

Curriculum vitae - Chad M. Eliason

Education

The University of Akron Ph.D. Integrated Bioscience	2014
The University of Akron M.S. Education	2006
Baldwin-Wallace University B.S. Biology	2002

Appointments

Field Museum of Natural History Postdoctoral Fellow, Grainger Bioinformatics Center	2019-
Field Museum of Natural History Bass Postdoctoral Fellow, Integrative Research Center Advisor: Shannon J. Hackett	2016-2019
The University of Texas at Austin Postdoctoral Scholar, Jackson School of Geosciences Advisor: Julia A. Clarke	2014-2016

Manuscripts

Submitted

- 27 **Eliason CM**, Clarke JA. Cassowary gloss and a novel form of structural color in birds. In revisions at *Science Advances*.
- 26 **Eliason CM**, Straker L, Jung S, Hackett SJ. Morphological innovation and biomechanical diversity in plunge-diving birds. In review at *Evolution*.
- 25 **Eliason CM**, McCullough J, Andersen MJ, Hackett SJ. Rates of brain shape evolution, not bill shape, correlate with diversification rates in kingfishers. In review at *The American Naturalist*.
- 24 Proffitt JV, **Eliason CM**, Clarke JA. Early diversification of avian limb proportions and the role of modularity in the locomotor evolution of crown birds. In revisions at *Evolution*.

Published or in press

- 23 **Eliason CM**, Maia R, Parra J, Shawkey MJ. 2019. Signal evolution and morphological complexity in hummingbirds (Aves: Trochilidae). Accepted at *Evolution*.
- 22 **Eliason CM**, Edwards SJ, Clarke JA. 2019. phenotools: an R package for visualizing and analyzing phenomic datasets. *Methods in Ecology & Evolution* 10(9):1393-1400.
- 21 **Eliason CM**, Andersen MJ, Hackett SJ. 2019. Using historical biogeography models to understand color pattern evolution. *Systematic Biology* 68(5):755-766.
- 20 **Eliason CM**. 2018. How do complex signals evolve? *PLOS Biology* 16(12):e3000093.

