Joshua M. Lyte, Ph.D., M.S.

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CITIZENSHIP United States of America

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LANGUAGES

English: Native speaker.

Mandarin Chinese: Chinese language (speaking, reading, listening, and writing). Certified at Chinese exam level 4 (汉语水平考试 ,Hanyu Shuiping Kaoshi).

POSITIONS

United States Department of Agriculture (USDA), Agricultural Research Service (ARS)
Poultry Production and Product Safety Research Unit (PPPSR)
University of Arkansas—Fayetteville

Research Microbiologist (SY; Permanent position)
October 2019 – Present.

My research centers on understanding how avian stress neurophysiology can serve as an actionable platform for the design of mechanistic-based strategies to improve health, performance, and behavior across poultry species. Much of this work concerns comparative aspects between chicken, turkey, duck, as well as quail, in the identification of neuroendocrine-immune axes as terminals of host-microbe bi-directional communication, and integrates methodologies and concepts from neurobiology, comparative physiology, electrophysiology, immunology, and microbiology.

Research Microbiologist (Research Associate; non-permanent)
September 2018 — September 2019

Adjunct faculty
Department of Poultry Science
University of Arkansas
September 2019 – Present.

Adjunct faculty
Cellular and Molecular Biology Program
University of Arkansas
September 2019 – Present.

POSTDOCTORAL RESEARCH

Alimentary Pharmabiotic Center (APC) Microbiome Ireland
University College Cork, Cork, Ireland
Laboratories of Professors John Cryan and Ted Dinan

Postdoctoral research fellow: September 2016 – September 2018

My postdoctoral research focused on the identification of mechanisms underpinning the impact of the microbiome on animal neurophysiology at the central and peripheral levels, as well as concomitant alterations in behavior. Specifically, I utilized multiple genetic strains of both male and female animals under conditions of acute and chronic psychological and physical stressors to explore the microbiota-gut-brain axis. This research resulted in high-impact publications demonstrating the role of the microbiome in the plasticity of animal physiological and behavioral stress responses.

EDUCATION

Iowa State University (Ames, Iowa, USA)
Doctoral degree Awarded December 2016. GPA: 3.99

Department of Food Science and Human Nutrition; Advisor, Dr. James Hollis
Major: Food Science and Technology.
Minor: Microbiology.
August 2013 – August 2016

My dissertation focused on the comparative physiology between the porcine and human gastrointestinal tracts in an effort to design a translational model system to study nutritional immunity. Specifically, my research utilized human clinical work and swine to examine how mimicry between dietary fatty acids and the lipid A portion of microbial lipopolysaccharide enables diet to affect local and systemic immune responses. Additional projects during my PhD included the targeted design of type-III and type-IV resistant starches for the modulation of physiological and behavioral responses to stress in gnotobiotic and conventional rodents.

Texas Tech University (Lubbock, Texas, USA)
Master of Science Awarded December 2009. GPA: 3.93

Department of Animal and Food Sciences.
Major: Food Science.
August 2007 – December 2009

My thesis combined Animal Science and the related field of Food Science to investigate the spoilage characteristics of ground beef stored under different forms of modified atmosphere packaging to address critical issues in consumer food safety of meat and meat products. I developed a combined approach utilizing solid-phase microextraction, gas chromatography, mass spectroscopy, and olfactometry to assess volatile odor indicators of spoilage in meat stored under high-oxygen or carbon monoxide modified atmosphere environments.

Texas Tech University (Lubbock, Texas, USA)
Bachelor of Arts. Awarded May 2007. GPA: 3.90 Summa cum Laude.
Major: History.
Minors: Chemistry; Biology.
Date of attendance: August 2003 — May 2007

My senior undergraduate thesis involved the development of an easily controlled stereoselective process for generating Morita-Baylis-Hillman products that contain a beta-branched amino adduct as well as the synthesis of vicinal amino alcohols through the utilization of alpha, beta- unsaturated amides in the Sharpless asymmetric amino hydroxylation reaction.

RECOGNITION

Honors and Awards

1. USDA-Agricultural Research Service (November 2023). Federal government service recognition award.
2. ARS-X Finalist (September 2022). Developing a microbial chill pill to mitigate the impact of heat stress on poultry food safety risk in the face of a warming climate.
3. USDA-Agricultural Research Service SEA Early Career Research Scientist of the Year award (March 2022).
4. US Air Force award for outstanding research presented by the commanding general of the 711th human performance wing, Dayton, Ohio Air Force base (November 2017).
5. A feature-length article highlighting my doctoral research was published in the May newsletter of the national food science honor society, Phi Tau Sigma (Spring 2017).
6. Food Science and Human Nutrition Departmental Travel Award (Spring 2015).
7. Graduate and Professional Student Service Professional Advancement Grant (Spring 2015).
8. Food Science and Human Nutrition Graduate Assistantship (Fall 2013-August 2016).
9. Graduated Summa cum Laude from Texas Tech University (May 2007).
10. Awarded Ernest Wallace Phi Alpha Theta Scholarship (Spring 2007).
11. President's List, Texas Tech University (Fall 2006).
12. Awarded Academic Freedom Scholarship (Spring 2006).
13. Dean's List, Texas Tech University (Spring 2006).
14. President' List, Texas Tech University (Fall 2005).

PUBLICATIONS

Peer-Reviewed Journal Articles

1) Facchetti v Assumpcao, A., Caputi, V., Ashwell, C., Honaker, C., Siegel, P., Taylor Jr., R., and **Lyte, J.M.*** 2026. Blood serum chemistry diverges between chickens selected for high or low antibody response to sheep red blood cells. *BMC Veterinary Research*. In press. *Corresponding author.

2) Wickramasuriya, S. and **Lyte, J.M*.** 2026. Neurochemical metabolic pathways display regional and age-specific expression patterns in the chicken intestinal tract. *Poultry Science* 105(1): 106172. *Corresponding author

3) **Lyte, J.M.*.** 2026. Stress neurophysiology in poultry: A functional framework for the application of microbiome science in poultry production. *Poultry Science.* In press. *Corresponding author.

4) Wickramasuriya, S., Oluwagbenga, E.M., Caputi, V., Daniels, K., Lyte, M., Fraley, G.S. and **Lyte, J.M.***. 2026. An Orange corn diet modulates Pekin duck cecal neurochemical responses to heat stress. *Poultry Science* 105(2): 106250. *Corresponding author.

5) Chung, T., Oladeinde, A., Woyda, A., Wickramasuriya, S., **Lyte, J.M.,** Liyanage, R., Rothrock, M., Li, X., Cho, S., Lawrence, J., Endale, D., Strickland, T., and Abdo, Z. 2025. Fitness factors and siderophores influence the survival of *E. coli* in reused broiler litter. *Journal of Food Protection.* 88(12): 100671.

