannopedia* (in Japanese). Kōdansha. 180 pp. [Amazon Japan page](#)

Computational Programs

- 2018 | **LaMDA: LandMark Data Analysis.** R package for simulating shape data and assessing the robustness of landmark sampling. <https://github.com/akiopteryx/lambda>
- 2015 | **PERDA: Permutational Entry Replacement Data Analysis.** TNT script to evaluate the impact of poor sampling of polymorphisms on resulting tree topology. <https://github.com/akiopteryx/PERDA>
- 2014 | **PermuTree.** Python script to perform permutational regression analysis on phylogenetic trees. <http://datadryad.org/resource/doi:10.5061/dryad.14fn1>
- Tree Comparison.** TNT script to test the significance of topological differences between phylogenetic trees. <http://datadryad.org/resource/doi:10.5061/dryad.14fn1>

Research Grants

- 2021 | **NSF Integrative Organismal Systems CAREER Grant** “Evo-developmental interactions of craniofacial and brain anatomy” (\$710,855)

- 2018 **NSF Major Research Instrumentation Grant** “Acquisition of a high-energy micro-computed tomography scanner for inter- and multi-disciplinary STEM research” (as Senior Personnel; PI: Simone Hoffmann) (\$426,621)
- NSF Division of Environmental Biology** “Ecomorphological diversification and the origin of phenotypic disparity in crocodile-line archosaurs” (as Senior Personnel; PI: Alan Turner) (\$579,508)
- 2017 **Paleontological Society Newell Early Career Grant** “Elucidating the drivers of cranial evolution in reptiles, amphibians, and their extinct relatives through large-scale morphometric analysis.” (\$5,000)
- 2016 **SYNTHESYS for research trips in the EU** “Elucidating drivers of cranial evolution in lizards, snakes, and their extinct relatives through large-scale phenomic analysis.”
- 2015 **NSF Division of Environmental Biology** “Unraveling the deep history of avian neurological complexity: implications for the origins of flight and organization of the modern avian brain.” (as Senior Personnel; PI: Amy Balanoff) (\$521,296)
- Society of Vertebrate Paleontology Mary R. Dawson Predoctoral 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)
- Robert B. Short Zoology Scholarship** Florida State University (\$150)

Awards

- 2022 **Early Career Investigator Award** American Association for Anatomy
- 2020 **American Association for Anatomy BioArt Winner 2020** [Anatomy BioArt Winners](#)
- Best Paper Prize Runner-Up** Journal of Anatomy
- 2019 **Top Downloaded Paper 2018–2019** Journal of Anatomy
- Best Paper Prize Runner-Up** Journal of Anatomy
- 2018 **Top Downloaded Article 2017–2018** Journal of Anatomy

Presentations

Invited Talks

- 2023 (invited) **University of Alabama** AL
- 2022 **Early Career Investigator Award Session** Experimental Biology, Philadelphia, PA
- University of Chicago** IL [Virtual]
- Humboldt State University** CA [Virtual]
- Vertebrate Paleontology Group** London, U.K.
- 2021 **University of Texas at Arlington** TX [Virtual]
- Puerto Ideas** Chile [Virtual]
- 2019 **Natural History Museum** London, U.K.
- Adelphi University** Garden City, NY

- Farmingdale State College East Farmingdale, NY
- 2018 **Japanese Association of Scholars in Science** New York, NY (presented in Japanese)
- 2017 **University of Bristol** Bristol, U.K.
Institute of Vertebrate Paleontology and Paleoanthropology Beijing, China
Museum für Naturkunde Berlin, Germany
Grant Museum of Zoology London, U.K.
- 2015 **Oklahoma State University Center for Health Sciences** Tulsa, OK
- 2014 **National Evolutionary Synthesis Center** Durham, NC
- 2013 **Harvard University** Department of Organismic & Evolutionary Biology, Cambridge, MA
Metropolitan Society of Natural Historians Darwin Symposium, New York, NY
- 2010 **Japanese Society for Humanistic Studies** Detroit Metro, MI (presented in Japanese)

