

VITA

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EDUCATION

2005	<u>Bachelor of Science</u> in Biology, Texas Tech University
2009	<u>Master of Science</u> Food Science, Oklahoma State University
2011	<u>Doctor of Philosophy</u> in Animal Science with an emphasis in Meat Science, Texas Tech University

PROFESSIONAL EXPERIENCE

2006 – 2008	Graduate Research Assistant, Oklahoma State University
2009 – 2011	Graduate Research Assistant, Texas Tech University
2012	Post-doctoral Research Associate, Texas Tech University
2013	Senior Research Associate, Texas Tech University
2013 – 2016	Assistant Professor, Utah State University
2015 – Present	Affiliate Faculty Member, Colorado State University
2016 – 2020	Assistant Professor, Texas Tech University
2017 – Present	Adjunct Faculty Member, Utah State University
2020 – Present	Associate Professor, Texas Tech University
2021 – Present	Interim Associate Chair, Department of Animal & Food Sciences, Texas Tech University
2022 – Present	Adjunct Faculty Member, University of Arkansas

LICENSES AND CERTIFICATIONS

2007	HACCP Certificate
2016	Food Safety Preventive Controls Alliance – Preventive Controls for Human Food
2017	BRC 3 rd Party Auditor, Global Standard Food Safety Issue 7 – BRC Global Standards
2017	HACCP Lead Instructor – International HACCP Alliance
2018	BRC Approved Training Partner, Global Standard Food Safety Issue 7 – BRC Global Standards
2018	BRC Approved Training Partner, Global Standard Food Safety Issue 8 – BRC Global Standards

2020	Advanced HACCP Certificate
2022	Implementing FSSC 22000
2022	ISO 9001:2015 Certified Lead Auditor (Quality Management System Training)
2022	ISO 9001:2015 Certified Internal Auditor (Quality Management System Training)
2022	BRC Approved Training Partner, Global Standard Food Safety Issue 9 – BRC Global Standards
2022	Texas Beef Quality Assurance Certificate

INTERNATIONAL EXPERIENCE

1. Agri-Food and Biosciences Institute in Belfast, Northern Ireland. Activity, Research. 2010.
2. Agri-Food and Biosciences Institute: Belfast, Northern Ireland. Activity, Research. 2012.
3. U.S. Meat Export Federation: Bogota, Columbia. Activity, Presentation. 2016.
4. U.S. Meat Export Federation: Medellin, Columbia. Activity, Presentation. 2016.
5. U.S. Meat Export Federation: Lima, Peru. Activity, Presentation. 2016.
6. Teys Australia: Brisbane, Australia. Activity, Research. 2017.
7. Charles Sturt University: Wagga Wagga, Australia. Activity, Presentation. 2017.
8. University of Otago: Dunedin, New Zealand. Activity, Workshop participant. 2017.
9. International Congress of Meat Science and Technology: Cork, Ireland. Activity, Conference attendee. 2017.
10. United Nations Economic Commission for Europe (UNECE), Sustainable Meat Markets, Cross-border Trade and Eating Quality Workshop: Dublin, Ireland. Activity, Conference attendee. 2017.
11. International Congress of Meat Science and Technology: Melbourne, Australia. Activity, Conference attendee. 2018
12. Bermudez Biscuit Company: Port of Spain, Trinidad and Tobago. Activity, Education. 2019
13. The Societal Role of Meat; An International Summit. Dublin, Ireland. Activity, Invited attendee, 2022.
14. International Congress of Meat Science and Technology: Padova, Italy. Activity, Conference attendee. 2023.

MEMBERSHIP IN PROFESSIONAL AND HONORARY SOCIETIES

Professional:

1. Institute of Food Technologists; 2007 – present
2. American Society of Animal Sciences; 2009 – present
3. American Meat Science Association; 2009 – present
4. American Chemical Society; 2014 – 2016

HONORS AND AWARDS

Honors:

1. Outstanding Meat Science Graduate Student – Department of Animal and Food Sciences, Texas Tech University - 2011
2. Undergraduate Research Mentor of the Year – Department of Nutrition, Dietetics, and Food Sciences, Utah State University – 2016
3. Institute of Food Technologists Muscle Foods Division – Member of the Year – 2018
4. American Meat Science Association – Distinguished Achievement Award – 2019
5. Chancellor's Council Distinguished Research Award – Texas Tech University – 2020-2021

Awards:

1. San Antonio Livestock Exposition Meat Science Graduate Student Scholarship – 2009 and 2010
2. Texas Tech TEACH (Teaching Effectiveness and Career enHancement) Program Fellow – 2010 and 2011
3. Society of Flavor Chemists Jogue Inc. Scholarship – 2011

AREA OF EXPERTISE

My specialization is in meat science. My program focuses on pre- and post-harvest factors, which influence meat quality. Some of the specific factors include animal diet, management, genetics, post-mortem aging, packaging, and cooking. I use analytical chemistry and sensory evaluation to answer applied and mechanistic questions about how the previously stated factors influence flavor, color and/or shelf-life of meat.

PATENTS

2023 - Provisional Patent Application: Nitric oxide modified atmosphere packaging to maintain beef color

PUBLICATIONS

Books: total of 1

Book Chapters: total of 1

1. R.E. Ward and **J.F. Legako**. 2017. Traditional Methods for Mineral Analysis. S.S. Nielsen (ed.), Food Analysis, 5th Ed. Springer International Publishing.

