**Dale Woerner**

Texas Tech University

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**Education and Post Graduate Training**

Ph D, Colorado State University, 2009.

Major: Animal Sciences

Supporting Areas of Emphasis: Meat Science

Dissertation Title: Evaluating instrument grading systems for market cows.

MS, Texas Tech University, 2005.

Major: Animal Sciences

Supporting Areas of Emphasis: Meat Science

Dissertation Title: Exploring SO2 as an antioxidant in ground beef.

BS, Texas Tech University, 2003.

Major: Animal Sciences

Supporting Areas of Emphasis: Meat and Food Industry Management

**Academic and Professional Experience**

**Associate Professor, Texas Tech University. (September 1, 2018 - Present).**

Cargill Endowed Chair in Sustainable Meat Science

College of Agricultural Sciences and Natural Resources Department of Animal and Food Sciences

**Associate Professor, Colorado State University. (July 1, 2015 - August 31, 2018).**

College of Agricultural Sciences, Animal Sciences

Research and Teaching Faculty

75% Research; 20% Teaching; 5% Outreach

**Assistant Professor, Colorado State University. (August 1, 2009 - June 30, 2015).**

College of Agriculture, Animal Sciences

Research and Teaching Faculty

75% Research; 20% Teaching; 5% Outreach

**Leadership Awards and Honors**

Chairman, AMSA Reciprocal Meat Conference, American Meat Science Association. (June 23, 2018).

**TEACHING**

**Courses Taught**

**Texas Tech University**

ANSC 2301, Livestock and Meat Evaluation I, 12 courses.

ANSC 3403, Selection, Care, Processing, and Cooking of Meats, 10 courses.

ANSC 4001, Special Problems in Animal Science, 8 courses.

ANSC 4400, Meat Science and Muscle Biology, 6 courses.

ANSC 5000, Professional Internship, 1 course.

ANSC 5001, Problems in Animal Science, 6 courses.

ANSC 5100, Seminar: Meat Science, 1 course.

ANSC 5400, Advanced Meat Science and Muscle Biology, 2 courses.

ANSC 6000, Master’s Thesis, 15 courses.

ANSC 6001, Supervised Teaching, 1 course.

ANSC 7000, Research, 14 courses.

ANSC 8000, Doctor’s Dissertation, 9 courses.

**Teaching Awards and Honors**

TTU Mortar Board, Apple Polishing Award. (2020).

**RESEARCH**

**Published Intellectual Contributions**

**Abstract**

Cooke, M. E., Frazier, K. N., Horton, T. M., Brooks, J. C., Legako, J., Miller, M., Woerner, D. (2023). *An assessment of carcass hot fat trimming to improve carcass chilling and carcass quality.*.

Scaranto Silva, K. G., Sarturi, J. O., Johnson, B., Lopez, A., Woerner, D., Rodrigues, B., Queiroz Dos Reis, B. (2023). Bacterial direct-fed microbial mixtures on beef cattle growth performance, ruminal fermentation/morphology, and nutrient digestibility. *Plains Nutrition Council Spring Conference*. San Antonio, TX: Plains Nutrition Council Spring Conference.

Hernandez, M. S., Woerner, D., Brooks, J. C., Miller, M., Legako, J. (2023). *Descriptive flavor and texture profile of ground beef and plant-based meat alternatives.*.

Queiroz Dos Reis, B., Sarturi, J. O., Nardi, K. T., Rush, C., Woerner, D., Scaranto Silva, K. G., Rodrigues, B. (2023). Effects of a nutritional packet on beef cattle growth performance, carcass traits, nutrient digestibility, methane emission, and ruminal characteristics of feedlot steers. *Plains Nutrition Council Spring Conference*. San Antonio, TX: Plains Nutrition Council Spring Conference.

Wilson, R., Nagaria, T. G., Enns, M., Speidel, S., Crossland, W., Sarturi, J., Legako, J., Miller, M., Brooks, J. C., Johnson, B., Woerner, D. (2023). *Effects of liver abscess on carcass performance in beef x dairy crossbred cattle.*.

Wagner, R., Hays, T. M., Horton, T. M., Kayser, W. C., Rincker, P. J., Brooks, J. C., Legako, J., Miller, M., Johnson, B., Woerner, D. (2023). *Effects of lubabegron fed to Holstein steers during the finishing period on beef quality and sensory components.*.

Mairena, C. A., Horton, T., Miller, M., Johnson, B., Legako, J., Nair, M. N., Brooks, J. C., Woerner, D. (2023). *Evaluating the impact of early postmortem temperature variation on beef muscle tenderness and color development.*.

Norwood, A., Mendizabal, A., Horton, T. M., Brooks, J. C., Legako, J., Miller, M., Woerner, D. (2023). *Evaluation of current USDA beef yield equation for predicting sub primal yield and the use of cutout data to predict lean, bone, and fat percentages in beef carcass.*.

Loomas, K., Woerner, D., Boher, B., Brown, T., Bruce, H., Duarte, M., Legako, J. (2023). *Evaluation of rapid evaporative ionization mass spectrometry (REIMS) for slice shear force tenderness category predication in beef steaks.*.

Hernandez, S., Woerner, D., Brooks, J. C., Miller, M., Legako, J. (2023). *Influence of wet aging temperature and duration on vacuum-packaged beef longissimus and exudate.*.

Sarchet, S. L., Woerner, D., Legako, J., Brooks, J. C., Miller, M. (2023). *Profiling sensory and microbial characteristics associated with the shelf- life of bulk packaged, previously frozen, enhanced USDA choice beef sirloin steaks.*.

Carlock, A., Miller, M., Sepulveda, C., Legako, J., Woerner, D. (2023). *Trained sensory evaluation of beef longissimus lumborum steaks from varying quality grades.*.

Sepulveda, C. A., Woerner, D., Legako, J., Miller, M. (2023). *Use of principal component analysis (PCA) to visualize a trained panel strip loin evaluation data.*.

Tegeler, A., Fiallo Diez, J. F., Michelotti, T., Flores, L., Woerner, D., Benitez Rojas, O., Strieder Barboza, C. (2023). *Transcriptional and Functional Analyses of Intramuscular, Subcutaneous, and Visceral Adipose Tissue in Finished Beef Cattle* (Supplement 3 ed., vol. 101, pp. 381-382). Journal of Animal Science, Oxford University Press.

Scaranto Silva, K. G., Sarturi, J., Johnson, B., Lopez, A., Woerner, D., Rodrigues, B., Queiroz Dos Reis, B. (2023). *Bacterial direct-fed microbial mixtures on beef cattle growth performance, ruminal fermentation/morphology, and nutrient digestibility* (pp. 1). Fort Worth, Texas: Texas & Southern Cattle Raisers Association.

