

MODOLUWAMU IDOWU (Ph.D.)

Assistant Professor

School of Agriculture, Tennessee Technological University, Cookeville, TN, 38501

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Professional summary: Detail-oriented and highly motivated ruminant nutrition researcher with a 5+ year expertise in metabolomics, immunology, and molecular studies. Seeking to apply my expertise and research experience to drive innovation and product development in the animal health industry. Possess a PhD in Animal Science, with a deep understanding of gut health, immunity, and the effects of feed additives on animal health, efficiency, and performance.

EDUCATION

Doctor of Philosophy, Animal and Food Sciences (August 2024)

Dissertation Title: Measures of feed efficiency in beef cattle: Biological basis and effect on response to feed additive supplementation.

West Virginia University, Morgantown, WV, USA

Master of Science, Animal Science (July 2021)

Fort Valley State University, Fort Valley, GA, USA

Master of Animal Science (Nutrition and Biotechnology)

Thesis: Effect of dietary supplementation of peanut skins with and without polyphenols on the performance, rumen fermentation and carcass characteristics of Florida-Native sheep lambs.

Bachelor of Science (Hons), Animal Breeding and Genetics (December 2016)

Magna Cum Laude.

University of Agriculture, Abeokuta, Ogun State, Nigeria.

Project: Effect of genotype and sex on performance of FUNAAB Alpha Chickens

GRANTS AND CONTRACTS

10/26/2021 – 12/31/2022. Purina Animal Nutrition Inc. Effects of supplementation of RX3-feed additive in the diet of newly weaned beef steers: growth performance, whole-blood immune gene expression, immune response to LPS challenge, and plasma metabolome - **\$256,375.**

Role: Graduate Research Assistant.

Funded WVU Internal Grant Proposal

Davis College Faculty Enrichment Grant: Hepatic mitochondrial function and metabolism in beef cattle with divergent residual feed intake - **\$4,700 (2021-2022)**.

Role: Graduate Research Assistant.

Travel Awards

1. Recipient of a **\$1,500** award from the Stitzel Graduate Student Support for AGR fund 2024.
2. Recipient of a **\$1,000** award from the Stitzel Graduate Student Support for AGR fund 2023.
3. Recipient of a **\$1,000** grant from the Stitzel Graduate Student Support for AGR fund 2022.

AWARDS AND SCHOLARSHIPS

1. Young Scholar Award, American Society of Animal Scientist (ASAS) 2024
2. Joseph P. Fontenot Travel Scholarship Awardee 2024
3. Davis College, Ogunade lab, Leadership and Innovative Award, West Virginia University 2023
4. Runner-up at the 2022 Northeast ADSA/ASAS graduate student poster competition, Syracuse, New York. (October 21st, 2022).
5. Presidential Award scholarship, Fort Valley State University. (Jan 2020 - July 2021).

PROFESSIONAL EXPERIENCE

Assistant Professor (October 2024- Present)

School of Agriculture

Tennessee Technological University

Cookeville, Tennessee, 38501

Graduate Research Assistant (August 2021 – August 2024)

Division of Animal Sciences

West Virginia University

Morgantown, West Virginia, 26505

Graduate Teaching Assistant (August 2022 – August 2024)

Division of Animal Sciences

West Virginia University

Morgantown, West Virginia, 26505

Graduate Research Assistant (January 2020 – July 2021)

Division of Animal Sciences
Fort Valley State University
Fort Valley, Georgia, 31030

Graduate Research Assistant (July 2019 – January 2020)

Division of Food and Animal Science
Kentucky State University Land Grant Program
Frankfort, Kentucky, 40601

Livestock Farm Manager (June 2018 – July 2019)

DOTTOFF Farms
Abeokuta, Ogun State, Nigeria

Graduate Teaching Assistant (July 2017 – May 2018)

College of Animal Production and Technology
National Veterinary Research Institute
Vom, Plateau State, Nigeria.

