

Michael William Butler

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Appointments

Assistant Professor, Lafayette College, Department of Biology 2012-present

Education

Arizona State University – Ph.D., Biology, May 2012. “Developmental plasticity: the influence of neonatal diet and immune challenges on carotenoid-based ornamental coloration and adult immune function in mallard ducks” (Advisor: Kevin J. McGraw). GPA – 4.00

Boise State University – M.S., Raptor Biology, May 2006. “Effects of corticosterone on growth, food consumption, body condition, feather development, and immune function in American kestrels and European starlings” (Advisor: Alfred M. Dufty, Jr.). GPA – 4.00

Bowdoin College – B.A. *cum laude*, double major Biology and Physics, May 2002. GPA – 3.55

Courses Taught

General Biology, Biology 102. Lafayette College.

Mate Choice: People to Peacocks, First-Year Seminar 106. Lafayette College.

Interdisciplinary Seminar in the Life Sciences, INDS 211. Lafayette College.

Human Physiology, Biology 251. Lafayette College.

Behavioral Ecology, Biology 275. Lafayette College.

Physiology of Extreme Animals, Biology 317. Lafayette College.

Publications

Peer-Reviewed Journal Articles

Stahlschmidt ZR, SS French, A Ahn, A Webb, **MW Butler**. *In Press*. A simulated heat wave has diverse effects on immune function and oxidative physiology in the cornsnake (*Pantherophis guttatus*). *Physiological and Biochemical Zoology*.

Butler MW, SC Bociulis, AR Little, JA Minnick, NJ Ritter, ME Rockman, ML Rossi, JK Hines. 2017. Quantifying biliverdin in liver and spleen samples from multiple avian species. *The Auk: Ornithological Advances*, 134:11-21.

Ligon RA and **MW Butler**. 2016. Body mass and immune function, but not bill coloration, predict dominance in female mallards. *Behavioural Processes*, 131:59-67.

Mason NA, **MW Butler**, JC Owen. 2016. Membership Trends in the American Ornithologists' Union and the Evolving Role of Professional Ornithological Societies. *The Auk: Ornithological Advances*, 133:806-811.

Butler MW and HS Waite. 2016. Eggshell biliverdin concentration does not sufficiently predict eggshell coloration. *Journal of Avian Biology*, 47:491-499.

Peer-Reviewed Journal Articles (cont'd)