Queiroz Dos Reis, B., Sarturi, J., Nardi, K. T., Rush, C., Woerner, D., Scaranto Silva, K. G., Rodrigues, B. (2023). *Effects of a nutritional packet on beef cattle growth performance, carcass traits, nutrient digestibility, methane emission, and ruminal characteristics of feedlot steers* (pp. 1). Fort Worth, Texas: Texas & Southern Cattle Raisers Association.

Frazier, K. N., Legako, J., Brooks, J. C., Miller, M. F., Woerner, D. (2022). *An assessment of carcass hot fat trimming to improve carcass composition, quality, and chilling rate.*.

Hernandez, S., Woerner, D., Brooks, J. C., Legako, J. (2022). *Comparison of the volatile flavor profile of ground beef and plant-based meat alternatives.*.

Thompson, T., Legako, J., Brooks, J. C., Miller, M. F., Woerner, D. (2022). *Determination of optimum practices of beef steaks.*.

Rush, C., Sarturi, J., Henry, D., Huerta-Leindez, N., Ciriaco, F., Woerner, D., Lopez, A., Scaranto Silva, K. G., Rodrigues, B., Nardi, K., Peters, S., DiManna, M., Osorio Doblado, A., Coello, K., Quijada, A., Hinds, J., Saes, Y., Wilkes, K. (2022). Effects of a nutritional packet on calf-fed system growth performance, carcass traits, nutrient digestibility, and ruminal characteristics. *Plains Nutrition Council Spring Conference*. San Antonio, TX: Plains Nutrition Council Spring Conference.

Frobose, H. M., Whitewood, T. A., Petry, A. L., Brooks, J. C., Gredell, D. A., Legako, J., Miller, M. F., Woerner, D. (2022). *Evaluating rapid evaporative ionization mass spectrometry (REIMS) as a novel, minimally invasive, real-time method for assessing pork belly quality and fat composition.*.

Frobose, H., Norwood, A., Petry, A., Gredell, D., Legako, J., Miller, M. F., Brooks, J. C., Woerner, D. (2022). *Evaluating the effect of diet and sex on fresh pork belly and bacon characteristics.*.

Wilson, R., Sarchet, J. C., Horton, T. M., Legako, J., Miller, M. F., Brooks, J. C., Woerner, D. (2022). *Evaluating variance (CV) of metabolic profiles of beef generated by rapid evaporative ionization mass spectrometry (REIMS).*.

Rush, C., Sarturi, J., Henry, D., Ciriaco, F., Woerner, D., Huerta-Leidenz, N., Crossland, W., Lopez, A., Scaranto Silva, K. G., Nardi, K., Peters, S., DiManna, M., Osorio Doblado, A., Coello, K., Quijada, A., Hinds, J., Saes, Y. (2022). *Growth performance and carcass characteristics of beef steers consuming finishing diets with an added nutritional packet in a calf-fed system* (pp. 1). American Society of Animal Science.

Lopez, A., Sarturi, J., Henry, D., Ciriaco, F., Sarturi, J. O., Woerner, D., Sarturi, J. O., Nardi, K., Rush, C., Rodrigues, B., Peters, S., Dimanna, M., Osorio Doblado, A., Coello, K., Quijada, A. (2022). *Growth performance and carcass characteristics of feedlot beef yearling steers offered finishing diets with direct fed microbial mixtures* (pp. 1). American Society of Animal Science.

Loomas, K., Hernandez, S., Woerner, D., Brooks, J. C., Legako, J. (2022). *Lipid profile in ground beef compared to plant-based protein alternatives.*.

Sarchet, J. C., Hernandez-Sintharakao, M., Nair, M. N., Gredell, D. A., Legako, J., Miller, M. F., Brooks, J. C., Woerner, D. (2022). *Predicting animal identity and age of longissimus lumborum steaks using rapid evaporative ionization mass spectrometry (REIMS).*.

Peters, S., Sarturi, J., Rush, C., Doretto Felizari, L., Henry, D., Huerta-Leidenz, N., Woerner, D., Rodrigues, B., Sarturi, J. O., Scaranto Silva, K. G., Nardi, K., Wilkes, K. (2022). *Ruminal papillae morphology and volatile fatty acid profile of beef steers consuming finishing diets with an added nutritional packet in a calf-fed system* (pp. 1). American Society of Animal Science.

Horton, T. M., Mendizabel, A., Harsh, B. N., Dilger, A. C., Legako, J., Miller, M. F., Brooks, J. C., Boler, D., Woerner, D. (2022). *Separation of pork lions and chops using rapid evaporative ionization mass spectrometry (REIMS) effect on quality and sensory attributes.*.

Cooke, M., Brooks, J. C., Legako, J., Miller, M. F., Woerner, D. (2022). *The effects of grind plate size, blend time, and patty-forming equipment on ground beef texture.*.

Hodges, K. M., Kerth, C. R., Whitney, T. R., Ramsey, W. S., Wall, K. R., Hicks, Z. M., Tucker, D. H., Woerner, D. (2020). *275 Replacing cottonseed meal and sorghum grain with corn dried distillers grains with solubles in lamb feedlot diets: carcass characteristics and sensory panel traits* (Supplement\\_3 ed., vol. 97, pp. 104-105). Oxford University Press US.

Woerner, D., Weinroth, M., Parker, J., Metcalf, J., Arthur, T., Schmidt, J., Wheeler, T., Vikram, A., Woerner, D., Morley, P., others (2019). *A Comparison of the Resistome between Natural and Conventional Retail Ground Beef Products* (2nd ed., vol. 2, pp. 147--148). American Meat Science Association.

Woerner, D., Bullard, B., Geornaras, I., Delmore, R., Woerner, D., Martin, J., Belk, K. (2019). *Assesment Of 1, 3-Dibromo-5, 5-Dimethylhydantoin as a Final Wash for Reducing Microbial Contamination on Beef Carcasses* (2nd ed., vol. 2, pp. 125--126). American Meat Science Association.

Pena, C., Cramer, T., Schilling, B., Miller, R., Kerth, C., Legako, J., Woerner, D., Nair, M., Brooks, J. C. (2019). *Beef flavor evaluation on top loin streaks, sirloin steaks, chuck roasts, and 80/20 ground beef over the retail case*. Ft. Collins, CO: Reciprocal Meats Conference.

Villatoro, K., Bauer, Z., Lew, T., Woerner, D., Yang, X., Chao, M. (2019). *Comparison of Nutrient Composition, Quality, and Sensory Differences among Dorper, Domestic Commercial Crossbred and Australian Commercial Crossbred Lamb Meat* (2nd ed., vol. 2, pp. 10--10). American Meat Science Association.