PUBLICATIONS

Peer-Reviewed Journal Articles

1. **Idowu, M**, Taiwo, G., Sidney, T., Adewoye, A., & Ogunade, I. M. (2024). Plasma proteomic analysis reveals key pathways associated with divergent residual body weight gain phenotype in beef steers. *Frontiers in Veterinary Science*, *11*, 1415594.
2. **Idowu, M**, Taiwo, G., Sidney, T., Treon, E., Leal, Y., Ologunagba, D., ... & Ogunade, I. M. (2024). Effects of rumen-bypass protein supplement on growth performance, hepatic mitochondrial protein complexes, and hepatic immune gene expression of beef steers with divergent residual feed intake. *Plos one*, *19*(7), e0293718.
3. Ologunagba, D., **Idowu, M.**, Taiwo, G., Sidney, T., Treon, E., Eichie, F., ... & Ogunade, I. M. (2024). Hepatic mRNA expression of innate and adaptive immune genes in beef steers with divergent residual body weight gain. *Frontiers in Animal Science*, *5*, 1349499.

4. Taiwo, G., **Idowu, M.**, Sidney, T., Treon, E., Ologunagba, D., Leal, Y., ... & Ogunade, I. M. (2024). 1H-NMR-Based Plasma Metabolomic Profiling of Crossbred Beef Cattle with Divergent RFI Phenotype. *Ruminants*, 4(2), 182-191.
5. Taiwo, G., Morenikeji, O. B., **Idowu, M.**, Sidney, T., Adekunle, A., Cervantes, A. P., ... & Ogunade, I. M. (2024). Characterization of rumen microbiome and immune genes expression of crossbred beef steers with divergent residual feed intake phenotypes. *BMC genomics*, 25(1), 245.
6. Treon, E., Sidney, T., Taiwo, G., **Idowu, M.**, Leal, Y., Ologunagba, D., & Ogunade, I. M. (2024). Effects of dietary supplementation of a blend of *Saccharomyces cerevisiae*, multiple live probiotic bacteria, and their fermentation products on performance, health, and rumen bacterial community of newly weaned beef steers during a 56-d receiving period. *Translational Animal Science*, 8, txad143.
7. Okedoyin, D.O., Alabi, J.O., Anotaenwere, C.C., Wuaku, M., Gray, D., Adelusi, O.O., Ike, K.A., Dele, P.A., Oderinwale, O.A., **Idowu, M.**, and Ogunade, I.M., 2024. Metabolomic Profiling, Volatile Fatty Acids, and Greenhouse Gas Emissions of Beef Cattle Infused with Different Essential Oil Blends. *Ruminants*, 4(3), pp.329-351.
8. **Idowu, M.**, Godstime Taiwo, Taylor Sidney, Ibukun Ogunade (2023). The differential plasma and ruminal metabolic pathways and ruminal bacterial taxa associated with divergent residual body weight gain phenotype in crossbred beef steers. *Tran. Anim. Sci.* doi: [10.1093/tas/txad054](https://doi.org/10.1093/tas/txad054)
9. **Idowu, M.**, Godstime Taiwo, Francisca Eichie, Thomas H. Terrill, Ibukun Ogunade, Andres A. Pech-Cervantes (2023). Effects of dietary supplementation of peanut skins (*Arachis hypogaea*) on performance, digestibility, and rumen fermentation of cattle: A meta-analysis. *Trop. Anim. Health Prod.* Doi: 10.1007/s11250-023-03775-1.
10. **Idowu, M.**, Godstime Taiwo, Taylor Sidney, Emily Treon, Deborah Ologunagba, Yara Leal, Francisca Eichie, Andres Pech Cervantes, Ibukun Ogunade (2023). Effects of rumen-bypass protein supplement on growth performance, hepatic mitochondrial protein complexes, and hepatic immune gene expression of beef steers with divergent residual feed intake. *PIOS One.* doi: [10.1101/2023.10.19.563076](https://doi.org/10.1101/2023.10.19.563076)

