2023 NE1942 Station Reports – Publications

Auburn University

Dr. Wilmer Pacheco

Peer-Reviewed Publications

1. Munoz, L. R., M. A. Bailey, J. T. Krehling, D. V. Bourassa, M. R. Hauck, **W. J. Pacheco**, B. Chaves-Cordoba, K. S. Chasteen, A. A. Talorico, C. Escobar, A. Pietruska, and K. S. Macklin. Role of mannan oligosaccharide supplementation with and without a *Campylobacter jejuni* challenge in broilers. Accepted June 21, 2023 Avian Dis.
2. Vargas, J. I., J. P. Gulizia, S. M. Bonilla, S. Sasia, and **W. J. Pacheco**. 2023. Effect of corn origin on broiler performance, processing yield, and nutrient digestibility from 1 to 35 days of age. Animals 2023, 13, 1248. https://doi.org/10.3390/ ani13071248.
3. Gulizia, J. P., S. M. Bonilla, J. I. Vargas, S. J. Sasia, S. Llamas-Moya, T. Doung, and **W. J. Pacheco**. 2023. The effects of phytase and multicarbohydrase complex containing ahpha-galactosidase on performance, processing yield, and nutrient digestibility in the broiler chicken. J. Appl. Anim. Res. Volume 1: 308-322.
4. Alfaro, G. F., R. B. Muntifering, **W. J. Pacheco**, S. P. Rodning, S. J. Moisa. 2023. Effects of endophyte-infected tall fescue on performance of genotyped pregnant beef cows supplemented with rumen-protected niacin. Livestock Science. Volume 270:105206.
5. Munoz, L. R., M. A. Paul, M. A. Bailey, J. T. Krehling, R. Hauck, **W. J. Pacheco**, K. S. Chasteen, A. A. Talorico, C. Escobar, and D. V. Bourassa and K. S. Macklin. 2023. Effect of yeast cell wall on performance, pathogen colonization, innate immune response, histomorphology, and slaughter characteristics of broiler chickens inoculated with Campylobacter jejuni at day 21. Accepted in Poult. Sci.102:102609.
6. Downs, K.M., **J.P. Gulizia**, G.R. Harder, E.K. Stafford, S.J. Sasia, and W.J. Pacheco. 2023. Corn particle size variation effects on broiler performance, organ weights, and nutrient digestibility during the early growout period (day 1 to 21). *J. Appl. Poult. Res.* 32:100327.
7. Slimen I, B., N. Taha, and **W. Pacheco**. 2022. Betalains in animal nutrition and health: importance of animal feed supplements: A review. Agricultural reviews, Volume 43 Issue 2: 178 – 185.

Peer-Reviewed Abstracts and Proceedings

Abstracts

1. Vargas, J. I., J. P. Gulizia, J. R. Hernandez, C. T. Simões, E. Guzman, S. M. Bonilla, J. T. Lee, R. Adhikari, and **W. J. Pacheco**. 2023. Dose response of xylanase enzyme on viscosity, digestibility of nutrients, and performance of broiler chickens fed wheat-based diets. *Poult. Sci*. 102.
2. Orellana Galindo, L. A., C. Escobar Lobo, V. M. Tashiguano, J. Krehling, M. A. Bailey, K. Macklin, **W. J. Pacheco**.2023. Relationship between eggshell translucency and color intensity with egg quality parameters on broiler eggs. *Poult. Sci*. 102.

3. Simões, C. T., E. G. Guzman, J. P. Gulizia, J. I. Vargas, J. R. Hernandez, **W. J. Pacheco**. 2023. Evaluation of pellet internal particle size and grinding during pelleting of feeds for broiler chickens. *Poult. Sci*. 102.
4. Hernandez, J. R., J. P. Gulizia, J. I. Vargas, S. M. Bonilla, S. Thuekeaw, **W. J. Pacheco**. 2023. Effect of dietary metabolizable energy levels and conditioning temperature on broiler performance, nutrient digestibility, and tibia ash from 1 to 42 days of age. *Poult. Sci*. 102.
5. Gulizia, J. P., M. T. Bethonico Terra, Z. Khalid, J. I. Vargas, S. M. Bonilla, J. R. Hernandez, S. Thuekeaw, J. Krehling, R. Hauck, K. Macklin, W. A. Dozier, K. McCafferty, **W. J. Pacheco**. 2023. Individual and combined effects of phytase and butyric acid on jejunum histomorphometry, cecal microbiome, and jejunum tight-junction gene expression of YPM x Ross 708 male broilers. *Poult. Sci*. 102.
6. Philpot, S. C., R. Hauck, A. Aderibigbe, K. Macklin, **W. J. Pacheco**, S. J. Rochell, B. Dozier. 2023. Response of broiler chickens vaccinated against coccidiosis to diets containing varying amino acid density and a nucleotide-rich extract during the pre-starter and starter periods. *Poult. Sci*. 102.
7. **Pacheco, W. J.**, and C. Starkey. 2023. Evaluation of conditioning temperature and retention time in the hygieniser on Enterococcus faecium, true amino acids digestibility, and metabolizable energy. European Symposium of Poultry Nutrition. Rimini, Italy.
8. **Pacheco, W. J.**, and S. M. Bonilla. 2023. Effect of corn particle size and pellet diameter on the internal particle size of pelleted feeds. European Symposium of Poultry Nutrition. Rimini, Italy.
9. Gulizia, J. P., J. I. Vargas, S. M. Bonilla, J. R. Hernandez, S. Thuekeaw, R. Hauck, K. Macklin, W. A. Dozier, III, K. W. McCafferty, and **W. J. Pacheco**. 2023. Individual and combined effects of phytase and butyric acid on performance and processing yield of YPM x Ross 708 male broilers reared to 42 days of age. Abstr. M100. International Poultry Scientific Forum.
10. Hernandez, J. R., J. P. Gulizia, J. I. Vargas, S. M. Bonilla, S. Thuekeaw, and **W. J. Pacheco**. 2023. Effect of dietary metabolizable energy levels and conditioning temperature on broiler performance, processing yield and footpad dermatitis from 1 to 42 days of age. *Poult. Sci*. 102.
11. Strobeck, R. E., A. D. McConnell, C. M. Broadwater, J. P. Gulizia, **W. J. Pacheco**, and K. M. Downs. 2023. The impact of retention time during the conditioning process of a starter diet on broilers grown to 21 days. *Poult. Sci*. 102.

Proceedings

1. **Pacheco, W. J.** 2023. Influence of feed processing in animal performance. BOKU Symposium. Feeding strategies at times of scarce resources. Vienna, Austria, April 20th.

Conference Papers, Posters, and Presentations

Invited Presentations

1. **Pacheco, W. J.** 2023. Broiler production and management. SEC Americas Poultry Track Intermediate Level. Zamorano, Honduras. July 4th.

2. **Pacheco, W. J.** 2023. Poultry nutrition. SEC Americas Poultry Track Intermediate Level. Zamorano, Honduras. July 4th.
3. **Pacheco, W. J.** 2023. Heat stress mitigation. SEC Americas Poultry Track Intermediate Level. Zamorano, Honduras. July 4th.
4. **Pacheco, W. J.** 2023. Poultry value chain overview. SEC Americas Poultry Track Intermediate Level. Zamorano, Honduras. July 4th.
5. **Pacheco, W. J.** 2023. Ingredients, processing, and feed formulation. SEC Americas Poultry Track Intermediate Level. Zamorano, Honduras. July 4th.
6. **Pacheco, W. J.** 2023. Impact of pelleting on the particle size of the microstructure of pelleted feeds. 1st Symposium Feed Technology, Process and Nutrition interaction. Curitiba, Brazil.
7. **Pacheco, W. J.** 2023. Impact of pelleting on amino acid digestibility. 1st Symposium Feed Technology, Process and Nutrition interaction. Curitiba, Brazil.
8. **Pacheco, W. J.** 2023. How to effectively communicate with others in your process chain. Producing quality feed through effective communication course. Northern Crops Institute. North Dakota.
9. **Pacheco, W. J.** 2023. Influence of feed processing in animal performance. BOKU Symposium. Feeding strategies at times of scarce resources. Vienna, Austria.
10. **Pacheco, W. J.** 2023. Effect of feed processing on poultry performance. Buenos Aires, Argentina. Online.
11. **Pacheco, W. J.** 2023. Feed mill 101. Anitox internal training. Auburn, AL.
12. **Pacheco, W. J.** 2023. The competitiveness of the poultry industry around the globe. Study Abroad Program. Thessaloniki, Greece.
13. **Pacheco, W. J.** 2023. Webinar "Importance of particle size and pellet quality on animal performance". The poultry podcast show.
14. **Pacheco, W. J.** 2023. The sustainability of the poultry industry. Poultry School in Spanish. Auburn Alabama.
15. **Pacheco, W. J.** 2023. Feed milling operations. Poultry School in Spanish. Auburn Alabama.
16. **Pacheco, W. J.** 2023. Batching and mixing operations. USSEC's 6th Poultry Feed Milling Training Course, Cairo Egypt.
17. **Pacheco, W. J.** 2023. Particle size reduction operations. USSEC's 6th Poultry Feed Milling Training Course, Cairo Egypt.
18. **Pacheco, W. J.** 2023. Principles of pelleting. USSEC's 6th Poultry Feed Milling Training Course, Cairo Egypt.
19. **Pacheco, W. J.** 2023. Pellet cooling and crumbling. USSEC's 6th Poultry Feed Milling Training Course, Cairo Egypt.
20. **Pacheco, W. J.** 2023. Post-pellet liquid applications. USSEC's 6th Poultry Feed Milling Training Course, Cairo Egypt.
21. **Pacheco, W. J.** 2023. Finished feed load out. USSEC's 6th Poultry Feed Milling Training Course, Cairo Egypt.
22. **Pacheco, W. J.** 2023. The effect of feed processing on animal performance. USSEC's 6th Poultry Feed Milling Training Course, Cairo Egypt.
23. **Pacheco, W. J.** 2023. The effect of soybean meal from different origins on poultry nutrition. USSEC's 6th Poultry Feed Milling Training Course, Cairo Egypt.