6) Seyoum, M., Facchetti v Assumpcao, A., Caputi, V., Ashwell, C., Honaker, C., Daniels, K., Lyte, M., Siegel, P., Taylor Jr., R.L., and **Lyte, J.M.*** 2025. Multigenerational selection for high or low antibody responses to sheep red blood cells modulates the chicken cecal microbiome and its evolutionary relationship to immune and serotonergic systems. *Poultry Science* 104 (4): 104943. *Corresponding author

7) Schober, J.M., Wilson, N., Seyoum, M., **Lyte, J.M**., Bergman, M.M., Oluwagbenga, E.M., and Fraley, G. 2025. Effects of semi-open water and non-water enrichment on welfare, production, behavior, and microbial exposure of grow-out Pekin ducks. *Poultry Science.* 104 (9): 105477.

8) **Lyte, J.M.,** Seyoum, M., Ayala, D., Kers, J.G., Caputi, V., Johnson, T., Zhang, L., Rehberger, J., Zhang, G., Dridi, S., Hale, B., de Oliveira, J.E., Grum, D., Smith, A.H., Kogut, M., Ballou, A., Ricke, S.C., Potter, B., and Proszkowiec-Weglarz, M. 2025. Do we need a standardized 16S rRNA gene amplicon sequencing analysis protocol for poultry microbiota research? *Poultry Science* 104 (7): 105242.

9) Rosell-Cardona, C., Leigh, S.J., Knox, E., Tirelli, E., **Lyte, J.M.**, Martinez-Herrero, S., O'Driscoll, C.M., Goodson, M.S., Kelley-Loughnane, N., Aburto, M.R., Cryan, J.F., and Clarke, G. 2025. Acute Stress-induced Alterations in Short-Chain Fatty Acids: Implications for Intestinal and Blood Brain Barriers. *Brain, Behavior, and Immunity—Health* 46: 100992.

10) **Lyte, J.M**.*, Jia, X., Caputi, V., Zhang, D., Daniels, K., Phillips, G., and Lyte, M. 2025. Changes in the chicken cecal bacterial metagenome co-occur with local host serotonin responses to heat stress. *Poultry Science* 104(3): 104886. *Corresponding author

11) Lyte, J.M.*, Facchetti v Assumpcao, A., Caputi, V., Ashwell, C., Seyoum, M., Honaker, C., Daniels, K., Lyte, M., Siegel, P., and Taylor Jr., R.L. 2025. Co-evolution of the humoral immune and serotonergic systems in chickens selected for high or low blood antibody titer response to sheep red blood cells. *Poultry Science* 104(2): 104699. *Corresponding author

12) **Lyte, J.M*.** Eckenberger, J., Keane, J., Caputi, V., Bacon, T., Donoghue, A.M., Liyanage, R., Robinson, K., Daniels, K.M., and Lyte, M. 2024. Cold stress initiates distinct catecholaminergic and serotonergic responses in the chicken gut that are associated with functional shifts in the cecal microbiome. *Poultry Science* 103(3): 103393. *Corresponding author

13) Gheorghe, C.E., Leigh, SJ., Tofani, G.S.S., Bastiaanssen, T.F.S., **Lyte, J.M.**, Gardelin, E., Govindan, A., Strain, C., Martinez-Herrero, S., Goodson, M., Kelley-Loughnane, N., Cryan, J.F., and Clarke, G. 2024. The microbiota drives diurnal rhythms in tryptophan metabolism in the stressed gut. *Cell Reports* 43(4):114079.

14) Seyoum, M.M., Ashworth, A.J., Owens, P., Katuwal, S., **Lyte, J.M.,** and Savin, M. 2024. Leaching of antibiotic resistance genes and microbial assemblages following poultry litter applications in karst and non-karst landscapes. *Science of the Total Environment*. 934:172905.

15) **Lyte, J.M.,** Arsi, K., Caputi, V., Liyanage, R., Facchetti V Assumpcao A., Jesudhasan, P.R., and Donoghue, A.M. 2024. Inclusion of trans-cinnamaldehyde and caprylic acid in feed results in detectable concentrations in the chicken gut and reduces foodborne pathogen carriage. *Poultry Science* 103 (2): 103368.

16) Jia, X., Phillips, G., and **Lyte, J.M*.** 2023. Complete genome sequence of an avian pathogenic Escherichia coli strain isolated from poultry. *Microbiology Resource Announcements* 12 (10): e0042423. *Corresponding author

17) **Lyte, J.M.***, Lyte, M., Daniels, K.M., Oluwagbenga, E., and Fraley, G.S. 2023. Catecholamine concentrations in duck eggs are impacted by hen exposure to heat stress. *Frontiers in Physiology.* 1122414. *Corresponding author

18) **Lyte, J.M.,** Koester, L., Daniels, K., and Lyte, M. 2022. Distinct cecal and fecal microbiome responses to stress are accompanied by sex- and diet-dependent changes in behavior and gut serotonin. *Frontiers in Neuroscience.* 827343.

19) [#]**Lyte, J.M.*,** Martinez, D.A., Robinson, K., Donoghue, A.M., Daniels, K.M., and Lyte, M. 2022. A neurochemical biogeography of the broiler chicken intestinal tract. *Poultry Science* 101 (3): 101671. *Corresponding author. [#] This article was selected as the Poultry Science journal Editor's Choice 2022.

20) Lee, M.D., Ipharraguerre, I.R., Arsenault, R.J., Lyte, M., **Lyte, J.M.,** Humphrey, B., Angel, R., and Korver, D.R. 2022. Informal Nutrition Symposium: Leveraging the microbiome (and metabolome) for poultry production. *Poultry Science* 101 (2): 101588.

21) van de Wouw, M., Walsh, C.J., Vigano, G.M.D., **Lyte, J.M.,** Boehme, M., Gaul, A., Walsh, A.M., Crispie, F., Clarke, G., Dinan, T.G., Cotter, P.D., and Cryan, J.F. 2021. Kefir Ameliorates Specific Microbiota-Gut-Brain Axis Impairments in a Mouse Model Relevant to Autism Spectrum Disorder. *Brain Behavior and Immunity*. 97: 119-134.

22) Diviccaro, S., Caputi, V., Cioffi, L., Giatti, S., **Lyte, J.M.,** Caruso, D., O'Mahony, S.M., and Melcangi, R.C. 2021. Exploring the impact of the microbiome on neuroactive steroid levels in germ-free animals. *International Journal of Molecular Sciences*. 22 (22): 12551.

