

Michael William Butler

Department of Biology

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Appointments

Associate Professor, Lafayette College, Department of Biology 2018-present
Assistant Professor, Lafayette College, Department of Biology 2012-2018

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.

Unity & Diversity of Biology, Biology 111. 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.

Recent Advances in Health and the Life Sciences: Societal Risks and Opportunities, INDS 331. Lafayette College.

Publications

Peer-Reviewed Journal Articles

Addy TM, E Berkove, **MW Butler**, F Cham, A deSaussure, A Exarhos, ME Mancuso, M Rizk, T Rossmann, CS Ruebeck, H Younas; M Borzone. 2022. Student pedagogical partnerships to advance inclusive teaching during the COVID-19 pandemic.

International Journal for Students as Partners 6: 81-89, 10.15173/ijsap.v6i1.4869.

Butler MW, EN Stierhoff, JM Carpenetti, MA Bertone, AM Adesso, SA Knutie. 2021.

Oxidative damage increases with degree of simulated bacterial infection, but not ectoparasitism, in tree swallow nestlings. *Journal of Experimental Biology* 224:

jeb243116, 10.1242/jeb.243116. *Cover image associated with article*

Peer-Reviewed Journal Articles (cont'd)

- Ganser SJ, JK Hines, **MW Butler**. 2021. Exploring Miracle Fruit: An Undergraduate Laboratory Exercise on Experimental Design. *CourseSource*, cs.2021.29, 10.24918/cs.2021.29.
- Butler MW**, ME Stine, KC Ki. 2020. Eastern Bluebirds (*Sialia sialis*) use color patterning, but not the colors themselves, as a cue to eject interspecific parasitic eggs. *The Auk: Ornithological Advances*, ukaa047, 10.1093/auk/ukaa047.
- Armour EM, TL Bruner, JK Hines, **MW Butler**. 2020. Low-dose immune challenges result in detectable levels of oxidative damage. *Journal of Experimental Biology* 223: jeb220095.
- Elmore JA, ..., **MW Butler**, et al. 2020. Correlates of bird collisions with buildings across three North American countries. *Conservation Biology* 35:654-665, 10.1111/cobi.13569.
- Wallace JW, LC Diamantides, KC Ki, **MW Butler**. 2020. Switched-antenna low-frequency (LF) radio-frequency identification (RFID) for ornithology. *IEEE Journal of Radio Frequency Identification* 4:137-145, 10.1109/JRFID.2020.2971534.
- Butler MW**, EM Armour, JA Minnick, ML Rossi, SF Schock, SE Berger, JK Hines. 2020. Effects of stress-induced increases of corticosterone on circulating triglyceride levels, biliverdin concentration, and heme oxygenase expression. *Comparative Biochemistry and Physiology, Part A* 240:110608.
- Baylor JL and **MW Butler**. 2019. Immune challenge-induced oxidative damage may be mitigated by biliverdin. *Journal of Experimental Biology*, 222:jeb200055.
- Homsher MP, MT Astor, JK Hines, **MW Butler**. 2018. Immune challenges decrease biliverdin concentration in the spleen of Northern Bobwhite Quail, *Colinus virginianus*. *Journal of Comparative Physiology B*, 188:505-515.
- Stahlschmidt ZR, SS French, A Ahn, A Webb, **MW Butler**. 2017. A simulated heat wave has diverse effects on immune function and oxidative physiology in the cornsnake (*Pantherophis guttatus*). *Physiological and Biochemical Zoology*, 90:434-444.
- Hager SB, ..., **MW Butler**, et al. 2017. Continent-wide analysis of how urbanization affects bird-window collision mortality in North America. *Biological Conservation*, 212:209-215.
- 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.
- 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.

Peer-Reviewed Journal Articles (cont'd)

- 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.
- Stahlschmidt ZR, O Lourdais, 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.
- 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 Guillette 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.
- 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.
- 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.
- 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.