Podium

*mentees

- 2023 (accepted) **A. Watanabe**, *S. Landman, *S. Marshall, *M. Shah, *M. Taylor, *T. Green, P. Gignac. Polish crested chickens: A promising new model system with aberrant head anatomy. International Congress of Vertebrate Morphology Meeting, Cairns, Australia.
- Molnar, J.L., **A. Watanabe**. Revisiting old questions with new methods: interplay between embryonic motility and craniofacial development. International Congress of Vertebrate Morphology Meeting, Cairns, Australia.
- *T. Green, D.I. Kay, M.C. Granatosky, **A. Watanabe**, P. Gignac. Assessing the cassowary casque as a visual display ornament via geometric morphometric shape analysis. International Congress of Vertebrate Morphology Meeting, Cairns, Australia.
- A.R. Beyl, A. Balanoff, P. Gignac, J. Smaers, **A. Watanabe**, E. Wilberg, A. Turner. Morphological variation and ecological signals in extant crocodylomorph endocasts. International Congress of Vertebrate Morphology Meeting, Cairns, Australia.
- K. Garland, J. Abramyan, *M. Taylor, **A. Watanabe**, A.R. Evans. Tweaking the chicken beak: Investigating the shape and development of the chicken (*Gallus gallus*) beak from embryo to adult. International Congress of Vertebrate Morphology Meeting, Cairns, Australia.
- 2023 *Green, T., *T. Goldblatt, *J. Ng, *S. Chariwala, P. Gignac, **A. Watanabe**. Do the cranial casques of cassowaries function as vocal resonators? Society of Integrative and Comparative Biology Meeting, Austin, TX.
- 2022 Goswami, A., E. Noirault, E.J. Coombs, J. Clavel, A.-C. Fabre, T.J.D. Halliday, M. Churchill, A. Curtis, **A. Watanabe**, N.B. Simmons, B. Beatty, J.H. Geisler, D.L. Fox, R.N. Felice. Attenuated evolution of mammals through the Cenozoic. Society of Vertebrate Paleontology Meeting, Toronto, Canada
- Watanabe, A.**, P.M. Gignac, *T.L. Green, *M. Bedell, *S. Landman, *S.S. Marshall, *Y. Okouneva. High-density shape analysis on a new avian model to study the emergence of bizarre brain (and craniofacial) morphologies. Society of Integrative and Comparative Biology Meeting, Phoenix, AZ.
- 2021 **Watanabe, A.**, *M. Bedell, *S. Landman, *S. Marshall, *Y. Okouneva, P. Gignac. Polish crested chickens: a promising new model system with bizarrely shaped brain and skull. Experimental Biology Meeting [Virtual]
- *Green, T.L., **A. Watanabe**, P.M. Gignac. Potentially neomorphic cranial bone revealed in first micro-CT study of southern cassowary casque development. Experimental Biology Meeting [Virtual]