Woerner, D., Weissend, C., Belk, A., Metcalf, J., Nair, M., Delmore, R., Woerner, D., Belk, K., Geornaras, I., Martin, J. (2019). *Competitive Inhibition of Methicillin-Resistant Staphylococcus Aureus (Mrsa) By a 4-Strain Lactobacillus Cocktail* (2nd ed., vol. 2, pp. 149--149). American Meat Science Association.

Woerner, D., Delmore, R., Geornaras, I., Woerner, D., Martin, J., Belk, K. (2019). *Effect of High Pressure Processing and Water Activity on the Survival of Listeria Monocytogenes on Ready-to-Eat Shelf-Stable Turkey-Based Meat Bars* (2nd ed., vol. 2, pp. 134--134). American Meat Science Association.

Woerner, D., Woerner, D., Nair, M., Martin, J., Delmore, R., Belk, K. (2019). *Effects of Electrical Stimulation, Chilling Rate, and Carcass Size on Rates of Temperature Decline and pH Decline, and Beef Quality* (2nd ed., vol. 2, pp. 87--87). American Meat Science Association.

Musa, O. E., Garmyn, A., Legako, J., Woerner, D., Miller, M. (2019). *Effects of extended aging on the flavor characteristics of grass and grain fed Australian beef longissimus thoracis*.

Levey, JR, Geornaras, I., Woerner, D., Prenni, J., Belk, K., Martin, J. (2019). *Evaluation of Changes in Microbiological and Biochemical Properties, And Color of Ground Beef During Aerobic Storage* (2nd ed., vol. 2, pp. 98--98). American Meat Science Association.

Levey, JR, Geornaras, I., Woerner, D., Prenni, J., Metcalf, J., Belk, K., Martin, J. (2019). *Fluctuations in the Microbial Community and the Volatile Organic Acids Created During Aerobic Storage of Ground Beef* (2nd ed., vol. 3, pp. 81--81). American Meat Science Association.

Foraker, B., Woerner, D., Gredell, D., Legako, J., Tatum, J., Martin, J., Delmore, R., Heuberger, A., Belk, K. (2019). *Identifying the Influence of Post-Mortem Aging Length and Method on Flavor and Tenderness of Beef Strip Loins* (2nd ed., vol. 2, pp. 86--86). American Meat Science Association.

Pena, C., Laird, H., Bamsey, M., Miller, R., Gredell, D., Woerner, D., Kerth, C. (2019). *Influence of Cook Method and Degree of Doneness on Aromatic Volatiles in Flap and Skirt Steaks* (2nd ed., vol. 2, pp. 25--25). American Meat Science Association.

Fletcher, W., Fletcher, N., Garmyn, A., Legako, J., Woerner, D., Miller, M. (2019). *Investigation 0f Beef Brisket Palatability from Three USDA Quality Grades* (2nd ed., vol. 3, pp. 8--8). American Meat Science Association.

Steele, C., Boykin, C., Eastwood, L., Harris, M., Hale, D., Kerth, C., Griffin, D., Woerner, D., Gehring, K., Hasty, J., others (2019). *National Beef Quality Audit-2016: Frequency Distributions of Beef Ribeyes within Usda Quality Grades* (2nd ed., vol. 2, pp. 27--28). American Meat Science Association.

Evers, D., Garmyn, A., Legako, J., Woerner, D., Miller, M. (2019). *Sensory Descriptive Attributes of Grass and Grain-Fed Australian Beef Longissimus Lumborum after Extended Wet-Aging Periods* (2nd ed., vol. 3, pp. 82--82). American Meat Science Association.

**Book, Chapter in Scholarly Book-New**

Vargas, D., Miller, M., Woerner, D., Echeverry, A. (2021). Microbial Growth Study on Pork Loins as Influenced by the Application of Different Antimicrobials. *Progress on Nutrient Composition, Meat Standardization and Grading, Processing and Safety in Different Types of Meat Sources*. Basel: MDPI.

Miller, M. F., Woerner, D. (2018). Beef Cattle: Carcass Composition and Quality. *Encyclopedia of Animal Science-(Two-Volume Set)* (pp. 60--62). CRC Press.

**Conference Proceeding**

Kerth, C. R., Hodges, K. M., Wall, K. R., Hicks, Z. M., Tucker, D. H., Whitney, T. R., Ramsey, W. S., Woerner, D. (2019). Replacing cottonseed meal and sorghum grain with corn dried distillers grains with solubles in lamb feedlot diets: volatile compounds from cooked lamb chops. *JOURNAL OF ANIMAL SCIENCE* (vol. 97, pp. 106--107).

Bullard, B., Delmore, R., Geornaras, I., Martin, J., Woerner, D., Belk, K. (2018). Survival of Listeria monocytogenes and Staphylococcus aureus on Ready-to-Eat, Shelf-stable, Poultry-based Meat Bars during Vacuum-packaged Storage. *IAFP 2018 Annual Meeting*.

Davis, H., Geornaras, I., Delmore, R., Martin, J., Woerner, D., Ogren, B., Owens, E., Sebring, B., Belk, K. (2018). Validation of Electrostatic Antimicrobial Application on Surrogate-inoculated Poultry and Beef in a Continuous Flow System. *IAFP 2018 Annual Meeting*.

**Journal Article, Academic Journal**

Wilson, R., Johnson, B., Sarturi, J., Crossland, W., Hales-Paxton, K., Rathmann, R., Bratcher, C., Theurer, M. E., Amachawadi, R. G., Nagaraja, T. G., Speidel, S. E., Enns, R. M., Thomas, M. G., Foraker, B. A., Cleveland, M. A., Sarturi, J. O. (2024). Identification of blood-based biomarkers for detection of liver abscess in beef × dairy heifers. *Applied Animal Science*.

Theurer, M. E., Woerner, D., Johnson, B., Wilson, R., Sarturi, J., Amachawadi, R. G., Nagaraja, T. G., Simpson, J., Fox, J. T., Adams, P., Karges, K. (2024). The effects of Saccharomyces cerevisiae CNCM I-1077 and calcium clinoptilolite zeolite compared to tylosin and negative control on health, performance, carcass outcomes, and liver abscesses in dairy-beef feedlot cattle. *Applied Animal Science*.

Lopez, A., Sarturi, J., Johnson, B., Woerner, D., Henry, D., Ciriaco, F., Scaranto Silva, K. G., Rush, C. (2024). Effects of bacterial direct-fed microbial combinations on beef cattle growth performance, feeding behavior, nutrient digestibility, ruminal morphology, and carcass characteristics.. *Journal of Animal Science*.