24. **Pacheco, W. J.** 2023. New technology in feed manufacturing. USSEC's 6th Poultry Feed Milling Training Course, Cairo Egypt.
25. **Pacheco, W. J.** 2023. Understanding handling of feed ingredients for animal nutrition. USSEC's 6th Poultry Feed Milling Training Course, Cairo Egypt.
26. **Pacheco, W. J.** 2023. Automation and statistical control. USSEC's 6th Poultry Feed Milling Training Course, Cairo Egypt.

Extension Activities and Publications

1. Fahrenholz, A. C., C. R. Stark, and **W. J. Pacheco**. 2023. Prioritization. Feedstuffs. April, 2023.
2. **Pacheco, W. J.,** Fahrenholz, A. C., and C. R. Stark. 2023. Check list for feed mill visits. Feedstuffs. June, 2023.
3. Stark, C. R., A. C. Fahrenholz, **W. J. Pacheco**. Critical thinking skills. Feedstuffs. May, 2023.
4. Fahrenholz, A. C., C. R. Stark, and **W. J. Pacheco**. 2023. Future feed mill employees. Feedstuffs. April, 2023.
5. **Pacheco, W. J.,** Fahrenholz, A. C., and C. R. Stark. 2023. Feed mill automation. Feedstuffs. February, 2023.

Dr. Dianna Bourassa

Peer-Reviewed Publications

Munoz, L.R., M.A. Bailey, J.T. Krehling, D.V. Bourassa, M.R. Hauck, W.J. Pacheco, B. Chaves-Cordoba, K.S. Chasteen, A.A. Talorico, C. Escobar, A. Pietruska, and K.S. Macklin. Role of mannan oligosaccharide supplementation with and without a *Campylobacter jejuni* challenge in broilers. Accepted June 21, 2023 Avian Dis.

Munoz, L.R., M.A. Bailey, J.T. Krehling, D.V. Bourassa, M.R. Hauck, W.J. Pacheco, B. Chaves-Cordoba, K.S. Chasteen, A.A. Talorico, C. Escobar, A. Pietruska, and K.S. Macklin. Effect of yeast cell wall on performance, pathogen colonization, innate immune response, histomorphology, and slaughter characteristics of broiler chickens inoculated with *Campylobacter jejuni* at day 21. Poult. Sci. 102:102609. https://doi.org/10.1016/j.psj.2023.102609

Harris, C.E., L.N. Bartenfeld Josselson, D.V. Bourassa, and R.J. Buhr. 2023. Development of injection inoculation methods to simulate *in ovo* vertical transmission of *Salmonella* spp. and *Campylobacter* spp. J. Appl. Poult. Res. 32:100329. https://doi.org/10.1016/j.japr.2023.100329

Harris, C.E., L.N. Bartenfeld Josselson, D.V. Bourassa, and R.J. Buhr. 2022. Examination of the eggshell cuticle and membranes on their impact of *Salmonella* Enteritidis or Typhimurium recovery from inoculated and stored eggs. J. Appl. Poult. Res. 31:100297. https://doi.org/10.1016/j.japr.2022.100297

Peer-Reviewed Abstracts and Proceedings

Hughes, M.B., A.D. McConnell, M.R. Riggs, M.M. Jennings, J.C. Figueroa, M.A. Reina, and D.V. Bourassa. Evaluation of egg carton type on *Salmonella* survival and cross-contamination. PSA Annual Meeting. July 9-13, 2023. Philadelphia, PA.

McConnell, A.D., M.M. Jennings, M.B. Hughes, J.C. Figueroa, M. Reina, R.J. Buhr, and D.V. Bourassa. Association of *Campylobacter* from bile with cecal counts, gall bladder size, and bile color. PSA Annual Meeting. July 9-13, 2023. Philadelphia, PA.

Figureoa, J.C., S. Kitchens, S.B. Price, R.J. Buhr, and D.V. Bourassa. Isolation and classification of bacteriophage sourced from poultry associated samples. PSA Annual Meeting. July 9-13, 2023. Philadelphia, PA.

Reina, M., A. Urrutia, J. Figueroa, M.R. Riggs, K.S. Macklin, R.J. Buhr, and D.V. Bourassa. Quantification of *Salmonella* Infantis transfer from transport drawer flooring to broiler chickens during different lairage times. PSA Annual Meeting. July 9-13, 2023. Philadelphia, PA.

Baura, S., M.A. Bailey, K. Zhong, N. Iduu, T. Dormitorio, K.S. Macklin, D.V. Bourassa, S.B. Price, R. Hauck, J. Krehling, S. Kitchens, C. Kyrakis, R.J. Buhr, and C. Wang. Role of darkling beetles (*Alphitobius diaperinus*) in spreading and maintaining *Salmonella* Enteritidis and *Campylobacter jejuni* in chicken flocks. PSA Annual Meeting. July 9-13, 2023. Philadelphia, PA.

Adhikari, Y., M.A. Bailey, J.T. Krehling, K.S. Chasteen, L. Munoz, C. Escobar, L. Orellana, P. Gaonkar, S. Kitchens, D.V. Bourassa, S.B. Price, R.J. Buhr, and K.S. Macklin. Assessment of *Salmonella* and *Campylobacter* among various stages of No-Antibiotics-Ever (NAE) commercial broiler complex. PSA Annual Meeting. July 9-13, 2023. Philadelphia, PA.

Hughes, M., B. McCrea, and D.V. Bourassa. Effects of stacked cages versus outdoor moveable pens on broiler growth and performance. International Poultry Scientific Forum, January 23, 2023. Atlanta, GA.

Adhikari, Y., M. Bailey, J. Krehling, K. Chasteen, L. Munoz, C. Lobo, L. Galindo, P. Gaonkar, S. Kitchens, D.V. Bourassa, S. Price, R.J. Buhr, and K.S. Macklin. Isolation and identification of *Salmonella* and *Campylobacter* isolates from a commercial broiler complex through pullets to final raw product. International Poultry Scientific Forum, January 23, 2023. Atlanta, GA.

Reina, M., A. Urrutia, J. Figueroa, M.R. Rigs, K.S. Macklin, R.J. Buhr, and D.V. Bourassa. Application of pressurized steam and forced hot air for cleaning broiler transport cage flooring. International Poultry Scientific Forum, January 23, 2023. Atlanta, GA.

Conference Papers, Posters, and Presentations

Bourassa, D.V. Effects of delayed broiler carcass processing on defeathered carcass microbiology. Symposium: Alternative slaughter procedures: On-farm slaughter and transport system for broilers. PSA Annual Meeting. July 9-13, 2023. Philadelphia, PA.

Invited Presentations

Bourassa, D.V. Formation of the Egg. National Egg Quality School. Minneapolis, MN. May 22-25, 2023.

Bourassa, D.V. Egg Processing Plant Sanitation, SSOPs and GMPs. National Egg Quality School. Minneapolis, MN. May 22-25, 2023.

Bourassa, D.V. Poultry processing condemnation causes and pathogen reduction strategies. BI Training, November 9, 2022, Global Attendance (Online)

Extension Activities and Publications

Bourassa, D.V. Gaping as an emerging meat quality defect in breast tenders. WOGS Newsletter, Vol. 23, No. 3. Jul 2023.

Bourassa, D.V. Neutral electrolyzed water as an alternative to chlorine. WOGS Newsletter, Vol. 23, No. 2. Feb 2023.

Bourassa, D.V. Carcass condemnations can be whole or partial. WOGS Newsletter, Vol. 23, No. 1. Jan 2023.

Dissertation and Thesis

Marco Reina, M.S., Poultry Science, Auburn University, August 2023. Thesis: Evaluation of poultry transport flooring cleaning methods for the reduction of *Salmonella* and *Campylobacter*

Andrea Urrutia Giron, M.S., Food Science, Auburn University, December 2022. Thesis: Evaluation of various antimicrobial agents to reduce the load of *Salmonella* and *Campylobacter* in poultry processing

Iowa State University

Dr. Brett Ramirez and Dr. Rich Gates

Peer-Reviewed Publications

Li, G., Gates, R. S., Xiong, Y., Ramirez, B. C., & Burns, R. T. (2023). Evaluating draft EPA emissions models for broiler operations. *Journal of Applied Poultry Research.* doi: 10.1016/j.japr.2023.100365

Li, P.[#], Koziel, J. A., Macedo, N., Zimmerman, J. J., Wrzesinski, D., Sobotka, E., Balderas, M., Walz, W. B., Paris, R. V., Lee, M., Liu, D., Yedilbayev, B., Ramirez, B. C., & Jenks, W. S. (2022). Evaluation of air cleaning device equipped with filtration and UV: Comparison of particulate matter and airborne pathogens in air inflow and outflow. *International Journal of Environmental Research and Public Health,* 19(*23*), 16135. doi: 10.3390/ijerph192316135

Haughery, J. R., Ramirez, B. C., Shepherd, T. A., Murphy, P. T., & Lewis, B. A[#]. (2022). Characterizing manure drying techniques in Iowa commercial egg production facilities. *Journal of Applied Poultry Research, 31*(3). doi: 10.1016/j.japr.2022.100269

Maciel, F. D. F., Gates, R. S., Tinôco, I. D. F. F., Sousa, F. C. D., Pelletier, N., Ibarburu-Blanc, M. A., & Oliveira, C. E. A. (2023). Life Cycle Assessment Project for the Brazilian Egg Industry. *Animals*, *13*(9), 1479.

Freitas, L. C. D. S. R., Tinôco, I. D. F. F., Gates, R. S., Dos Santos, T. C., Andrade, R. R., Barbari, M., & Bambi, G. (2023). Spatial Variability of External Egg Quality in Vertical Naturally Ventilated Caged Aviaries. *Animals*, *13*(4), 750.

Li, G., Gates, R. S., Meyer, M. M., & Bobeck, E. A. (2023). Tracking and Characterizing Spatiotemporal and Three-Dimensional Locomotive Behaviors of Individual Broilers in the Three-Point Gait-Scoring System. *Animals*, *13*(4), 717.

Li, G., Chesser, G. D., Purswell, J. L., Magee, C., Gates, R. S., & Xiong, Y. (2022). Design and Development of a Broiler Mortality Removal Robot. *Applied Engineering in Agriculture*, *38*(6), 853-863.