- 19 Eliason CM and Clarke JA. 2018. Metabolic physiology explains macroevolutionary trends in the melanin color system across amniotes. *Proceedings B* 285:20182014.
- 18 Kingsley EP, Eliason CM[†] (contributed equally), Riede T, Li Z, Hiscock TW, Farnsworth M, Thomson SL, Goller F, Tabin CJ, Clarke JA. 2018. Identity and novelty in the avian syrinx. *PNAS* 115(41):10209-10217.
- 17 Li Z, Clarke JA, Eliason CM, Stidham TA, Deng T, Zhou Z. 2018. Vocal specialization through tracheal elongation in an extinct Miocene pheasant from China. *Scientific Reports* 8:8099.
- 16 Hu D, Clarke JA, Eliason CM, Qiu R, Li Q, Shawkey MD, Zhao C, D'Alba L, Jiang J, Xu X. 2018. A bony-crested Jurassic dinosaur with iridescent plumage highlights complexity in early paravian evolution. *Nature Communications* 9(1):217. **(Received extensive media coverage, including Reuters, Discover Magazine, and National Geographic)**
- 15 Eliason CM, Hudson L*, Watts T*, Garza H*, Clarke JA. Exceptional preservation and the fossil record of tetrapod integument. 2017. *Proceedings of the Royal Society B* 284:20170556. **(Highlighted in National Science Foundation's Science 360 News)**
- 14 D'Alba L, Torres R, Waterhouse G, Eliason CM, Hauber M, Shawkey MD. 2017. What does the eggshell cuticle do? A functional comparison of eggshell cuticles. *Physiological and Biochemical Zoology* 90:588-599.
- 13 Riede T, Eliason CM, Miller EH, Goller F, Clarke JA. 2016. Coos, booms, and hoots: the evolution of closed-mouth vocal behavior in birds. *Evolution* 70:1734-1746. **(Received extensive media coverage, including The Tonight Night Show with Jimmy Fallon, Time Magazine, NPR Weekend Edition; highlighted in Discover Magazine as one of the top-100 science stories of the year)**
- 12 Iskandar J-P*, Eliason CM, Astrop T, Igic B, Maia R, Shawkey MD. 2016. Morphological basis of glossy red plumage colors. *Biological Journal of the Linnean Society* 119:477-487.
- 11 Eliason CM, Shawkey MD, Clarke JA. 2016. Evolutionary shifts in the melanin-based color system of birds. *Evolution* 70:445-455.
- 10 Eliason CM, Maia R, Shawkey MD. 2015. Modular color evolution in ducks facilitated by a complex nanostructure. *Evolution* 69:357-367.
- 9 Eliason CM, Shawkey MD. 2014. Antireflection-enhanced color by a natural graded refracting index (GRIN) structure. *Optics Express* 22:A642-A650. **(Highlighted in Virtual Journal of Biomedical Optics)**
- 8 D'Alba LD, Jones DN, Eliason CM, Badawy HT, Shawkey MD. 2014. Antimicrobial properties of a nanostructured eggshell from a compost-nesting bird. *Journal of Experimental Biology* 217:116-1121.
- 7 Eliason CM, Bitton, P-P, Shawkey MD. 2013. How hollow melanosomes affect iridescent colour production in birds. *Proceedings of the Royal Society B* 280:20131505.
- 6 Maia R, Eliason CM, Bitton, P-P, Doucet SM, Shawkey MD. 2013. pavo: an R package for the analysis, visualization and organization of spectral data. *Methods in Ecology and Evolution* 4:906-913.
- 5 Eliason CM, Shawkey MD. 2012. A photonic heterostructure produces diverse iridescent colours in duck wing patches. *Journal of the Royal Society Interface* 9(74):2279-2289. **(Received press coverage in Science and Spiegel Online)**
- 4 Eliason CM, Shawkey MD. 2011. Decreased hydrophobicity of iridescent feathers: a potential cost of shiny plumage. *Journal of Experimental Biology* 214:2157-2163. **(Named as Editor's Choice for that issue of JEB, and as one of the top eight articles of the year;**

received press coverage in Spiegel Online)

- 3 Shawkey MD, D'Alba L, Wozny J*, **Eliason CM**, Koop JAH, Jia L. 2011. Structural color change following hydration and dehydration of iridescent mourning dove (*Zenaida macroura*) feathers. *Zoology (Jena)* 114:59-68.
- 2 **Eliason CM**, Shawkey MD. 2010. Rapid, reversible response of iridescent feather color to ambient humidity. *Optics Express* 18:21284-92.
- 1 Blackledge TA, **Eliason CM**. 2007. Functionally independent components of prey capture are architecturally constrained in spider orb webs. *Biology Letters* 3:456-458.

(*undergraduate co-author, † contributed equally)

Grants and fellowships

- 2019 Grainger Bioinformatics Center Grant, Field Museum of Natural History, 2019-2020 (\$21,000)
- 2016 Bass Postdoctoral Fellowship, Field Museum of Natural History, 2016-2018 (\$95,000)
- 2015 NSF REU Supplement - Collaborative Research: Phylogenomics of palaeognathous birds and the genomic basis of flightlessness, 2015-2016 (\$6771)
- 2011 The University of Akron, Tiered Mentoring Research Program (\$1000)

Invited talks

- 2018 Splashing into water: cranial and biomechanical diversity in a cosmopolitan radiation of birds. Comparative Aspects of Avian Morphology Symposium, International Ornithological Congress, Vancouver BC, August 27.
- 2018 Morphological and functional diversification in the beaks and feathers of birds, Evolutionary Morphology Seminar, University of Chicago, March 1.
- 2017 Mechanisms and evolution of signal traits in birds, Price lab talk, University of Chicago, September 13.
- 2017 Feathers, fossils, and signal evolution in birds, Armour lecture, Field Museum of Natural History, April 26.
- 2015 Diversity of form and function in the avian integument, Department seminar series, University of Texas Austin, March 12.
- 2014 Form-function relationships in iridescent bird feathers: optical and evolutionary implications, Department seminar series, Baldwin-Wallace University, April 25.
- 2013 Linking form and function to elucidate the evolution of iridescent colors in birds, Physiological and Functional Advances in Avian Coloration Symposium, American Ornithological Union Meeting, Chicago IL, August 13-17.