Referred Journals: total published 77, in press 2 *Denotes graduate student advisee or mentee, post-doc, or visiting scientist

Published:

1. **Legako, J.** and N.T. Dunford. 2010. Effect of spray nozzle design on fish oil-whey protein microcapsule properties. *J Food Sci.* 75(6): E394-E400.
2. Brooks, J.C., J.M. Mehaffey, J.A. Collins, H.R. Rogers, **J. Legako**, B.J. Johnson, T. Lawrence, D.M. Allen, M.N. Streeter, W.T. Nichols, J.P. Hutcheson, D.A. Yates and M.F. Miller. 2010. Moisture enhancement and blade tenderization effects on the shear force and palatability of strip loin steaks from beef cattle fed Zilpaterol Hydrochloride. *J Anim Sci.* 88:1809–1816.
3. Martin, J.N., J.C. Brooks, L.D. Thompson, J.W. Savell, K.B. Harris, L.L. May, A.N. Haneklaus, J.L. Schutz, K.E. Belk, T. Engle, D.R. Woerner, **J.F. Legako**, A.M. Luna, L.W. Douglass, S.E. Douglass, J. Howe, M. Duvall, K.Y. Patterson, and J.L. Leheska. 2013. Nutrient database improvement project. The influence of USDA Quality and Yield grade on the separable components and proximate composition of raw and cooked retail cuts from the beef rib and plate. *Meat Sci.* 95(3):486-494.
4. Martin, J.N., J.C. Brooks, T.A. Brooks, **J.F. Legako**, J.D. Starkey, S.P. Jackson, and M.F. Miller. 2013. Storage length, storage temperature, and lean formulation influence the shelf-life and stability of traditionally packaged ground beef. *Meat Sci.* 95(3):495-502.
5. Hunt, M.R.*, A.J. Garmyn, T.G. O'Quinn, C.H. Corbin, **J.F. Legako**, R.J. Rathmann, J.C. Brooks, and M.F. Miller. 2014. Consumer assessment of beef palatability from four beef muscles from USDA Choice and Select graded carcasses. *Meat Sci.* 98:1-8.
6. Corbin, C.H.*, T.G. O'Quinn, A.J. Garmyn, **J.F. Legako**, M.R. Hunt, T.T.N. Dinh, R.J. Rathmann, and M.F. Miller. 2015. Sensory evaluation of tender beef strip loin steaks of varying marbling levels and quality treatments. *Meat Sci.* 100:24-31.
7. **Legako, J.F.**, J.C. Brooks, T.G. O'Quinn, T.D.J. Hagan, R. Polkinghorne, L.J. Farmer, and M.F. Miller. 2015. Consumer palatability scores and volatile beef flavor compounds of five USDA quality grades and four muscles. *Meat Sci.* 100:291-300.
8. **Legako, J.F.**, T.T.N. Dinh, M.F. Miller, and J.C. Brooks. 2015. Effects of USDA beef quality grade and cooking on fatty acid composition of neutral and polar lipid fractions. *Meat Sci.* 100:246-255.
9. Hergenreder, J.E., **J.F. Legako**, T.T.N. Dinh, K.S. Spivey, J.O. Baggerman, P.R. Broadway, J.L. Beckett, M. Branine, and B.J. Johnson. 2016. Zinc methionine supplementation impacts gene and protein expression in calf-fed Holstein steers with minimal impact on feedlot performance parameters. *Biol Trace Elem Res.* 171:315-327.
10. Lyte, J.M., **J.F. Legako**, J.N. Martin, L. Thompson, K. Surowiec, and J.C. Brooks. 2016. Volatile compound characterization of modified atmosphere packaged ground beef held under temperature abuse. *Food Control.* 59:1-6.
11. **Legako, J.F.**, T.T.N. Dinh, M.F. Miller, K. Adhikari, and J.C. Brooks. 2016. Consumer palatability scores, sensory descriptive attributes, and volatile compounds of grilled beef steaks from three USDA quality grades. *Meat Sci.* 112:77-85.

12. O'Quinn, T.G., D.R. Woerner, T. Engle, P. Chapman, **J.F. Legako**, J.C. Brooks, K. Belk, and J.D. Tatum. 2016. Identifying consumer preferences for specific beef flavor characteristics in relation to cattle production and postmortem processing parameters. *Meat Sci.* 112:90-102.
13. Hunt, M.R.,* **J.F. Legako**, T.T.N. Dinh, A.J. Garmyn, T.G. O'Quinn, C.H. Corbin, R.J. Rathmann, J.C. Brooks, and M.F. Miller. 2016. Assessment of volatile compounds, neutral and polar lipid fatty acids of four beef muscles from USDA Choice and Select graded carcasses and their relationships with consumer palatability scores and intramuscular fat content. *Meat Sci.* 116:91-101.
14. Brothersen, C., D.J. McMahon, **J. Legako**, and S. Martini. 2016. Comparison of milk oxidation by exposure to LED and fluorescent light. *J Dairy Sci.* 99(4):2537-2544.
15. Chail, A.*, **J.F. Legako**, L.R. Pitcher, T.C. Griggs, R.E. Ward, S. Martini, and J.W. MacAdam. 2016. Legume finishing provides beef with positive human dietary fatty acid ratios and comparable consumer preference with grain-finished beef. *J Anim Sci.* 94(5):2184-2197.
16. Lucher, L.W.*, T.G. O'Quinn, **J.F. Legako**, R.J. Rathmann, J.C. Brooks, and M.F. Miller. 2016. Consumer and trained panel evaluation of beef strip steaks of varying marbling and enhancement levels cooked to three degrees of doneness. *Meat Sci.* 122:145-154.
17. Chail, A.*, **J.F. Legako**, L.R. Pitcher*, R.E. Ward, S. Martini, and J.W. MacAdam. 2017. Consumer sensory evaluation and chemical composition of beef Gluteus medius and Tricep brachii steaks from cattle finished on forage and concentrate diets. *J Anim Sci.* 95(4):1553-1564.
18. Lucher, L.W.*, T.G. O'Quinn, **J.F. Legako**, R.J. Rathmann, J.C. Brooks, and M. F. Miller. 2017. Assessment of objective measures of beef steak juiciness and their relationships to sensory panel juiciness ratings. *J Anim Sci.* 95(6):2421-2437.
19. Hergenreder, J.E., **J.F. Legako**, T.T.N. Dinh, P.R. Broadway, K.S. Spivey, J.O. Baggerman, J.P. Hutcheson, M.E. Corrigan, and B. J. Johnson. 2017. Zilpaterol hydrochloride affects cellular muscle metabolism and lipid components of ten different muscles in feedlot heifers. *Meat and Muscle Biol.* 1:192-206.
20. O'Quinn, T.G., **J.F. Legako**, J.C. Brooks, and M.F. Miller. 2018. Evaluation of the contribution of tenderness, juiciness, and flavor to the overall consumer beef eating experience. *Transl Anim Sci.* 2:26-36.
21. Gredell, D.A.*, T.G. O'Quinn, **J.F. Legako**, J.C. Brooks, and M.F. Miller. 2018. Palatability and biochemical factors of beef from cattle of varying maturity levels and finishing diets. *Meat and Muscle Biol.* 2(1):111-126.
22. **Legako, J.F.**, T. Cramer*, K. Yardley, T.J. Murphy, A. Chail*, and J.W. MacAdam. 2018. Retail stability of three beef muscles from grass-, legume-, and feedlot-finished cattle. *J Anim Sci.* 96(4):2238-2248.