Peer-Reviewed Journal Articles (cont'd)

- 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.
- 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.

Peer-Reviewed Journal Articles (cont'd)

- 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

- Julianna Carpenetti. How do changes in air temperature affect House Sparrow egg size, coloration, and developmental success? Successfully defended May 2021.
- Emma Stierhoff. Do House Sparrow nestlings tolerate or resist nest parasites? Successfully defended December 2019.
- Kwanho "Claudia" Ki. Is Biliverdin an Antioxidant? Successfully defended May 2019.
- Ellen Armour. Degree of immune challenge affects oxidative physiology of northern bobwhite quail (*Colinus virginianus*). Successfully defended May 2018.
- Jennifer Minnick. Does foreign egg size affect adult nesting behavior in Eastern Bluebirds (*Sialia sialis*), House Sparrows (*Passer domesticus*), and Tree Swallows (*Tachycineta bicolor*)? Successfully defended May 2017.

Honors Projects (cont'd)

- 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*). Successfully defended May 2017.
- 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 study projects

- Devon Hallihan. Spring 2022: Sex-based variation in adult house sparrow foraging behavior.
- Caroline Garti. Fall 2021: Assessing the antioxidant function of biliverdin at physiologically relevant levels. Spring 2022: Determination of the degree to which biliverdin acts as an antioxidant in biological tissues.
- Dory Howard. Fall 2021: Assessing the antioxidant function of biliverdin at physiologically relevant levels. Spring 2022: Determination of the degree to which biliverdin acts as an antioxidant in biological tissues.
- Jordan Lam. Spring 2021: Developing RFID-based protocols to assess social dominance in free-living house sparrows. Fall 2021: Investigating variation in food preference to evaluate social dominance interactions. Spring 2022: Sex-based variation in adult house sparrow foraging behavior.
- Zack Cullen. Fall 2020: Quantifying seasonal and diurnal variation in avian community structure. Spring 2021: Relationships between biliverdin and other physiological metrics in iguanas. Fall 2021: Assessing the antioxidant function of biliverdin at physiologically relevant levels. Spring 2022: Determination of the degree to which biliverdin acts as an antioxidant in biological tissues.
- Grace Emin. Spring 2020: Relationships between biliverdin and other physiological metrics in iguanas. Fall 2020: Quantifying color and shape of eastern bluebird eggs to explore relationship between egg ellipticity and saturation. Spring 2021: Quantifying color and shape of eastern bluebird eggs to explore relationship between egg ellipticity and saturation.
- Kwabena “Koby” Acheampong. Spring 2020: Relationships between biliverdin and other physiological metrics in iguanas.
- Erin Arevalo. Spring 2020: Quantifying biliverdin in ducks exposed to parasitic trematodes. Fall 2020: Quantifying seasonal and diurnal variation in avian community structure.

Independent study projects (cont'd)