Contributed presentations

- 2018 Maia R, **Eliason CM**, Parra J, Shawkey MJ. Re-visiting the optical bases of hummingbird (Aves: Trochilidae) coloration. Living Light Conference, 2018.†
- 2018 Papendieck A, Cheah YH, **Eliason CM**, Clarke JA. Mapping Research and Writing Mentorship Assemblages in a Mixed Cohort Course-based Research Experience. International Conference on Learning Sciences, June 23-30.†
- 2018 Takano OM, Bates JM, Dumbacher JP, Marks BD, Moyle RG, Peterson AT, Wieczorek J, Winkler DW, James HJ, Steadman DW, **Eliason CM**, Stanley EL, Blackburn DC. Inside the

Birds of the World: CT-scanning fluid-preserved bird collections via the oVert Thematic Collections Network. AOS April 9-14. †

- 2018 **Eliason CM**, Hackett SJ. Splashing into water: cranial and biomechanical diversity in a cosmopolitan radiation of birds. SICB annual meeting, January 3-7.‡
- 2017 **Eliason CM**, Andersen M, Hackett SJ. Can we use biogeography models to understand plumage evolution in birds? Society for the Study of Evolution annual conference, June 23-27.†
- 2016 **Eliason CM**, Hudson L, Watts T, Garza H, Clarke JA. Exceptional preservation and the fossil record of tetrapod integument. Geological Society of America annual meeting, September 25-28.†
- 2016 Riede T, **Eliason CM**, Miller EH, Goller F, Clarke JA. Coos, booms, and hoots: the evolution of closed-mouth vocal behavior in birds. International Congress of Vertebrate Morphology annual conference. Washington D.C. June 29-July 3.‡
- 2016 Riede T, **Eliason CM**, Miller EH, Goller F, Clarke JA. Coos, booms, and hoots: the evolution of closed-mouth vocal behavior in birds. Society for the Study of Evolution annual conference. Austin, TX. June 17-21.‡
- 2016 **Eliason CM**, Clarke JA. Pipelines and methods for visualization and analysis of phenomic data. Society for the Study of Evolution annual conference. Austin, TX. June 17-21.†
- 2016 **Eliason CM**, Shawkey MD, Clarke JA. Evidence for early shifts in the melanin-based color system of birds. Society for Integrative and Comparative Biology annual conference. Portland, OR, USA. January 3-7.‡
- 2015 **Eliason CM**, Shawkey MD, Clarke JA. Melanosome shape and color diversity in palaeognathous birds. Evolution conference. Norman, OK. July 28-August 2.‡
- 2014 **Eliason CM**, Maia R, Shawkey MD. Modular color evolution facilitated by a complex nanostructure in birds. Society for the Study of Evolution annual conference, Raleigh NC, June 20-24.‡
- 2013 Hsiung B-K, **Eliason CM**, Shawkey MD, Blackledge TA. Nanostructural basis for blue color in tarantulas. 19th International Congress of Arachnology. Taiwan. June 23-28.†
- 2013 **Eliason CM**, Maia R, Shawkey MD. Optics and evolution of iridescence in the wings of ducks. Society for Integrative and Comparative Biology Annual Meeting, San Francisco, CA. January 3-7.‡
- 2012 **Eliason CM**, Maia R, Shawkey MD. Evolvability of photonic heterostructures in dabbling ducks. Evolution annual meeting. Ottawa, Ontario. July 6-10.†
- 2011 **Eliason CM**, Maia R, Shawkey MD. Sexual selection and the evolution of colorful wing patches in ducks. Evolution annual meeting. Norman, OK. June 17-21.†
- 2011 **Eliason CM**, Shawkey MD. Rapid, reversible response of iridescent feather color to ambient humidity. Society for Integrative and Comparative Biology Annual Meeting, Salt Lake City, UT. January 3-7.‡