- Schwab, J.A., M.T. Young, Y. Herrera, L. Witmer, S. Walsh, **A. Watanabe**, A.H. Turner, S. Brusatte. Ecomorphological variation in endocranial shape in thalattosuchian crocodylomorphs. *Secondarily Adaptation of Tetrapods to Life in Water Conference* [Virtual]
- 2020 **Watanabe A.**, *M. Bedell, R. Felice, A. Balanoff. Getting it inside your head: a unified analysis of brain and skull evolution. *Society of Vertebrate Paleontology Meeting*. [Virtual]
- Gignac, P., A.R. Beyl, M.E.L. Gold, J. Gray, A. Morhardt, R. Stout, D. Vazquez-Sanroman, **A. Watanabe**, M. Wilson, N.J. Kley. Extending the endocast paradigm: standard and contrast-enhanced computed tomography unite paleontological and neontological neuroimaging. *Society of Vertebrate Paleontology Meeting*. [Virtual]
- Turner, A.H., A.R. Beyl, S. Brusatte, P. Gignac, D. Pol, J.A. Schwab, J.B. Smaers, **A. Watanabe**, E. Wilberg, M.T. Young. Ecomorphological and allometric signatures in endocranial shape in crocodylomorphs. *Society of Vertebrate Paleontology Meeting*. [Virtual]
- Green, T., **A. Watanabe**, P.M. Gignac. An osteo-developmental baseline for cranial casque anatomy of Southern cassowaries better informs functional interpretations. *Experimental Biology Meeting, San Diego, CA*. doi: [10.1096/fasebj.2020.34.s1.06194](https://doi.org/10.1096/fasebj.2020.34.s1.06194) [canceled due to COVID]
- Beyl, A.R., J.B. Smaers, P.M. Gignac, **A. Watanabe**, E.W. Wilberg, A.H. Turner. Evolutionary regime shifts in crocodylian neuroanatomy. *Society of Integrative and Comparative Biology Meeting, Austin, TX*.
- *Landman, S., *Y. Okouneva, P. Gignac, **A. Watanabe**. Brain and skull interactions in Polish crested chickens as a model for hydrocephalus. *Osteopathic Medicine Education Conference*. [Virtual]
- 2019 **Watanabe, A.**, R.N. Felice, A.M. Balanoff, *M. Bedell, *S. Marshall. The brain's influence on skull development and evolution. *Northeast Regional Society of Integrative and Comparative Biology Meeting, Chestnut Hill, MA*.
- Gold, M.E.L., **A. Watanabe**. Flightless birds are not neuroanatomical analogs of non-avian dinosaurs. *Northeast Regional Society of Integrative and Comparative Biology Meeting, Chestnut Hill, MA*.
- Goswami, A., A.-C. Fabre, E. Noirault, R. Felice, J. Clavel, **A. Watanabe**, P. Fabre, A. Curtis, N. Simmons, D.L. Fox, M. Churchill, B.L. Beatty, J. Geisler. Integration, extinction, climate, and the evolution of the placental mammal cranium. *Society of Vertebrate Paleontology Annual Meeting, Brisbane, Australia*.
- Felice, R.N., **A. Watanabe**, A. Cuff, M. Hanson, D. Pol, B.S. Bhullar, M.A. Norell, L.M. Witmer, P.M. O'Connor, A. Goswami. Dinosaurs disparity differently: Contrasting patterns of cranial variation and macroevolution across dinosaurs and crocodylomorphs. *Society of Vertebrate Paleontology Annual Meeting, Brisbane, Australia*.
- Turner, A.H., **A. Watanabe**, A.R. Beyl, A.H. D'Amore, E. Wilberg, J.H. Smaers, P.M. Gignac. Ecomorphological and allometric signatures in endocranial shape in crocodylians. *Society of Vertebrate Paleontology Annual Meeting, Brisbane, Australia*.
- *Bedell, M.L., P.M. Gignac, A. Balanoff, **Watanabe, A.**. The phenotypic interplay between the brain and skull in developing chicken (*Gallus gallus*) and American alligator (*Alligator mississippiensis*). *Osteopathic Medicine Education Conference, Baltimore, MD*.
- Watanabe, A.**, R.N. Felice, M.L. Bedell, A.M. Balanoff. The brain as a constraint on craniofacial evolution in birds. *International Congress of Vertebrate Morphology Meeting, Prague, Czech Republic*.
- Goswami, A., C. Bardua, **A. Watanabe**, A.-C. Fabre, M. Randau, A. Marshall, M. Bon, E. Noirault, R.N. Felice. Assessing the macroevolutionary consequences of phenotypic integration with dense phenomic data from living and extinct tetrapods. *International Congress of Vertebrate Morphology Meeting, Prague, Czech Republic*.