23. Poli, C., K.J. Thornton-Kurth, **J.F. Legako**, C. Bremm, V.S. Hampel, J. Hall, I.R. Ipharraguerre, J.J. Villalba. 2018. Self-selection of plant bioactive compounds by sheep in response to challenge infection with *Haemonchus contortus*. *Physiol Behav.* 194:302-310.
24. Dinh, T.T.N., **J.F. Legako**, M.F. Miller, and J.C. Brooks. 2018. Effect of USDA quality grade and cooking on water-soluble precursors of beef flavor. *Meat Sci.* 146:122-130.
25. Berger, J.*, Y.H. Kim, **J.F. Legako**, S. Martini, J. Lee*, P. Ebner, and S.M. Scramlin Zuelly. 2018. Dry-aging improves meat quality attributes of grass-fed beef loins. *Meat Sci.* 145:285-291.
26. Phelps, M.R.*, A.J. Garmyn, J.C. Brooks, G.G. Mafi, S.K. Duckett, **J.F. Legako**, T.G. O'Quinn, and M.F. Miller. 2018. Effects of marbling and postmortem aging on consumer assessment of domestic lamb loin. *Meat and Muscle Biol.* 2(1):221-232.
27. Gredell, D.A.*, J.H. McHenry, D.R. Woerner*, **J.F. Legako**, T.E. Engle, J.C. Brooks, J.D. Tatum and K.E. Belk. 2018. Characterization of fresh and dry-aged ground beef patties. *Meat and Muscle Biol.* 2(1):265-276.
28. Gardner, K.* and **J.F. Legako**. 2018. Volatile flavor compounds vary by beef product type and degree of doneness. *J Anim Sci.* 96:4238-4250.
29. Hardcastle, N.C.*, A.J. Garmyn, **J.F. Legako**, M.M. Brashears, and M.F. Miller. 2018. The effect of finishing diet on consumer perception of enhanced and non-enhanced Honduran beef. *Meat and Muscle Biol.* 2(1):277-295.
30. Nyquist, K.M.*, T.G. O'Quinn, L.N. Drey*, L.W. Lucherck*, J.C. Brooks, M.F. Miller, and **J.F. Legako**. 2018. Palatability of beef chuck, loin, and round muscles from three USDA quality grades. *J Anim Sci.* 96:4276-4292.
31. Gredell, D.A.*, D.R. Woerner, **J.F. Legako**, N. de Faria Sant'Ana*, L. Arantes-Pereira*, J.C. Brooks, J.D. Tatum, R.J. Delmore, and K.E. Belk. 2018. Understanding the impact of oven temperature and relative humidity on the beef cooking process. *Meat and Muscle Biol.* 2(1):334-343.
32. Webb, M.J.*, J.J. Kincheloe, R.N. Funston, K.R. Underwood, **J.F. Legako**, A.A. Harty, R.R. Salverson, K.C. Olson, and A. D. Blair. 2019. Influence of maternal protein restriction in primiparous heifers during mid- and/or late-gestation on meat quality and fatty acid profile of progeny. *Meat Sci.* 152:31-37. doi.org/10.1016/j.meatsci.2019.02.006.
33. Ponce, J.*, J.C. Brooks, and **J.F. Legako**. 2019. Consumer liking and descriptive flavor attributes of M. Longissimus lumborum and M. Gluteus medius beef steaks held in varied packaging systems. *Meat and Muscle Biol.* 3(1):1-13.
34. Milopoulos, J.T.*, B.M. Koch, A.J. Garmyn, **J.F. Legako**, B.J. Johnson, J.C. Brooks, S.K. Duckett, and M.F. Miller. 2019. Palatability of beef strip loin steaks following variable length high-concentrate diet exposure prior to pasture-finishing. *Meat and Muscle Biol.* 3(1):127-146.
35. Vierck, K.R., K.V. McKillip, T.G. O'Quinn, and **J.F. Legako**. 2019. The impact of enhancement, degree of doneness, and USDA quality grade on beef flavor development. *Meat and Muscle Biol.* 3(1):299-312.