(† *poster*, ‡ *talk*)

Teaching and mentorship

Co-instructor

The University of Texas at Austin

Research methods, data analysis and visualization in paleobiology (Fall 2016)

The University of Akron

Programming and Applied Statistics using R (12h workshop, Fall 2013)

Teaching assistant

The University of Akron

Comparative Vertebrate Morphology (Fall 2012)

Microbiology (Spring 2005, Summer 2005, Fall 2010, Spring 2012)

Ornithology (Fall 2011)

Principle of Biology (Fall 2009, Spring 2010)

Genetics (Fall 2005)

Guest lecturer

The University of Texas at Austin

Language and Communication Across Species (1h class, Oct 31, 2016)

The University of Akron

Ornithology (3h class, Fall 2014)

Electromagnetism and Light (1h class, Fall 2012, 2013)

Research mentor

Field Museum of Natural History

Supervised 10-week long NSF REU research project (Summer 2018)

Supervised undergraduate research in geometric morphometrics (Summer 2017)

The University of Texas at Austin

Supervised 10+ undergraduates in paleontology research (2014-2016)

The University of Akron

Supervised independent undergraduate thesis projects (2010, 2013)

Students supervised: Chance Mitran, Jean-Pierre Iskandar, Jessica Valdes (Denver Museum of Natural History), Hector Garza, Leslie Jordan, Paul Viola (UT Austin), Jenny Le, James Hall, Victor Gonzalez, Rebecca Van Houten, Mitchell Riegler (Virginia Tech MS candidate), Adele Anderson (Brown University graduate), Kris Menghi (Purdue), Lauren Mellenthin (Iowa State University)

Service to profession

Departmental and society service

- 2018 Judge for student Wake Awards, Society for Integrative and Comparative Biology Annual Meeting
- 2015 Session Chair, Society for the Study of Evolution Annual Meeting
- 2012 Interviewer for the Honors College scholarship program, The University of Akron
- 2011 Session Chair, Society for Integrative and Comparative Biology Annual Meeting

Reviewer

- 2010- PLoS Biology, Evolution, Proceedings B, PLoS One, Ecology and Evolution, PeerJ, Journal of Anatomy, Behavioral Ecology and Sociobiology, Journal of Applied Spectroscopy, Optics Express, African Journal of Ecology

Synergistic activity

Community outreach

- 2018 Admiral Lecture Series “How birds make colorful feathers, and why it matters”, September 25
- 2017 Field Museum of Natural History, “Speed Science” event, December 11
- 2017 Park View Elementary School, Science Olympiad program, December 8 (3h)
- 2017 Evanston Bird Club “How birds make colorful feathers, and why it matters”, September 26
- 2017 Field Museum of Natural History, “Speed Science” event, September 14
- 2017 Field Museum of Natural History, donor outreach event, September 7
- 2017 Field Museum of Natural History, Members’ Night outreach event, May 18
- 2017 Field Museum of Natural History, High school “talk to a scientist” event, April 19

Blogging

- 2018 Facebook Livestream event on reconstruction of color in extinct dinosaurs, January 23
- 2017 Feather blog (<https://www.fieldmuseum.org/science/blog/feathers-and-our-feathered-friends>)
- 2017 Facebook post on brain shape in birds, July 18
- 2017 Facebook Livestream event on feather coloration, Feb 14

High school mentorship

- 2012 Volunteer judge, Buchtel High-School Science Fair, Akron, OH
- 2005 Volunteer judge, Science and Technology EXPO, Akron, OH
- 2005 Research mentor, K-12 “Science Buddies” Program, Akron, OH

References

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