23) **Lyte, J.M.*,** Shrestha, S., Wagle, B.R., Liyanage, R., Martinez, D.A., Donoghue, A., Daniels, K.M., and Lyte, M. 2021. Serotonin modulates *Campylobacter jejuni* physiology and interaction with the gut epithelium *in vitro*. *Poultry Science.* 100(3): 100944. *Corresponding author

24) **Lyte, J.M.*,** Keane, J., Eckenberger, J., Anthony, N., Shrestha, S., Marasini, D., Daniels, K., Caputi, V., Donoghue, A., and Lyte, M. 2021. Japanese quail (*Coturnix japonica*) as a novel model to study the relationship between the avian microbiome and microbial endocrinology-based host-microbe interactions*. Microbiome*. 9(1):38. *Corresponding author

25) Bastiaanssen, T., Gururajan, A., van de Wouw, M., Moloney, G., Ritz, N.L., Long-Smith, C.M., Wiley, N.C., Murphy, A.B., **Lyte, J.M.,** Fouhy, F., Stanton, C., Claesson, M.J., Dinan, T.G., and Cryan, J.F. 2021. Volatility as a concept to understand the impact of stress on the microbiome. *Psychoneuroendocrinology*. 124: 105047.

26) **Lyte, J.M.,** Gheorghe, C., Goodson, M.S., Kelley-Loughnane, N., Dinan, T.G., Cryan, J.F., and Clarke, G. 2020. Gut-brain axis serotonergic responses to acute stress exposure are microbiome-dependent. *Neurogastroenterology & Motility.* 32 (11): e13881.

27) van de Wouw, M., **Lyte, J.M.,** Boehme, M., Sichetti, M., Moloney, G., Goodson, M.S., Kelley-Loughnane, N., Dinan, T.G., Clarke, G., and Cryan, J.F. 2020. The role of the microbiota in acute stress-induced myeloid immune cell trafficking. *Brain, Behavior, and Immunity.* 84: 209-217.

28) van de Wouw, M., Walsh, A.M., Crispie, F., van Leuven L., **Lyte, J.M.,** Boehme, M., Clarke, G., Dinan, T.G., Cotter, P.D., and Cryan, J.F. 2020. Distinct Actions of the Fermented Beverage Kefir on Host Behaviour, Immunity and Microbiome Gut-Brain Modules in the Mouse. *Microbiome.* 8: 67.

29) Walsh, J., Gheorghe, C., **Lyte, J.M.,** van de Wouw, M., Boehme, M., Dinan, T., Cryan, J.F., Griffin, B.T., Clarke, G., and Hyland, N.P. 2020. Gut-microbiome mediated modulation of hepatic cytochrome P450 and P-glycoprotein: impact of butyrate and FOS-inulin. *Journal of Pharmacy and Pharmacology*. 72 (8): 1072-1081.

30) **Lyte, J.M.*** 2019. Eating for $3.8x10^{13}$: Examining the impact of diet and nutrition on the microbiota-gut-brain axis through the lens of microbial endocrinology. *Frontiers in Endocrinology.* Jan 29; 9:796. *Corresponding author

31) **Lyte, J.M.*,** Proctor, A., Phillips, G.J., Lyte, M., and Wannemuehler, M. 2019. Altered Schaedler flora mice: A defined microbiota animal model to study the microbiota-gut-brain axis. *Behavioural Brain Research*. 356: 221-226. *Corresponding author

32) **Lyte, J.M.*** and Lyte, M. 2019. Microbial Endocrinology: Intersection of Microbiology and Neurobiology Matters to Swine Health from Infection to Behavior. *Animal*. 13 (11): 2689-2698. *Corresponding author

33) Gururajan, A., van de Wouw, M., Boehme, M., Becker, T., O'Connor, R., Bastiaanssen, T., Moloney, G.M., **Lyte, J.M.,** Ventura da Silva, A., Merckx, B., Dinan, T.G., and Cryan, J.F. 2019. Resilience to Chronic Stress Is Associated with Specific Neurobiological, Neuroendocrine and Immune Responses. *Brain, Behavior, and Immunity.* 80: 583-594.

34) Cryan, J.F., O'Riordan, K.J., Cowan, C., Bastiaanssen, T., Boehme, M., Codagnone, M.G., Cussotto, S., Fulling, C., Golubeva, A., Guzzetta, K., Long-Smith, C., **Lyte, J.M**., Martin, J., Moloney, G., Morelli, E., Morillas, E., O'Connor, R., Pereira, J., Peterson, V., Rea, K., Ritz, N., Sandhu, K., Sherwin, E., Spichak, S., van de Wouw, M., Ventura Da Silva, A., Wallace-Fitzsimons, S.E., Hyland, N., Clarke, G. and Dinan, T.G. 2019. The Microbiota-Gut-Brain Axis. *Physiological Reviews.* 99 (4): 1877-2013.

35) van de Wouw, M., Boehme, M., **Lyte, J.M.,** Wiley, N., Strain, C., O'Sullivan, O., Clarke, G., Stanton, C., Dinan, T.G., and Cryan, J.F. 2018. Short-Chain Fatty Acids: Microbial Metabolites That Alleviate Selective Enduring Stress-induced Brain-Gut Axis Alterations in Mice. *The Journal of Physiology.* 596 (20): 4923-4944.

36) **Lyte, J.M**.*, Gabler, N.K, and Hollis, J.H.H. 2016. Postprandial serum endotoxin in healthy humans is modulated by dietary fat: a randomized, controlled, cross-over study. *Lipids in Health and Disease.* 15 (1): 186. *Corresponding author

37) **Lyte, J.M**.*, Legako, J.F., Martin, J.N., Thompson, L., Surowiec, K., and Brooks, J.C. 2016. Volatile compound characterization of modified atmosphere packaged ground beef held under temperature abuse. *Food Control* 59: 1-6. *Corresponding author

38) Lyte, M., Chapel, A., **Lyte, J.M**., Ai, Y., Proctor, A., Jane, J.L., and Phillips, G.J. 2016. Resistant starch alters the microbiota-gut brain axis: Implications for dietary modulation of behavior. *PLOSone*. 11 (1).

39) Li, Q., Shi, M., **Lyte, J.M**., and Li, G. 2006. ZrCl4-catalyzed X-C/C-C formation for the geometric selective synthesis of (*E*)-*β*-iodo-aza-Morita-Baylis-Hillman (MBH) adducts. *Tetrahedron Letters* 47 (44): 7699-7702.