11. Taylor Sidney, Godstime Taiwo, **Idowu, M.**, Ibukun Amusan, Andres A. Pech-Cervantes, Ibukun Ogunade (2023). Rumen fluid amine/phenol-metabolome of beef steers with divergent residual feed intake phenotype. *Ruminants*. Doi: 10.3390/ruminants3010001.
12. Francisca Eichie, Godstime Taiwo, **Idowu, M.**, Taylor Sidney, Deborah Ologunagba, Emily Treon, Yara Leal, and Ibukun M. Ogunade (2023). Effects of bovine respiratory disease on the plasma metabolome of beef steers during the receiving period. *Frontiers in Veterinary Science*. [10.3389/fvets.2023.1239651](https://doi.org/10.3389/fvets.2023.1239651)
13. Jorge A. Hidalgo Moreno, Zaira M. Estrada-Reyes, Ibukun M. Ogunade, Andres Alfredo Pech-Cervantes, Thomas Terrill, **Idowu, M.**, Godstime Taiwo (2023). Estimation of genetic parameters for parasite resistance and genome-wide identification of runs of homozygosity islands in Florida Cracker sheep. *Frontiers in Animal Science*. [doi: 10.3389/fanim.2023.1249470](https://doi.org/10.3389/fanim.2023.1249470)
14. Adeoye Oyebade, Godstime Taiwo, **Idowu, M.**, Taylor Sidney, Oscar Queiroz, Adegbola Adesogan, Diwakar Vyas, Ibukun Ogunade Effects of direct-fed microbial supplement on ruminal and plasma metabolome of early-lactation dairy cows: Untargeted metabolomics approach. *Journal of Dairy Science*. doi: [10.3168/jds.2023-23876](https://doi.org/10.3168/jds.2023-23876)
15. **Idowu, M.**, Godstime Taiwo, Scott Bowdridge, Andres A. Pech-Cervantes, and Ibukun Ogunade (2022). Effects of a multi-component microbial feed additive containing prebiotics and probiotics on health, immune status, metabolism, and performance of newly weaned beef steers during a 35-d receiving period. *Tran. Anim. Sci.* <https://doi.org/10.1093/tas/txac053>.
16. Godstime Taiwo, **Idowu, M.**, Mathew Wilson, and Ibukun M. Ogunade. 2022. Residual feed intake in beef cattle is associated with differences in hepatic mRNA expression of amino acid, fatty acid, and mitochondrial energy metabolism genes. *Frontiers in Vet. Sci.* [10.3389/fanim.2022.828591](https://doi.org/10.3389/fanim.2022.828591)
17. Godstime Taiwo, **Idowu, M.**, James Denvir, Andres A. Pech-Cervantes, and Ibukun M. Ogunade (2022). Identification of key pathways associated with residual feed intake of beef cattle based whole blood transcriptome data analyzed using gene set enrichment analysis. *Frontiers in Anim. Sci.* [10.3389/fvets.2022.848027](https://doi.org/10.3389/fvets.2022.848027).
18. Godstime Taiwo, Taylor Sidney, **Idowu, M.**, Francisca Eichie, Theodore Karnezos, Ibukun Ogunade (2022). Dietary fenugreek seed extract improves dry matter intake, apparent total-

tract nutrient digestibility, and alters whole blood transcriptome of Holstein dairy heifers. *Trans. Anim. Sci.* [10.1093/tas/txac132](https://doi.org/10.1093/tas/txac132)