- Felice, R.N., **A. Watanabe**, A. Cuff, M. Hanson, B.A. Bhullar, D. Pol, M.A. Norell, L.M. Witmer, P.M. O'Connor, E.J. Rayfield. Disparate integration patterns shape the evolution of cranial disparity across archosaurs. International Congress of Vertebrate Morphology Meeting, Prague, Czech Republic.
- Watanabe, A.**, P.M. Gignac, M.E.L. Gold, A.M. Balanoff, M.A. Norell. Developmental and evolutionary dynamics of the dinosaurian brain. Northeastern Regional Vertebrate Evolution Symposium, Old Westbury, NY.
- Watanabe, A.**, R.N. Felice, JA Maisano, J. Müller, A. Herrel, A. Goswami. First squamate-wide phenomic analysis reveals conserved pattern of cranial integration underlying mosaic skull shape evolution. Society of Integrated and Comparative Biology Meeting, Tampa, FL.
- Goswami, A., **A. Watanabe**, R.N. Felice, C. Bardua, A.-C. Fabre, P.D. Polly. Phenomic approaches to analysing integration in complex systems and across diverse taxa: the good, the bad, and the ugly. Society of Integrated and Comparative Biology Meeting, Tampa, FL.
- 2018 **Watanabe, A.**, P.M. Gignac. High-dimensional shape analysis of endocasts and brain reconstructions reveals the precise applicability of endocasts as a neuroanatomical correlate in archosaurs. Society of Vertebrate Paleontology, Albuquerque, NM.
- Bardua, C., R.N. Felice, **A. Watanabe**, A. Goswami. Best practices for capturing and analyzing high dimensional shape data: An amphibian case study. Society of Vertebrate Paleontology Meeting, Albuquerque, NM.
- Felice, R.N., **A. Watanabe**, A. Cuff, L.M. Witmer, M.A. Norell, E.J. Rayfield, A. Goswami. Quantifying cranial convergence, evolutionary rates, and disparity in the dinosaur skull. Society of Vertebrate Paleontology Meeting, Albuquerque, NM.
- Hoffmann, S., R. Shahid, **A. Watanabe**, P. Gill. Large sampling from early Jurassic fissure filling reveals variation in cochlear canal shape in the basal mammaliaform *Morganucodon*. Society of Vertebrate Paleontology, Albuquerque, NM.
- Watanabe, A.**, J.A. Maisano, J. Müller, A. Herrel, A. Goswami. The tempo, mode, and modularity of skull shape evolution in squamate reptiles. Northeastern Regional Vertebrate Evolution Symposium, Old Westbury, New York.
- 2017 **Watanabe, A.**, R. Felice, J.A. Maisano, J. Müller, A. Herrel, A. Goswami. High-dimensional geometric morphometric approach to understanding skull shape evolution in squamates. Paleontological Association Meeting, London, U.K.
- Watanabe, A.**, J.A. Maisano, J. Müller, A. Herrel, A. Goswami. Large-scale morphometric analysis reveals patterns of cranial shape evolution across squamates. Society of Vertebrate Paleontology Annual Meeting, Calgary, Canada.
- Vremir, M., D.E. Barta, M. Fernandez, R. Totoianu, D. Grigorescu, **A. Watanabe**, M.A. Norell. Megaloolithid eggs and nests from the Late Maastrichtian of Sebes area (Transylvanian Basin, Romania). Symposium on Dinosaur Eggs and Babies, Portugal.
- 2016 **Watanabe, A.** Modular evolution and development of the theropod brain. Society of Vertebrate Paleontology Annual Meeting, Salt Lake City, UT.
- Watanabe, A.**, P.M. Gignac, M. Norell. Mind the epidural gap: shape differences between endocast and brain through ontogeny. International Congress of Vertebrate Morphology Meeting, Washington, DC. Invited contribution to the symposium "Iodine-enhanced Soft-tissue Imaging: A Neontological Inference Tool for Vertebrate Paleontology."
- 2015 **Watanabe, A.** How many landmarks are enough? Identifying adequate sampling of landmarks for capturing the shape of specimens. Society of Vertebrate Paleontology Annual Meeting, Dallas, TX.
- Watanabe, A.** Tree building on Noah's Ark: the impact of poor sampling of polymorphism on phylogenetic inference. Evolution Meeting, Guarujá, Brazil.