- Butler MW**, TJ Lutz, HB Fokidis, ZR Stahlschmidt. 2016. Eating increases oxidative damage in a reptile. *Journal of Experimental Biology*, 219:1969-1973.
- Luoma RL, **MW Butler**, ZR Stahlschmidt. 2016. Plasticity of immunity in response to eating. *Journal of Experimental Biology*, 219:1965-1968.
- Butler MW** and RA Ligon. 2015. Interactions between Biliverdin, Oxidative Damage, and Spleen Morphology after Simulated Aggressive Encounters in Veiled Chameleons. *PLoS ONE* 10(9): e0138007.
- Fairhurst GD, N Damore, **MW Butler**. 2015. Feather corticosterone levels independent of developmental immune challenges predict carotenoid-based, but not melanin-based, traits at adulthood. *The Auk: Ornithological Advances*, 132:863-877.
- Ligon RA, AG Dolezal, MR Hicks, **MW Butler**, NI Morehouse, TG Ganesh. 2014. Using ants, animal behavior, & the learning cycle to investigate scientific processes. *American Biology Teacher*, 76:522-531.
- Thomas DB, KJ McGraw, **MW Butler**, MT Carrano, O Madden, HF James. 2014. Ancient origins and multiple appearances of carotenoid-pigmented feathers in birds. *Proceedings of the Royal Society, B* 281:20140806.
- McCartney KL, RA Ligon, **MW Butler**, DF DeNardo, KJ McGraw. 2014. The effect of carotenoid supplementation on immune system development in juvenile male veiled chameleons (*Chamaeleo calyptratus*). *Frontiers in Zoology* 11:26.
- Butler MW** and KJ McGraw. 2013. Eggshell coloration reflects both yolk characteristics and dietary carotenoid history of female mallards. *Functional Ecology* 27:1176-1185.
- Butler MW** and KJ McGraw. 2013. Immune function is related to adult carotenoid and bile pigment levels, but not dietary carotenoid access during development, in female mallard ducks. *Journal of Experimental Biology* 216:2632-2640.
- Butler MW**, B Karanfilian, M Homsher, KJ McGraw. 2013. Carotenoid supplementation during adulthood, but not development, decreases testis size in mallards. *Comparative Biochemistry and Physiology Part A: Molecular & Integrative Physiology* 166:465-469.
- Moller KT, **MW Butler**, DF DeNardo. 2013. The effect of hydration state and energy balance on innate immunity of a desert reptile. *Frontiers in Zoology* 10:23.
- Butler MW**, ZR Stahlschmidt, DR Ardia, S Davies, JR Davis, LG Guillelte Jr., N Johnson, SD McCormick, KJ McGraw, DF DeNardo. 2013. Thermal sensitivity of immune function: evidence against a generalist-specialist tradeoff among endothermic and ectothermic vertebrates. *American Naturalist* 181:761-774.
- Stahlschmidt ZR, O Lourdaïs, S Lorient, **MW Butler**, JR Davis, K Salin, Y Voituren, DF DeNardo. 2013. Morphological and physiological changes during reproduction and their relationships to reproductive performance in a capital breeder. *Physiological and Biochemical Zoology* 86:398-409.
- Giraudeau M, K Sweazea, **MW Butler**, KJ McGraw. 2013. Effects of carotenoid and vitamin E supplementation on oxidative stress and plumage coloration in House Finches (*Haemorrhous mexicanus*). *Comparative Biochemistry and Physiology: Part A: Molecular & Integrative Physiology* 166:406-413.
- Butler MW** and KJ McGraw. 2012. Differential effects of early- and late-life access to carotenoids on adult immune function and ornamentation in mallard ducks (*Anas platyrhynchos*). *PLoS ONE* 7: e38043.

Peer-Reviewed Journal Articles (cont'd)

- Behbahaninia H, **MW Butler**, MB Toomey, KJ McGraw. 2012. Food color preferences against a dark, textured background vary in relation to sex and age in house finches (*Carpodacus mexicanus*). *Behaviour* 149:51-65.
- Butler MW** and KJ McGraw. 2012. Developmental immune history affects adult immune function but not carotenoid-based ornamentation in mallard ducks. *Functional Ecology* 26:406-415.
- Butler MW**, MB Toomey, KJ McGraw, M Rowe. 2012. Ontogenetic immune challenges shape adult personality in mallard ducks. *Proceedings of the Royal Society, B* 279:326-333.
- Lambrechts MM, KL Wiebe, P Sunde, T Solonen, F Sergio, A Roulin, AP Møller, BC López, JA Fargallo, K-M Exo, G Dell'Omo, D Costantini, M Charter, **MW Butler**, GR Bortolotti, R Arlettaz, E Korpimäki. 2012. Nest-box design for the study of diurnal raptors and owls is still an overlooked point in ecological, evolutionary and conservation studies: a review. *Journal of Ornithology* 153:23-34.
- Butler MW** and KJ McGraw. 2011. Past or present? Relative contributions of developmental and adult conditions to adult immune function and coloration in mallard ducks (*Anas platyrhynchos*). *Journal of Comparative Physiology B* 181:551-563.
- Butler MW**, MB Toomey, KJ McGraw. 2011. How many color metrics do we need? Evaluating how different color-scoring procedures explain carotenoid pigment content in avian bare-part and plumage ornaments. *Behavioral Ecology and Sociobiology* 65:401-413.
- Butler MW** and KJ McGraw. 2010. Relationships between dietary carotenoids, body tissue carotenoids, parasite burden, and health state in wild mallard (*Anas platyrhynchos*) ducklings. *Archives of Biochemistry and Biophysics* 504:154-160.
- Costantini D, M Rowe, **MW Butler**, KJ McGraw. 2010. From molecules to living systems: historical and contemporary issues in oxidative stress and antioxidant ecology. *Functional Ecology* 24:950-959.
- Toomey MB, **MW Butler**, KJ McGraw. 2010. Immune-system activation depletes retinal carotenoids in house finches (*Carpodacus mexicanus*). *Journal of Experimental Biology* 213:1709-1716.
- Butler MW**, LL Leppert, AM Dufty Jr. 2010. Effects of small increases in corticosterone levels on morphology, immune function, and feather development. *Physiological and Biochemical Zoology* 83:78-86.
- Toomey MB, **MW Butler**, MG Meadows, LA Taylor, HB Fokidis, KJ McGraw. 2010. A novel method for quantifying the glossiness of animals. *Behavioral Ecology and Sociobiology* 64:1047-1055.
- Butler MW** and KJ McGraw. 2009. Indoor housing during development affects moult, carotenoid circulation and beak colouration of mallard ducks (*Anas platyrhynchos*). *Avian Biology Research* 2:203-211.
- Butler MW**, BA Whitman, AM Dufty Jr. 2009. Nest box temperature and hatching success of American kestrels varies with nest box orientation. *The Wilson Journal of Ornithology* 121:778-782.