19. Adeoye Oyebade, Godstime Taiwo, **Idowu, M.**, Taylor Sidney, Diwakar Vyas, Ibukun Ogunade (2022). A multi-species direct fed microbial supplement alters the milk lipidome of dairy cows. *J. Dairy Sci.* [10.3168/jdsc.2022-0244](https://doi.org/10.3168/jdsc.2022-0244)
20. Donielle Pannell, Brou Kouakou, Thomas Terrill, Ibukun Ogunade, Zaira Magdalene Estrada-Reyes, Voris Bryant, **Idowu, M.**, Godstime Taiwo, Andres A. Pech-Cervantes (2022). Adding dried distillers' grains with solubles influences the rumen microbiome of meat goats fed lespedeza or alfalfa-based diets. *Small Rum. Res.* [10.1016/j.smallrumres.2022.106747](https://doi.org/10.1016/j.smallrumres.2022.106747)
21. Godstime Taiwo, **Idowu, M.**, Taylor Sidney, Olanrewaju Morenikeji, and Ibukun M. Ogunade (2021). Urine metabolome reveals candidate biomarkers for divergent residual feed intake in beef cattle. *Urine.* [10.1016/j.urine.2022.04.002](https://doi.org/10.1016/j.urine.2022.04.002)
22. Godstime Taiwo, **Idowu, M.**, Shelby Collins, Mathew Wilson, and Ibukun M. Ogunade (2021). Chemical group-based metabolome analysis identifies candidate plasma biomarkers associated with residual feed intake in beef steers. *Frontiers in Animal Sci.* doi.org/10.3389/fanim.2021.783314
23. I. M. Ogunade, Megan McCoun, **Idowu, M.**, and S. O. Peters (2020). Comparative effects of two multi-species direct-fed microbial products on energy status, nutrient digestibility, and ruminal fermentation, bacterial community, and metabolome of beef steers. *J. Anim. Sci.* 98: 9 <https://doi.org/10.1093/jas/skaa201>

- **Google scholar link:** [Modoluwamu Idowu - Google Scholar](https://scholar.google.com/citations?user=ModoluwamuIdowu)
- **ResearchGate link:** [Modoluwamu Idowu \(researchgate.net\)](https://www.researchgate.net/profile/Modoluwamu-Idowu)

Conference Research Abstracts and Presentations

1. **Idowu, M.**, Ogunade, I. M., & Sidney, T. S. (2024). 177 Awardee Talk: Residual feed intake in beef cattle: Biological basis and effect on response to dietary supplementation of rumen bypass protein. *Journal of Animal Science*, 102(Supplement_3), 349-350.
2. Treon, E., Sidney, T. S., Taiwo, G. A., **Idowu, M.**, Leal, Y., Ologunagba, D., & Ogunade, I. M. (2024). 123 Effects of a *Saccharomyces cerevisiae* based direct-fed microbial on performance, health, and rumen bacterial community of newly weaned beef steers during a 56-d receiving period. *Journal of Animal Science*, 102(Supplement_3), 341-342.