Scaranto Silva, K. G., Sarturi, J., Johnson, B., Woerner, D., Lopez, A., Rodriguez, B. M., Nardi, K. T., Rush, C. (2024). Effects of bacterial direct-fed microbial mixtures offered to beef cattle consuming finishing diets on intake, nutrient digestibility, feeding behavior, and ruminal kinetics/fermentation profile. *Journal of Animal Science*.

O'Quinn, T. G., Legako, J., Woerner, D., Kerth, C. R., Nair, M. N., Brooks, J. C., Lancaster, J. M., Miller, R. K. (2023). A current review of U.S. beef flavor II: Managing beef flavor. *Meat Science, 209*, 109403.

Long, N. S., Hales-Paxton, K., Berry, E. D., Legako, J., Woerner, D., Broadway, P. R., Carroll, J., Burdick Sanchez, N. C., Fernando, S. C., Wells, J. E. (2023). Antibimicrobial Susceptibility of Trimethoprim--Sulfamethoxazole and 3rd-Generation Cephalosporin-Resistant Escherichia coli Isolates Enumerated Longitudinally from Feedlot Arrival to Harvest in High-Risk Beef Cattle Administered Common Metaphylactic Antimicrobials. *Mary Ann Liebert, Inc., publishers 140 Huguenot Street, 3rd Floor New~…, 20*(7), 252--260.

Long, N. S., Hales, K. E., Berry, E. D., Legako, J., Woerner, D., Broadway, P. R., Carroll, J. A., Burdick Sanchez, N. C., Fernando, S. C., Wells, J. E. (2023). Antibimicrobial Susceptibility of Trimethoprim–Sulfamethoxazole and 3rd-Generation Cephalosporin-Resistant Escherichia coli Isolates Enumerated Longitudinally from Feedlot Arrival to Harvest in High-Risk Beef Cattle Administered Common Metaphylactic Antimicrobials.. *Foodborne Pathog. Dis., 2*(7), 252-260.

Hernandez, M., Woerner, D., Brooks, J. C., Legako, J. (2023). Descriptive Sensory Attributes and Volatile Flavor Compounds of Plant-Based Meat Alternatives and Ground Beef. *MOLECULES, 28*(7).

Hernandez, M. S., Woerner, D., Brooks, J. C., Legako, J. (2023). Descriptive sensory attributes and volatile flavor compounds of plant-based meat alternatives and ground beef.. *Molecules*(28), 3151.

Blandon, S. E., Vargas, D. A., Casas, D., Sarasty, O., Woerner, D., Echeverry, A., Miller, M., Carpio, C., Sanchez-Plata, M., Legako, J. (2023). Efficacy of Common Antimicrobial Interventions at and above Regulatory Allowable Pick-Up Levels on Pathogen Reduction.. *Foods*(12), 883.

Barker, S., Brooks, J. C., Bachler, J. T., Woerner, D., Legako, J. (2023). Flavor development of individually vacuum packaged beef steaks during extended wet aging.. *Meat and Muscle Biology, 7*(1), 1-11.

Hernandez, M. S., Woerner, D., Brooks, J. C., Wheeler, T. L., Legako, J. (2023). Influence of aging temperature and duration on flavor and tenderness development of vacuum-packaged beef Longissimus.. *Meat and Muscle Biology, 7*(1), 1–14.

Rush, C., Sarturi, J., Huerta-Leindez, N., Woerner, D., Crossland, W., Henry, D., Scaranto Silva, K. G., Lopez, A. (2023). The effects of a nutritional packet (live yeast, vitamins C and B1, and electrolytes) offered to steers in a calf-fed system on growth performance, nutrient digestion, feeding behavior, carcass characteristics, and ruminal variables. *Translational Animal Science, 7*, 1-11.

Miller, R. K., Pena, C. A., Legako, J., Woerner, D., Brooks, J. C., Schilling, B., Nair, M. N., Cramer, T., Smith, P., Wall, K. R., Kerth, C. R. 2018 United States Beef Flavor Audit: consumer and descriptive sensory attributes.. *Meat and Muscle Biology*.

Helmuth, C. L., Woerner, D., Ballou, M., Manahan, J. L., Coppin, C. M., Long, N. S., Hoffman, A., Young, J. D., Smock, T., Hales, K. E. (2022). Effects of physical activity and feed and water restriction at reimplanting time on feed intake patterns, growth performance, and carcass characteristics of finishing beef steers. *Oxford University Press US, 6*(1), txac008.

Foraker, B. A., Johnson, B. J., Rathmann, R., Legako, J., Brooks, J. C., Miller, M. F., Tatum, J. D., Woerner, D. (2022). Expression of beef-versus dairy-type in crossbred beef x dairy cattle does not impact shape, eating quality, or color of strip loin steaks.. *Meat and Muscles Biology, 6*.

Hernandez, M. S., Woerner, D., Brooks, J. C., Wheeler, T. L., Legako, J. (2022). Influence of aging temperature and duration on spoilage organism growth, proteolytic activity, and related chemical changes in vacuum-packaged beef longissimus.. *Meat and Muscle Biology, 6*.

Long, N. S., Wells, J. E., Berry, E. D., Legako, J., Woerner, D., Loneragan, G., Broadway, P. R., Carroll, J. A., Sanchez, N. C. B., Fernando, S. C., others (2022). Metaphylactic antimicrobial effects on occurrences of antimicrobial resistance in Salmonella enterica, Escherichia coli and Enterococcus spp. measured longitudinally from feedlot arrival to harvest in high-risk beef cattle. *Blackwell Science Ltd Oxford, UK, 133*(3), 1940--1955.

Long, N. S., Wells, J. E., Berry, E. D., Legako, J., Woerner, D., Loneragan, G. H., Broadway, P. R., Carroll, J. A., Burdick Sanchez, N. C., Fernando, S. C., Coppin, C. M., Helmuth, C. L., Smock, T. M., Manahan, J. L., Hoffman, A. A., Hales, K. E. (2022). Metaphylactic antimicrobial effects on occurrences of antimicrobial resistance in Salmonella, Escherichia coli, and Enterococcus spp. measured longitudinally from feedlot arrival to harvest in high-risk beef cattle.. *Journal of Applied Microbiology, 133*.

Barker, S., Legako, J., Brooks, J. C., Woerner, D. (2022). Evaluation of beef steak flavor development in vacuum rollstock packaging under two lighting sources.. *Meat and Muscle Biology, 6*.