Peer-Reviewed Journal Articles (cont'd)

- Meadows, MG, **MW Butler**, NI Morehouse, LA Taylor, MB Toomey, KJ McGraw, RL Rutowski. 2009. Iridescence: views from many angles. *Journal of the Royal Society Interface* 6:S107-S113.
- Ghiradella, HT and **MW Butler**. 2009. Many variations on a few themes: a broader look at development of iridescent scales (and feathers). *Journal of the Royal Society Interface* 6:S243-S251.
- Butler MW**, JC Garvin, NT Wheelwright, CR Freeman-Gallant. 2009. Ambient temperature, but not paternity, is associated with immune response in Savannah sparrows (*Passerculus sandwichensis*). *The Auk* 126:536-542.
- McGraw KJ, EA Tourville, **MW Butler**. 2008. A quantitative comparison of the commonly used methods for extracting carotenoids from avian plasma. *Behavioral Ecology and Sociobiology* 62:1991-2002.
- Butler MW** and AM Dufty Jr. 2007. Nestling immunocompetence is affected by captivity but not investigator handling. *The Condor* 109:920-928.
- Butler M** and A Johnson. 2004. Are melanized feather barbs stronger? *Journal of Experimental Biology* 207:285-293.

Published Abstracts

- Butler MW** and KJ McGraw. 2011. Effects of carotenoids and immunity during development on adult health and coloration in male and female mallard ducks. *Acta Biologica Cracoviensia: Series Botanica* 53 (S1):23.
- Butler MW** and KJ McGraw. 2010. Immunological perturbations during neonatal development reduce immunocompetence and body mass in adult mallards. *Integrative and Comparative Biology* 50 (S1):e21.

Popular Articles

- Butler MW**. April 10, 2012. Hot Research. *Arizona State University Ask A Biologist*. <http://askabiologist.asu.edu/explore/hot-research>
- Butler MW**. October 23, 2005. Intelligent Design's assumptions simply can't be tested. *The Idaho Statesman*.

Book Reviews

- Butler MW**. September 2011. An Introduction to Animal Behavior: An Integrative Approach, by Michael J. Ryan and Walter Wilczynski. International Society for Behavioral Ecology Newsletter, Supplement to *Behavioral Ecology*. Volume 23, Issue 2.

Mentoring Experience

Honors Projects

- Jennifer Minnick. Does foreign egg size affect adult nesting behavior in Eastern Bluebirds (*Sialia sialis*), House Sparrows (*Passer domesticus*), and Tree Swallows (*Tachycineta bicolor*)? Defending May 2017.
- Marissa Rossi. Parental aggression in relation to egg and nestling quality in eastern bluebirds (*Sialia sialis*), tree swallows (*Tachycineta bicolor*), and house sparrows (*Passer domesticus*). Defending May 2017.