Peer-Reviewed Abstracts and Proceedings

Conference Papers, Posters, and Presentations

Li, P., Shepherd, T. A., Ramirez, B. C., & Andersen, D. S. (2023). *Development of standardizing the assessment of dust generation potential from laying hen litter.* Presented at American Society of Agricultural and Biological Engineers Annual International Meeting 2023, Omaha, NE.

Rodrigues-Picchi, F., Ramirez, B. C. & Shepherd, T. A. (2022). *Danish Entry 3.0: AI enabled biosecurity system for enhanced protection.* Poster presented at Iowa Egg Industry Symposium. Ames, IA

Li, P., Koziel, J. A., Macedo, N., Zimmerman, J., Wrzesinski, D., Sobotka, E., Balderas, M., Walz, W.B., Paris, R. V., Lee, M., Liu, D., Yedilbayev, B., Ramirez, B. C. & Jenks, W. S. (2022). *Evaluation of an air cleaning device equipped with filtration and UV: comparison of*

removal efficiency on particulate matter and viable airborne bacteria in a poultry facility. Poster presented at Iowa Egg Industry Symposium. Ames, IA.

Xiong, Y., Li, G., Ramirez, B. C. & Gates, R. S. (2022). *Evaluating the draft US-EPA emissions models for laying hen and broiler facilities.* Presented at Poultry Science Association 3rd Latin American Scientific Conference 2022, Iguacu Falls, Parana, Brazil.

Dotto, J., Xiong, Y., Pitla, S. K., & Gates, R. S. (2023). *A web-based interface for automatic pollutant emission estimations in poultry facilities.* Presented at American Society of Agricultural and Biological Engineers Annual International Meeting 2023, Omaha, NE.

Invited Presentations

Ramirez, B. C. (2022). *Characterizing manure drying practices in Iowa commercial egg production facilities.* Presented at the 2022 Egg Industry Center Egg Industry Issues Forum, Ames, IA.

Extension Activities and Publications

Ramirez, B. C. (2023). *Ventilation challenges: Steps to recognize and resolve*. PEAK: Pullet/Egg Layer Education Track. Minneapolis, MN.

Ramirez, B. C. (2022). *Introduction to heat exchangers*. (Sep. 2022). Webinar hosted by Vencomatic Group.

Michigan State University

Dr. Janice Siegford and Dr. Janice Swanson

Peer-Reviewed Publications

Rentsch AK, Harlander A, Niel L, Siegford JM, Widowski TM. 2023. Rearing Laying Hens: environmental complexity and genetic strain affect pullet but not chick performance in a T-maze learning task. Applied Animal Behaviour Science. 265:105997. doi: 10.1016/j.applanim.2023.105997.

Rentsch AK, Ross E, Harlander A, Niel L, Siegford J, Widowski TM. 2023. The development of laying hen locomotion in 3D space is affected by early environmental complexity and genetic strain. Scientific Reports. 13:10084. doi: 10.1038/s41598-023-35956-1.

Rentsch AK, Harlander A, Siegford J, Vitienes I, Willie B, Widowski TM. 2023. Rearing laying hens: the effect of aviary design and genetic strain on pullet exercise and perching behavior. Frontiers in Animal Science: Animal Welfare and Policy. 4:57. doi: 10.3389/fanim.2023.1176702.

Peer-Reviewed Abstracts and Proceedings

Rentsch AK, Harlander A, Niel L, Siegford J, Widowski T. 2022. Early life environment and genetic strain are key for the development of locomotion skills in laying hens. Proceedings of the 2022 World Poultry Congress. (talk)

Rentsch AK, Harlander A, Niel L, Siegford J, Widowski T. 2022. Rearing experience and genetic strain affect fear response in laying hen pullets. Proceedings of the 2022 Poultry Science Association Meeting. (talk)

Mississippi State University

Dr. Ken Macklin (Department Head)

Peer-Reviewed Publications

*Munoz, L.R., *M.A. Bailey, J.T. Krehling, D.V. Bourassa, R. Hauck, W.J. Pacheco, B. Chavez-Cordoba, *K.S. Chasteen, *A.A. Talorico, *C. Escobar, A. Pietruska, and **K.S. Macklin.** 2023. Effects of dietary yeast cell wall supplementation on growth performance, intestinal *Campylobacter jejuni* colonization, innate immune response, villus height, crypt depth, and slaughter characteristics of broiler chickens inoculated with *Campylobacter jejuni* at d 21. Poultry Science 102(5), 1-11. https://doi.org/10.1016/j.psj.2023.102609

*Orellana, L., D. Neves, J. Krehling, R. Burin, P. Soster, L. Almeida, A. Urrutia, *L. Munoz, *C. Escobar, *M. Bailey, B. Chaves-Cordoba, C. Williams, M. Rebollo and **K. Macklin**. 2023. Effect of translucency and eggshell color on broiler breeder egg hatchability and hatch chick weight. Poultry Science 102(9). https://doi.org/10.1016/j.psj.2023.102866

Peer-Reviewed Abstracts and Proceedings

*Munoz, L.R., *M. Bailey, J.T. Krehling, *K.S. Chasteen, *C. Escobar, *L.A. Orellana, *Y. Adhikari and **K. Macklin**. 2023. Effects of Dietary Yeast Cell Wall Supplementation on Pathogen Colonization, Performance, and Slaughter Characteristics of Broiler Chickens Inoculated with *Campylobacter jejuni* at Day 16. *International Association of Food Protection Annual Meeting*, July 16-19 2023. Toronto CA.

*Bailey, M., J.T. Krehling, *L.R. Munoz, *K.S. Chasteen, *A. Talorico and **K. Macklin**. 2023. Effect of *Salmonella* Enteritidis and *Salmonella* Kentucky Co-Challenge on Salmonella Colonization of the Broiler GI Tract. *International Association of Food Protection Annual Meeting*, July 16-19 2023. Toronto CA.

Philpot, S.C., R. Hauck, A. Aderibigbe, **K. Macklin,** W.J. Pacheco, S.J. Rochell, and B. Dozier. 2023. Response of broiler chickens vaccinated against coccidiosis to diets containing varying amino acid density and a nucleotide-rich extract during the pre-starter and starter periods. PSA Annual Meeting, July 10-15, 2023. Philadelphia, PA.

*Orellana, L.A., *C. Escobar, *V.M. Tashiguano, J. Krehling, *MA. Bailey, **K. Macklin,** and W.J. Pacheco. 2023. Relationship between eggshell translucency and color intensity with egg quality parameters on broiler eggs. PSA Annual Meeting, July 10-15, 2023. Philadelphia, PA.

*Munoz, L.R., *C. Escobar, *M.A. Bailey, W.D. King, *Y. Adhikari, *L.A. Orellana, *V.M. Tashiguano, *M. Quino, *C. Guardado, and **K. Macklin.** 2023. Effects of gut health water treatments on broilers with or without Campylobacter jejuni inoculation. PSA Annual Meeting, July 10-15, 2023. Philadelphia, PA.

*Adhikari, Y., *M.A. Bailey, J. Krehling, *K.S. Chasteen, *L.R. Munoz, *C. Escobar, *L.A. Orellana, P. Gaonkar, S. Kitchens, S. Price, D. Bourassa, R.J. Buhr, and **K. Macklin**. 2023. Assessment of Salmonella and Campylobacter among various stages of No-Antibiotics-Ever (NAE) commercial broiler complex. PSA Annual Meeting, July 10-15, 2023. Philadelphia, PA.

Barua, S., *M.A. Bailey, K. Zhong, N. Iduu, T. Dormitorio, **K. Macklin,** D. Bourassa, S. Price, R. Hauck, J. Krehling, S. Kitchens, C. Kyriakis, J. Buhr, C. Wang. 2023. Role of darkling beetles (*Alphitobius diaperinus)* in spreading and maintaining *Salmonella* Enteritidis and *Campylobacter jejuni* in chicken flocks. PSA Annual Meeting, July 10-15, 2023. Philadelphia, PA.

*Escobar, C., D.B. Watts, H.A. Torbet III, *M A. Bailey, J. Krehling, *L.R. Munoz, *L.A. Orellana, *Y. Adhikari, B. Baker-Cook, and **K. Macklin.** 2023. Evaluation of Gypsum as a Bedding Material for Broiler Chickens**.** PSA Annual Meeting, July 10-15, 2023. Philadelphia, PA.

Hauck, R., **K. Macklin**, J. Beckmann, M. Burleson, A. Jeon, M.T. Terra-Long Description of insect populations in and around broiler breeder pullet farms with regard to potential vectors of Histomonas meleagridis. IPSF Annual Meeting, Jan 23-24, 2023. Atlanta, GA.

*Munoz, L., M. Paul, J. Krehlng, *M. Bailey, W. King, *C. Escobar, *L. Orellana, *Y. Adhikari, and **K. Macklin**. 2023. Effects of yeast cell wall on performance, immune response, and cecal colonization of Campylobacter jejuni inoculated broilers. IPSF Annual Meeting, Jan 23-24, 2023. Atlanta, GA.

Pietruska, A., S.Kitchens, J. Krehling, **K. Macklin,** S. Price, Z. Khalid, M. Terra-Long, T. Dormitorio, and R. Hauck. 2023.The impact of Salmonella Typhimurium and coccidiosis vaccine on the cecal transcriptome in broiler chickens. IPSF Annual Meeting, Jan 23-24, 2023. Atlanta, GA.

*Escobar, C., *L. R. Munoz, *M.A. Bailey, J.T. Krehling, W.J. Pacheco, R. Hauck, **K.S. Macklin.** 2023. Microbial analysis of feed ingredients and manufactured animal feed. IPSF Annual Meeting, Jan 23-24, 2023. Atlanta, GA.

*Orellana, L., J. Krehling, *K. Chasteen, *M. Quino, *C. Guardado, *L. Munoz, *Y. Adhikari, *C. Escobar, *M. Bailey, and **K. Macklin**. 2023. Impact of eggshell translucency and color intensity on egg quality parameters, moisture loss, and chick weight. IPSF Annual Meeting, Jan 23-24, 2023. Atlanta, GA.