- Samantha Ganser. Spring 2020: Using active learning to increase student understanding of experimental design.
- Julianna Carpenetti. Spring 2019: Comparative analysis of liver biliverdin concentration in avian species. Fall 2019: Relationship between nest success and egg morphology and patterning.
- Casey Nevins. Fall 2018. Tissue biliverdin concentration and degree of biliverdin deposition into eggshells: a phylogenetic perspective.
- Catherine Futterman. Spring 2018: Relationship between nest box orientation, weather, and roosting behavior.
- Zachary Salomon. Spring 2018: Relationship between nest box orientation, weather, and roosting behavior. Fall 2018, Spring 2019: Window-based mortality in birds.
- Emma Stierhoff. Fall 2017: Relationship between nest box orientation, weather, and roosting behavior. Spring 2018: Relationship between nest box orientation, weather, and roosting behavior. Fall 2018: Links between immune system activation in nestlings and provisioning rate of parents.
- Maya Stine. Fall 2017: Eastern bluebirds (*Sialia sialis*) use color patterning, but not the colors themselves, as a cue to recognize parasitic eggs.
- Alexandra Stanford. Spring 2017: Programming and deployment of radio frequency identification devices to track bird activity; Fall 2017: Effect of LPS on biliverdin levels in spleen and liver tissues; Spring 2018: Effect of LPS on biliverdin levels in spleen and liver tissues.
- Ellen Armour. Spring 2017: Determination of biliverdin concentration in response to stressors in nestling songbirds.
- Katherine "Grace" Veghte. Spring 2017: Detecting interplay between roosting habits and environmental temperature in songbirds; Fall 2017: Relationship between nest box orientation, weather, and roosting behavior.
- Kwanho "Claudia" Ki. Spring 2017: Programming and deployment of radio frequency identification devices to track bird activity; Fall 2017: Relationship between nest box orientation, weather, and roosting behavior; Spring 2018: Relationship between nest box orientation, weather, and roosting behavior.
- Riley Godshall. Spring 2017: Detecting interplay between roosting habits and environmental temperature in songbirds; Fall 2017: Relationship between nest box orientation, weather, and roosting behavior.
- Xavier Laracuate. Spring 2017, Fall 2017: Using LiDAR-based point clouds to uncover relationships between environment and nesting success; Spring 2018: Using LiDAR-based point clouds to uncover relationships between environment and nesting success.
- Morgan Levy. Fall 2016: Investigation into a novel method of quantifying heme oxygenase expression in avian tissue.
- Samantha Bociulis. Fall 2015 and Spring 2016: Repeatability and recovery of biliverdin in homogenized avian tissue.
- Jennifer Minnick. Spring 2015: Correlations between eggshell coloration and parental behavior in eastern bluebirds (*Sialia sialis*); Spring 2016: Repeatability and recovery of biliverdin in homogenized avian tissue.

Independent study projects (cont'd)

Marissa Rossi. Spring 2015: Refinement of infrared fluorescence techniques for detecting small quantities of biliverdin in plasma; Fall 2015: Repeatability and recovery of biliverdin in homogenized avian tissue;

Thomas Lutz. Spring 2015: Variation in antioxidant and oxidative damage levels in response to digestive state.

Aaron Little. Fall 2014 and Spring 2015: Optimization of techniques to extract biliverdin from biological samples.

Jessica Baylor. Fall 2014: Exploration of infrared fluorescence in detecting small quantities of biliverdin in plasma.

Emily Lubas. Spring 2014: Egg coloration in relation to nest site selection in European starlings; Fall 2014: Effect of exogenous biliverdin on immune function in European starlings.

Haleigh Waite. Spring 2014: Development of an enzymatic assay to quantify biliverdin in avian plasma; Fall 2014: Correlates between eggshell coloration, egg quality, and environmental factors in wild-breeding European starlings.

Nathan Ritter. Spring 2013: Use of thin layer chromatography to compare biliverdin levels of mallards and starlings; Fall 2013 and Spring 2014: Use of thin layer chromatography to compare biliverdin levels of mallards and starlings;

Briette Karanfilian. Fall 2012 and Spring 2013: Using high-performance liquid chromatography to quantify biliverdin levels in avian bile and liver.

Melissa Homsher. Fall 2012: Bile pigment quantification from avian tissues.

Additional Research Mentoring Experience

Lafayette College: Sedomo Agosa, Michael Astor, Heather Bauerle, Julianna Carpenetti, Nicole Damore, Fatma Esra Demirhan, Kara Falvey, Samantha Gleich, Kwanho Claudia Ki, Megan Mauriello, Camila Moscoso, Erin Murray, Daniel Vincent, Isabella Walko, Brooke Weiss

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. Animal coloration: from enzymes to behavior. University of the Pacific Seminar Series. University of the Pacific, Stockton, CA. January 2021. Virtual talk.