- 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.
- 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 Noah's 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

*mentees

- 2023 (submitted) *S. Landman, *M.J. Taylor, *T.L. Green, K. Moussa, P. Gignac, M.E.L. Gold, **A. Watanabe**. Evaluating congenital hydrocephalus as potential etiology for novel brain morphologies? Anatomy Connected Meeting, Washington DC
- Cerio, D.G., C.J. Llera, A. Hogan, A.M. Balanoff, **A. Watanabe**, G.S. Bever. Differential growth of the adductor chamber, eye, and brain in the chick *Gallus gallus* with comments on the avialan fossil record. Anatomy Connected Meeting, Washington, DC.
- 2023 *S. Landman, *M.J. Taylor, *T.L. Green, K. Moussa, P. Gignac, M.E.L. Gold, **A. Watanabe**. Could congenital hydrocephalus lead to evolution of novel brain morphologies in domestic chickens? Society of Integrative and Comparative Biology, Austin, TX.
- 2022 *Forcellati, M.R., *T.L. Green, **A. Watanabe**. Distinct lineage-specific developmental trajectories underlie brain shape diversification in ratites (Aves: Palaeognathae). Society of Vertebrate Paleontology Meeting, Toronto, Canada. **Colbert Student Poster Prize for Best Student Poster**
- *Green, T.L., **A. Watanabe**, *J. Ng, *S. Chariwala, *T. Goldblatt, P. Gignac. 3D cranial imaging is the swan song for the cassowary casque as a vocal resonator. Society of Vertebrate Paleontology Meeting, Toronto, Canada.
- *Green, T.L., **A. Watanabe**, P. Gignac. Potentially Neomorphic Cranial Bone Revealed in First Micro-CT Study of Southern Cassowary Casque Development. Experimental Biology Meeting, Philadelphia, PA.
- *S. Landman, *M.J. Taylor, *T.L. Green, K. Moussa, P. Gignac, M.E.L. Gold, **A. Watanabe**. Could congenital hydrocephalus lead to evolution of novel brain morphologies in domestic chickens? NYITCOM Student Research Symposium, Old Westbury, NY.
- *Tharakan, S., *N. Shepherd, R.N. Felice, A. Goswami, D.J. Gower, E.L. Stanley, **A. Watanabe**. Intraspecific cranial integration in *Anolis carolinensis* and *Natrix helvetica* mirrors squamate-wide macroevolutionary pattern. NYITCOM Student Research Symposium, Old Westbury, NY.

- *Green, T.L., P.M. Gignac, **A. Watanabe**. Cassowaries are unicorns: Ontogenetic micro-CT analyses of *Casuarius* casques reveal a likely neomorphic cranial bone. Society of Integrative and Comparative Biology, Phoenix, AZ.
- *Forcellati, M., *T. Green, **A. Watanabe**. Distinct developmental trajectories underlie brain shape development in ratites (Aves: Palaeognathae). Society of Integrative and Comparative Biology Meeting, Phoenix, AZ.
- *S. Tharakan, *N. Shepherd, R.N. Felice, A. Goswami, D.J. Gower, E.L. Stanley, **A. Watanabe**. Intraspecific cranial integration in *Anolis carolinensis* and *Natrix helvetica* mirrors squamate-wide macroevolutionary pattern. Society of Integrative and Comparative Biology Meeting, Phoenix, AZ. **David and Marvalee Wake Award for Best Student Presentation**
- 2021 *Forcellati, M., *T. Green, **A. Watanabe**. Distinct developmental trajectories underlie unique brain morphology in large ratites (Aves: Palaeognathae). Columbia University Undergraduate Research Symposium.
- 2020 *Landman, S., *Y. Okouneva, P. Gignac, **A. Watanabe**. Brain and skull interactions in Polish crested chickens as a model for hydrocephalus. NYIT Academic Physican Scientist Association Research Poster Symposium. [Virtual]
- 2019 *Bedell, M.L., P.M. Gignac, A. Balanoff, **A. Watanabe**. How does the brain influence skull development in chickens and alligators? NYIT Summer Research Program Poster Symposium, Old Westbury, NY.
- *Marshall, S., P.M. Gignac, A.M. Balanoff, **A. Watanabe**. Polish Crested chickens: Model for the evolution of big brains? NYIT Summer Research Program Poster Symposium, Old Westbury, NY.
- 2018 Hogan, A., **A. Watanabe**, A.M. Balanoff, G.S. Bever. Differential growth in the telencephalon of developing chick—the olfactory bulb in ontogeny and phylogeny. Society of Vertebrate Paleontology Meeting, Albuquerque, NM.
- Zaransky, S., M. Gibilisco, **A. Watanabe**, S. Hoffmann. Postnatal ontogeny of inner ear morphology in chicken and alligator. Society of Integrative and Comparative Biology Meeting, San Francisco, CA.
- 2011 **Watanabe, A.**, G.M. Erickson. Arctic dinosaur histology: osteological growth in an arcotometatarsalian 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