*Adhikari, Y., *M. Bailey, J. Krehling, *K. Chasteen, *L. Munoz, *C. Escobar, *L. Orellana, P. Gaonkar, S. Kitchens, D. Bourassa, S. Price, J. Buhr, and **K. Macklin.** 2023. Isolation and identification of Salmonella and Campylobacter isolates from a commercial broiler complex through pullets to final raw product. IPSF Annual Meeting, Jan 23-24, 2023. Atlanta, GA.

Reina, M., A. Urrutia, J. Figueroa, M. Riggs, **K. Macklin**, R. Buhr, and D. Bourassa. 2023. Application of pressurized steam and forced hot air for cleaning broiler transport cage flooring. IPSF Annual Meeting, Jan 23-24, 2023. Atlanta, GA.

Dissertation and Thesis

Cesar Escobar Lobo, MS Thesis – Survey of feed mills around the United States for select bacterial pathogens. Dec 2022.

Dr. Pratima Adhikari

Peer-Reviewed manuscripts

Poudel, I., Beck, M. M., Kiess. A. S., & Adhikari, P. 2022. The effect of blue and red LED light on the growth, egg production, egg quality, behavior and hormone concentration of Hy-Line W-36 laying hens. Journal of Applied Poultry Research.

Peer-Reviewed Abstracts and Proceedings

Waters, Charis A., Wamsley, K. G. S., Elliot, M., Bedford, M., Wyatt, C., & Adhikari, P. A. (2023). Role of phytase and limestone particle size ratios on performance, egg breaking strength and gizzard pH and inositol levels of late-lay phase of single cycled laying hens. *Poult. Sci.*

Cribillero, N. G., Wyatt, C., Wamsley, K. G. S., Boltz, T., McCafferty, K. & Adhikari, P. A. (2023). Impact of a cellulase-xylanase enzyme supplementation on performance and intestinal health in pullets fed almond hulls. *Poult. Sci.*

Poudel, I., Faruk, M. U., Cisneros-Gonzalez, F., Kiess, A. S., Zhang, L. & Adhikari, P. A. (2023). Effect of a glycan microbial metabolic modulator on fecal shedding and tissue translocation of *Salmonella* Enteritidis in laying hen. *Poult. Sci.*

Waters, Charis A., Wamsley, K. G. S., Elliot, M., Bedford, M., Wyatt, C., & Adhikari, P. A. (2022). Role of phytase and limestone particle size ratios on performance, egg quality and bone quality in post-peak phase of single cycled laying hens. *Poult. Sci.*

Self, R. G., & Adhikari, P. A. (2022). Effects on production, welfare, and behavior on layers transferred from a caged to cage-free environment. *Poult. Sci.*

Conference Papers, Posters, and Presentations

Waters, Charis A., Wamsley, K. G. S., Elliot, M., Bedford, M., Wyatt, C., & Adhikari, P. A. (2023). Role of phytase and limestone particle size ratios on performance, egg breaking strength and gizzard pH and inositol levels of late-lay phase of single cycled laying hens. *Poult. Sci.* Oral presentation, IPSF 2023.

Cribillero, N. G., Wyatt, C., Wamsley, K. G. S., Boltz, T., McCafferty, K. & Adhikari, P. A. (2023). Impact of a cellulase-xylanase enzyme supplementation on performance and intestinal health in pullets fed almond hulls. *Poult. Sci.* Oral presentation, IPSF 2023.

Poudel, I., Faruk, M. U., Cisneros-Gonzalez, F., Kiess, A. S., Zhang, L. & Adhikari, P. A. (2023). Effect of a glycan microbial metabolic modulator on fecal shedding and tissue translocation of *Salmonella* Enteritidis in laying hen. *Poult. Sci.* Oral presentation, IPSF 2023.

Waters, Charis A., Wamsley, K. G. S., Elliot, M., Bedford, M., Wyatt, C., & Adhikari, P. A. (2022). Role of phytase and limestone particle size ratios on performance, egg quality and bone quality in post-peak phase of single cycled laying hens. *Poult. Sci.* Oral presentation, PSA, 2022.

Self, R. G., & Adhikari, P. A. (2022). Effects on production, welfare, and behavior on layers transferred from a caged to cage-free environment. *Poult. Sci.* Oral presentation, PSA, 2022.

Dr. Kelley Wamsley

Peer-Reviewed Publications

Brown, A. T., M. J. Alvarenga, M. E. Lemons, C. D. McDaniel, J. S. Moritz, and **K. G. S. Wamsley**. "Determining the average particle size consumed (APSC) between two genetic strains (GS) receiving starter diets varying in feed form (FF) and feed quality (FQ)." *Journal of Applied Poultry Research* (2023): 100336.

In progress/submitted:

Alvarenga, Maria, Pratima Adhikari, Joseph Moritz, **Kelley Wamsley**. *In revisions*. Effects of breeder flock age (pullet or late) and feeding strategy (choice or no choice) as it influences 0-14 d bird beak capacity, feed particle selection, and 0-14 d performance. JAPR.

Alvarenga, Maria, Pratima Acharya Adhikari, Joe Moritz, and **Kelley G.S. Wamsley.** *In progress.* Carryover effects of breeder flock age (pullet or late) and feeding strategy (choice or no choice) as it influences 14-61d bird beak capacity, performance and processing. JAPR.

Invited Presentations

Kelley G.S. Wamsley. Invited Speaker– 30-minute programmatic "*Leadoff*" presentation at the 2023 PSA Annual Meeting for General Nutrition Session. Maximizing broiler potential through increased starter complete feed particle size.

Kelley G.S. Wamsley. Invited Speaker– Pilgrim's Feed Mill Manager Meeting - June 5^{th} – 7^{th}, 2023. Maximizing broiler potential through starter feed form: considerations of beak capacity, preference, and overall performance.

Peer-Reviewed Abstracts and Proceedings

Dennehy, Dalton, Andrew Brown, Mark Lemons, Christopher McDaniel, Joe Moritz, and **Kelley G.S. Wamsley,** 2022. Correlation of 7-14 d performance metrics with d 15 ileal amino acid digestibility (AAD) when birds are fed starter feed varying in average particle size (APS)," WPSA, Paris, France.

Alvarenga, Maria, Pratima Adhikari, Joseph Moritz, **Kelley Wamsley**. 2022. Effects of breeder flock age (pullet or late) and feeding strategy (choice or no choice) as it influences 0-14 d bird

beak capacity, feed particle selection, and 0-14 d performance. Poultry Science, 101 (E-suppl 1): *Accepted*.

Alvarenga, Maria, Pratima Acharya Adhikari, Joe Moritz, and **Kelley G.S. Wamsley.** 2022. Carryover effects of breeder flock age (pullet or late) and feeding strategy (choice or no choice) as it influences 14-61d bird beak capacity, performance and processing. Poultry Science, 101 (E-suppl 1): Accepted.

Kelley Wamsley. 2023. Maximizing broiler potential through increased starter complete feed particle size. Poultry Science, 101 (E-suppl 1): *Accepted*.

Other

Podcast and blog for Food Chain Chats (Mar 25 2022; Increasing Efficiency in Poultry Production Systems | Arm & Hammer Animal and Food Production (ahfoodchain.com).

Research Featured in Poultry Podcast Show – Episode #28 – Dr. Wamsley – Maximizing broiler performance: the importance of physical feed quality. 2023

Link to video - https://www.youtube.com/watch?v=_KpyeHxYcA0; also on most podcast platforms

Dr. Li Zhang

Peer-Reviewed Publications

Sabin Poudel, Linan Jia, Mark A. Arick II, Chuan-Yu Hsu, Adam Thrash, Anuraj T. Sukumaran, Pratima Adhikari, Aaron S. Kiess, **Li Zhang***. (2023). *In silico* prediction and expression analysis of vaccine candidate genes of *Campylobacter jejuni*. *Poultry Science*, 102592. https://doi.org/10.1016/j.psj.2023.102592

Peer-Reviewed Abstracts and Proceedings

Sabin Poudel, Mark A. Arick II, Chuan-Yu Hsu, Pratima Adhikari, Anuraj Sukumaran, Aaron S. Kiess, **Li Zhang***. (2023). Complete genome sequences of *Campylobacter jejuni* strains isolated from no antibiotics ever raised broiler reveal the presence of antimicrobial resistance and virulence genes. 2023 Poultry Science Association Annual Meeting. July 10-15, 2023. Philadelphia, PA.

Sabin Poudel, Linan Jia, Xue Zhang, Anuraj Sukumaran, Wes Schilling, **Li Zhang***. (2023). Efficacy of 405 nm light in inactivating *Campylobacter jejuni* and its impact on broiler meat quality. 2023 Poultry Science Association Annual Meeting. July 10-15, 2023. Philadelphia, PA.

Sabin Poudel, Linan Jia, Chuan-Yu Hsu, Wen-Hsing Cheng, Pratima Adhikari, Aaron S. Kiess, **Li Zhang***. (2023). Expression analysis of *Campylobacter jejuni*-induced cytokine responses in avian cell line infection study. 2023 International Poultry Scientific Forum. Jan 23-24, 2023. Atlanta, GA.

Linan Jia, Mark A. Arick II, Chuan-Yu Hsu, Daniel G. Peterson, Jeffrey D. Evans, Anuraj T Sukumaran, Reshma Ramachandran, Pratima Adhikari, **Li Zhang***. (2023). High-throughput

Escherichia coli (APEC) multilocus sequence typing (MLST) using Oxford Nanopore Technologies. 2023 International Poultry Scientific Forum. Jan 23-24, 2023. Atlanta, GA.

Priyanka Devkota, Linan Jia, Xue Zhang, Anuraj T Sukumaran, Aaron S Kiess, Jeffrey D Evans, Reshma Ramachandran, Pratima Adhikari, **Li Zhang***. (2023). Understanding the adhesion and invasion characteristics of avian *E. coli* isolated from clinical and non-clinical samples using avian macrophages cell line HD11. 2023 International Poultry Scientific Forum. Jan 23-24, 2023. Atlanta, GA.

Invited Presentations

Li Zhang. 2023. IPPE Research TECHTalk. Use of comparative genomics and *in vitro* screening approach for the identification of vaccine candidates for food-borne pathogen *Campylobacter jejuni*. Atlanta, GA on January 26, 2023.

Dissertation and Thesis

Sabin Poudel. PhD Dissertation – Use of comparative genomics and in vitro screening approach to identify vaccine candidates for the food-borne pathogen *Campylobacter jejuni*. Mississippi State University, Mississippi State, MS. Aug 2023.