Butler MW. A colorful look at animal physiology and behavior. Princeton University Integrated Behavioral Research Group Seminar Series, Princeton University, Princeton, NJ. February 2020.

Butler MW. The how and why of animal coloration. Hamilton College Biology Seminar Series, Hamilton College, Clinton, New York. September 2019.

Invited Speaker Engagements (cont'd)

- Butler MW**, Armour EA, Hines JK. Immune response, oxidative damage, and triglyceride levels exhibit different dose-dependent relationships with intensity of immune challenge. *Keynote speaker* for the “Immune function as a mediator of trade-offs” symposium. 12th European Ornithologists’ Union Congress, Cluj-Napoca, Romania. August 2019.
- Butler MW**. Colorful Animals in a Challenging World. Thomas Roy and Lura Forrest Jones Faculty Lecture Award, Lafayette College, Easton, Pennsylvania. February 2019.
- Butler MW**. Physiological underpinnings of avian ecology. Plenary session, American Ornithological Society (135th Stated Meeting) and Society of Canadian Ornithologists (35th Stated Meeting), East Lansing, Michigan, August 2017.
- 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.
- 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**, Hines JK, Ganser SJ. Improving students' experimental design skills with miracle fruit. 2022 Scholarship of Teaching & Learning Forum, virtual meeting, Lehigh Valley Association of Independent Colleges, March 2022.
- Butler MW**, Stierhoff ES, Carpenetti JM, Knutie SA. House sparrow nestlings employ immunological resistance when ectoparasite numbers are low, and immunological tolerance when ectoparasite numbers are high. Annual Meeting of the Society for Integrative and Comparative Biology, Phoenix, Arizona, January 2022.

Conference Seminars (cont'd)

- Butler MW**, Stierhoff ES, Carpenetti JM, Adesso AM, Knutie SA. Oxidative damage increases with degree of simulated bacterial infection in tree swallow nestlings. 7th North American Ornithological Conference, Virtually based in Puerto Rico, August 2020.
- Butler MW**, Armour EM, Minnick JA, Rossi ML, Schock SF, Berger SE, Hines JK. Both circulating corticosterone levels and heme oxygenase expression are correlated with circulating triglyceride levels in house sparrows. Annual Meeting of the Society for Integrative and Comparative Biology, Austin, Texas, January 2020.
- Butler MW**, Stierhoff ES, Carpenetti JM, Adesso AM, Knutie SA. Oxidative damage increases with degree of simulated bacterial infection in tree swallow nestlings. Annual Meeting of the Society for Integrative and Comparative Biology, Tampa, Florida, January 2019.
- Butler MW** and EM Armour. Degree of immune challenge differentially affects oxidative stress and metabolism. American Ornithological Society (136th Stated Meeting), Tucson, Arizona, April 2018.
- Butler MW** and ML Rossi. House sparrows exhibit less nest defense than both eastern bluebirds and tree swallows. American Ornithological Society (135th Stated Meeting) and Society of Canadian Ornithologists (35th Stated Meeting), East Lansing, Michigan, August 2017.
- 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 Lorigou, **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.

Conference Seminars (cont'd)

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.

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

Weiss BM, Lam J, Cullen ZE, **Butler MW**. Methodological considerations of test feeder color preferences of native birds. Fall 2021 Student Research Poster Session, Lafayette College, Easton PA, October 2021.

Ganser SJ, Hines JK, **Butler MW**. Exploring Miracle Fruit: An Undergraduate Laboratory Exercise on Experimental Design. National Association of Biology Teachers Professional Development Conference, Virtually hosted, November 2020.

Carpenetti JM, Stierhoff ES, Diamantides LC, Wallace JW, **Butler MW**. Does degree of immune challenge affect house sparrow survival before and after leaving the nest? Spring 2019 Student Research Poster Session, Lafayette College, Easton PA, April 2019.