3. Deborah Ologunagba, **Idowu, M.**, Godstime A Taiwo, Taylor S Sidney, Emily Treon, Francisca Eichie, Ibukun M Ogunade, 197 Hepatic mRNA expression of innate and adaptive immune genes in beef steers with divergent residual body weight gain, *Journal of Animal Science*, Volume 102, Issue Supplement_3, September 2024, Page 343, <https://doi.org/10.1093/jas/skae234.390>
4. **Idowu, M.**, Godstime Taiwo, Taylor Sidney, Ibukun Ogunade*. Metabolic pathway and rumen bacterial taxa associated with divergent residual gain phenotypes. Location: ASAS/ CSAS/ WSASAS. Albuquerque, New Mexico. July 16-20, 2023.
5. **Idowu, M.**, Godstime Taiwo, Taylor Sidney, Emily Treon, Deborah Ologunagba, Yara Leal, Francisca Eichie, Lanre Morenikeji, and Ibukun M. Ogunade*. Effects of rumen-bypass protein supplement on growth performance, hepatic mitochondrial function, and immune gene expression of beef steers with divergent residual feed intake phenotype. Location: ASAS/ CSAS/ WSASAS. Albuquerque, New Mexico. July 16-20, 2023.
6. **Idowu, M.**, Deborah Ologunagba, Godstime Taiwo, Taylor Sidney, Emily Treon, Yara Leal, Francisca Eichie, Lanre Morenikeji, and Ibukun M. Ogunade*. Hepatic mRNA expression of genes related to innate and adaptive immune genes in beef steers with divergent residual body weight gain. Location: ASAS/ CSAS/ WSASAS. Albuquerque, New Mexico. July 16-20, 2023.
7. Godstime Taiwo, **Idowu, M.**, Taylor Sidney, Lanre Morenikeji, and I. M. Ogunade Inflammation- and Immunity-Associated Gene Expression in the Liver and Whole Blood of Crossbred Beef Cattle with Divergent Residual Feed Intake Phenotype. Location: ASAS/ CSAS/ WSASAS. Albuquerque, New Mexico. July 16-20, 2023.
8. Yuri Smith, Godstime Taiwo, Ibukun Ogunade, Andres Pech Cervantes, **Idowu, M.**, Zaira Estrada-Reyes, Thomas Terrill. Nutraceutical Effects of Fertilized and Unfertilized Sericea Lespedeza Hay on Gastrointestinal Parasitism and Whole-Plasma Metabolome of Naturally Infected Goats. Location: ASAS/ CSAS/ WSASAS. Albuquerque, New Mexico. July 16-20, 2023.
9. Taylor Sidney, Godstime Taiwo, **Idowu, M.**, Ibukun Amusan, Andres A. Pech-Cervantes, Ibukun Ogunade* Rumen Fluid Amine/Phenol-Metabolome of Beef Steers with Divergent Residual Feed Intake Phenotype. Location: ASAS/ CSAS/ WSASAS. Albuquerque, New Mexico. July 16-20, 2023.

10. Godstime Taiwo, Taylor Sidney, **Idowu, M.**, Francisca Eichie, Theodore Karnezos, Ibukun Ogunade Dietary Fenugreek Seed Extract Improves Dry Matter Intake, Apparent Total Tract Nutrient Digestibility, and Alters Whole Blood Transcriptome of Holstein Dairy Heifers. Location: ASAS/ CSAS/ WSASAS. Albuquerque, New Mexico. July 16-20, 2023.
11. Oluwatoyin Osuolale, **Idowu, M.**, Godstime Taiwo, Francisca Eichie, Thomas H. Terrill, Ibukun Ogunade, Andres A. Pech-Cervantes Effects of Dietary Supplementation of Peanut Skins (*Arachis hypogaea*) on Performance, Digestibility, and Rumen Fermentation of Cattle: a Meta-Analysis. Location: ASAS/ CSAS/ WSASAS. Albuquerque, New Mexico. July 16-20, 2023.
12. Terra Odom, Davia Brown, Chelsea Pulsifer, Thomas Terrill, Niki Whitley, Ibukun Ogunade, Zaira Magdalene Estrada-Reyes, **Idowu, M.**, Godstime Taiwo. Effect of Dietary Inclusion of Fertilized and Unfertilized Sericea Lespedeza Hay on Performance and Plasma Metabolome of Naturally Infected Goats. Location: ASAS/ CSAS/ WSASAS. Albuquerque, New Mexico. July 16-20, 2023.
13. **Idowu, M.**, Godstime Taiwo, Taylor Sidney, Francisca Eichie, and Ibukun M. Ogunade. 2022. Effects of a multicomponent microbial feed additive containing prebiotics and probiotics on health, immune status, metabolism, and performance of newly weaned beef steers during a 35-d receiving period. New York City, Syracuse, Dates: October 19-21, 2022. North-East ADSA/ASAS Section 2022.
14. Godstime Taiwo, **Idowu, M.**, Taylor Sidney, Francisca Eichie, Emily Treon, Mathew Wilson, Andres Pech-Cervantes, and I. M. Ogunade. 2022. Chemical Group-Based Metabolome Analysis Identifies Candidate Plasma Biomarkers Associated with Residual Feed Intake in Beef Steers. New York City, Syracuse, Dates: October 19-21, 2022. North-East ADSA/ASAS Section 2022.
15. Taylor Sidney, Godstime Taiwo, **Idowu, M.**, and Ibukun Ogunade. Selection for low or high residual feed intake is associated with altered rumen fluid amine/phenol metabolome of beef cattle. New York City, Syracuse, Dates: October 19-21, 2022. North-East ADSA/ASAS Section 2022.
16. **Idowu, M.**, Godstime Taiwo, Ibukun Ogunade* et. al (2022). Effects of dietary supplementation of *Saccharomyces cerevisiae*-based microbial additive containing