Nardi, K., Sarturi, J. O., Huerta-Leindenz, N., Henry, D., Woerner, D., Ciriaco, F., Sanchez-Escalante, A., Torrescano-Urrutia, G., Scaranto Silva, K. G., Favero, I. (2022). The effects of a Nutritional Packet (live yeast, vitamins C and B1, and electrolytes) offered during the final phase of feedlot steers on growth performance, nutrient digestion, and feeding behavior. *Journal of Animal Science, 101*, 1-9.

Mallick, S., Woerner, D., de Mancilha Franco, T., Miller, M. F., Legako, J. (2021). Development of Beef Volatile Flavor Compounds in Response to Varied Oven Temperature and Degree of Doneness. *Meat and Muscle Biology, 5*(1), 1-14.

Smock, T. M., Woerner, D., Petry, A., Manahan, J. L., Helmuth, C. L., Coppin, C. M., Hales-Paxton, K. (2021). Effects of feedlot bunk management and bulk density of steam-flaked corn on growth performance, carcass characteristics, and liver score of finishing beef steers fed high-concentrate diets without by-products or tylosin phosphate. *Elsevier, 37*(6), 722--732.

Fletcher, W. T., Garmyn, A. J., Legako, J., Woerner, D., Miller, M. (2021). Investigation of smoked beef brisket palatability from three USDA quality grades.. *Meat and Muscle Biology, 5*(1), 1, 1-12.

Mallick, S., Woerner, D., de Mancilha Franco, T., Miller, M., Legako, J. (2021). Development of beef volatile flavor compounds in response to varied oven temperature and degree of doneness. *Meat and Muscle Biology, 5*(1), 40, 1-14.

Miller, R., Pena, C. A., Kerth, C., Smith, P., Wall, K. R., Legako, J., Cramer, T., Woerner, D., Brooks, J. C., Nair, M. N., Schilling, B. 2018 National Beef Flavor Audit: Consumer and Descriptive Sensory Attributes. *Meat and Muscle Biology*.

Vargas, A., Miller, M., Woerner, D., Echeverry, A. (2021). Microbial Growth Study on Pork Loins as Influenced by the Application of Different Antimicrobials. *Foods, 10*(968), 9.

Fletcher, W. T., Garmyn, A., Legako, J., Woerner, D., Miller, M. F. (2021). Investigation of Smoked Beef Brisket Palatability from Three USDA Quality Grades. *Meat and Muscle Biology, 5*(1).

Evers, D. L., Garmyn, A., Legako, J., Woerner, D., Miller, M. (2020). Flavor Characterization of Grass- and Grain-Fed Australian Beef *Longissimus Lumborum* Wet-Aged 45 to 135 Days. *Meat and Muscle Biology, 4*(1).

Musa, O. E., Garmyn, A., Legako, J., Woerner, D., Miller, M. (2020). Flavor Characterization of Grass- and Grain-Fed Australian Beef *Longissimus Thoracis* Aged 35 to 65 Days Postmortem. *Meat and Muscle Biology, 4*(1).

Evers, D. L., Garmyn, A., Legako, J., Woerner, D., Miller, M. (2020). Flavor Characterization of Grass- and Grain-Fed Australian Beef Longissimus Lumborum Wet-Aged 45 to 135 Days. *Meat and Muscle Biology, 4*(1), 14.

Musa, O. E., Garmyn, A., Legako, J., Woerner, D., Miller, M. (2020). Flavor Characterization of Grass- and Grain-Fed Australian Beef Longissiumus Thoracis Aged 35 to 65 Days Postmortem. *Meat and Muscle Biology, 4*(1), 15.

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**Journal Article, Professional Journal**

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**Review**

Gifford, C. L., O'Connor, L. E., Campbell, W. W., Woerner, D., Belk, K. E. (2017). *Broad and Inconsistent Muscle Food Classification Is Problematic for Dietary Guidance in the US* (9th ed., vol. 9). NUTRIENTS.

**Presentations Given**

Ryder, D., Fischer, L., Woerner, D., National Conference, "High steaks: Examining student motivations toward participation in agricultural science research.," North American Colleges and Teachers of Agriculture, Las Cruces, NM. (2023).

Legako, J. (Presenter Only), Dilger, A. (Presenter Only), Woerner, D. (Presenter Only), Miller, R. (Presenter Only), American Meat Science Association Research Forum Discussion, "What Parameters are Most Important when Designing Flavor Research?," American Meat Science Association. (January 20, 2023).

Mortensen, E. G. (Presenter & Author), Horton, T. M. (Author Only), B, F. A. (Author Only), Legako, J. (Author Only), Thompson, L. (Author Only), Brooks, J. C. (Author Only), Miller, M. (Author Only), Woerner, D. (Author Only), 74th Annual Reciprocal Meat Conference, "Nutrient Profile of USDA Prime Beef Cuts," American Meat Science Association, Reno, Nevada. (August 2021).

Woerner, D., 2020 International Wagyu Conference, "Why Wagyu can claim it has a superior product.," 2020 International Wagyu Conference, Virtual - Hosted by Wagyu South Africa. (November 15, 2020).

Vargas, D. (Presenter & Author), Miller, M., Woerner, D., Echeverry, A., American Meat Science Association/International Congress of Meat Science and Technology (AMSA/ICoMST), "Microbial growth and shelf-life study on pork loins by the application of different antimicrobials," RMC. (August 2020).

Hardcastle, N. C. (Presenter & Author), Legako, J. (Author Only), Brooks, J. C. (Author Only), Miller, M. (Author Only), Pohlman, S. (Author Only), Howard, S. R. (Author Only), Dolezal, G. (Author Only), Woerner, D. (Author Only), International Congress of Meat Science and Technology, "BEEF ABATTOIR WATER USAGE MAY BE REDUCED THROUGH LOW-VOLUME SPRAY CHILLING WITHOUT DETRIMENTAL IMPACTS ON BEEF QUALITY OR SALABLE YIELD," American Meat Science Association. (August 2020).

Mills, B. (Presenter Only), Fletcher, W. (Presenter & Author), Garmyn, A. (Author Only), Legako, J. (Author Only), Woerner, D. (Author Only), Brooks, J. C. (Author Only), Miller, M. (Author Only), International Congress of Meat Science and Technology, "INVESTIGATION OF RAPID EVAPORATIVE IONIZATION MASS SPECTROMETRY (REIMS) TO CHARACTERIZE BEEF BRISKETS," American Meat Science Association. (August 2020).

Woerner, D., ICOMST, "New Technologies in Meat Quality – REIMS," AMSA/ICOMST, Virtual. (August 17, 2020).

Woerner, D., ICOMST, "AMSA Student Career Panel," ICOMST/AMSA, Virtual. (August 14, 2020).