Stierhoff ES, Carpenetti JM, **Butler MW**. The relationship between degree of immune challenge in house sparrow nestlings and parental feeding behavior. Spring 2019 Student Research Poster Session, Lafayette College, Easton PA, April 2019.

Carpenetti JM, Stierhoff ES, Diamantides LC, Wallace JW, **Butler MW**. Does degree of immune challenge affect house sparrow survival before and after leaving the nest? Annual Meeting of the Society for Integrative and Comparative Biology, Tampa, Florida, January 2019.

Stierhoff ES, Carpenetti JM, **Butler MW**. The relationship between degree of immune challenge in house sparrow nestlings and parental feeding behavior. Annual Meeting of the Society for Integrative and Comparative Biology, Tampa, Florida, January 2019.

Stine M, Ki K, and **MW Butler**. Eastern bluebirds (*Sialia sialis*) use color patterning, but not the colors themselves, as a cue to recognize parasitic eggs. Spring 2018 Student Research Poster Session, Lafayette College, Easton PA, April 2018.

Armour E and **MW Butler**. Degree of Immune Challenge Affects Oxidative Physiology in Northern Bobwhite Quail. Spring 2018 Student Research Poster Session, Lafayette College, Easton PA, April 2018.

Conference Posters (cont'd)

- Stine M, Ki K, and **MW Butler**. Eastern bluebirds (*Sialia sialis*) use color patterning, but not the colors themselves, as a cue to recognize parasitic eggs. National Conference on Undergraduate Research 2018, Oklahoma City, Oklahoma, April 2018.
- Rossi ML and **MW Butler**. 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 **MW Butler**. 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.
- 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.

Conference Posters (cont'd)

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

Richard King Mellon Research Fellowship	2019
Sigma Xi Grants-in-Aid of Research (to undergraduate mentee KK)	2017
Sigma Xi Grants-in-Aid of Research (to undergraduate mentee JB)	2015
Sigma Xi Grants-in-Aid of Research (to undergraduate mentee BK)	2013
ASU Chapter of Sigma-Xi Grants-in-Aid of Research	2011
Frank M. Chapman Research Grant	2011
Graduate and Professional Student Association JumpStart Research Grant	2011
Sigma-Xi Grants-in-Aid of Research	2010
Animal Behavior Society Student Research Grant	2010
Facilities Initiative Grant for Graduates	2009
Graduate and Professional Student Association JumpStart Research Grant	2009
Society for Integrative and Comparative Biology Grant in Aid of Research	2009
Graduate and Professional Student Association Research Grant	2008
American Ornithologists' Union Research Awards	2008
Sigma-Xi Grants-in-Aid of Research	2007
Graduate Research Grant in Raptor Biology	2005
Graduate Research Grant in Raptor Biology	2004

Fellowships

National Science Foundation International Research Fellowship	2012
Graduate College Dissertation Fellowship	2011
Faculty Emeriti Association Fellowship	2011
University Graduate Fellowship	2009
University Graduate Fellowship	2008
University Graduate Fellowship	2007
Arizona State University Fall Fellowship	2006
Summer Research Fellowship in Raptor Biology	2005
Summer Research Fellowship in Raptor Biology	2004

Travel Awards

Charlotte Mangum Program, SICB Meeting (to undergraduate mentee ES)	2018
International Carotenoid Society Travel Award	2011

Travel Awards (cont'd)

Graduate and Professional Student Association Conference Travel Grant	2011
Preparing Future Faculty Travel Grant	2011
Conference Travel Grant, School of Life Sciences	2011
Graduate College Travel Grant	2011
Graduate and Professional Student Association Conference Travel Grant	2009
Conference Travel Grant, School of Life Sciences	2009
Conference Travel Grant, School of Life Sciences	2008
American Museum of Natural History Collection Study Grant in Ornithology	2008
Delaware Museum of Natural History Ornithology Scholarship	2008
Graduate and Student Professional Association Travel Grant	2006
National Science Foundation Research Coordination Network Grant	2005
Marcia Brady Tucker Travel Award	2005