fermentation products on health, and performance of weaned beef steers during a 35-d receiving period. Location: ASAS. Oklahoma City, Oklahoma, Dates: June 26-30, 2022.

17. Godstime Taiwo, **Idowu, M.**, Shelby Collins, Taylor Sidney, Mathew Wilson, Andres Pech-Cervantes, and I. M. Ogunade. 2022. Candidate plasma biomarkers associated with residual feed intake in beef steers. Location: ASAS. Oklahoma City, Oklahoma, Dates: June 26-30, 2022.
18. Godstime Taiwo, **Idowu, M.**, Andres Pech-Cervantes, Zaira M. Estrada-Reyes I. M. and Ogunade. 2022. Hepatic mRNA expression of nutrient and mitochondrial energy metabolism genes in beef steers selected for low or high residual feed. Location: ASAS. Oklahoma City, Oklahoma, Dates: June 26-30, 2022.
19. Godstime Taiwo, **Idowu, M.**, Mata Padrino Domingo, James Denvir, and I. M. Ogunade. 2022. Urine metabolome and whole blood transcriptome of beef steers with low or high residual feed intake. Location: ASAS. Oklahoma City, Oklahoma, Dates: June 26-30, 2022.
20. Godstime A. Taiwo, Oyebade, A.O. **Idowu, M.**, Diwakar Vyas, and Ibukun M. Ogunade. 2022. A multi-species direct fed microbial supplement alters the milk lipidome of dairy cows. Kansas City, MO, Dates: June 19-22. ADSA 2022.
21. **Idowu, M.**, Voris Bryant, Andres A Pech-Cervantes* et. al (2021). Effect of Dietary Supplementation of Peanut Skins with and Without Polyphenols on the Performance, Rumen Fermentation and Carcass Characteristics of Florida-native Sheep. ASAS. Location: Louisville, KY, Dates: July 16, 2021
22. Voris Bryant, **Idowu, M.**, Andres A Pech-Cervantes* et. al (2021). Effect of pre-slaughter transport stress on carcass weight, rumen fermentation and bacterial community of growing goats. ASAS. Location: Louisville, KY, Dates: July 15, 2021
23. I. M. Ogunade, Megan McCoun, **Idowu, M.**, and S. O. Peters (2020). Comparative effects of two multi-species direct-fed microbial products on energy status, nutrient digestibility, and ruminal fermentation, bacterial community, and metabolome of beef steers. ASAS. Virtual Meeting July 20, 2020
24. **Idowu, M.**, Voris Bryant, Andres A Pech-Cervantes* et. al (2021). Effect of homofermentative and heterofermentative bacterial inoculants on quality, fermentation, and digestibility of alfalfa-bermudagrass mixture ensiled in the summer. ADSA. Virtual Meeting. July 12, 2021.