36. Sepulveda, C.A.*, A.J. Garmyn, **J.F. Legako**, and M.F. Miller. 2019. Cooking method and USDA quality grade affect consumer palatability and flavor of beef strip loin steaks. *Meat and Muscle Biol.* 3(1):375-388. doi: 10.22175/mmb2019.07.0031.
37. Burnett, D.D., **J.F. Legako**, K.J. Phelps, and J.M. Gonzalez. 2020. Board invited review: Strategies, fresh meat consequences, and economics of manipulating the fatty acid composition of meat. *J Anim Sci.* 98(2):1-12. doi:10.1093/jas/skaa033.
38. Broadway, P.R., J.A. Carroll, N.C. Burdick Sanchez, T.R. Callaway, S.D. Lawhon, E.V. Gart, L.K. Bryan, D.J. Nisbet, H.D. Hughes, **J.F. Legako**, J.E. Hergenreder, and P.W. Rounds. 2020. *Bacillus subtilis* PB6 supplementation in weaned Holstein steers during an experimental *Salmonella* challenge. *Foodborne Pathog. Dis.* doi.org/10.1089/fpd.2019.2757.
39. Evers, D.L., A.J. Garmyn, **J.F. Legako**, D.R. Woerner, and M.F. Miller. 2020. Flavor characterization of grass- and grain-fed Australian beef longissimus lumborum wet-aged 45 to 135 days. *Meat and Muscle Biol.* 4(1):22, 1-14. doi:10.22175/mmb.11043.
40. Musa, O.E., A.J. Garmyn, **J.F. Legako**, D.R. Woerner, and M.F. Miller. 2020. Flavor characterization of grass- and grain-fed Australian beef longissimus thoracis aged 35 to 65 days postmortem. *Meat and Muscle Biol.* 4(1):21, 1-15. doi:10.22175/mmb.11076.
41. Ponce, J.*, J.C. Brooks, and **J.F. Legako**. 2020. Chemical characterization and sensory relationships of beef M. Longissimus lumborum and M. Gluteus medius steaks after retail display in various packaging environments. *Meat and Muscle Biol.* 44(1):27, 1-17. doi:10.22175/mmb.10481.
42. Vierck, K.R.*, **J. F. Legako**, J.K. Kim, B.J. Johnson, and J.C. Brooks. 2020. Determination of package and muscle type influence on proteolysis, beef flavor contributing free amino acids, final beef flavor and tenderness. *Meat and Muscle Biol.* 4(1): 26, 1-14. doi:10.22175/mmb.10933.
43. Dang, D.S., J.F. Buhler, K.J. Thornton, **J.F. Legako**, and S.K. Matarneh. 2020. Fiber type composition of beef steaks varying in tenderness. *Meat Sci.* 170: 108266, 1-8. <https://doi.org/10.1016/j.meatsci.2020.108266>.
44. Gardner, T.*, K. R. Vierck*, S. Martini, K. Allen, H. Ban, R. K. Miller, C. R. Kerth, and **J. F. Legako**. 2020. Thermophysical properties of beef steaks of varying thicknesses cooked with low and high grill surface temperatures. *Meat and Muscle Biol.* 4(1): 26, 1-14. doi:10.22175/mmb.10933.
45. Foraker, B.A., D.A. Gredell, **J.F. Legako**, R.D. Stevens, J.D. Tatum, K.E. Belk, and D.R. Woerner. 2020. Flavor, tenderness, and related chemical changes of aged beef strip loins. *Meat and Muscle Biol.* 4(1): 28, 1-18. doi:10.22175/mmb.11115.
46. Setyabrata, D., B.R. Cooper, T.J.P. Sobreira, **J.F. Legako**, S. Martini, and Y.H.B. Kim. 2021. Elucidating mechanisms involved in flavor generation of dry-aged beef loins using metabolomics approach. *Food Res. Int.* 139(2021), 109969. doi.org/10.1016/j.foodres.2020.109969.