Manuscripts under review

1. Wickramasuriya, S., Matusik, K., Graham, D., and **Lyte, J.M.*** Regional expression of neurochemical pathways in the intestinal tract of the turkey (*Meleagris gallopavo*). Submitted to *Poultry Science*. *Corresponding author.

Manuscripts in preparation

1. **Lyte, J.M.*,** Seyoum, M., Ayala, D., Kers, J.G., Caputi, V., Johnson, T., Zhang, L., Rehberger, J., Zhang, G., Dridi, S., Hale, B., de Oliveira, J.E., Grum, D., Smith, A.H., Kogut, M., Ballou, A., Ricke, S.C., Potter, B., and Proszkowiec-Weglarz, M. A Best-practices framework for the use of 16S rRNA gene sequencing in poultry microbiota research. To be submitted to *Poultry Science*. *Corresponding author.

INVITED BOOK CHAPTERS

1. **Lyte, J.M.** and Caputi, V. 2024. Leveraging neurochemistry in the design of 21st century feed and microbiota strategies to improve food animal gut health. In: Environmental Effects on Gut Health in Production Animals. Kogut, M.H. and Fernandez Miyakawa, M.E. (Editors).

INVITED CONFERENCE PROCEEDINGS

1. **Lyte, J.M.** 2025. Animal Nutrition Conference of Canada. Utilization of Diet and Enteric Neurochemistry as a New Mechanistic-based Feed Strategy to Accelerate the Application of the Gut Microbiome in Poultry and Livestock Production. https://www.anacan.org/education-and-events/annual-conference/past-proceedings/

2. **Lyte, J.M.** and Lyte, M. 2019. Animal Nutrition Conference of Canada. Microbial Endocrinology: Why the Evolutionary-based Integration of Microbiology and Neurobiology Matters in the Examination of the Intersection of Animal Nutrition and Epigenetics. https://www.anacan.org/education-and-events/annual-conference/past-proceedings/

FUNDING

Title: Impact of feed protein type on antibiotic resistance gene transfer within the poultry microbiome.
Role: Principal Investigator
Funding Agency: USDA-ARS
Amount ($): $30,000
Dates: 2025-2026

Title: Early life microbiota transplantation as a novel mechanistic-based approach to prevent climate change mediated susceptibility to foodborne pathogen carriage in poultry.
Role: Principal Investigator
Funding Agency: USDA-ARS, Geospatial and Environmental Epidemiology award
Amount ($): $215,861
Dates: 2022-2026

Title: Developing a Microbial Chill Pill to Mitigate the Impact of Heat Stress on Poultry Food Safety Risk in the Face of a Warming Climate
Role: Principal Investigator
Funding Agency: USDA-ARS, Office of Technology Transfer Pilot Initiative award
Amount ($): $25,000
Dates: 2023-2025

Title: Elucidation of novel *Salmonella*-gut neurochemical mechanisms that promote *Salmonella* carriage in poultry.
Role: Principal Investigator
Funding Agency: USDA-ARS
Amount ($): $70,000
Dates: 2021-2023

Title: Heat stress and respiratory infection in chickens: A novel neuroendocrine-microbiome mechanism mediating development of APEC.
Role: Project Director
Funding Agency: USDA-NIFA
Amount ($): $500,000
Dates: 2021- 2023

Title: Systems-based integrated program for enhancing the sustainability of antibiotic-restricted poultry production.
Role: Co-Project Director
Funding Agency: USDA-NIFA-AFRI-SAS
Amount ($): $10,000,000 (subcontract of $710,000)
Dates: 2020-2025

TEACHING EXPERIENCE

Classroom teaching experience

April 2019. University of Arkansas

Guest lecture for Cell and Molecular Biology (CEMB) 5911. Title of talk: From Bench to Behavior: An Overview of Methods Commonly Used to Assess Animal Behavior.

January—May 2016. Iowa State University.

Teaching assistant for Food Science and Human Nutrition (FSHN) 405: Food Quality Assurance. I created lab assignments and experiments for lecture and lab-based lessons. Coordinated multiple lab sections, graded homework and exams from lecture and lab. This teaching role emphasized aspects of food safety in meat and/or meat products as well as the control and elimination of foodborne pathogens. Delivered guest lectures during class sessions.

November 2015. Iowa State University.

Guest lecture for two class session of Food Science and Human Nutrition (FSHN) 364. Nutrition and Prevention of Chronic Disease. Lecture topics explored how diet, through biochemical mechanisms along the microbiota-gut-brain-axis and changes in the gut microbiome (enteric microbial communities), influence animal and human behavior and health.

September—December 2009. Texas Tech University.

Food Chemistry. Teaching assistant.
Created and graded lab assignments and exams. Set up and helped design laboratory exercises for undergraduate students. Held dedicated office hours for students to discuss comprehension of class and laboratory materials. Topics covered in fulfillment of this teaching role included protein, carbohydrate, and lipid interactions in food, influence of processing on food characteristics, chemical basis of food palatability including microorganism fermentation, and the alteration of food traits by contaminating microorganisms such as foodborne pathogens.

Supervisory role in graduate and undergraduate student research

January – February 2024. USDA-ARS.

Hosted a Veterinary Medicine student from Iowa State University for her entire 4th year research rotation. Characterization of neurochemical metabolizing enzymes catechol-o-methyltransferase and monoamine oxidase in broiler chicken gut tissues.

March-August 2018. University College Cork.

During my post-doctoral fellowship at the University College Cork Alimentary Pharmabiotic Centre Ireland (2016-2018), I directed the successful completion of three independent Master's level internships. In Europe, the Master's degree can be part of the bachelor's degree and requires the student complete a research internship at an academic institution. All students, immediately following the internship, successfully placed either in industry, world-renowned PhD programs, or won internationally-competitive scholarships.

Hosted and supervised undergraduate/Master's student Cassandra Gheorghe from Ecole de Biologie Industrielle, France. 6-month internship. Project: Microbial regulation of host xenobiotic metabolism following acute stress.

June-August 2017. University College Cork.

Hosted and supervised undergraduate student Ella Murphy from University College Cork, Ireland. 10-week internship. Project: Acute stress-induced changes in intestinal permeability of three genetically-distinct mouse strains.
Award: This project won a competitive Wellcome Trust (London, United Kingdom) biomedical scholarship.

April-June 2017. University College Cork.

Hosted and supervised undergraduate/Master's student Salome Rognant from University of Poitiers, France. 5-week internship. Project: Markers of murine intestinal mucosal immune response following a single acute stressor.