STUDENTS MENTORSHIP

Graduate students

1. Deborah Ologunagba, master's student. **January 2023- July 2024.** "Hepatic mRNA expression of genes related to innate and adaptive immune genes in beef steers with divergent residual body weight gain".
2. Emily Treon, master's student. **January 2023- May 2024** "Effects of dietary supplementation of a blend of *Saccharomyces cerevisiae*, multiple live probiotic bacteria, and their fermentation products on performance, health, and rumen bacterial community of newly weaned beef steers during a 56-d receiving period"

Undergraduate students

3. Steven Williams, undergraduate research scholar. **January 2022 – July 2023.** "Effects of dietary supplementation of a rumen-protected amino acid additive in beef steers with divergent RFI phenotype"
4. Jordan McCoy, undergraduate research scholar. **January 2022 – July 2023.** "Effects of dietary supplementation of a rumen-protected amino acid additive in beef steers with divergent RFI phenotype"

PROFESSIONAL AFFILIATIONS

1. Member, American Society of Animal Science (2020 – Present).
2. Member, American Dairy Science Association (2020 – Present).

PROFESSIONAL MEETINGS ATTENDED

1. ASAS/CSAS. Location: Louisville, KY, Dates: July 14 -17, 2021
2. ADSA Virtual Meeting. July 11-14, 2021
3. ASAS/CSAS. Location: Oklahoma City, Oklahoma, Dates: June 26-30, 2022.
4. ADSA. Location: Kansas City, Missouri, Dates: June 19-22, 2022
5. North-East ADSA/ASAS Section 2022. Syracuse, New York. Dates: October 19-21, 2022.
6. Southern Section ASAS 2023. Raleigh, North Carolina. Dates: January 21-24, 2023.
7. ASAS/CSAS. Location: Albuquerque, NM, Dates: July 16 -20, 2023
8. Southern Section ASAS 2024. Louisville, Kentucky. Dates: January 24-27, 2024.
9. ASAS/CSAS. Location: Calgary, Canada, Dates: July 20 -24, 2024

RESEARCH ACTIVITIES

- Conducted metabolomics studies and analyses on plasma, rumen fluid, and urine samples of beef steers, WVU.
- Applied RNA-sequencing analysis to whole blood samples at WVU Genomics Core Facility.
- Executed mitochondrial analysis of bovine liver samples at Mitochondria Functional Assessment Core, WVU Health Sciences.
- Performed molecular studies including RNA extraction, PCR, and Real-Time PCR on whole blood and liver tissue samples.
- Investigated the effects of a multi-component blend of prebiotics and probiotics on health, immune status, metabolism, and performance of newly weaned beef steers.
- Utilized advanced metabolomics techniques, including ruminal and plasma metabolomics and ruminal 16S rRNA gene sequencing, to elucidate metabolic pathways and bacterial taxa associated with diverse residual body weight gain phenotypes in crossbred beef steers.
- Identified blood metabolic signatures linked to residual feed intake in beef cattle through chemical group-based metabolomics.
- Employed whole blood transcriptome analysis and gene set enrichment analysis to uncover pathways associated with divergent selection for low or high residual feed intake (RFI) in beef cattle.
- Investigated the impact of dietary supplementation of Bacillus-based microbial additives and rumen-protected amino acids in beef steers with divergent RFI phenotypes.
- Analyzed amine/phenol-metabolome of urine samples to identify urinary metabolic biomarkers associated with residual feed intake in beef cattle.
- Explored whole blood and hepatic mRNA expressions of immune genes and rumen microbiome in crossbred beef steers to unveil biological processes underlying feed efficiency.
- Conducted studies evaluating the mRNA expression of genes involved in hepatic fatty acid, amino acid, and mitochondrial energy metabolism in crossbred beef steers with divergent low and high RFI.
- Evaluated the effects of supplementing fenugreek seed extract as a source of saponins on various parameters in Holstein dairy heifers.
- Investigated the effects of supplementing a multi-species direct-fed microbial (DFM) on the milk lipidome of lactating dairy cows.
- Analyzed the amine/phenol-metabolome of rumen fluid to identify amino acid metabolism-related biomarkers associated with phenotypic selection for low or high residual feed intake (RFI) in beef cattle.
- Investigated the impact of Bovine Respiratory Disease (BRD) on the metabolism of beef steers during a 35-day receiving period using plasma metabolomics.
- Acquired Liquid Chromatography-Mass Spectrometry training at the Proteomic Core Facility, WVU Chemistry Department.