Woerner, D. (Presenter & Author), Taste of Colorado, "High Quality Beef," Colorado Boxed Beef, Orlando, FL. (October 18, 2019).

Woerner, D. (Presenter & Author), Grass Run Farms Producer Event, "Beef Quality Demonstration," JBS, LaCrosse, WI. (September 19, 2019).

Woerner, D. (Presenter & Author), American Lamb Board Summit, "Consumer Preference for Lamb Flavor," American Lamb Board, Fort Collins, Co. (August 29, 2019).

Woerner, D. (Presenter & Author), Certified Angus Beef Feeding Forum, "Future of Beef Grading," Certified Angus Beef, Amarillo, TX. (August 27, 2019).

Woerner, D. (Presenter & Author), South African Wagyu Conference, "Producing high quality beef," SA Wagyu, Johannesburg South Africa. (August 19, 2019).

Woerner, D. (Presenter & Author), 4H Livestock Ambassadors Workshop, "Natural, Organic, and Convention Meat Production," Texas Agrilife Extension, Lubbock, TX. (July 23, 2019).

Woerner, D. (Presenter & Author), ASAS Animal Health Symposium - ASAS Annual, "The impact of morbidity on carcass quality," ASAS, Austin TX. (July 11, 2019).

Rodriguez, K. M. (Presenter & Author), Vargas, D. (Author Only), Woerner, D. (Author Only), Miller, M. (Author Only), Echeverry, A. (Leader), Reciprocal Meat Conference (RMC), "Evaluation of microbial indicators on pork loins after application of four different antimicrobials," American Meat Science Association, Fort Collins, CO. (June 23, 2019).

Woerner, D. (Presenter & Author), ABS In Focus Training, "Beef on Dairy Model and Sustainability," ABS Global, Lubbock, TX. (June 11, 2019).

Woerner, D. (Presenter & Author), ABS Global Sales Rep Meeting, "Sustainability in the dairy beef model," ABS Global, Amarillo, TX. (May 20, 2019).

Woerner, D. (Co-Chair), Cargill Beef Quality Summit, "Beef Quality Workshop," Cargill, Stillwater, OK. (April 15, 2019).

Woerner, D. (Presenter & Author), REIMS, "REIMS for Beef," Simplot, Boise, ID. (April 10, 2019).

Woerner, D. (Coordinator/Organizer), Texas High School BBQ Association, "BBQ Shortcourse," THSBBQ, Lubbock. (March 29, 2019).

Woerner, D. (Presenter & Author), ASAS Snack and Fact, "Definition of Meat," ASAS and AMSA, Capitol Hill, Washington DC. (March 6, 2019).

Woerner, D. (Leader), Indiana and Illinois Meat Proecessing Annual Convention, "Science of Smoke and Beef Demo," NCBA, Bloomington, IL. (February 22, 2019).

Woerner, D. (Leader), IPPE, "Beef Quality," NAMI, Atlanta, GA. (February 13, 2019).

Woerner, D. (Presenter & Author), American Sheep Industry Board Meeting, "REIMS and Flavor Reserach," American Sheep Industyr, New Orleans, LA. (January 24, 2019).

Woerner, D. (Presenter & Author), American Lamb Board Meeting, "REIMS Flavor Research," American Lamb Board, New Orleans, LA. (January 23, 2019).

Woerner, D. (Presenter Only), FCSTAT Midwinter Conference, "BBQ Events for Students," FCSTAT, Lubbock, TX. (January 18, 2019).

Woerner, D. (Coordinator/Organizer), Beef on Dairy Sustainability Conference, "Host: Sustainable Beef Production with the Beef on Dairy Model," TTU and Cargill, Texas Tech. (January 9, 2019).

Woerner, D., TX District 2 4H Goldstar Banquet, "Keynote: Opportunities in Agriculture," TX 4H, Lubbock, TX. (November 19, 2018).

Woerner, D., Taste of the Hawaiian Range, "Beef Cutting Demonstration," Hawaiian Cattlemen's Association, Waimea, HI. (September 28, 2018).

Woerner, D., Ankony Angus Bull Sale, "The significance of marbling in the beef supply," Ankony Angus, Clarksville, GA. (September 27, 2018).

Woerner, D., Grass Run Farms Event, "Beef Product Demonstration," JBS USA, LaCrosse, WI. (September 10, 2018).

Woerner, D., ASAS, "Using REIMS to characterize the flavor profile of meat," American Society of Animal Science, Vancouver, BC. (July 9, 2018).

Mallick, S., Woerner, D., Miller, M., Legako, J., Reciprocal Meat Conference, "The influence of rate of cooking, cooking temperature, and degree of doneness on volatile compounds related with flavor and tenderness," Kansas City, MO. (June 2018).

Foreaker, B. A., Woerner, D., Gredell, D. A., Legako, J., Tatum, J. D., Martin, J. N., Delmore, R. J., Heuberger, A., Belk, K. E., Reciprocal Meat Conference, "Identifying the influence of post-mortem aging length and method on flavor and tenderness of beef strip loins," Kansas City, MO. (June 24, 2018).

Woerner, D., Grass Run Farms Customer Event, "Beef Carcass Product Demonstration," JBS USA, LaCrosse, WI. (June 3, 2018).

Woerner, D., JBS Beef University, "Beef Industry Overview," JBS USA, Fort Collins, CO. (May 15, 2018).

Woerner, D., NCBA Annual Convention, "YG Subcommittee - Instrumentation and beef assessment," NCBA, Phoenix, AZ. (February 1, 2018).

Woerner, D., IPPE, "Beef Flavor Workshop," NAMI, Atlanta, GA. (January 31, 2018).

**Contracts, Grants and Sponsored Research**

**Awarded**

Thompson, L. (Lead Principal Investigator), Woerner, D. (Principal Investigator), "Composition of Meats and Meat Products," Sponsored by USDA-ARS, Federal, $50,000.00. (August 30, 2022 - August 29, 2027).

Woerner, D. (Lead Principal Investigator), Shaw, A. (Investigator), "Beef flavor characterization of gluteus medius, biceps femoris, and semimembranosus during extended aging," Sponsored by National Cattlemen’s Beef Association, $149,500.00. (September 2023 - October 2025).

Legako, J., Fischer, L., Woerner, D., "Industry assessment of beef aging and product handling practices," Sponsored by National Cattlemen's Beef Association, Other Nonprofit Org, $46,651.00. (January 2024 - August 2025).

Woerner, D., Shaw, A., Legako, J., "Beef flavor characterization of Gluteus medius, Biceps femoris, and Semimembranosus during extended aging.," Sponsored by National Cattleman’s Beef Association., Foundation, $143,500.00. (2023 - 2024).