Deepa Chaudhary. MS Thesis – Development of a novel loop-mediated isothermal amplification (LAMP) assay for the rapid detection of *Clostridium perfringens*. Mississippi State University, Mississippi State, MS. Dec 2022.

Priyanka Devkota. MS Thesis – Molecular and phenotypic characterization of *Escherichia coli* isolated from broiler chicken flocks in Mississippi. Mississippi State University, Mississippi State, MS. Dec 2022.

Dr. Tim Boltz

Invited Presentations

July 10, 2023, Philadelphia, PA. **Invited Speaker** for *Poultry Science Association Annual Meeting*. Title "Improving poultry feed hygienics: Utilizing feed manufacture techniques and equipment to improve feed hygiene."

Dr. Anuraj Theradiyil Sukumaran

Peer-Reviewed Publications

Peer-Reviewed Abstracts and Proceedings

Pokhrel, D., Thames, H., Fugate, H., Zhang, L., Dinh, T. T.N., Schilling, M. W., Ramachandran, R., White, S., Theradiyil Sukumaran, A. (2023). Biofilm formation ability of Campylobacter jejuni isolated from commercial broiler processing plants. International Poultry Scientific Forum, Atlanta, GA.

Diksha Pokhrel, Hudson T. Thames, Li Zhang, Thu Dinh, Wes Schilling, Shecoya White, Reshma Ramachandran and Anuraj T. Sukumaran. (2023). Freezing and refrigeration decrease aerotolerant Campylobacter jejuni counts on chicken drumsticks during storage. Poultry Science Association Annual Meeting, Philadelphia, PA.

Hudson T. Thames, Diksha Pokhrel, Thu T. N. Dinh, Li Zhang, Wes Schilling, Reshma Ramachandran, Shecoya White, and Anuraj T. Sukumaran. (2023). The Expression of Biofilm Associated Genes in Mature Salmonella Biofilms. Poultry Science Association Annual Meeting, Philadelphia, PA.

Dr. Xue Zhang

Peer-Reviewed Publications

Zhang, X., Smith, S.W., Zaldivar, L.R., Lesak, D.J., Schilling, M.W. 2023. Study of emerging chicken meat quality defects using OMICs: What do we know? J Proteomics 276:104837. doi: 10.1016/j.jprot.2023.104837.

Peer-Reviewed Abstracts and Proceedings Conference Papers, Posters, and Presentations

Little, E., **Zhang, X**, Chatham, L., Bishop, M., Smith, S., Fornes, C., Mosby, M. 2023. Effect of xanthan gum on rheological and sensory properties of gluten-free chicken nugget batters. Undergraduate Research Symposium at Mississippi State University. (2^{nd} place)

Penn State University

Dr. John Boney

Peer-Reviewed Publications

Poholsky, C. M., Erb, L. S., Lyons, A. M., Rohlf, P., & Boney, J. (2023). Improving pellet quality enhances Nicholas Select turkey performance in targeted phases of production. *32*(2). DOI: https://doi.org/10.1016/j.japr.2023.100340

Lynch, E., Bowen, K., Ayers, V., Boltz, T., Wamsley, K. G.S., Boney, J. W., & Moritz, J. S. (2023). Hygenic pelleting can decrease Hubbard x Ross 708 pparent ileal amino acid digestibility, broiler performance, and increase digestible amino acid requirement. *Journal of Applied Poultry Research, 32:100355*. DOI: https://doi.org/10.1016/j.japr.2023.100355

Lyons, A. M., Patterson, P. H., & Boney, J. (2023). Hammermill screen selection for soybean processing: Effects of soybean meal particle size on amino acid digestibility, feed milling efficiency, and D1-42 broiler performance. *Journal of Applied Poultry Research, 32*(1). DOI: https://doi.org/10.1016/j.japr.2022.100325

Peer-Reviewed Abstracts and Proceedings

Liebross, B. S., Poholsky, C. V., & Boney, J. W. (2022). "The impacts of amino acid density and phytase activity variability on D1-38 Ross 308 male broiler performance and processing yields." *Poultry Science*, 101 (E-suppl. 1) (90).

Poholsky, C. V., Watt, M. L., Erb, L. S., Lyons, A. M., & Boney, J. W. (2022). "Effects of improvements to pellet quality on commercial hen and tom turkey performance and processing parameters." *Poultry Science*, 101 (E-suppl. 1) (92).

Poholsky, C. V., Lyons, A. M., Cantley, S., & Boney, J. W., (2022). "Effects of non-starch polysaccharide degrading enzyme inclusion to corn and soybean-meal based diets containing wheat on broiler performance and ileal energy digestibility." *Poultry Science*, 101 (E-suppl. 1)(M95).

Lyons, A. M., Erb, L. S., Poholsky, C. V., & Boney, J. W., 60%) (2022). "Impact of aragonite as an alternative calcium source on hen egg production and egg quality." *Poultry Science*, 101 (E-suppl. 1) (P346).

Fonseca, A., Clouser, S., Boney, J. W., & Ganda, E. (2022). "Longitudinal characterization of the effect of probiotic, phytotherapeutic, and antimicrobial feeding strategies on poultry performance." *Poultry Science*, 101 (E-suppl. 1) (M93).

Invited Presentations

Assessing Feed Quality at the Farm to Feed Broilers Efficiently, University of Georgia, 100 participants, September 28, 2022

LED Lighting in Turkeys, VA Poultry Federation, August 3, 2022

Extension Activities and Publications

Poultry Grower Meeting, Co-Instructor, Extension Program, Operational Biosecurity, Ephrata, PA, 21 participants, February 15, 2023

Extension Presentation, Co-Director and Instructor, On-Line, Operational Biosecurity, 146 participants, February 10, 2023

Extension Presentation, Co-Director and Instructor, Why Small Poultry Flock Owners Need to Stay Vigilant with HPAI to Protect Their Flock, 172 participants, September 26, 2022

Director, PA Poultry Sales and Service Conference and Northeast Conference on Avian Disease, The Penn Stater, 267 participants September 14, 2022 - September 15, 2022

Special Programs, College Connections: Highly Pathogenic Avian Influenza in PA: What you should know, College of Agricultural Sciences, University Park, PA. July 20, 2022

Conference, Instructor, Extension Program, Managing Birds for Optimal Welfare: Hatch to Catch, University Park, PA, 25 participants, External to Penn State, June 15, 2022

Hovingh, E., & Boney, J. W. (Co-Author, 40%) (2022). Highly Pathogenic Avian Influenza: "What, Me Worry?"

University of Arkansas

Dr. Yi Liang, Dr. Shawna Weimer, and Dr. Sara Orlowski

Peer-Reviewed Publications

Kang, S. W., K. D. Christnesen, M. T. Kidd Jr., S. K. Orlowski and J. Clark. 2023. Effects of a variable light intensity program on the welfare and performance of commercial broiler chicken. Front. Physiol. 14. https://doi.org/10.3389/fphys.2023.1059055.

Greene, E.S.; Adeogun, E.; Orlowski, S.K.; Nayani, K.; Dridi, S. Effects of heat stress on cyto(chemo)kine and inflammasome gene expression and mechanical properties in isolated red and white blood cells from 4 commercial broiler lines and their ancestor jungle fowl. Poult. Sci. 2022, 101, 101827.

Magnaterra, A., R. Mitchell, C. R. Angel, M. Khong, Z. McMillian, A. Snyder, and S. Weimer. 2023. Research Note: Comparison of two methods to measure broiler tibia morphology. Poultry Science. 102:102245. DOI: 10.1016/j.psj.2022.102245.

Khong, M. J., A. M. Snyder, A. K. Magnaterra, M. M. Young, N. L. Barbieri, and S. L. Weimer. 2023. Antimicrobial resistance profile of Escherichia coli isolated from poultry litter. Poultry Science. 102:102305. DOI: 10.1016/j.psj.2022.102305.

Mendoza, A. V., S. Weimer, Z. Williams. 2023. Can UV light induce movement in cage-free laying hens? Journal of Applied Poultry Research. 32:100350. DOI: 10.1016/j.japr.2023.100350.

Peer-Reviewed Abstracts and Proceedings

Jacobs, L., R. A. Blatchford, I. C. de Jong, M. A. Erasmus, M. Levengood, R. C. Newberry, P. Regmi, A. B. Riber, and S. L. Weimer. 2023. Enhancing their quality of life: environmental enrichment for poultry. Poultry Science. 102:102233. DOI: 10.1016/j.psj.2022.102233.

Moon, J., J. Wells, Y. Liang and G.T. Tabler, 2023. Effects of sprinkler technology combined with a cool cell system on cooling water usage, bird performance, and indoor environment of broiler houses, Proceeding of the 2nd U.S. Precision Livestock Farming Conference, University of Tennessee.

Liang, Y., M. Janorschke, C. Hayes, and T.A. Costello. 2023. Measurement of dynamic electric consumption trend in a broiler house in Arkansas. ASABE Annual Meeting, Paper Number: 2301155, Omaha, NE.

Conference Papers, Posters, and Presentations

World's Poultry Science Meeting-Paris, France. August 10, 2022. Divergent Selection for Water Conversion Ratio in Broilers.

Tensa, L. and S. Weimer. The effect of light intensity on grade and performance in regular turkey hens. American Association of Avian Pathologists meeting in Jacksonville, FL. June 11-14, 2023. (oral)

Magnaterra, A. and S. Weimer. Effect of environmental enrichments on the proximity of broiler chickens to a human and novel object. European Symposium on Poultry Welfare meeting in Prague, Czech Republic. June 26-29, 2023. (poster)

Oyeniran, V., J. Palmer, W. Thomas, C. Pennicott, A. Perretti, A. Atencio Vega, A. Forga, D. Graham, and S. Weimer. Feeding behavior of turkey poults supplemented with AquaBeads®. Poultry Science Association meeting in Philadelphia, PA. July 10-13, 2023. (oral)

Perretti, A., C. Pennicott, V. Oyeniran, D. Graham, A. Forga, B. M. Hargis, T. E. Porter, and S. Weimer. Effects of early-life thermal conditioning on the behavior of broilers during heat stress later in life. Poultry Science Association meeting in Philadelphia, PA. July 10-13, 2023. (oral)

Pennicott, C., A. Perretti, V. Oyeniran, S. Orlowski, and S. Weimer. Effect of humidity during the hatching phase of incubation on broiler chick quality. Poultry Science Association meeting in Philadelphia, PA. July 10-13, 2023. (poster)

Liang, Y., M. Janorschke, and T.A. Costello. 2023. Measurement of dynamic electric consumption trend in a broiler house in Arkansas. ASABE Annual Meeting, Paper Number: 2301155, Omaha, NE

Invited Presentations

The Poultry Industry: Animal Welfare and Sustainability. Mississippi Poultry Association Breeder and Hatchery Virtual Workshop. August 10, 2021.