Courses

- 2018–Current **Foundations of Osteopathic Medicine–Human Gross Anatomy** (Co-Instructor) New York Institute of Technology College of Osteopathic Medicine [Taught Annually]
- 2015–2023 **Geometric Morphometrics** (Co-Instructor) American Museum of Natural History [Taught Alternate Years]

2022	Vertebrate Paleontology (Co-Instructor) American Museum of Natural History
2020	Practicum in Clinically Oriented Anatomy (Course Director) New York Institute of Technology College of Osteopathic Medicine
2013	Systematics & Biogeography (Lab Instructor) American Museum of Natural History
2011	Comparative Vertebrate Anatomy (Lab Instructor) Florida State University Human Anatomy & Physiology I (Lab Instructor) Florida State University
2010	Vertebrate Structure & Function (Lab Instructor) University of Chicago Dinosaur Science (Teaching Assistant) University of Chicago

Mentorship

2020–Current	Todd Green NYIT Postdoctoral Teaching Fellow. Izza Arqam NYIT Undergraduate. Project: “Skull-brain interplay during development in the domestic chicken.” Siem Satti NYIT Undergraduate. Project: “Skull-brain interplay during development in the domestic chicken.”
2021–Current	Meghan Forcellati Columbia University Undergraduate. Project: “Brain development in paleognath birds.” Colbert Prize for Best Student Poster at Society of Vertebrate Paleontology Meeting 2022 Hamza Siddiqui NYIT Undergraduate. Project: “Skull-brain interplay during development in the domestic chicken.”
2022–Current	Abdullah Ansari NYIT Undergraduate. Project: “BrainBirding virtual reality application for immersive exploration of avian anatomical data.” Brian D’Amore NYIT Undergraduate. Project: “BrainBirding virtual reality application for immersive exploration of avian anatomical data.” Mohit Shah NYIT Undergraduate. Project: “High-resolution digital brain atlas of the Polish crested chicken.”
2019–2023	Scott Landman NYIT College of Osteopathic Medicine. Project: “Skull-brain interplay during development in Polish crested chicken.”
2018–2022	Sylvia Marshall NYIT College of Osteopathic Medicine. Project: “Imaging and reconstruction of enucleated cadaveric eyes.” “Phenotypic difference between the brain of Polish crested chickens to typical domestic chicken.”
2020–2022	Shebin Tharakan NYIT College of Osteopathic Medicine. Project: “Intraspecific cranial integration in lizards and snakes.” David and Marvalee Wake Award for Best Student Presentation at Society of Integrative and Comparative Biology Meeting 2022
2019–2020	Yekaterina Okouneva NYIT College of Osteopathic Medicine. Project: “Skull-brain interplay during development in Polish crested chicken.” Marichelle Pita NYIT College of Osteopathic Medicine. Project: “New education app for learning the nervous and circulatory systems in humans.”
2018–2019	Mariel Bedell NYIT College of Osteopathic Medicine. Project: “Skull-brain interplay during development in the American alligator and domestic chicken.” Chun Maung NYIT College of Osteopathic Medicine. Project: “New education app for learning the nervous and circulatory systems in humans.” Alexis Morin NYIT College of Osteopathic Medicine. Project: “Impact of cranial muscles on skull shape in developing chickens.”
2018	Anthony D’Amore Smithtown High School, NY. Project: “Habitat preference drives brain shape in crocodylomorphs.” Long Island Science and Engineering Fair First Prize in Animal Sciences. Regeneron Science Talent Search Semi-Finalist