47. Fletcher, W.T., A.J. Garmyn, **J.F. Legako**, D.R. Woerner, and M.F. Miller. 2021. Investigation of smoked beef brisket palatability from three USDA quality grades. *Meat and Muscle Biol.* 5(1): 1, 1-12. doi:10.22175/mmb.10963.
48. Gardner, J.M.*, N.E. Ineck, S.M. Quarnberg*, **J.F. Legako**, C.E. Carpenter, K.A. Rood, and K.J. Thornton-Kurth. 2021. The influence of maternal dietary intake during mid-gestation on growth, feedlot performance, miRNA and mRNA expression, and carcass and meat quality of resultant offspring. *Meat and Muscle Biol.* 5(1): 3, 1-18. doi:10.22175/mmb.11538.
49. Poli, C.H.E.C., K.J. Thornton-Kurth, **J.F. Legako**, C. Bremm, V.S. Hampel, J. Hall, I.R. Ipharraguerre, and J.J. Villalba. 2021. The effect of plant bioactive compounds on lamb performance, intake, gastrointestinal parasite burdens and lipid peroxidation in muscle. *J Anim Sci.* 99(1): 1, 1-18. doi:10.1093/jas/skab009.
50. Vierck, K.R.*, **J.F. Legako**, and J.C. Brooks. 2021. Evaluation of dry heat cookery method on volatile flavor compound development and consumer evaluation of six beef muscles. *Meat and Muscle Biol.* 5(1): 20, 1-14. doi:10.22175/mmb.11710.
51. Janssen, J., K. Cammack, **J. Legako**, R. Cox, J.K. Grubbs, K. Underwood, J. Hansen, C. Kruse, and A. Blair. 2021. Influence of grain- and grass-finishing systems on carcass characteristics, meat quality, nutritional composition, and consumer sensory attributes of bison. *Foods.* 10, 1060. <https://doi.org/10.3390/foods10051060>.
52. Hanlon, K. E., J. C. McCann, M. F. Miller, M. M. Brashears, C. L. Smith, J. C. Brooks, and **J. F. Legako**. 2021. Microbial profile evaluation of beef steaks from different packaging and retail lighting display conditions. *Meat and Muscle Biol.* 5(1): 24, 1-9. doi:10.22175/mmb.11711.
53. Briggs, R.K., R.C. Christensen, S.M. Quarnberg*, R.C. Raymond, M. MacNeil, **J.F. Legako**, and K.J. Thornton. 2021. Relationship between meat quality and protein abundance of HSP β 1, HSPA and DJ1 in beef *longissimus lumborum* at harvest or after 14 days aging. *Meat and Muscle Biol.* 5(1): 22, 1-14. doi:10.22175/mmb.11685.
54. Naqvi. Z.B., P.C. Thomson, M.A. Campbell, S. Latif, **J.F. Legako**, D.M. McGill, P.C. Wynn, M.A. Friend, and R.D. Warner. 2021. Sensory and Physical Characteristics of M. biceps femoris from Older Cows Using Ginger Powder (Zingibain) and Sous Vide Cooking. *Foods*, 10, 1936. doi.org/10.3390/foods10081936.
55. Vierck, K.R.*, **J.F. Legako**, and J.C. Brooks. 2021. Effects of dry heat cookery method on beef strip loin steaks of two quality grades following sous vide preparation. *Meat and Muscle Biol.* 5(1): 39,1-13. doi:10.22175/mmb.11700.
56. Gubbels, E.R., J.J. Block, R.R. Salverson, A.A. Harty, W.C. Rusche, C.L. Wright, K.M. Cammack, Z.K. Smith, J.K. Grubbs, K.R. Underwood, **J.F. Legako**, K.C. Olson, and A.D. Blair. 2021. Influence of Maternal Carbohydrate Source (Concentrate-based vs Forage-based) on Growth Performance, Carcass Characteristics, and Meat Quality of Progeny. *Foods.* 10, 2056. [https://doi.org/10.3390/ foods10092056](https://doi.org/10.3390/foods10092056).

57. Mallick, S., D.R. Woerner, T. de Mancilha Franco, M. F. Miller, and **J. F. Legako**. 2021. Development of beef volatile flavor compounds in response to varied oven temperature and degree of doneness. *Meat and Muscle Biol.* 5(1): 40, p.1-14. doi.org/10.22175/mmb.12365.
58. Mahagan, K.T., A.J. Garmyn, **J.F. Legako**, and M.F. Miller. 2022. A comparison of consumer responses using paper and digital ballots for eating quality assessment of beef steaks. *Meat and Muscle Biol.* 5(1): 48, 1–12. doi:10.22175/mmb.12611.
59. Setyabrata, D., K.R. Vierck, T.R. Sheets, **J.F. Legako**, B.R. Cooper, T.A. Johnson, and Y.H.B. Kim. 2022. Characterizing the Flavor Precursors and Liberation Mechanisms of Various Dry-Aging Methods in Cull Beef Loins Using Metabolomics and Microbiome Approaches. *Metabolites*. 12, 472. https://doi.org/10.3390/metabo12060472.
60. Hernandez, M.S.*, J.T. McClennan*, S. Martini, K. Allen, H. Ban, and **J.F. Legako**. 2022. Thermophysical properties of beef steaks varying in USDA quality grade and internal temperature. *Meat and Muscle Biol.* 5(3): 13900, p.1–10. doi: https://doi.org/10.22175/mmb.13900.
61. Barker, S.N*., **J.F. Legako**, J.C. Brooks, and D.R. Woerner. 2022. Evaluation of beef steak flavor development in vacuum rollstock packaging under two lighting sources. *Meat and Muscle Biol.* 6(1): 13725, p.1–16. doi: https://doi.org/10.22175/mmb.13725.
62. Hernandez, M.S.*, D.R. Woerner, J.C. Brooks, T.L Wheeler, and **J.F. Legako**. 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 Biol.* 6(1): 13724, p.1–15. doi: https://doi.org/10.22175/mmb.13724.
63. Setyabrata, D., S. Xue, K.R. Vierck, **J.F. Legako**, P. Ebner, S. Zuelly, and B. Kim. 2022. Impact of Various Dry-Aging Methods on Meat Quality and Palatability Attributes of Beef Loins (*M. longissimus lumborum*) from Cull Cow. *Meat and Muscle Biol.* Accepted. 6(1): 13025, p.1-15. doi: https://doi.org/10.22175/mmb.13025.
64. Lee, J. **J.F. Legako**, and S. Martini. 2022. Degree of oxidation of sonicated soybean oil using various sonication process parameters. *Int. J. Food Sci.* 57: 4473–4482. doi:10.1111/ijfs.15781.
65. Foraker, B.A., B.J. Johnson, R.J. Rathmann, **J.F. Legako**, J.C. Brooks, M.F. Miller, J.D. Tatum, and D.R. Woerner. 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 Muscle Biol.* 6(1): 13926, p.1–19. doi: https://doi.org/10.22175/mmb.13926.
66. Long, N.S., J.E. Wells, E.D. Berry, **J.F. Legako**, D. R. Woerner, G. H. Loneragan, P.R. Broadway, J.A. Carroll, N.C. Burdick Sanchez, S.C. Fernando, C.M. Coppin, C.L. Helmuth, T.M. Smock, J.L. Manahan, A.A. Hoffman, and K.E. Hales. 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. *J. Appl. Microbiol.* 133(3):1940-1955 DOI: 10.1111/jam.15691.
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- based on consumer preference. *J. Food Sci. Technol.* <https://doi.org/10.1007/s13197-022-05562-6>.
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In Press:

1. Kerth, C.R., **J.F. Legako**, D.R. Woerner, T.G. O'Quinn, M.N. Nair, J.C. Brooks, J.M. Lancaster, and R.K. Miller. A current review of U.S. beef flavor I: Measuring beef flavor. *Meat Sci.* Accepted, in press.
2. Gonzalez, A.A., E.P. Williams, T.E. Schwartz, A.N. Arnold, D.B. Griffin, R.K. Miller, K.B. Gehring, J.C. Brooks, **J.F. Legako**, C.C. Carr, G.G. Mafi, C.L. Lorenzen, R.J. Maddock, and J.W. Savell. National Beef Tenderness Survey – 2022: Consumer Panel Evaluations and Warner-Bratzler Shear Force of Beef Steaks from Retail and Foodservice. *Meat and Muscle Biol.* Accepted, in press.

Under Review:

1. Briggs, R.K., **J.F. Legako**, P.R. Broadway, J.A. Carroll, N.C. Burdick Sanchez, N.E. Ineck, Z.K. Smith, R. Ramanathan, and K.J. Thornton. Effects of pre-mortem stress on protein expression, steak color, oxidation, and myofibrillar fragmentation index in the longissimus lumborum. *Meat Sci.* Submitted.
2. Hernandez, M.S.*, C.N. French, **J.F. Legako**, L.D. Thompson, M.F. Miller, and J.C. Brooks. Flavor development of three beef muscles from three USDA quality grades and two wet-aging durations. *Meat and Muscle Biol.* Submitted.

Proceedings: total of 13

Refereed

Volunteered:

1. **Legako, J.F.**, L.J. Farmer, J.C. Brooks, T.G. O'Quinn, T.D.J. Hagan, R. Polkinghorne, and M.F. Miller. 2014. Volatile aroma compounds from different grilled beef muscles. 14th Weurman Flavour Research Symposium. Queens College, Cambridge, UK.
2. Farmer, L.J., **J. F. Legako**, T.D.J. Hagan, R. Polkinghorne, J.C. Brooks, and M.F. Miller. 2014. A simple volatile analysis method to complement consumer studies on beef eating quality. 14th Weurman Flavour Research Symposium. Queens College, Cambridge, UK.
3. Lucherck, L.W., T.G. O'Quinn, **J.F. Legako**, J.C. Brooks, and M.F. Miller. 2017. Palatability of beef strip loin steaks from grass- and grain-finished beef representing various fat levels and aging times. International Congress of Meat Science and Technology. Cork, Ireland.
4. Vierck, K.R., J.C. Brooks, M.F. Miller and **J.F. Legako**. 2018. Consumer sensory evaluation of six beef muscles cooked with multiple dry heat methods. International Congress of Meat Science and Technology. Melbourne, Australia.
5. Lucherck, L.W., T.G. O'Quinn, **J.F. Legako**, A.J. Garmyn, J.C. Brooks, and M.F. Miller. 2018. Slice shear force of grass- and grain-finished beef strip loin steaks varying in marbling level and aging time. International Congress of Meat Science and Technology. Melbourne, Australia.

6. Gredell, D.A., J.H. McHenry, D.R. Woerner, **J.F. Legako**, T.E. Engle, J.C. Brooks, J.D. Tatum, and K.E. Belk. 2018. The effect of muscle source on ground beef flavor and texture. International Congress of Meat Science and Technology. Melbourne, Australia.
7. Chong, F.S., J.P. Kerry, M.G. O'Sullivan, **J. Legako**, T.D.J. Hagan, and L.J. Farmer. 2019. Effect of ageing period on volatile flavour compounds in cooked beef. International Congress of Meat Science and Technology. Potsdam, Germany.
8. Chong, F.S., J.P. Kerry, M.G. O'Sullivan, **J. Legako**, T.D.J. Hagan, and L.J. Farmer. 2019. Comparison of solid-phase microextraction methods on beef volatile analysis. International Congress of Meat Science and Technology. Potsdam, Germany.
9. D. Setyabrata, S. Xue, K. Vierck, T. Cramer, **J. Legako**, and Y.H. Kim. 2019. Impacts of various dry-aging methods on meat quality and palatability attributes of beef loins from cull cow. International Congress of Meat Science and Technology. Potsdam, Germany.
10. S. Hernandez, B. Kim, D. Woerner, C. Brooks, and **J. Legako**. 2023. Characterizing the Metabolomes of Plant-Based Meat Alternatives and Ground Beef. International Congress of Meat Science and Technology. Padova, Italy.
11. S.N. Barker, K.B. Kohl, N.C. Burdick Sanchez, P.R. Broadway, J.A. Carroll, C.L. Bratcher, and **J.F. Legako**. 2023. Ante-mortem stress effects the oxidative products and colour stability of steaks following retail display. International Congress of Meat Science and Technology. Padova, Italy.

Invited:

1. Kerth, C. and **J.F. Legako**. 2015. Flavor development and relating volatile compounds to sensory evaluation. American Meat Science Association. Reciprocal Meat Conference. Lincoln, NE.
2. **Legako, J.F.**, J. Ponce, and J.C. Brooks. 2017. Post-mortem product handling and beef flavor chemistry. American Meat Science Association. Reciprocal Meat Conference. College Station, TX.