Supervisory role in post-doctoral scientist research

2023 – Present. University of Arkansas – Department of Poultry Science
Dr. Mitiku Seyoum. Post-doctoral research projects aim to develop litter/bedding materials that leverage neurochemical-based host-microbe interaction to counteract foodborne pathogen carriage in poultry. Other projects include the development of poultry-focused microbiota standard reagents, the characterization of functional aspects of the duck microbiome, and understanding how *Campylobacter jejuni* infection in chickens shifts metabolic potential of the broiler chicken microbiome.

2023 – Present. USDA-Agricultural Research Service (Poultry Production and Product Safety Research Unit)
Dr. Samiru Wickramasuriya. Post-doctoral research projects focus on the targeted modulation of enteric neurochemical metabolism through trans-generational microbiome transplantation. Other projects include development of feed-driven solutions to engage host-microbe interaction in the chicken intestinal tract in order to reduce foodborne pathogen carriage.

2018-2021 – Present. University of Arkansas – Department of Poultry Science
Dr. Sandip Shrestha. 2018-2021. Research projects included the characterization of the impact of serotonin on *Campylobacter jejuni* interaction with the host gut epithelium.

GRADUATE STUDENT COMMITTEE EXPERIENCE

Mohit Bansal. 2019-2021. PhD committee. Dissertation, "Investigating the potential of microbial metabolites and mTOR signaling on chicken necrotic enteritis."

Ayidh Almansour. 2019- 2023. PhD committee. Dissertation "The role of microbiota on *Campylobacter jejuni* colonization and growth performance in broiler chickens."

MEMBERSHIP IN PROFESSIONAL SOCIETIES

1. Poultry Science Association
2. Phi Tau Sigma

SCIENTIFIC SOCIETY OFFICE/COMMITTEE ASSIGNMENTS/EDITORIAL BOARD MEMBERSHIP

Poultry Science Association, member on the Committee on Food Safety (2022-Present).

Member on the US multi-state research project NC1202 Enteric Diseases of Food Animals: Enhanced Prevention, Control and Food Safety. (2021 – Present).

Member on the US multi-state research project NE2334, The Genetic Bases for Resistance and Immunity to Avian Diseases (2024 – Present).

Review editor for the journal, *Frontiers in Physiology: Avian Physiology*

Review editor for the journal, *Frontiers in Genetics: Nutrigenomics*

Technical reviewer of grants, Canada Poultry Research Council

Technical reviewer of grants, Southern SARE Graduate Student Grant Program.

Technical reviewer of grants, United Kingdom Research and Innovation

INVITED TALKS

1. July 2025. Poultry Science Association annual conference. Presentation entitled, "Functional perspectives of host-microbiome interactions in poultry production: Where are we at and where do we need to go?". Raleigh, NC.

2. May 2025. Animal Nutrition Conference of Canada. Presentation entitled, "Accelerating microbiome applications to improve poultry and livestock production." Niagara Falls, Ontario, Canada.

3. April 2025. University of Georgia, Department of Poultry Science. Avian Seminar Series, "Harnessing enteric neuroendocrine plasticity as a next-generation strategy to control foodborne pathogen carriage in poultry." Athens, GA. The full presentation, with audience questions, can be viewed online on-demand free-of-charge at: https://kaltura.uga.edu/channel/Avian+Seminar+Series/201616723

4. November 2024. Symposium on Gut Health in Production of Food Animals. Chair member for expert panel on, "Standardizing a Protocol for Poultry Microbiome Analysis/Other Production Animals?". St. Louis, MO.

5. October 2024. Kemin Intestinal Physiology Symposium. Presentation entitled, "The Microbiome in poultry and livestock: Cutting through the hype and getting to solutions." Park City, UT. The full presentation, with audience questions, can be viewed online on-demand free-of-charge at: https://www.kemin.com/na/en-us/markets/animal/intestinal-health-symposium/videos

6. October 2023. 10th World Congress on Targeting Microbiota. Presentation entitled, "Environmental drivers of avian enteric neuroendocrine plasticity in the context of foodborne pathogen carriage." Venice, Italy.

7. October 2023. University of Padova. Presentation entitled, "Neuroendocrine gut homeostasis as a determinative factor of poultry foodborne pathogen carriage". Padova, Italy.

8. July 2022. USDA-ARS New Scientist training. "Early career success in the ARS as a new scientist." Virtual.

9. October 2021. 8th World's Congress on Targeting Microbiota. Presentation entitled, "Microbial endocrinology as a framework to understand the avian microbiome in a post-antibiotic world." Paris, France.

10. October 2021. U.S. Department of State, Food safety working group. Presentation entitled, "Microbial endocrinology: How evolved intersections of microbiology and neurobiology in farm production animals are susceptible to climate change."

11. June 2020. USDA Agricultural Research Service invited Antimicrobial Resistance/Alternatives to Antibiotics webinar. Presentation entitled, "Microbial endocrinology as a novel antibiotic alternative framework for the control of foodborne pathogens in poultry."

12. May 2018. Irish Society of Gastroenterology. Presentation entitled, "Gastrointestinal serotonergic responses to an acute stressor are altered in the absence of the microbiota."

13. November 2017. United States Air Force 711th Human Performance Wing. Dayton, Ohio. Presentation entitled, "Host-microbe interactions as novel determinants of the stress response."

UPCOMING INVITED TALKS (FORMALLY ACCEPTED)

1. May 2026. University of Arkansas, Department of Poultry Science. Avian Seminar Series. Re-framing poultry stress physiology: Why bi-directional axes of host-microbiome interaction matter for production.

2. July 2026. Poultry Science Association annual conference. Importance of methods selected for microbiome studies: State of the science and challenges. Toronto, Canada.

SPECIAL INVITATIONS

1. Chair member of the poultry microbiota standardization committee, comprised of academia, industry, and government experts, that has been formed to determine standard guidelines that could be used universally to produce dependable and comparative analysis of the poultry microbiota. 2024-Present.

2. Invited to serve as panel member in the USDA-Canadian Bi-lateral agreement on antimicrobial resistance (AMR) on the high priority research topic of AMR resistance, 2020.

3. Member of the ARS Grand Challenge Synergies - Debugging a new mini livestock commodity: Developing a model of insect production to demonstrate their value as a safe solution for food waste and sustainable fish and livestock production, 2020-present.

PRESENTATIONS AT SCIENTIFIC/TECHNICAL MEETINGS

January 2026

1. Wickramasuriya, S. and **Lyte, J.M.** Impact of feed protein source on intestinal monoamine oxidases and growth performance. International Poultry Scientific Forum, International Production and Processing Expo.