- Conducted metabolic assessment of plasma and serum samples using Idexx machine at WVU research farm.
Collection of blood samples from lambs fed peanut skins with and without polyphenol compounds extracted for blood metabolite analysis.
- Estimation of meat quality and shelf life of meat of lambs fed peanut skins with and without polyphenol compounds extracted.
- Estimated the magnitude of effects of the dietary inclusion of peanut skins (*Arachis hypogea* L.) byproduct on intake, total-tract digestibility, and rumen fermentation of cattle via meta-analysis.
- Evaluated the effects of pre-slaughter transport stress on the rumen fermentation and bacterial community of growing meat goats.
- Evaluated the effect of replacement of corn and soybean meal (SBM) with dried distillers' grains with solubles (DDGS) in sericea lespedeza (SL; *Lespedeza cuneata*) and alfalfa (*Medicago sativa*)-based diets on ruminal fermentation and bacterial community of growing meat goats
- Created mini-silos to observe effects of homofermentative and heterofermentative bacterial inoculants on the quality, fermentation, and *in vitro* digestibility of an alfalfa-bermudagrass mixture ensiled during summer.
- Evaluated the effects of pre-slaughter transport stress on the rumen fermentation and bacterial community of growing meat goats.

SKILLS

- **Metabolomics Data Analysis:** Proficient in processing and interpreting metabolomics data to uncover meaningful insights into biological processes.
- **Microbial Community Analysis (16S rRNA Sequencing):** Skilled in utilizing 16S rRNA sequencing to investigate microbial communities and their impact on various biological systems.
- **Working knowledge of R-programming**
- **Transcriptomics and Proteomics Data Analysis:** Adept at analyzing high-throughput transcriptomics and proteomics data to uncover valuable biological information.
- **Bioinformatic Tools:** Well-versed in utilizing bioinformatic tools such as Gene Ontology (GO), PANTHER, ShinyGO, DAVID, and Ingenuity Pathway Analysis to interpret complex biological data.
- **Genomics (RNA Isolation, cDNA synthesis, Gene expression, Real time PCR)**
- **Molecular Techniques:** Skilled in various molecular techniques, including DNA extraction, RNA isolation, Real-Time PCR, and cDNA synthesis, enabling comprehensive genetic analysis.
- **Data Collection and Management:** Highly skilled in systematic data collection, organization, and management to facilitate accurate and efficient analysis.
- **Laboratory Techniques and Equipment Operation:** Demonstrated expertise in a wide range of

laboratory techniques and equipment operation, ensuring precise and reliable results.

- Detail-Oriented Personality: Known for meticulous attention to detail, ensuring accuracy and rigor in all aspects of research and analysis.
- Independent Experimental Design: Proven ability to independently design experiments and resolve technical challenges to drive successful outcomes.
- Effective Communication and Collaboration: Exceptional communication skills to interact collaboratively with colleagues, share findings, and contribute to productive working relationships.
- Microsoft office skills (Excel, Word, Powerpoint)
- Liver Biopsy in Cattle
- Qiagen QIAcube Connect Applications Training
- Creating experimental silage mini silos
- Jugular venipuncture and tail vein blood sampling
- Rumen fluid sampling
- Ability to effectively communicate, understand, and interact with others respectfully and develop productive working relationships.

UNIVERSITY AND COMMUNITY SERVICE

- Workshop Facilitator, Metabolomics Analysis for Graduate Students
 - ✓ *North Carolina A&T University, Greensboro*
 - ✓ *Kentucky State University, Frankfort*
- Member, Davis College Graduate Student Association (August 2021- August 2024).
- Member, African Student Association (August 2021- August 2024).
- Bass and rhythm guitarist for local church choir (2019-2024).
- Provided transportation and shelter to newly admitted international students (2020-2024).