Genetics and Animal Welfare Research at the University of Arkansas. Aviagen. Sallisaw, OK. August 15, 2022.

Liang, Y. Cooling Through Surface Wetting, Pilgrims Pride– virtual. 02/21/2023

Liang, Y. Broiler heat stress management with engineering intervention. 2023 Georgia Precision Poultry Farming Conference - Virtual. 05/02 2023.

Extension Activities and Publications

Pennicott, C. and S. Weimer. 2023. Tryptophan: The link between poultry welfare & nutrition. Poultry Extension Collaborative. Vol 37: April 2023 Newsletter.

Weimer, S. 2023. Optimizing incubation conditions for chick welfare. Poultry Extension Collaborative. Vol 38: May 2023 Newsletter.

Tabler, T., V. Ayres, P. Maharjan, S. Hawkins, Y. Liang, and J. Urrutia. 2023. Poultry farming and good neighbor relations: coexistence is possible. Publication D175, University of Tennessee Institute of Agriculture.

Tabler, T., Y. Liang, J. Moon, V. Ayres, P. Maharjan and J. Wells. 2023. Poultry production going forward: Where will the water come from? Publication D203, University of Tennessee Institute of Agriculture.

Tabler, T., Y. Liang, V. Ayres, J. Wells., P. Maharjan and J. Moon 2023. Attention needed on poultry drinking water. Publication D204, University of Tennessee Institute of Agriculture

University of Connecticut

Dr. Mary Ann Amalaradjou, Dr. Indu Upadhyaya, Dr. Abhinav Upadhyaya, Dr. Kumar Venkitanarayanan

Products (In chronological order):

Grants:

- Upadhyay, A, Upadhyaya, I, Qiao, M. Rechargeable antimicrobial coating for poultry and meat processing facilities. USDA-SBIR phase 3. 2023-2024. $220,000.
- Amalaradjou, MA; Tako, E (Cornell University); Mandoiu, I. Effect of in-ovo probiotic supplementation on energy status, yolk sac function and intestinal development in broilers. USDA NIFA. 2023-2026. $650,000.
- Fragomeni, B; Amalaradjou, MA. Genomic selection as a tool to mitigate *Salmonella* shedding in broilers. Cobb Research Institute. 2024-2026, $150,000.
- Reddyvari, R; Amalaradjou M.A. Controlling Salmonella on eggs using probiotics and postbiotics. Northeast SARE. 2022-2024. $15,000.
- Amalaradjou, MA; Upadhyaya, I; Boney, J. A; Darre, M. A comprehensive probiotic-based approach to promote layer performance, layer health and egg safety for small and midsize farms. USDA NIFA. 2021-2025. $500,000.
- Amalaradjou, MA; Upadhyaya, I. In ovo and early probiotic supplementation to control *Salmonella* in broilers. USDA NIFA SARE. 2021-2024. $150,000.
- Venkitanarayanan, K., Darre, M., Amalaradjou, MA., Upadhyay, A., Upadhyay, I., Luo, Y., Martin, G., Boney, J., Lillehoj, H., Porter, T., Weimer., S., Moyle, J., Thakur, S., Ashwell, C., Kolar, P., Boyes, K., Pairis-Garcia, M., Borst, R., Liang, K., Fasina, Y., Fanatico, A., Czarick, M., Fairchild, B., Ramos, J., Rojas, M., Donoghue, A,, Moore, P., Ashworth, A., Lyte, J., Dridi, S., Arsi, K., Bramwall, S., Kommalapati, R., Mooyottu, S., Tangudu, C., Johny, A. Systems-based integrated program for enhancing the sustainability of antibiotic-restricted poultry production. USDA NIFA. 2020-2025. $10,000,000.
- Sartini, B; Upadhyay, A; Upadhyaya, I. Developing Evidence-based Handling Guidelines for Improving the Safety of Free- range Poultry Eggs. USDA-NIFA-AFRI. 05/2021-04/2023. $200,000.

- Upadhyay, A., Upadhyaya, I., Ghimire, S. Enhancing the Safety of Eggs and Fresh Produce by Novel Ultra-fine Bubble Technology and Farmer Training. NE-SARE. 03/2020 – 02/2023. $150,000.
- Amalaradjou, MA; Darre, M; Reed, S., Mandoiu, I. Effects of in-ovo probiotic supplementation on muscle growth and performance in broilers. USDA NIFA. 2020-2024. $200,000.
- Upadhyay, A., Fiala, N., Luo, Y., Mishra, N., (University of Connecticut); Arsi, K., Wagle, B., (University of Arkansas); Robinson, K., Donoghue, A., (USDA-ARS, Fayetteville, AR). Developing plant-based drinking water supplements for controlling *Salmonella* and *Campylobacter jejuni* in broiler chickens. USDA NIFA AFRI (A1332 program). 01/2021-01/2026. $455,000.
- Upadhyay, A., Fiala, N., Ghimire, S., Darre, M., (University of Connecticut); Fanatico, A., (Appalachian State University); Gekara, O., (Cal Poly Pomona), Arsi, K., (University of Arkansas); Donoghue, A., (USDA-ARS, Fayetteville, AR). Novel microbubble technology to reduce contamination of poultry products and fresh produce for small and medium veteran farmers. USDA NIFA AFRI. 07/2020 - 06/2024. $500,000.

Other products:

Abstracts: (* Indicates corresponding author).

1. Yuying Ren, Sarah Reed, **Mary Anne Amalaradjou*.** 2023. Sustained probiotic supplementation promotes myogenesis and muscle growth in broiler chickens. 2023 PSA Annual Meeting, July 10-14, 2023.
2. Praveen Raja Kosuri, Sulthana Muttathukonam, Ragini Reddyvari, Mairui Gao, Yuying Ren and **Mary Anne Amalaradjou*.** 2023. Hatching egg sanitation using probiotics to control Salmonella Enteritidis. 2023 PSA Annual Meeting, July 10-14, 2023.
3. Mairui Gao, Yuying Ren, Si Lu, Praveen Kosuri, Ragini Reddyvari, **Mary Anne Amalaradjou*.** 2023. In ovo probiotic application improves embryonic development and modulates microbiome acquisition in broiler chicks. 2023 PSA Annual Meeting, July 10-14, 2023.
4. Atul Walunj, Trushenkumar Shah, Chetna Shah, Chen Zhu, Ana Leticia Rodrigues, Jodie Allen, Brindhalakshmi Balasubramanian, **Abhinav Upadhyay*.** 2023. Effect of ultra-fine oxygen bubble water supplementation on production performance and jejunal proteome of broiler chickens. PSA Annual Meeting, July 10-14, 2023.
5. Trushenkumar Shah, Chetna Shah, Chen Zhu, Atul Walunj, Jodie Allen, Brindhalakshmi Balasubramanian, Ana Leticia, Kimberly Rankin, Neha Mishra, Indu Upadhyaya, Kumar Venkitanarayanan, **Abhinav Upadhyay*.** 2023. In-water supplementation of Trans-cinnamaldehyde nanoemulsion reduces colonization of *Salmonella* Enteritidis in broiler chickens. PSA Annual Meeting, July 10-14, 2023.
6. Chetna Shah, Trushenkumar Shah, **Abhinav Upadhyay***. 2023. Application of Caprylic acid nanoemulsion for controlling *Salmonella* Enteritidis biofilm in poultry processing environment. PSA Annual Meeting, July 10-14, 2023.

7. Jodie Allen, Brindhalakshmi Balasubramanian, Trushenkumar Shah, **Abhinav Upadhyay*.** 2023. Effect of continuous exposure to Trans-cinnamaldehyde on induction of resistance in *Salmonella* Enteritidis. PSA Annual Meeting, July 10-14, 2023.

University of Georgia

Dr. Lilong Chai

Peer-reviewed publications:

1. Muyyarikkandy MS, Schlesinger M, Ren Y, Gao M, Liefeld A, Reed S, **Amalaradjou MA***. 2023. In ovo probiotic supplementation promotes muscle growth and development in broiler embryos. Poult Sci. 102(7):102744.
2. Allen, J, Balasubramanian, B, Donoghue, A, Upadhyaya, I, Luo, Y, **Upadhyay, A*.** 2023. Effect of trans-cinnamaldehyde nanoemulsion wash on chicken embryo development in fertilized eggs. Poult Sci. 102:102812. https://doi.org/10.1016/j.psj.2023.102812
3. Allen, J, Balasubramanian, B, Rankin, K, Shah, T, Donoghue, A, Upadhyaya, I, Sartini, B, Luo, Y, **Upadhyay, A*.** 2023. Trans-cinnamaldehyde nanoemulsion wash inactivates *Salmonella* Enteritidis on shelled eggs without affecting egg color. Poultry Science 102:102523.

Peer-Reviewed Publications

[1] Chai, L., Y. Zhao (Eds). Housing Environment and Farm Animals' Well-Being. MPDI Books. ISBN 978-3-0365-4585-1. 212 pages, June 2022. https://www.mdpi.com/books/pdfview/book/5695

[2] Qiao, Y., L. Chai, D. He, D. Su (Eds). 2022. Advances in Sensors, Big Data and Machine Learning in Intelligent Animal Farming. MPDI Books. ISBN 978-3-0365-4036-8. 230 pages, May 2022. https://www.mdpi.com/books/pdfview/book/5492.

Peer-Reviewed Journal Articles (* corresponding author; # Chai's graduate students)

[1] #Guo, Y., Aggrey, S., Yang, X., A. Oladeinde, L. Chai*. Detecting Broiler Chickens on Litter Floor with the YOLOv5-CBAM Deep Learning Model. Artificial Intelligence in Agriculture (Accept after minor revision).