Legako, J., Woerner, D., Brooks, J. C., "Evaluating the efficacy of Nitric Oxide-Modified Atmosphere Packaging (NO-MAP).," Sponsored by National Cattlemen’s Beef Association., Foundation, $68,296.00. (2023 - 2024).

Legako, J., Woerner, D., Miller, M., Brooks, J. C., "Evaluation of beef tissue oxidative status, color stability, and metabolic profile from carcasses of varied instrumental color categories assessed in a commercial processing facility.," Sponsored by National Cattlemen’s Beef Association., Foundation, $74,596.00. (2023 - 2024).

Legako, J., Woerner, D., Miller, M., Brooks, J. C., "Meta-analysis to determine the contribution of intramuscular fat to beef palatability.," Sponsored by National Cattlemen’s Beef Association., Foundation, $10,000.00. (2023 - 2024).

Woerner, D., Sarturi, J., Crossland, W., Rathmann, R., Hales-Paxton, K., Legako, J., Bratcher, C., Johnson, B., "Modeling for genomic, blood, and microbiological markers for liver abscesses in fed beef cattle.," Sponsored by Foundation for Food & Agriculture Research., Foundation, $300,000.00. (2023 - 2024).

Legako, J., Brooks, J. C., Woerner, D., Sanchez, M., Hanlon, K., Brown, T. R., "Beef quality evaluation following extended storage or double freezing.," Sponsored by National Cattlemen's Beef Association, Foundation, $59,020.00. (2022 - 2023).

Legako, J., Woerner, D., "Characterization of beef lipids in comparison with plant-based alternatives.," Sponsored by National Cattlemen's Beef Association, Foundation, $95,798.00. (2022 - 2023).

Miller, M., Woerner, D., Legako, J., "Development of genomic multi-breed eating quality trait estimates using shared global data.," Sponsored by Meat & Livestock Australia, Foreign, $603,960.00. (2022 - 2023).

Legako, J. (Lead Principal Investigator), Woerner, D. (Principal Investigator), Moustaid-Moussa, N. (Principal Investigator), "A scoping review of low carbohydrate diets with dietary animal protein components on cardiometabolic risk," Sponsored by National Cattlemens Beef Association, Industry/For Profit, $34,606.00. (October 2021 - March 2022).

Brooks, J. C., Legako, J., Woerner, D., "National Beef Tenderness Survey," Sponsored by National Cattleman's Beef Association, $21,500.00. (2022).

Woerner, D., Legako, J., "Evaluating the impact of early postmortem temperature variation on beef muscle tenderness and color development," Sponsored by National Cattleman's Beef Association, $39,176.00. (August 2021 - June 1, 2022).

Legako, J. (Lead Principal Investigator), Woerner, D., Brooks, J. C., "Sensory and chemical characterization of ground beef and plant-based alternative proteins," Sponsored by National Cattlemen's Beef Association, $101,594.00. (August 2021 - May 31, 2022).

Brooks, J. C., Legako, J., Woerner, D., "Dissemination of beef flavor research," Sponsored by National Cattleman's Beef Association, $8,950.00. (January 1, 2022).

Woerner, D., Legako, J., Brooks, J. C., "Flavor research publication support," Sponsored by National Cattleman's Beef Association, $31,312.00. (March 2021 - January 1, 2022).

Legako, J. (Lead Principal Investigator), Woerner, D., Brooks, J. C., "Dissemination of beef palatability research as it relates to cookery," Sponsored by National Cattlemen's Beef Association, $28,526.00. (March 2021 - January 1, 2022).

Hales, K. (Lead Principal Investigator), Woerner, D. (Principal Investigator), Legako, J. (Principal Investigator), Machado, V. (Principal Investigator), "Novel Strategies to Improve the Understanding of Liver Abscess Formation in Beef Cattle," Sponsored by Foundation for Food and Agriculture Research, Federal, $250,000.00. (2021 - Present).

Woerner, D., Brooks, J. C., Echeverry, A., Legako, J., "Using Rapid Evaporative Ionization Mass Spectrometry (REIMS) as a novel, minimally invasive, real time method for characterization of metabolic variation contributing to flavor, tenderness, and color stability of beef," Sponsored by Foundation for Meat and Poultry Research and Education, Other Nonprofit Org, $41,687.00. (May 2021).

Woerner, D., Thompson, L., Legako, J., "Nutrient analysis of prime beef cuts," Sponsored by National Cattlemen’s Beef Association, Industry/For Profit, $88,891.00. (June 1, 2020 - May 31, 2021).

Legako, J., Woerner, D., Brooks, J. C., Nightingale, K., Sanchez, M., Echeverry, A., "Efficacy of common antimicrobial interventions at and above regulatory allowable pick up levels," Sponsored by Foundation for Meat & Poultry Research & Education, $87,328.00. (May 31, 2021).

Henry, D. (Lead Principal Investigator), Johnson, B. (Principal Investigator), Sarturi, J. (Principal Investigator), Crossland, W. (Principal Investigator), Legako, J. (Principal Investigator), Woerner, D. (Principal Investigator), "Effects of tannins on beef production: A restorative systems approach," Sponsored by SilvaTeam S.p.A, Industry/For Profit, $227,795.00.

Woerner, D. (Lead Principal Investigator), Legako, J. (Principal Investigator), Brooks, J. C. (Principal Investigator), "Evaluating Rapid Evaporative Ionization Mass Spectrometry (REIMS) As A Novel, Minimally Invasive, Real Time Method for Accessing Pork Belly Quality and Fat Composition," Sponsored by National Pork Board, Foundation, $141,677.00. (October 2019 - September 30, 2020).

Woerner, D. (Lead Principal Investigator), "A review of sustainability on the beef on dairy model.," Sponsored by Cargill, $46,400.00. (June 1, 2019 - May 30, 2020).

Woerner, D. (Lead Principal Investigator), "McDonald's Beef Patty Cooking Validation," Sponsored by Cargill, National Beef, Lopez Foods, and OSI, Industry/For Profit, $16,456.00. (October 1, 2019 - October 30, 2019).

Woerner, D., "An evaluation of the effects of supplementation of a novel feed additive on carcass characteristics and longissimus muscle characteristics of feedlot steers.," Sponsored by Elanco Animal Health, Industry/For Profit, $243,059.00. (July 1, 2018 - September 30, 2019).

Woerner, D., "Evaluating Rapid Evaporative Ionization Mass Spectrometry (REIMS) as a novel, real time method for measuring and predicting beef flavor, tenderness, and nutritional value," Sponsored by National Cattlemens Beef Association, Federal, $89,980.00. (December 1, 2018 - May 31, 2019).