- 2017 **Noah Shepherd** University College London, U.K. M.Res. Project: “Intraspecific patterns of cranial modularity across diapsids.”
- 2014–2016 **Isabelle Brenes** Saint Francis Preparatory School, NY. Project: “Shedding light on the evolution and development of the encephalized dinosaur brain.” **NYC Science & Engineering Fair Finalist (Second Place in Division)**

Workshops

- 2022 **Invited Speaker** Integrative Organismal Modeling of Movement (IOMM) Workshop on “Morphological Methods in Evolutionary Biomechanics” [2 Virtual Sessions]
- 2020 **Invited Panelist** Academic Jobs Roundtable, Society of Vertebrate Paleontology Meeting [Virtual]
- 2016 **TNT Phylogenetic Workshop** (Co-Instructor) American Museum of Natural History
- 2015 **geomorph R Package Workshop** Society of Vertebrate Paleontology Meeting, Dallas, TX
- 2014 **NSF Dissertation Improvement Grant Panel** American Museum of Natural History
- 2011 **NSF Graduate Research Fellowship Panel** Florida State University

Service

Professional

- NYIT Committees** Anatomy Ph.D. Program Committee, Anatomy Postdoctoral Teaching Fellow Search Committee, D.O.-Ph.D. Admissions Committee, NYITCOM Academic Medicine Scholar M.Sc. Program Admissions and Curriculum Committees, NYITCOM Facilities Committee, NYITCOM Diversity Committee (**Interim Chair**), NYITCOM Faculty Onboarding Committee, NYITCOM Faculty Senate, NYITCOM Faculty Senate By-Laws Committee, NYITCOM Summer Research Program Review Panel, Sustainability Committee (**Chair**)
- Peer Reviews** *Acta Zoologica*, *American Journal of Physical Anthropology*, *American Naturalist*, *Anatomical Record*, *Data in Brief*, *Developmental Dynamics*, *Ecology & Evolution*, *Evolution*, *Evolutionary Ecology*, *GeoBio*, *Integrative and Comparative Biology*, *Journal of Anatomy*, *Journal of Evolutionary Biology*, *Journal of Morphology*, *Palaeoworld*, *Paleobiology*, *PeerJ*, *PLoS ONE*, *Proceedings of the Royal Society of London B*, *Methods in Ecology and Evolution*, *Nature Ecology & Evolution*, *Nature Communications*, *Scientific Reports*, *Systematic Biology*, *Zoological Journal of the Linnean Society*, *Zoological Science*
- 2023 **Lead Organizer** Conference Symposium: “Domestication and feralization: modern techniques on evolutionary exemplars”, International Congress of Vertebrate Morphology, Cairns, Australia (co-organizers: Ana Balcarcel, Emma Sherratt)
- Invited Reviewer** National Science Foundation Grant Review Panel
- 2022 **Invited Speaker & Instructor**, NSF-funded Integrative Organismal Modeling of Movement (IOMM) Workshop in “Morphological Methods in Evolutionary Biomechanics”, UC Irvine [virtual]
- Invited Reviewer** National Science Foundation Grant Review Panel
- 2018 **Lead Organizer** Conference Symposium: “Building A Phenomic Universe: The Collection, Management, and Applications of Digital Morphological Data”, Society of Vertebrate Paleontology Meeting, Albuquerque, NM (co-organizer: Jen Bright)
- 2018 **Committee Member** Society of Vertebrate Paleontology Colbert Poster Prize Committee
- 2016 **Guest Lecturer** Dinosaur Ecosystems MOOC hosted by University of Hong Kong
- 2015 **Lead Organizer** Conference Symposium: “The Shape of Things to Come: Geometric Morphometrics in Vertebrate Paleontology”, Society of Vertebrate Paleontology Meeting, Dallas, TX (co-organizers: Marc Jones, Emma Sherratt)