[2] #Bist, R.B., Yang, X, Subedi, S, L. Chai*. (2023). Mislaying behavior detection with deep learning technologies. Poultry Science, 102729. (IF = 4.4).

[3] #Bist, R.B., S. Subedi, L. Chai*, Xiao Yang (2023). Ammonia Emissions, Impacts, and Mitigation Strategies for Poultry Production: A Critical Review. Journal of Environmental Management, 328, 116919. (IF = 8.7).

[4] #Guo, Y., Regmi, P., Ramesh Bist, L. Chai*. Automatic Tracking of Brown Hens on the Litter Floor of Cage Free Houses with Deep Learning Methods. Poultry Science, 102784 (IF = 4.4).

[5] #Yang, X., R. Bist, S. Subedi, Z. Wu, T. Liu, L. Chai*. (2023). An automatic classifier for monitoring applied behaviors of cage–free laying hens with deep learning. Engineering Applications of Artificial Intelligence, 123, 106377 (IF=8.0).

[6] #Yang, X., R. Bist, S. Subedi, L. Chai*. (2023). A Deep Learning Method for Monitoring Spatial Distribution of Cage-Free Hens. Artificial Intelligence in Agriculture, 8: 20-29 (CiteScore = 15.1; invited article).

[7] #Yang, X., R. Bist, S. Subedi, L. Chai*. (2023) A computer vision based automatic system for egg grading and defect detection. Animals, 13(14), 2354 (IF = 3.0).

[8] Li, G*., L. Chai. (2023). AnimalAccML: An open-source graphical user interface for automated behavior analytics of individual animals using triaxial accelerometers and machine learning. Computers and Electronics in Agriculture, 209, 107835. (IF = 8.3).

[9] #Subedi, S., Bist, R. B, X.Yang, L. Chai* (2023). Tracking Floor Eggs with Machine Vision in Cage-free Hen Houses. Poultry Science, 102637. (IF = 4.014).

[10] #Subedi, S., Bist, R. B, X.Yang, L. Chai*. (2023). Tracking Pecking Behaviors and Damages of Cage-free Laying hens with Machine Vision Technologies. Computers and Electronics in Agriculture, 204 (1), 107545. (IF = 8.3).

[11] #Bist, R.B., Subedi, S, Yang, X, L. Chai*. A novel YOLOv6 object detector for monitoring piling behavior of cage-free laying hens. AgriEngineering, 5(2), 905-923 (IF = 2.8; Invited article).

[12] Sharma, M. K., Regmi, P., Applegate, T., L. Chai., & Kim, W. K*. (2023). Osteoimmunology: A Link between Gastrointestinal Diseases and Skeletal Health in Chickens. Animals, 13(11), 1816.

[13] Castro, F., **L. Chai**, J. Arango, C. Owens, et al. (2023). Poultry industry paradigms: connecting the dots. Journal of Applied Poultry Research 32 (1), 100310.

[14] #Bist, R.B., Subedi, S, Yang, X, L. Chai*. 2023. Automatic Detection of Cage-Free Dead Hens with Deep Learning Methods. AgriEngineering, 5(2), 1020-1038 (Invited).

[15] #Bist, R.B., X.Yang, S. Subedi, C. Ritz, W K. Kim, M K Sharma, A K Singh, L. Chai*. Temporal Spatial Variations of Particulate Matter Levels in Cage-Free Experimental Pullets Facilities. Poultry 2(2), 320-333 (Invited).

[16] #Bist, R. B, S. Subedi, X. Yang, L. Chai* (2023). Strategies for mitigating feather pecking and cannibalism in cage-free W-36 pullets. Poultry. 2(2), 281-291.

Conference Papers, Posters, and Presentations

[1] #Bist, R. B, L. Chai*, X. Yang, and S. Subedi. Cage Free Hens' Feather Pecking Management. 2023 ASABE Annual International Meeting. Full Paper.

[2] #Bist, R. B, L. Chai*, X. Yang, and S. Subedi. Effects of artificial dusk lighting on perching behaviors of cage-free laying hens. 2023 ASABE Annual International Meeting. Full Paper.

[3] #Bist, R. B, L. Chai*, X. Yang, and S. Subedi. Monitoring floor egg laying behaviors of cage-free hens with machine vision. 2023 USPLF Conference. Knoxville, TN, May 21-24. Full Paper.

[4] #Yang, X, L. Chai*, R. Bist, S. Subedi, and Z. Wu. Monitoring cage-free laying hens with deep learning models. 2023 USPLF Conference. Knoxville, TN, May 21-24. Full Paper.

[5] #Subedi, S., L. Chai*, R. Bist, X. Yang. Floor Egg Detection with Machine Vision in Cage-free Hen Houses. 2023 USPLF Conference. Knoxville, TN, May 21-24. Full Paper.

[6] #Bist, R. L. Chai*, X. Yang, S. Subedi. 2022. 2022 ASABE Annual International Meeting. Paper# 2200329 (doi:10.13031/aim.202200329).

[7] #Yang, X., L. Chai*, R. Bist, and S. Subedi. 2022. Litter quality in cage-free houses. 2022 ASABE Annual International Meeting. Paper# 2200925 (doi:10.13031/aim.202200925).

[8] Qiao, Y., #Y. Guo, D. He, L. Chai. 2022. Deep Learning-based Autonomous cow body detection for smart livestock farming. 2022 ASABE Annual International Meeting. Paper#20220012

Abstracts (# Chai's student was presenter):

[1] #Yang, X., Bist, R., Subedi, S., L. Chai*. 2023. A computer vision based automatic system for egg grading and defect detection in cage-free facilities. 2023 PSA. Poultry Science, 100 (E-Suppl. 1) #43.

[2] #Bist, R., Yang, X., Subedi, S., L. Chai*. Detecting cage-free hens bumblefoot with deep learning models. 2023 PSA. Poultry Science, 98 (E-Suppl. 1) #94.

[3] #Bist, R., Yang, X., Subedi, S., C. Ritz, W. Kim, L. Chai*. Synergistic effect of electrostatic particle ionization and bedding management on particulate matter and ammonia reduction in cage-free hen houses. 2023 PSA. Poultry Science, 98 (E-Suppl. 1) #91.

[4] #Subedi, S., Yang, X., Bist, R., L. Chai*. Multiple Behavior Classification of Cage-Free Laying Hens Using Deep Learning. 2023 PSA. Poultry Science, 98 (E-Suppl. 1). #28.

[5] #Yang, X., Bist, R., Subedi, S., L. Chai*. 2023. Tracking cage-free laying hens on litter floor with machine vision. 2023 IPSF. Poultry Science, 100 (E-Suppl. 1)

[6] #Bist, R., Yang, X., Subedi, S., L. Chai*. Monitoring mislaying behaviors of cage-free hens with deep learning. 2023 IPSF. Poultry Science, 98 (E-Suppl. 1)

[7] #Subedi, S., Yang, X., Bist, R., L. Chai*. Detecting Floor Eggs with Machine Vision Technologies

2023 IPSF. Poultry Science, 98 (E-Suppl. 1)

[8] Chai, L. 2022. Developing next-gen data management strategies for smart poultry farms. 2022 Poultry Science Association Annual Meeting (abstract#493S). Poultry Science, 98 (E-Suppl. 1)

[9] #Bist, R., L. Chai*, et al. 2022. Bedding Management for Suppressing Particulate Matter in Cage-free Layer Houses. 2022 PSA (abstract#71).

[10] #Subedi, S., L. Chai*, R. Bist, X. Yang. 2022. Tracking Pecking Behaviors and Damages with Machine Vision in Cage-free Hen Houses. 2022 PSA (abstract#21). Poultry Science, 98 (E-Suppl. 1)

[11] #Yang, X., L. Chai*, R. Bist, S. Subedi. 2022. A deep learning model for detecting hens on litter floor of cage-free houses. 2022 PSA (abstract#22).

Extension Activities and Publications

[1] Coordinator, 2023 Georgia Precision Poultry Conference -Virtual. May 2, 2023. (Initiated by Chai; the 3rd annual conference had 450 registered participants globally from 40 different countries).

[2] Coordinator, 2022 Georgia Layer Conference -Virtual. September 26, 2022. (175 registered participants).

Delivered 20 extension trainings/talks in the past year.

Extension publications:

[1] **Chai, L**, C. Dunkley, and C. Ritz (2023). Floor Egg Management in Cage-free Houses. *UGA Extension Bulletin*. https://extension.uga.edu/publications/detail.html?number=C1254

[2] Dunkley, C., C.Ritz, **L. Chai** (2023). Using Container Composters to Dispose Poultry Mortality. UGA Extension Bulletin. B1550. In press.

[3] **Chai, L**. (2023). Tracking Floor Eggs in Cage-free Houses with Machine Vision Technologies. UGA CAES Precision Poultry Farming Newsletter. March 26, 2023.

[4] **Chai, L**. (2023). Dust Generations, Impacts, and Control Strategies in Poultry Houses. UGA CAES Precision Poultry Farming Newsletter. March 10, 2023.

[5] **Chai, L**. (2023). Controlling Ammonia Emissions in Poultry Houses. UGA CAES Precision Poultry Farming Newsletter. February 21, 2023. https://site.caes.uga.edu/precisionpoultry/

[6] **Chai, L**. (2023). Monitoring Cage-free Hens' Pecking with Deep Learning. UGA CAES

Precision Poultry Farming Newsletter. January 9, 2023.

[7] **Chai, L,** S. Aggrey, A. Oladeinde, C. Ritz, T. Applegate (2022). An Automated Approach to Monitoring Poultry Floor Distribution. *UGA Extension Publication (C1256)*. https://extension.uga.edu/publications/detail.html?number=C1256

[8] **Chai, L**. (2022). Tracking Broiler Chickens at Different Ages with Deep Learning. UGA CAES Precision Agriculture Newsletter. December 12, 2022.

[9] **Chai, L**. (2022). Solar Powering Systems for Climate Smart Poultry Production in Georgia. UGA CAES Precision Agriculture Newsletter. October 24, 2022.