2. Chung, T., Oladeinde, A., Woyda, A., Wickramasuriya, S., **Lyte, J.M.,** Liyanage, R., Rothrock, M., Li, X., Cho, S., Lawrence, J., Endale, D., Strickland, T., and Abdo, Z. Fitness factors and siderophores influence the survival of *E. coli* in reused broiler litter. International Poultry Scientific Forum, International Production and Processing Expo.

July 2025

1. **Lyte, J.M.,** Oluwagbenga, E.M., Caputi, V., Daniels, K., Lyte, M., and Fraley, G.S. Enteric neurochemical responses to heat stress in Pekin ducks are sex- and diet-dependent. Poultry Science Association meeting.

2. Seyoum, M., Caputi, V., Anderson K., Daniels, K., Lyte, M., Moore Jr, P., and **Lyte, J.M.** Litter amendments drive distinct compositional and functional shifts in the chicken gut microbiome. Poultry Science Association meeting.

3. Wickramasuriya, S., Caputi, V., and **Lyte, J.M.** Neurochemical metabolic pathways display region and age-specific expression patterns in the chicken intestinal tract. Poultry Science Association annual meeting.

4. Assumpcao, A. L. F. V., Caputi, V., Ashwell, C.M., Honaker, C.F., Siegel, P.B., Taylor Jr R.L., **Lyte, J.M**. Blood serum biochemistry analysis of White Leghorn chickens selected for divergent blood antibody titer response to sheep red blood cells. American Society of Animal Science.

January 2025

1. De Oliveira, J.E., Ayala, D., Dridi, S., Grum, D., Johnson, T., Kers, J.G., Kogut, M., **Lyte, J.M**., Rehberger, J., Seyoum, M., Smith, A.H., Zhang, G., Proszkowiec-Weglarz. Standardizing microbiome practices of poultry for practical application. International Production and Processing Expo (IPPE).

November 2024

1. **Lyte, J.M**., Ayala, D., De Oliveira, J.E., Dridi, S., Grum, D., Johnson, T., Kers, J.G., Kogut, M., Rehberger, J., Seyoum, M., Smith, A.H., Zhang, G., Proszkowiec-Weglarz, M. Standardization of methodologies in poultry microbiome research: One year of progress. Symposium on Gut Health in Production of Food Animals.

July 2024

1. Facchetti v Assumpcao, A., Caputi, V., Ashwell, C.M., Honaker, C.F., Donoghue, A.M, Siegel, P.B., Taylor Jr R.L., and **Lyte, J.M**. Cecal antibody concentrations of White Leghorn chickens selected for divergent blood antibody titer response to sheep red blood cells. Poultry Science Association annual conference.

2. Wickramasuriya, S., Arsi, K., Caputi, V., Donoghue, A., and **Lyte, J.M**. Ovotransferrin is detectable in broiler chicken ileal, cecal, and proximal colon luminal content. Poultry Science Association annual conference.

January 2024

1. Jia, X., Phillips, G., Caputi, V., Daniels, K., Lyte, M., and **Lyte, J.M**. Impact of heat stress on the chicken cecal bacterial metagenome and luminal serotonin. Conference of Research Workers in Animal Diseases.

July 2023

1. **Lyte, J.M**., Caputi, V., Anderson, K., Daniels, K., Lyte, M., and Moore Jr, P.A. Litter amendments differentially modulate trace metal concentrations and norepinephrine in the broiler chicken gut. Poultry Science Association annual conference.

2. Caputi, V., Bacon, T., Arsi, K., Jesudhasan, P., and **Lyte, J.M.** Heat stress induces regional-dependent modulation of aquaporin 4 expression in the enteric nervous system of broiler chickens. Poultry Science Association annual conference.

January 2023

1. Caputi, V., Robinson, K., Arsi, K., Donoghue, A., and **Lyte, J.M.** The impact of heat stress on the broiler chicken ileal enteric nervous system. Conference of Research Workers in Animal Diseases.

July 2022

1. Caputi, V., Robinson, K., Arsi, K., Donoghue, A., and **Lyte, J.M.** Exposure to heat stress alters the structural integrity of the enteric nervous system in the broiler chicken ileum. Poultry Science Association annual conference.

December 2021

1. **Lyte, J.M.,** Phillips, G.J., and Lyte, M. A novel neuroendocrine-microbiome mechanism mediating heat stress and infection in chickens. Conference of Research Workers in Animal Diseases.

September 2021

1. Leigh, S.J., Martinez-Herrero, S., **Lyte, J.M.,** Goodson, M.S., Kelley-Loughnane, N., Dinan, T.G., Cryan, J.F., and Clarke, G. Poster presentation. Gut microbiota modulates acute stress-induced alterations in the gut metabolome. Neurogastro.

July 2021

1. **Lyte, J.M.,** Eckenberger, J., Keane, J., Robinson, K., Shrestha, S., Donoghue, A.M., Caputi, V., and Lyte, M. Oral presentation. Early life exposure to cold stress causes distinct changes in broiler

chicken gut neurochemistry and microbiome that persist into later life. Poultry Science Association annual conference.

July 2020

1. Shrestha, S., Wagle, B.R., Liyanage, R., Donoghue, A.M., and **Lyte, J.M.** Oral presentation. Gut-derived serotonin modulates *Campylobacter jejuni* colonization *in vitro*. Poultry Science Association annual conference.

October 2019

1. Moloney, G., van de Wouw, M., **Lyte, J.M.,** Boehme, M., Dinan, T.G., Cryan, J.F., and Clarke, G. Poster presentation. The Impact of the Microbiota on Acute Stress-Induced Monocyte Trafficking. Society for Neuroscience.

September 2019

1. **Lyte, J.M.,** Shrestha, S., Lyte, M., and Donoghue, A. The role of serotonin in the growth and motility of different strains of *Campylobacter jejuni* isolated from poultry. Campylobacter, Helicobacter and Related Organisms.

February 2019

1. FSIS/ARS Food Safety Meeting. Oral presentation. Antibiotic Alternatives for Controlling Foodborne Pathogens and Disease in Poultry.

January 2019

1. Gheorge, C., **Lyte, J.M.,** Olavarría-Ramírez, L., Goodson, M.S., Kelley-Loughnane, N., Moloney, G., Shanahan, F., Dinan, T., Cryan, J.F., Clarke, G. Poster presentation. Microbial Regulation of Tryptophan Metabolism: Focus on Gastrointestinal and Hepatic Gene Expression. Mind, Mood, & Microbes: The second annual conference on microbiota-gut-brain axis.

July 2018

1. Fulling, C., Lach, G., Ventura Da Silva, P., **Lyte, J.M.,** Clarke, G., Dinan, T.G., and Cryan, J.F. Differential long-lasting behavioural and molecular effects of perturbations of the microbiome during the adolescent period in mice. International Society for Serotonin Research meeting.