Honors Projects (cont'd)

- Jessica Baylor. Exploring Potential Protective Properties of Biliverdin during Immune Challenges in Northern Bobwhite Quail, *Colinus virginianus*. Successfully defended May 2016.
- Aaron Little. Stress-Induced Pigment Levels in the Urates, Liver, and Spleen of European Starlings (*Sturnus vulgaris*). Successfully defended May 2016.
- Melissa Homsher. Biliverdin production is related to body condition, but is not affected by immune challenges, in the Northern Bobwhite Quail, *Colinus virginianus*. Successfully defended May 2014.
- Kristen McCartney. Effects of carotenoid supplementation during development on adult coloration and immune function in veiled chameleons (*Chameleo calyptratus*). Successfully defended March 2012.
- Shana Quinn. Behavioral signaling function of fluorescent feather markings in mallard (*Anas platyrhynchos*) ducklings. Successfully defended April 2008.

Independent projects

- Alexandra Stanford. Programming and deployment of radio frequency identification devices to track bird activity.
- Kwanho Ki. Programming and deployment of radio frequency identification devices to track bird activity.
- Katherine Veghte. Detecting interplay between roosting habits and environmental temperature in songbirds.
- Riley Godshall. Detecting interplay between roosting habits and environmental temperature in songbirds.
- Ellen Armour. Determination of biliverdin concentration in response to stressors in nestling songbirds.
- Xavier Laracuate. Using LiDAR-based point clouds to uncover relationships between environment and nesting success.
- Morgan Levy. Investigation into a novel method of quantifying heme oxygenase expression in avian tissue.
- Samantha Bociulis. Repeatability and recovery of biliverdin in homogenized avian tissue.
- Jennifer Minnick. Correlations between eggshell coloration and parental behavior in eastern bluebirds (*Sialia sialis*).
- Marissa Rossi. (1) Refinement of infrared fluorescence techniques for detecting small quantities of biliverdin in plasma. (2) Repeatability and recovery of biliverdin in homogenized avian tissue.
- Thomas Lutz. Variation in antioxidant and oxidative damage levels in response to digestive state.
- Jessica Baylor. Exploration of infrared fluorescence in detecting small quantities of biliverdin in plasma.
- Aaron Little. Optimization of techniques to extract biliverdin from biological samples.
- Haleigh Waite. (1) Development of an enzymatic assay to quantify biliverdin in avian plasma; (2) Correlates between eggshell coloration, egg quality, and environmental factors in wild-breeding European starlings.
- Emily Lubas. (1) Egg coloration in relation to nest site selection in European starlings; (2) Effect of exogenous biliverdin on immune function in European starlings.

Independent projects (cont'd)

- Briette Karanfilian. Using high-performance liquid chromatography to quantify biliverdin levels in avian bile and liver.
- Nathan Ritter. (1) Use of thin layer chromatography to compare biliverdin levels of mallards and starlings; (2) Comparison of extraction methods to quantify biliverdin in spleen and liver tissue.
- Hirbod Behbahaninia. An experimental test of the effect of seed color contrast on food preferences of house finches.
- Aaron Immel. Biotic and abiotic predictors of breeding-season behavioral displays in male great-tailed grackles, *Quiscalus mexicanus*.
- Grant Mulligan. Do nutrients during development affect juvenile exploratory behavior and color preferences?
- Todd Schuster. Circulating vitamin A levels are related to age in mallard ducks receiving immune challenges.

Additional Research Mentoring Experience

- Lafayette College: Sedomo Agosa, Michael Astor, Heather Bauerle, Nicole Damore, Fatma Esra Demirhan, Kara Falvey, Samantha Gleich, Kwanho Claudia Ki, Megan Mauriello, Camila Moscoso, Erin Murray, Daniel Vincent, Isabella Walko
- Arizona State University: David Anderson, Brianna Bero-Buell, Alston Bolick, Chelsie Daniel, Deandre Derrick, Rachel Garcia, Scott Harshbarger, Megan Keel, Geoff Kimmel, Dominique Lewis, Derrick Moriarty, Amanda Mozilo, Vasiliki Nikolav, Ashley Pekala, Rebecca Patrick, Christine Ross, Maja Rozmilowska, Evan Shaw, Stephanie Smith, Alberto Torrez, Elizabeth Tourville, Andrew Winters, Bin Xiu
- Boise State University: Mark Belluzzo, Angela LaCava