Woerner, D., "Predicting Beef Flavor Differing in Lipid Heat Denaturation and Maillard Reaction Products," Sponsored by National Cattlemens Beef Association, Federal, $32,750.00. (December 1, 2018 - May 31, 2019).

Woerner, D. (Lead Principal Investigator), "Omega 3 Beef Trial," Sponsored by Cargill, $14,170.00. (April 1, 2019 - April 30, 2019).

**Pending**

Amin, M. D. (Lead Principal Investigator), Hudson, M. (Investigator), Woerner, D. (Investigator), "Detecting Potential Export Opportunities for The U.S. Meat Industry With Machine Learning," Sponsored by USDA-NIFA, Federal, $518,029.00.

**Intellectual Contributions in Submission**

**Journal Article, Academic Journal**

Tegeler, A., Ford, H., Fiallo Diez, J. F., Johnson, B., Benitez Rojas, O., Woerner, D., Strieder Barboza, C. Transcriptome and cellular evidence of depot-specific function in beef cattle intramuscular, subcutaneous, and visceral adipose tissues. *BMC Genomics*.

**Manuscript**

Blandon, S., Vargas, D. A., Casas, D. E., Sarasty, O. S., Woerner, D., Echeverry, A., Miller, M., Carpio, C., Sanchez Plata, M., Legako, J. (2023). In Mr.Dusan Djuric (Ed.), *Efficacy of Common Antimicrobial Interventions At and Above Regulatory Allowable Pick-up Levels on Pathogen Reduction* (4th ed., vol. 12, pp. 883). Basel: MDPI.

**SERVICE**

**Professional Service**

Board of Advisors of a Company, NCBA - Beef Quality Assurance Advisory Committee. (January 1, 2020 - Present).

Board Member/Foundation, Fats and Proteins Research Foundation, Arlington, VA. (February 1, 2016 - Present).

Board Member/Foundation, American Meat Science Association, Champaign, IL. (June 1, 2016 - June 30, 2019).

**Public Service**

Task Force Member, Texas Education Agency (TEA), Texas. (February 1, 2019 - Present).

**Service/Performance Partnerships**

Lallemand – TTU Beef Short Course / 2023, Relationship Development, Technical or Expert Assistance, Reception of national Lallemand Animal Nutrition staff (Veterinarians, Agronomists, and Animal Scientists). This event combined three days, in which meetings/discussions, practical demonstrations, and a tour at the New Deal Research and Education Center (NDREC), in which detailed description of activities performed in the center was provided, as well as update of ongoing research efforts., California. (August 1, 2023 - August 2023).

**Service Awards and Honors**

**Service, Professional**

Harry L. Rudnick Educator's Award, North American Meat Institute. (April 9, 2019).

Texas Tech University Distinguished Alumni Award of the College of Agricultural Sciences and Natural Resources, TTU College of Agricultural Sciences and Natural Resources. (February 26, 2018).

**GENERAL**

**Professional Memberships**

Texas Education Agency Science TEKS Review Committee. (December 1, 2019 - Present).

member, Raider Red Meats BBQ Contest Advisory Board. (September 1, 2018 - Present).

American Meat Science Association Lexicon Committee. (January 2016 - Present).

Research Committee Member, Fats and Proteins Research Foundation. (January 1, 2015 - Present).

Team Member, NCBA Beef Innovations Group. (January 1, 2010 - Present).

International Association for Food Protection. (January 2009 - Present).

Past Chairman, American Meat Science Association National 4H Advisory Board. (January 2008 - Present).

USDA-AMS Beef Tenderness Task Force. (January 2008 - Present).

Colorado Cattlemen’s Association. (August 2005 - Present).

Colorado Livestock Association. (August 2005 - Present).

American Meat Science Association Student Activities Committee. (January 2004 - Present).

Past President, Intercollegiate Meat Coaches Association. (January 2003 - Present).

Board of Directors and RMC Chairman, American Meat Science Association. (June 1, 2001 - Present).

American Society of Animal Science. (June 1, 2001 - Present).

American Hereford Association. (January 1996 - Present).

Technical Advisor, Colorado Association of Meat Processors. (January 2009 - August 2018).

**Development Activities Attended**

Workshop, "Texas Education Agency TEKS Review Training," Texas Education Agency (TEA), Austin, Texas, United States. (December 1, 2019 - Present).

Tutorial, "Onsite REIMS Training," Waters, Lubbock, TX, United States. (September 24, 2019 - September 26, 2019).

Conference Attendance, "American Lamb Summit," American Lamb Board, Fort Collins, CO, United States. (August 28, 2019 - August 29, 2019).

Conference Attendance, "South African Annual Wagyu Conference," South African Wagyu, Johannesburg, South Africa. (August 13, 2019 - August 19, 2019).

Conference Attendance, "ASAS Annual Meeting," American Society of Aniaml Science, Austin, Texas, United States. (July 9, 2019 - July 10, 2019).

Conference Attendance, "Reciprocal Meat Conference," AMSA, Fort Collins, CO, United States. (June 21, 2019 - June 26, 2019).

Workshop, "Texas 4H Ambassador Training," Texas AgriLife Extension, Lubbock, TX, United States. (June 22, 2019 - June 25, 2019).

Seminar, "ABS In Focus Training," ABS Global, Amarillo, TX, United States. (June 11, 2019).

Seminar, "ASAS Snack and Fact," ASAS, Washington, DC, DC, United States. (May 6, 2019 - May 7, 2019).

Conference Attendance, "Indiana and Illinois Meat Processors Convention," NCBA, Bloomington, IL, Uni. (February 21, 2019 - February 22, 2019).

Conference Attendance, "IPPE," NAMI, Atlanta, GA, United States. (February 12, 2019 - February 13, 2019).

Conference Attendance, "NCBA Annual Convention," NCBA, New Orleans, LA, United. (January 30, 2019 - February 1, 2019).

Conference Attendance, "American Lamb Board and ASI Annual Meeting," American Lamb Board and American Sheep Industry, New Orleans, LA, United States. (January 23, 2019 - January 24, 2019).

Conference Attendance, "ASAS Annual Meeting," American Society of Animal Sciences, Vancouver, BC, Canada. (July 9, 2018 - July 11, 2018).

Conference Attendance, "Reciprocal Meat Conference," American Meat Science Association, Kansas City, MO, USA. (June 21, 2018 - June 24, 2018).

Conference Attendance, "IPPE Annual Convention," North American Meat Institute, Atlanta, GA, USA. (January 30, 2018 - January 31, 2018).