June 2018

1. **Lyte, J.M.**, Goodson, M.S., Kelley-Loughnane, N., Dinan, T.G., Cryan, J.F., Clarke, G. Poster presentation. Absence of the microbiota alters the gastrointestinal serotonergic response to acute stress in a region-dependent manner. International Human Microbiome Congress.

2. Gururajan, A., Bastiaanssen, T., Moloney, G., **Lyte, J.M.,** Wiley, N., Stanton, C., Dinan, T., and Cryan, J.F. Poster presentation. Gut microbial signatures as mediators and predictors of the response to chronic stress. Stress Neurobiology Workshop.

December 2017

1. **Lyte, J.M.**, Goodson, M.S., Kelley-Loughnane, N., Dinan, T.G., Cryan, J.F., Clarke, G. Poster presentation. Dynamic Gastrointestinal Serotonergic Responses to an Acute Stressor: Role of Host Genetics. New Horizons University College Cork School of Medicine.

November 2017

1. **Lyte, J.M.**, Goodson, M.S., Kelley-Loughnane, Dinan, TG., Cryan, J.F., Clarke, G. Poster presentation. Acute-stress induced gastrointestinal serotonergic responses are region-dependent and host strain specific. Society for Neuroscience.

2. A, Gururajan, **J Lyte**, AP Ventura-Silva, GM Moloney, T Becker, R O'Connor, M Boehme, M Van de Wouw, TG Dinan, and JF Cryan. Poster presentation. Neuromolecular Markers of Resilience to Chronic Stress in the Bed Nucleus of Stria Terminalis of the Mouse. Society for Neuroscience.

August 2017

1. **Lyte, J.M.**, Goodson, M.S., Kelley-Loughnane, N., Dinan, T.G., Cryan, JF., Clarke, G. Poster presentation. Dynamic Gastrointestinal Serotonergic Responses to an Acute Stressor: Role of Host Genetics. Neurogastroenterology.

March 2017

1. Gururajan, A. **Lyte, J.M.,** Ventura-Silva, A.P., Moloney, G.M., Becker, T., O'Connor, R., Boehme, M., Van de Wouw, M., Dinan T.G., and Cryan, J.F. Poster presentation. Neuromolecular mediators of stress resilience in mice. Munich Winter Conference on Stress.

2. Bidne, K., **Lyte, J.M.,** J.H.Hollis, Gabler, N.K, and Keating, A.F. Poster presentation. Impact of dietary fatty acid source on ovarian phosphatidylinositol-3 kinase signaling. American Society of Animal Science Midwest.

April 2016

1. **Lyte J.M.,** Gabler, N., and Hollis, J.H. Poster presentation. The Modulatory Effect of Common Dietary Fatty Acids on IPEC-J2 Transport of Lipopolysaccharide and Monolayer Barrier Integrity in vitro. Experimental Biology.

2. Liu, F., **Lyte J.M.,** Gabler, N., and Dunshea, F. Poster presentation. Hypoxia Compromised Barrier Integrity in IPEC-J2 Monolayer Independent of Oxidative Stress. Experimental Biology.

March 2015

1. **Lyte J.M.,** Gabler, N., and Hollis, J.H. Experimental Biology 2015. Poster presentation. Dietary Fat Composition Effects on Postprandial Systemic Markers of Inflammation and Metabolism.

February-March 2015

1. Invited reviewer in Iowa State University and Henan Normal University “Bald Eagle & Panda” U.S.-China Culture Exchange Virtual Conference.

Statement of Research Philosophy, Accomplishments, and Future Plans

Joshua Lyte, Ph.D., M.S.

Research philosophy:

My overall aim is to develop a new interdisciplinary approach to the study of physiology in poultry through the application of my research expertise in the intersection of peripheral neurophysiology and the microbiome. This program is founded upon a One Health approach to poultry production as the causal link between neurophysiology and the microbiome in poultry is also found in all farm production animals and humans. Considering my expertise in poultry neurobiology and microbiology, particularly the impact of the microbiome on bi-directional crosstalk between peripheral systems, such as the gastrointestinal and respiratory tracts, in orchestrating the bird's stress response, I will provide the Department of Animal Sciences an innovative approach to elucidate neurophysiological mechanisms that drive the impact of stress on poultry performance, food safety, and health. Central to this goal will be the creation of state-of-the-art collaborative projects with Animal Sciences faculty (see Future Plans section below), and the establishment of a next-generation poultry science program within Department of Animal Sciences that is founded upon the core, complementary tenets of a comparative approach that looks across poultry species through an interdisciplinary lens employing diverse experimental techniques. This will, in turn, enable the development of a neurophysiological-based One Health approach towards major challenges facing modern poultry production. This will also lead to collaborative applications for federal and industry grants that should be highly competitive.

Accomplishments:

1. In my current position at the USDA-Agricultural Research Service, I have pioneered the use of neurochemistry as a way to understand local stress physiology in the poultry gastrointestinal, respiratory, and reproductive tracts. My research has demonstrated that catecholamines and indoleamines, which are traditionally thought of as neurotransmitters, are abundantly found throughout peripheral tissues of the duck, turkey, chicken and quail. Likewise, I have shown that neurochemicals are also present in the duck egg albumen and yolk, providing a novel vertical route of stress transmission between hen and developing embryo. I have demonstrated that production-relevant stressors, including heat, cold, and handling stressors drive local neurochemical responses in peripheral tissues that can be used to explain stress-driven susceptibility to infectious disease, foodborne pathogen carriage, inflammation, and other issues in poultry.

2. As the microbiome is often subject to hype, I have sought to identify causal routes across poultry species directly linking microbial function to host neurophysiology and stress. I have discovered novel mechanisms by which stress adaptations in poultry neurochemistry directly affect host-microbe interactions that have immediate relevance to poultry production. For example, I demonstrated that serotonin directly affects the ability of *Campylobacter jejuni* to colonize the gut. As my work across poultry species, including ducks, chickens, and quail have shown that production-relevant stress drives serotonin responses in the gut, this work has directly tied together avian neurophysiology, stress, and the microbiome.

3. I have established that genetic selection in poultry can concurrently drive neurobiological adaptation and directly shape microbial metabolic processes that contribute to host physiology. The serotonergic system is an important neuroendocrine axis that links central and peripheral systems in the modulation of behavior, inflammation, and other aspects in poultry. Although serotonin is well-recognized to drive changes in the immune system, it was not previously known

if this causal relationship was bi-directional, namely if the immune system can affect the serotonergic system, as well as what, if any contribution was provided by the microbiome. I demonstrated that selection in chickens for IgY and IgA antibody titers caused divergence in the serotonergic system with distinct impact on systemic and enteric serotonin concentrations. Moreover, divergence in serotonin was linked to gut microbial production of tryptophan, which is the precursor in serotonin synthesis. This work has identified a previously unknown route by which the immune system can directly affect the intersection of a major poultry neurophysiological system and the functional contributions of the microbiome.