Presentations

Invited Speaker Engagements

- Butler MW.** Relating life history to oxidative physiology. Arkansas State University Biology Seminar Series, Arkansas State University, Jonesboro Arkansas. February 2016.
- Butler MW.** The physiology and ecology of antioxidants and oxidative damage. University of Pittsburgh Department of Biological Sciences Seminar Series, University of Pittsburgh, Pittsburgh, Pennsylvania. January 2016.
- Butler MW.** Blue and gold: how pigments shape organismal ecology. Academy Research Seminar Series, The Academy of Natural Sciences of Drexel University, Philadelphia, Pennsylvania. November 2013.
- Butler MW.** Becoming sexy and healthy: the ugly duckling grows up. Franklin & Marshall College, Lancaster, Pennsylvania. November 2012.
- Butler MW.** Maturing mallards: Developmental plasticity of ornamentation, immune function, and behavior. East Stroudsburg University BioColloquium, East Stroudsburg, Pennsylvania. October 2012.
- Butler MW.** Developmental plasticity of ornamentation, immune function, and behavior. University of Massachusetts Amherst, February 2012.
- Butler MW.** From duckling to drake: Developmental conditions affect ornamentation and immune function. Lafayette College, Easton, Pennsylvania. February 2012.

Independent Speaker Engagements (cont'd)

Butler MW. From duckling to drake: Effects of developmental conditions on adult immune function and ornamentation in mallard ducks. Boise State University Department of Biological Sciences Seminar Series, Boise, Idaho. November 2011.

Butler MW. Graduate Partners in Science Education. Fifth Annual Advancing Arizona Education Conference, Arizona State University, Tempe, Arizona. September 2008. Received a 4.0 out of 4.0 speaker rating from attendees.

Conference Seminars

Butler MW. Welcome to the Early Professionals Mini-Talk Symposium. 6th North American Ornithological Conference, Washington DC, August 2016.

Butler MW and J Baylor. Biliverdin levels are more closely related to nutritional variables than either immune challenges or oxidative damage. 6th North American Ornithological Conference, Washington DC, August 2016.

Baylor J and **MW Butler.** Exploring potential protective properties of biliverdin during immune challenges in northern bobwhite. 92nd Annual Meeting of the Pennsylvania Academy of Science, Doylestown, Pennsylvania, April 2016.

Little A and **MW Butler.** Stress-induced pigment levels in the feces, liver, and spleen in the European starling (*Sturnus vulgaris*). 92nd Annual Meeting of the Pennsylvania Academy of Science, Doylestown, Pennsylvania, April 2016.

Butler MW. Welcome to the Early Professionals Mini-Talk Symposium. Joint meeting of American Ornithologists' Union and the Cooper Ornithological Society, Norman, Oklahoma, August 2015.

Butler MW. Providing Resources to Early-Professional Ornithologists. Joint meeting of American Ornithologists' Union, Cooper Ornithological Society, and Society of Canadian Ornithologists, Estes Park, Colorado, September 2014.

Butler MW and KJ McGraw. Physiological roles of a pigment used in eggshell coloration. 131st Stated Meeting of the American Ornithologists' Union, The Field Museum, Chicago, Illinois, August 2013.

Butler MW. Differential effects of early- and late-life access to carotenoids on adult immune function and ornamentation in mallard ducks (*Anas platyrhynchos*). 5th North American Ornithological Conference, Vancouver, Canada, August 2012.

Stahlschmidt Z, O Lourdais, S Lorient, **MW Butler**, D DeNardo. Intrinsic costs underlying parental investment: insight from a capital breeder. Annual Meeting of the Society for Integrative and Comparative Biology, Salt Lake City, Utah, January 2011.

Butler MW, M Rowe, MB Toomey. Changing personality: how health challenges during development affect adult exploratory behavior in ducks. Graduates in Earth, Life, and Social Sciences Symposium, Tempe, Arizona, February 2010.

Butler MW and KJ McGraw. Immunological perturbations during neonatal development affect immunocompetence in adult mallard ducks. Annual Meeting of the Society for Integrative and Comparative Biology, Seattle, Washington, January 2010.