Professional Recognition and Conference Awards

American Ornithological Society, Marion Jenkinson Service Award	2020
Thomas Roy and Lura Forrest Jones Faculty Lecture Award	2018
American Ornithological Society, Ned K. Johnson Young Investigator Award	2017
Elected Member, American Ornithological Society	2016
Student Government Superior Teaching Award	2015
Graduate Citizen Scholar Award	2007
Research Conference Award, Division of Graduate Studies (co-PI)	2007
Frontiers in Life Sciences Conference Grant (co-PI)	2007
Graduate Student Teaching Assistant Award	2005

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

- Session (Ecoimmunology) chair and served as mentor for Meet an Ecoimmunologist/Disease Ecologist Mentor Meetup at 2022 Annual Meeting of the Society for Integrative and Comparative Biology, Phoenix, Arizona, January 2022.
- Chair of the Membership Committee of the American Ornithological Society, 2016-2021.
- Session (S.T.R.E.S.S. 1) chair and served as a Code of Conduct Ally at the 2020 Annual Meeting of the Society for Integrative and Comparative Biology, Austin, Texas, January 2020.
- Session (Immune Trade-offs) chair and served as mentor for “Lunch with an Ecoimmunologist/Disease Ecologist” event at 2019 Annual Meeting of the Society for Integrative and Comparative Biology, Tampa, Florida, January 2019.
- Session chair and judge of student talks during the joint meeting of the American Ornithological Society and Society of Canadian Ornithologists, East Lansing, Michigan, August 2017.
- Chair of the Early Professionals Committee of the American Ornithologists’ Union, 2012-2016.
- 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.
- 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.
- 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.
- Member of the Membership Committee of the American Ornithologists’ Union, 2015-present.
- 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, Illinois Natural History Survey Bulletin, Journal of Animal Ecology, Journal of Avian Biology, 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,

Manuscript Referee (cont'd)

Nature Communications, 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*.

Professional Development

Invited speaker for informal lunchtime seminar, "Faculty life at a small liberal arts college." Princeton University, Princeton, NJ. February 2020.

Institutional Service

Mentor, Women in Sports Monroe Neighborhood House	2022-2023
Member, Promotion, Tenure, and Review Committee	2021-2022
Assistant Chair, Department of Biology	2021-present
Chair, Inclusion Committee, Biology Department	2021-present
Member, Institutional Animal Care and Use Committee	2021-present
Co-organizer, Lafayette Allies for Gender Equity	2018-2019, 2022-2023
Chair, Health, Life Sciences, and Society Program	2017-2019, 2020-present
Chair, Institutional Animal Care and Use Committee	2018-2019
Chair, Teaching & Learning Committee	2018-2019
Member, Lafayette Allies for Gender Equity	2017-2018, 2020-2021
Faculty Representative, Teaching & Learning Committee	2016-2018
Faculty Representative, Alcohol and Other Drugs Standing Committee	2012-2019
Faculty Representative, Student Life Committee	2013-2016, 2022-2023
Integrated Student Experience Task Force	2013-2014
Faculty mentor, Science Horizons (HHMI-supported program)	2013-2014, 2018-2019

Community Service

Co-led Nurture Nature Center's "Fliers and Singers: Bird Walk and Talk along the Karl Stirner Arts Trail"	Summer 2022
Co-led Nurture Nature Center's "Fliers and Singers: Bird Walk and Talk along the Karl Stirner Arts Trail"	Summer 2019
Co-led Nurture Nature Center's "Fliers and Singers: Bird Walk and Talk along the Karl Stirner Arts Trail"	Summer 2018
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 2006-2012
Spoke at Preserve Inhabitants Lecture Series at Scottsdale Comm. College	October 2008
Mentor for Graduate Partners in Science Education	Fall 2006