4. Ongoing research in my lab involves the comparative mapping of neurophysiological metabolism in the gastrointestinal tracts of chickens, ducks, and turkeys. Specifically, the metabolic steps involved in the synthesis, transport, and breakdown of neurochemicals were not previously known in the gastrointestinal tracts of poultry. <u>This work has demonstrated that key metabolic pathways, including amino acid hydroxylases, neurochemical transporters, and enzymes involved in the degradation of catecholamines and indoleamines, such as catechol-O-methyltransferase and monoamine oxidases are present and share structural homology in the gastrointestinal tracts of ducks, turkeys, and chickens.</u>

Future plans:

<u>Collaboration with faculty and the development of my research program:</u>

I seek to bring a novel, interdisciplinary approach in the study of poultry science that employs a diverse set of analytical and functional techniques including immunohistochemistry, electrophysiology, microbiology, and analytical chemistry. Thus, I look forward to the opportunity to work and set up multidisciplinary collaborations with the different members of the faculty. The diverse research interests of the Department faculty, and study of several animal species in the Animal Sciences department, present multiple opportunities for productive and innovative collaborations that advance the objectives of a One Health approach. For example, I would seek opportunities to collaborate with Dr. Erasmus on the intersection of the microbiome and neurophysiology in mediating poultry stress and welfare. Likewise, with Dr. Karcher, on the vertical transmission of stress between laying hen and egg as affective of food safety, egg quality, and welfare. Dr. Johnson on the functional contributions of the microbiome to animal health through neurophysiological axes, and with Dr. Fraley on the microbiota-gut-brain axis in ducks. Collaborations between faculty members, I believe, would enable undergraduate and graduate students to gain an interdisciplinary understanding of neurophysiology and the microbiome that emphasizes its causal role in multiple issues facing modern poultry production. As such, *I would strive to develop a cross-disciplinary poultry science program that operates at the interface of foundational and applied science thereby furthering a One Health approach to achieving optimal health and alleviating disease.*

<u>Funding avenues:</u>

Extramural funding for my research program is of the highest priority and one that I would seek to achieve utilizing a mix of federal and industry sources. In my current position at the USDA-ARS, despite having no requirement to do so, I have made the securing of extramural funding a fundamental objective. As reflected in my CV, I have a strong successful track record in bringing in extramural funding to my laboratory for research on the intersection of neurophysiology and the microbiome in understanding stress in poultry. Currently, I have a new NIFA grant application already submitted which will be reviewed in 2026 addressing further exploration of the interface between the host's neurophysiology and the gut microbiome in poultry.

At present, it is important to acknowledge that the funding landscape is undergoing a fundamental shift, with traditional routes being significantly affected, such as NIFA-AFRI. Once NIFA-AFRI RFA's are again announced, I will immediately apply to this route. In addition, I will actively seek out both industrial and foundational sources of funding, ranging from US Poultry and Egg Association to Foundation for Food and Agriculture Research (FFAR). Similarly, the Sustainable Agriculture and Research Education (SARE) funding would be excellent for securing funding towards graduate students. Likewise, as Indiana is the largest duck producer in the US, and multiple large companies, such as Maple Leaf Farms, operate in Indiana there is opportunity for industry collaborations and funding.

Statement of Teaching Accomplishments and Future Direction

Joshua Lyte, Ph.D., M.S.

Statement of teaching accomplishments:

Within the USDA, teaching is neither a formally assigned duty nor one that is particularly encouraged. In spite of this, I have consistently demonstrated a strong commitment to teaching, whether through guest lectures in graduate courses or by mentoring graduate students in the University of Arkansas Department of Poultry Science and the University College Cork in Ireland where I did my postdoctoral training. At the start of my USDA career, I made it an objective to secure appointment within the graduate school so I would have the opportunity to teach and mentor graduate students as detailed in my CV.

Undergraduate/Graduate student mentorship:

I am strongly committed to graduate education and would fully intend to mentor Masters and PhD students in my lab. I would, as I have done before, also open my lab for undergraduate research experiences. I find this to be equally rewarding for the student as well as for myself especially as it helps solidify an undergrad student's desire to pursue graduate education. My mentoring philosophy is to provide the student a supportive and enthusiastic educational environment in which learning is enhanced through in-class discussion to ultimately cultivate independent critical thought and the ability to work in a team-based setting. Neurophysiology is a rapidly growing area of study for the poultry science student, who is required to apply her/his knowledge in novel ways to support poultry health in diverse vocations, such as the veterinary clinic, academia, or industry, each with unique constraints and expectations. It is crucial that the student be equipped at both the undergraduate and graduate levels with a diverse conceptual and methodological toolbox from which she/he can apply and, when necessary, adapt learned information to effectively solve both familiar and unexpected problems. It is therefore important to blend lecture-based class with hands-on practicum in the form of laboratory or farm experience to translate how skills learned in a classroom apply to problems faced on the job site.

Vision for my teaching role in the Department of Animal Sciences:

Building upon the strong course catalog offered by the Department of Animal Sciences, I would incorporate concepts from neurophysiology and the microbiome into a new graduate-level course, tentatively titled "Stress in the periphery: How neurophysiology and the microbiome drive poultry health." Given my expertise in poultry neurophysiology, I would be excited about the possibility of developing such an interdisciplinary graduate level course in poultry stress physiology that focuses on getting the student to understand how the integration of the neurophysiological system and microbiome matters in poultry health and production. This course would emphasize a One Health framework as the causal link between the microbiome and neurobiology of stress drives multiple production-relevant factors, including food safety and antibiotic resistance, that are central to human health. Learning objectives within the course would be directed at students learning canonical and non-canonical neurophysiological pathways, as well focusing on crosstalk between neural and endocrine-immune systems such as that of the monoaminergic and glucocorticoid axes. Emphasis would also be given to the emerging role of the microbiome on poultry neurophysiology as regards host plasticity and responses especially during periods of stress. It would be my goal to make the course one that combines didactic teaching with student-focused critical analysis and presentation of relevant journal articles.

I would also be very willing, as demonstrated by my past teaching, to participate in undergraduate courses to deliver lectures on the nature of the poultry neurophysiological system, as well as constitutive microbiome, to further their knowledge base.