Butler MW. As ducks grow up: a carotenoid tale. Research in Interdisciplinary Science and Engineering Symposium, Arizona State University, Tempe, Arizona, October 2007.

Conference Seminars (cont'd)

Johnson AS, O Ellers, **MW Butler**. Barbs of a feather bend (and twist) together. Annual Meeting of the Society for Integrative and Comparative Biology, Phoenix, Arizona, January 2007.

Butler MW and AM Dufty Jr. Immunocompetence and neonatal daily investigator handling of two cavity nesting species. 123rd Stated Meeting of the American Ornithologists' Union, University of California, Santa Barbara, August 2005.

Conference Posters

Rossi ML and **Butler MW**. Parental aggression in relation to egg and nestling quality in eastern bluebirds (*Sialia sialis*), tree swallows (*Tachycineta bicolor*), and house sparrows (*Passer domesticus*). 31st Annual National Conference on Undergraduate Research, Memphis, Tennessee, April 2017.

Ki K, M Mauriello, E Murray, **MW Butler**. Analysis of the relationship of ambient temperature and food presence to winter roost site occupation. 92nd Annual Meeting of the Pennsylvania Academy of Science, Doylestown, Pennsylvania, April 2016.

Minnick J and **Butler MW**. The effects of biliverdin eggshell coloration on parental care in eastern bluebirds, *Sialia sialis*. 2015 Student Summer Research Poster Symposium, Lafayette College, Easton PA, September 2015.

Butler MW, M Homsher, N Ritter, H Waite, E Lubas, JK Hines. Method for quantifying biliverdin in animal tissues. Joint meeting of American Ornithologists' Union, Cooper Ornithological Society, and Society of Canadian Ornithologists, Estes Park, Colorado, September 2014.

Waite H and **MW Butler**. Biliverdin-based eggshell coloration relative to egg quality of European starlings. 2014 Student Summer Research Poster Symposium, Lafayette College, Easton PA, September 2014.

Vincent DW, **MW Butler**, D Brandes. Bird window strikes: a clear killer. 2014 Student Summer Research Poster Symposium, Lafayette College, Easton PA, September 2014.

Butler MW, MP Homsher, NJ Ritter. Method for quantifying biliverdin in animal tissues. Fifteenth Congress of the International Society for Behavioral Ecology, New York, New York, July 2014.

Damore NM, GD Fairhurst, **MW Butler**. Corticosterone levels influence white plumage coloration in mallard ducks. 90th Annual Meeting of the Pennsylvania Academy of Science, Selinsgrove, Pennsylvania, April 2014.

Astor MT, SJ Gleich, **MW Butler**. Mid-life immune challenges affect melanin deposition in male mallard feathers. 90th Annual Meeting of the Pennsylvania Academy of Science, Selinsgrove, Pennsylvania, April 2014.

Karanfilian BV and **MW Butler**. Biliverdin: Presence and Potential Applications in *Sturnus vulgaris*. 89th Annual Meeting of the Pennsylvania Academy of Science, Bradford, Pennsylvania, April 2013.

Butler MW, RA Ligon, KJ McGraw. Are dominance and beak color developmentally plastic in female mallards? 48th Annual Meeting of the Animal Behavior Society, Bloomington, Indiana, July 2011.

Conference Posters (cont'd)

- Butler MW** and KJ McGraw. Effects of carotenoids and immunity during development on adult health and coloration in male and female mallard ducks. 16th International Symposium on Carotenoids, Krakow, Poland, July 2011.
- Butler MW** and KJ McGraw. Interplay between neonatal development, immune function, and circulating carotenoid titer. Gordon Research Conference on Carotenoids, Ventura, California, January 2010.
- Butler MW** and KJ McGraw. Importance of duckling carotenoid levels on adult immune function and coloration. Twelfth International Behavioral Ecology Congress, Ithaca, New York, August 2008.
- Butler MW** and NI Morehouse. A model for incorporating non-traditional skill sets into graduate education. Center for the Integration of Research, Teaching, and Learning Forum 2008, University of Wisconsin, Madison, June 2008.
- Morehouse NI, **MW Butler**, A Webber. Community outreach as a core training experience in graduate education. Center for the Integration of Research, Teaching, and Learning Forum 2008, University of Wisconsin, Madison, June 2008.
- Butler MW** and AM Dufty, Jr.. Effects of elevated corticosterone levels on morphology, immune function, and feather development. IV North American Ornithological Conference, Veracruz, Mexico, October 2006.