Non-refereed

Volunteered:

Invited:

Abstracts: total of 165

Volunteered:

1. **Legako, J.** and N. Dunford. 2009. Effect of spray nozzle design on fish oil microencapsulation efficiency. American Oil Chemists' Society Annual Meeting.
2. **Legako, J.F.**, B.J. Schilling, S.P. Jackson, M.F. Miller, M.A. Carr, G.G. Hilton, and J.C. Brooks. Effect of breed-type on performance, carcass traits, and consumer sensory evaluation of crossbred hair sheep. Proceedings of the 2010 AMSA Reciprocal Meat Conference, Lubbock, TX.

3. Farmer, L.J., T.D.J. Hagan, M.F. Miller, J.C. Brooks, **J.F. Legako**. Prediction of beef flavour. International Symposium on current research and development of prediction model of beef palatability, Jeju, S Korea, August 2010.
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5. Martin, J.N., J.C. Brooks, S.P. Jackson, T.A. Brooks, J.D. Starkey, **J.F. Legako**, and M.F. Miller. 2011. The shelf life and stability of traditionally packaged ground beef of three lean formulations as affected by storage length and storage temperature. Proceedings of the 2011 AMSA Reciprocal Meat Conference, Manhattan, KS.
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9. Dinh, T.T.N., **J.F. Legako**, M.F. Miller, and J.C. Brooks. Free Amino Acids in Water-Soluble Extract from Beef Strip Steaks. Submitted for the proceedings of the 2012 AMSA Reciprocal Meat Conference, Fargo, ND.
10. **Legako, J.F.**, T.T.N. Dinh, M.F. Miller, and J.C. Brooks. Effect of grilling and USDA quality grade on neutral lipid and phospholipid fatty acids of beef strip steaks. Submitted for the proceedings of the 2012 AMSA Reciprocal Meat Conference, Fargo, ND.
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59. Ponce, J.A., **J.F. Legako**, and J.C. Brooks. 2018. Beef muscle and packaging influence descriptive sensory attributes. J. Anima. Sci. 96(Supplement 1):29.
60. Cramer, T., **J.F. Legako**, J.A. Ponce, and J.C. Brooks. 2018. Effects of packaging conditions on volatile compounds of raw beef from two muscles. J. Anima. Sci. 96(Supplement 1):29.
61. Foraker, B.A., D.R. Woerner, D.A. Gredell, **J.F. Legako**, J.D. Tatum, J.N. Martin, R.J. Delmore, A. Heuberger, and K.E. Belk. 2018. Identifying the influence of post-mortem aging length and method on flavor and tenderness of beef strip loins. Reciprocal Meat Conference, Kansas City, MO.
62. Mahalitic, E.N., M.M. Brashears, **J.F. Legako**, J.C. Brooks, and M.F. Miller. 2018. Effects of lactic acid dipped beef trim stored 24 or 48 h and chub storage duration on ground beef color in retail display. Reciprocal Meat Conference, Kansas City, MO.
63. Mallick, S., D.R. Woerner, M.F. Miller, and **J.F. Legako**. 2018. The influence of rate of cooking, cooking temperature, and degree of doneness on volatile compounds related with flavor and tenderness. Reciprocal Meat Conference, Kansas City, MO.
64. Bendele, C., A.J. Garmyn, T.G. O'Quinn, **J.F. Legako**, J.C. Brooks, R.J. Polkinghorne, K. Spivey, and M.F. Miller. 2018. New Zealand and U.S. consumer assessment of various slow cooked muscles from New Zealand Beef. Reciprocal Meat Conference, Kansas City, MO.
65. Cramer, T., **J.F. Legako**, and J.C. Brooks. 2018. Influence of packaging and retail display lighting on beef flavor and sensory attributes. Reciprocal Meat Conference, Kansas City, MO.
66. Milopoulos, J.T., B.M. Koch, M.F. Miller, Jr., **J.F. Legako**, S.K. Duckett, and M.F. Miller. 2018. Duration of exposure to a high-concentrate diet prior to pasture-