Outreach

- 2022 **Scientific Consultant** “Dinosaurs Among Us” Panel Exhibit, American Museum of Natural History, NY
Scientific Consultant Richard Gilder Center Collections Core Exhibit, American Museum of Natural History, NY
Invited Speaker “T. rex: The Ultimate Predator” Exhibit Event, Peoria Museum, IL
- 2021 **Invited Speaker** “The World’s Largest Dinosaurs” Exhibit Event, Mayborn Museum, TX
Invited Speaker “T. rex: The Ultimate Predator” Exhibit Event, Peoria Museum, IL [Virtual]
- 2018 **Featured Scientist** “Space vs. Dinos” YouTube series (collaborator: AMNH)
Featured Scientist Video: “On the Myths and Truths of Jurassic Park” (NYIT Media)
Invited Speaker “How a Paleontologist Sees Jurassic Park,” Science on Tap, Brooklyn, NY
- 2017 **Invited Presenter** Science Unleashed event, Natural History Museum, London, UK
- 2013–2015 **Invited Presenter** NYU Science, Health, and Education & Environmental Reporting Graduate Program Workshop, AMNH, New York, NY
- 2014, 2015 **Invited Speaker** Adventures in Science Workshop (Grades 2-4), AMNH, New York, NY
- 2015 **Featured Scientist** “Shelf Life” Episode: “Six Extinctions in Six Minutes”
Co-Developer & Speaker AMNH “Hack the Dinos” Hackathon, AMNH, New York, NY
Featured Scientist, Contributor “Dinosaurs Among Us” exhibit, AMNH, New York, NY
Invited Speaker “Science and Scientists at the AMNH” program, AMNH, New York, NY
Invited Speaker “Meet the Scientist” program, AMNH, New York, NY
Invited Scientist Saint Ann’s School Science program (Grades 6-7), New York, NY
Invited Speaker Greenwich Series at The Bitter End, New York, NY
- 2014 **Invited Participant** DARPA Art & Science Workshop, Washington, D.C.
Invited Speaker New York City Science & Engineering Fair Finals, New York, NY
Invited Scientist Museum Identification Day, AMNH, New York, NY
- 2013 **Invited Speaker** TEDxYouth, New York, NY
Google Glass beta-tester “Google Glass with Aki Watanabe” YouTube series. Press Coverage: [io9](#), [Smithsonian Magazine](#)
Co-Developer & Co-Instructor “Capturing Dinosaurs” 3D scanning & printing summer course (Grades 9-12), AMNH, New York, NY. Press Coverage: [YouTube video](#), [Gizmodo](#)
Judge Urban Barcoding Project Poster Session (Grades 9-12), New York, NY
- 2011 **Scientist Guide** SciGirls Camp Fossil Collecting Field Trip (Grade 9), Tallahassee, FL
Judge Tri-beta Biology Undergraduate Society Poster Session, Florida State University
Judge Capital Regional Science & Engineering Fair, Tallahassee, FL
- 2009 **Invited Speaker** Project Exploration, Chicago, IL

Fieldwork

- 2021 Cassowary Conservation Project, Fort Pierce, FL
- 2018 Joint NHMUK-CONICET Expedition, Salta Province, Argentina
- 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

2021–Current	Society for Neuroscience
2020–Current	Society for Developmental Biology
2018–Current	American Association for Anatomy
2011–Current	Society of Integrative and Comparative Biology
2008–Current	Society of Vertebrate Paleontology
2010–2016	Willi Hennig Society

Miscellaneous

2012–Current	Violin 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