Awards, Fellowships, and Honors

Research

Sigma Xi Grants-in-Aid of Research (to undergraduate mentee JB), 2015	\$500
Sigma Xi Grants-in-Aid of Research (to undergraduate mentee BK), 2013	\$1,000
ASU Chapter of Sigma-Xi Grants-in-Aid of Research, 2011	\$400
Frank M. Chapman Research Grant, 2011	\$1,900
Graduate and Professional Student Association JumpStart Research Grant, 2011	\$500
Sigma-Xi Grants-in-Aid of Research, 2010	\$400
Animal Behavior Society Student Research Grant, 2010	\$1,350
Facilities Initiative Grant for Graduates, 2009	\$1,500
Graduate and Professional Student Association JumpStart Research Grant, 2009	\$500
Society for Integrative and Comparative Biology Grant in Aid of Research, 2009	\$1,000
Graduate and Professional Student Association Research Grant, 2008	\$1,958
American Ornithologists' Union Research Awards, 2008	\$1,600
Sigma-Xi Grants-in-Aid of Research, 2007	\$794
Graduate Research Grant in Raptor Biology, 2005	\$500
Graduate Research Grant in Raptor Biology, 2004	\$500

Fellowships

National Science Foundation International Research Fellowship, 2012	Declined
Darwin Postdoctoral Fellowship, UMASS Amherst, 2012	Declined
U. Toronto Ecology and Evolutionary Biology Post-Doctoral Fellowship, 2012	Declined
Killam Postdoctoral Fellowship, Dalhousie U., 2012	Declined
Graduate College Dissertation Fellowship, 2011	\$17,000
Faculty Emeriti Association Fellowship, 2011	\$3,000
University Graduate Fellowship, 2009	\$4,339

Fellowships (cont'd)

University Graduate Fellowship, 2008	\$4,339
University Graduate Fellowship, 2007	\$1,030
Arizona State University Fall Fellowship, 2006	\$3,000
Summer Research Fellowship in Raptor Biology, 2005	\$1,000
Summer Research Fellowship in Raptor Biology, 2004	\$1,000

Travel Awards

International Carotenoid Society Travel Award, 2011	\$1000
Graduate and Professional Student Association Conference Travel Grant, 2011	\$950
Preparing Future Faculty Travel Grant, 2011	\$300
Conference Travel Grant, School of Life Sciences, 2011	\$500
Graduate College Travel Grant, 2011	\$350
Graduate and Professional Student Association Conference Travel Grant, 2009	\$710
Conference Travel Grant, School of Life Sciences, 2009	\$300
Conference Travel Grant, School of Life Sciences, 2008	\$300
American Museum of Natural History Collection Study Grant in Ornithology, 2008	\$600
Delaware Museum of Natural History Ornithology Scholarship, 2008	\$500
Graduate and Student Professional Association Travel Grant, 2006	\$250
National Science Foundation Research Coordination Network Grant, 2005	\$1,000
Marcia Brady Tucker Travel Award, 2005	\$280

Professional Recognition and Conference Awards

Elected Member, American Ornithological Society, 2016	\$0
Student Government Superior Teaching Award, 2015	\$0
Graduate Citizen Scholar Award, 2007	\$625
Research Conference Award, Division of Graduate Studies (co-PI), 2007	\$2,000
Frontiers in Life Sciences Conference Grant (co-PI), 2007	\$30,000
Graduate Student Teaching Assistant Award, 2005	\$100

Additional Research Experience

Consultant September 2014

Skyped in for a training session to provide expertise on experimental design and biological functions of miraculin. Next Level Partners, Avon, CT.