[10] Bist, R.B., **L. Chai*** (2022). Particulate Matter Generation and Mitigation in Poultry Houses. *Encyclopedia. https://encyclopedia.pub/entry/35932*

[11] **Chai, L**. (2022). A precision method for counting cage-free layers on the floor. UGA Precision Poultry Farming Newsletter. September 29, 2022.

[12] **Chai, L**. (2022). Robots for poultry and egg production. UGA Precision Poultry Farming Newsletter. August 24, 2022.

[13] **Chai, L** . (2022). Thermal imaging and smart cooling for laying hens in commercial cage-free houses. UGA Precision Poultry Farming Newsletter. July 22, 2022.

[14] **Chai, L**. (2022). Manure drying methods in layer houses. *Poultry Tips*. UGA Poultry-Extension. June 1, 2022.

[15] **Chai, L**. Sprinkling Cooling for Cage-free Hens. *UGA Extension Poultry Tips*. July, 2021. https://site.extension.uga.edu/poultrytips/2021/07/sprinkling-cooling-for-cage-free-hens/

[16] **Chai, L** (2021) COVID-19 in Farm Animals. Scholarly Community Encyclopedia. https://encyclopedia.pub/8952

[17] **Chai, L.** 2021. Cage-free Hen House Floor Egg Management. *UGA Extension Poultry Tips*.

University of Hawaii

Dr. Rajesh Jha

Publications:

eBook:

1. F. Hassan, M. Alagwany and **R. Jha**, Eds. (2022). Interplay of nutrition and genomics: Potential for improving performance and health of poultry. Lausanne: Frontiers Media SA. ISBN: 978-2-83250-523-6. [PDF].

Editorial:

1. F. Hassan, M. A. Alagawany, and **R. Jha** (2022). *Editorial*: Interplay of nutrition and genomics: Potential for improving performance and health of poultry. In: F. Hassan, M. A. Alagawany, and R. Jha (Eds.), Interplay of nutrition and genomics: Potential for improving performance and health of poultry. Frontiers in Physiology, 13:1030995. [PDF]

Peer-Reviewed publications:

1. **R. Jha** and B. Mishra (2023). Feeding and nutritional strategies for commercial poultry dealing with climate changes. Proceedings of 23rd European Symposium on Poultry Nutrition (June 21-24, 2023), Rimini, Italy. pp. 26-29. [PDF]
2. R. Mishra, **R. Jha**, B. Mishra, and Y. S. Kim (2022). Maternal immunization against myostatin suppresses post-hatch chicken growth. PLOS ONE, 17(10):e0275753.[PDF]
3. R. Mishra, B. Mishra, Y. S. Kim, and **R. Jha** (2022). Practices and issues of molting programs for laying hen: A review. British Poultry Science, 63(5):720-729.[PDF]

Presentations:

Invited presentations:

1. ***Keynote speaker***: Feeding and nutritional strategies for commercial poultry dealing with climate changes. 23rd European Symposium on Poultry Nutrition (June 21-24, 2023), Rimini, Italy.
2. Nutritional strategies for sustainable pig and poultry production. Queen's University Belfast (June 19, 2023). Belfast, UK.
3. Fiber fermentation characteristics and their impacts on gut health of pigs and poultry. Evonik Industries (Oct 4, 2022). Hanau-Wolfgang, Germany.
4. Prebiotics in poultry nutrition to modulate gut health. Institute of Agricultural Sciences, ETH Zurich (July 13, 2022), Switzerland.

Conference presentations (*Presenter):

1. P. Mishra*, R. Das, A. Chaudhary, B. Mishra, and **R. Jha**. Microalgae and xylanase in diet modulate cecal microbial diversity and metabolic pathways of broiler chickens (**Poster**). PSA Annual Meeting (July 10-14, 2023), Philadelphia, PA.
2. R. Das*, P. Mishra, B. Mishra, and **R. Jha**. Effects of in ovo injection of xylobiose and xylotriose on immunity, cecal metabolites, microbial ecology, and metabolic pathways in broiler chickens (**Poster**). PSA Annual Meeting (July 10-14, 2023), Philadelphia, PA.
3. R. Das*, P. Mishra, G. Gonzalez Ortiz, M. Bedford, B. Mishra, and **R. Jha**. Effect of in ovo injection of xylooligosaccharides and diets supplemented with xylanase or a combination of xylanase and xylooligosaccharides on hatchability, growth performance, and ileal gene expressions of broilers (**Poster**). PSA Annual Meeting (July 10-14, 2023), Philadelphia, PA.
4. N. Stohr*, P. Harig, R. Ibrahim, K. Schuh-van Graevenitz, **R. Jha**, and G. Dusel. Black soldier fly larvae meal as an alternative protein source in broiler chicken's diet (**Poster**). 23rd European Symposium on Poultry Nutrition (June 21-24, 2023), Rimini, Italy.
5. N. Stohr*, P. Harig, R. Ibrahim, K. Schuh-van Graevenitz, **R. Jha**, and G. Dusel. Black soldier fly larvae (*Hermetia illucens*) meal in low inclusion rates is a suitable protein source for broiler chickens (**Poster**). BOKU-Symposium Animal Nutrition (Apr 20, 2023), Vienna, Austria. (Received **Best Poster Presentation Award**).
6. P. Mishra*, R. Das, A. Chaudhary, B. Mishra, and **R. Jha**. Effects of microalgae, with or without xylanase supplementation, on serum immunoglobulins, cecal short-chain fatty acids, and microbiome of broiler chickens (**Poster**). International Poultry Scientific Forum (Jan 23-24, 2023), Atlanta, GA.
7. P. Mishra*, R. Das, A. Chaudhary, B. Mishra, and **R. Jha**. Effects of microalgae, with or without xylanase supplementation, on growth performance and gut health parameters of

broiler chickens (**Poster**). International Poultry Scientific Forum (Jan 23-24, 2023), Atlanta, GA.

8. R. Das*, P. Mishra, B. Mishra, and **R. Jha**. Effects of in ovo injection of xylobiose and xylotriose on growth performance, carcass traits, and immune-related gene expression of broilers (**Oral**). International Poultry Scientific Forum (Jan 23-24, 2023), Atlanta, GA.

Dr. Birendra Misra

Peer-Reviewed Publications:

***** *Indicates corresponding author*

1. Chaudhary A, Mishra P, Das R, Amaz S, Mahato P, Jha R, ***Mishra B**. (2023). Dietary supplementation of microalgae mitigates the negative effects of heat stress in broilers. *Poultry Science Journal* (Accepted)
2. El-Sabrout K, Khalifah A, and ***Mishra B**. (2023). Application of botanical products as nutraceutical feed additives for improving poultry health and production. *Veterinary World* 16(2):369-379.
3. Khanam MS, Hossain MS, **Mishra B**, *Rahman MA (2023). Anatomical, Morphological and Histological Studies of Infundibulum of Indigenous, Sonali and Rhode Island Red (RIR) Chickens (Gallus gallus domesticus L.) in Bangladesh. *European Journal of Veterinary Medicine* 3 (2), 12-18
4. El-Sabrout K, Aggag S, and ***Mishra B**. (2022). Advanced Practical Strategies to Enhance Table Egg Production. *Scientifica*, 1393392.

Presentations:

** Indicates presenter*

1. ***Mishra B**. (2023). Transcriptional regulation of Egg formation in the oviduct of broiler breeder hens. 56th SSR annual meeting in the special section for NIFA/USDA Program Directors meeting, (July 10-11) Ottawa, Canada. (*Oral presentation*)
2. *Chaudhary A, Mishra P, Das R, Amaz S, Mahato P, Jha R, **Mishra B**. (2023). Mitigation of heat stress in broiler chickens using dietary supplementation of microalgae (Spirulina platensis). International Poultry Scientific Forum (Jan 23-26, 2023), Atlanta, GA, USA. (*Poster presentation*)
3. *Chaudhary A, Mishra P., Jha R, **Mishra B**. (2022). Broiler chickens farming in the tropics: potential challenges and opportunities. Hawai'I Agriculture Conference. The Hawaii Convention Center (September 27-28, 2022). (*Poster presentation*)

University of Kentucky

Dr. Sunday Adedokun and Dr. Anthony Pescatore

Abstracts:

Adedokun, S. A., A. J. Pescatore, M. D. Lindemann, and M. Azain. 2023. Effect of oil quality and supplemental vitamin E on nutrient utilization and fatty acid composition of selected broiler tissues. Presented at the 2nd Pan African Poultry Conference, Lomé, Togo (May 16-18, 2023).

Perrin, G., M. Ford, A. Pescatore, M. Azain, and S. Adedokun. 2022. Evaluating the effects of long-term storage on egg quality parameters, moisture loss, and fatty acid content of eggs from laying hens fed corn-soybean meal-based diets with different levels of non-phytate phosphorous. Presented at the Poultry Science Association Meeting in San Antonio. July, 2022. (Oral).

Jones, M., M. Ford, J. Jacob, A. Pescatore, S. Adedokun. 2022. Effects of age of lay, egg storage length, and level of non-phytate phosphorous on egg quality parameters and mineral contents of eggs from 24- and 32-week-old laying hens fed corn-soybean meal-based diets. Presented at the Poultry Science Association Meeting in San Antonio. July, 2022. (Oral)

University of Maryland

Dr. Jon Moyle

Conference Papers, Posters, and Presentations

July 11, 2022, San Antonio TX. Poster, Poultry Science Association. "Decreasing Contact Dermatitis with Circulation Fans in Commercial Broiler Houses".

January 24, 2022, Atlanta, GA. Poster, International Poultry Science Forum. "Evaluating the effect of circulation fans on broiler footpad dermatitis severity in commercial houses".

Invited Presentations

October 5 2022, Ocean City, MD. Invited speaker for the National Meeting on Poultry Health, Processing and Production. Title "Using Circulation Fans to Improve Ventilation and Bird Welfare"

September 12 2022, State College, PA. Inviter speaker for the Pennsylvania Poultry Sales and Service Conference. Title "Circulation Fan Research Update"

Extension Activities and Publications

Held multiple grower meetings to discuss how using circulation fans can improve bird welfare as well as other newer management techniques.

Dissertation and Thesis

Zoie McMillian, Master of Science, 2022, "Circulation Fans and Broiler welfare In Commercial Broiler houses"