Consultant June 2009

Trained personnel at major animal food-production company in carotenoid analytical techniques, including high-performance liquid chromatography. Kaytee Products, Inc., Chilton, Wisconsin

Professional Memberships

American Ornithological Society / American Ornithologists' Union (2004-present),
Animal Behavior Society (2007-2015), Cooper Ornithological Society (2007-2014),
International Society for Behavioral Ecology (2008-2015), Sigma Xi (2005-present),
Society for Integrative and Comparative Biology (2005-present)

Selected Press Coverage

Research findings highlighted by [Science News](#), [ScienceNOW](#), and [Discover Magazine](#) regarding our 2012 paper in *Proceedings of the Royal Society, B*, Ontogenetic immune challenges shape adult personality in mallard ducks.

Coverage of our 2010 paper in *Behavioral Ecology and Sociobiology* (A novel method for quantifying the glossiness of animals), was featured in [BBC Earth News](#) and the [Discovery Channel Canada's Daily Planet](#) (minute 8:13).

Professional Service

Professional Society Service

Organizer of Early Professionals Mini-talk Symposium and Early Professionals Social at the 6th North American Ornithological Conference, Washington DC, August 2016.

Session chair during 6th North American Ornithological Conference, August 2016.

Chair of the Membership Committee of the American Ornithological Society, 2016-present.

Organizer of Early Professionals Mini-talk Symposium and Early Professionals Social at the joint meeting of the American Ornithologists' Union and the Cooper Ornithological Society, Norman, Oklahoma, July 2015.

Member of the Membership Committee of the American Ornithologists' Union, 2015-present.

Organizer of Early Professionals Mini-talk Symposium and Early Professionals Social at the joint meeting of the American Ornithologists' Union, Cooper Ornithological Society, and Society of Canadian Ornithologists, Estes Park, Colorado, September 2014.

Chair of the Early Professionals Committee of the American Ornithologists' Union, 2012-2016.

Symposium organizer and session chair at the 131st Stated Meeting of the American Ornithologists' Union, August 2013. Symposium title: Physiological and functional advances in avian coloration.

Session chair during 5th North American Ornithological Conference, August 2012.

Manuscript Referee

American Biology Teacher, American Naturalist, Animal Biology, Ardeola, Auk, Behavioral Ecology and Sociobiology, Biological Journal of the Linnean Society, Biology Letters, BMC Ecology, Canadian Journal of Zoology, Comparative Biochemistry and Physiology, Condor, Evolutionary Ecology, Functional Ecology, General and Comparative Endocrinology, Ibis, Journal of Animal Ecology, Journal of Comparative Physiology B, Journal of Evolutionary Biology, Journal of Experimental Biology, Journal of Experimental Zoology Part A: Ecological Genetics and Physiology, Journal of Field Ornithology, Journal of Fish Biology, Journal of Ornithology, Journal of Raptor Research, Journal of the Royal Society Interface, Methods in Ecology and Evolution, Naturwissenschaften, Oecologia, Physiological and Biochemical Zoology, PLoS ONE, Proceedings of the Royal Society, B

Conference Organizer for “Iridescence: More than meets the eye”

February 2008

In conjunction with four other graduate students, I secured funding for and organized the first ever international conference on iridescence. Participants included biologists, physicists, and artists from over 10 countries on five continents. I organized the publication efforts of the participants, resulting in a special issue of the *Journal of the Royal Society Interface*.

Institutional Service

Faculty Representative, Teaching & Learning Committee	2016-present
Faculty Representative, Alcohol and Other Drugs Standing Committee	2012-present
Faculty Representative, Student Life Committee	2013-2016
Integrated Student Experience Task Force	2013-2014
Faculty mentor, Science Horizons (HHMI-supported program)	2013-2014
Undergraduate Research Applicant Review Committee Member	Fall 2011
Physiology Reading Group Coordinator	Fall 2010
President of the Graduate Scholars in the School of Life Sciences	2009-2010

Community Service

Presented for STEAM camp at Nurture Nature Center	Summer 2016
Spoke at the Nurture Nature Center’s Environment and Health Lecture Series	Fall 2014
Program Director of Graduate Partners in Science Education	Fall 2007-Spring 2009
Ask-A-Biologist Participant	Fall 2006-present
Mentor for Graduate Partners in Science Education	Fall 2006
Spoke at Preserve Inhabitants Lecture Series at Scottsdale Comm. College	October 2008