- finishing affects fatty acid composition and volatile compounds of beef strip loin steaks. Reciprocal Meat Conference, Kansas City, MO.
67. Voegele, H.R., N.C. Hardcastle, **J.F. Legako**, A.J. Garmyn, M.M. Brashears, and M.F. Miller. 2018. Fatty acid composition of Honduran beef from various finishing diets. Reciprocal Meat Conference, Kansas City, MO.
 68. Setyabrata, D., J. Lee, S. Martini, **J. Legako**, T.J.P. Sobreira, and Y.H. Kim. 2018. Further investigations of dry-aging impacts on palatability attributes and metabolomics profiles of beef loins. Reciprocal Meat Conference, Kansas City, MO.
 69. Lucherck, L.W., T.G. O'Quinn, **J.F. Legako**, J.C. Brooks, and M.F. Miller. 2018. Lipid oxidation of American grain-fed and New Zealand grass-fed strip loins varying in aging time and marbling level. Reciprocal Meat Conference, Kansas City, MO.
 70. Smith, C.L., **J.F. Legako**, K.E. Hanlon, T.A. Cramer, M.M. Brashears, M.F. Miller, and J.C. Brooks. 2018. Impact of retail display case lighting and packaging type on microbial growth and beef color. Reciprocal Meat Conference, Kansas City, MO.
 71. Hardcastle, N.C., A.J. Garmyn, **J.F. Legako**, M.M. Brashears, and M.F. Miller. 2018. The effects of finishing diet and enhancement on the composition and objective measures of tenderness of Honduran Beef. Reciprocal Meat Conference, Kansas City, MO.
 72. Ponce, J., J.C. Brooks, M.F. Miller, and **J.F. Legako**. 2018. Measures of oxidation in beef following retail display in various packaging types. Reciprocal Meat Conference, Kansas City, MO.
 73. Rizzieri, R.A., C.F. Costa, G.F. Melo, L.R. Muller, A. Perdigao, M. Zanata, R.D.L. Pacheco, **J. Legako**, D.D. Millen, C.L. Martins, and M.D.B. Arrigoni. 2018. Fatty acid profile of Nellore bulls supplemented with different fat sources during feedlot finishing. Reciprocal Meat Conference, Kansas City, MO.
 74. Vierck, K.R., J.C. Brooks, and **J.F. Legako**. 2018. Impact of dry heat cookery method on consumer ratings of beef strip loin steaks following sous vide preparation. Reciprocal Meat Conference, Kansas City, MO.
 75. Poli, C., K.J. Thornton-Kurth, **J.F. Legako**, C. Bremm, V.S. Hampel, J. Hall, I.R. Ipharraguerre, J.J. Villalba. 2018. Self-selection of plant bioactive compounds by sheep in response to challenge infection with *Haemonchus contortus*. ASAS-CSAS Annual Meeting, Vancouver, Canada.
 76. Urso, P.M., J. Kim, **J.F. Legako**, M.M. Beverly, S.F. Kelley, M.J. Anderson, K.B. Wellmann, and B.J. Johnson. 2018. The effects of supplementing olive pomace on serum and tissue fatty acid composition in Spanish goats. ASAS-CSAS Annual Meeting, Vancouver, Canada.
 77. Ineck, N.E., R.G. Christensen, S.M. Quarnberg, K.A. Rood, C.E. Carpenter, **J.F. Legako**, and K.J. Thornton. 2018. Impacts of bovine maternal nutrition on muscle fiber type in skeletal muscle of the progeny. ASAS-CSAS Annual Meeting, Vancouver, Canada.

78. Briggs, R.K., R.G. Christensen, **J.F. Legako**, and K.J. Thornton. 2018. Determination of the role of small heat shock proteins and oxidation in the development of beef tenderness. Animal, Dairy, and Veterinary Sciences Research Symposium, Utah State University, Logan, UT.
79. Vierck, K.R., J.C. Brooks, M.F. Miller, and **J.F. Legako**. 2018. Consumer sensory evaluation of six beef muscles cooked with multiple dry heat methods. International Congress of Meat Science and Technology, Melbourne, Australia.
80. Lucherck, L.W., T.G. O'Quinn, **J.F. Legako**, A.J. Garmyn, J.C. Brooks, and M.F. Miller. 2018. Slice shear force of grass- and grain-finished beef strip loin steaks varying in marbling level and aging time. International Congress of Meat Science and Technology. Melbourne, Australia.
81. Farmer, L.J., F.S. Chong, T.D.J. Hagan, and **J.F. Legako**. 2019. Accessible protocols for international research on meat flavor marker compounds. Wartburg Symposium on Flavor Chemistry & Biology, Eisenach, Germany.
82. Vierck, K.R., **J.F. Legako**, and J.C. Brooks. 2019. Cooking method and beef flavor: a multivariate approach. American Society of Animal Sciences Southern Section Meeting. Oklahoma City, OK.
83. Chong, F.S., J.P. Kerry, M.G. O'Sullivan, **J. Legako**, T.D.J. Hagan, and L.J. Farmer. 2019. Effect of ageing period on volatile flavour compounds in cooked beef. International Congress of Meat Science and Technology. Potsdam, Germany.
84. **Legako, J.F.** 2019. Effect of altering fatty acid profile on fresh meat palatability. ASAS-CSAS Annual Meeting, Austin, TX.
85. Ineck, N.E., R.G. Christensen, S.M. Quarnberg, K.A. Rood, C.E. Carpenter, **J.F. Legako**, and K.J. Thornton. 2019. Effects of bovine maternal nutrient restriction on offspring microRNA and mRNA expression and muscle fiber type. ASAS-CSAS Annual Meeting, Austin, TX.
86. Briggs, R.K., **J.F. Legako**, P.R. Broadway, J.A. Carroll, N.C. Burdick-Sanchez, Z.K. Smith, and K. J. Thornton. 2019. Effects of pre-mortem stress on heat shock protein expression in the longissimus lumborum following harvest. ASAS-CSAS Annual Meeting, Austin, TX.
87. Conn, B.J., P. Snokhous, S.F. Kelley, M. Beverly, M. Anderson, **J.F. Legako**. 2019. Fat analysis and sensory trial on Gallus gallus domesticus fed olive pomace. ASAS-CSAS Annual Meeting, Austin, TX.
88. Setyabrata, D., S. Xue, T. Cramer, K. Vierck, **J.F. Legako**, and Y.H. Kim. 2019. Impacts of various dry-aging methods on meat quality and palatability attributes of beef loins from cull cow. Reciprocal Meats Conference. Ft. Collins, CO.
89. Lucherck, L.W., T.G. O'Quinn, **J.F. Legako**, J.C. Brooks, and M.F. Miller. 2019. Comparison of fatty acid content between New Zealand Grass-fed and American Grain-fed beef strip loins varying in marbling level. Reciprocal Meats Conference. Ft. Collins, CO.

90. Hall, H.R., C.A. Sepulveda, A.J. Garmyn, **J.F. Legako**, and M.F. Miller. 2019. Effects of dry heat cooking method and quality grade on the composition and objective tenderness and juiciness of beef strip loin steaks. Reciprocal Meats Conference. Ft. Collins, CO.
91. Musa, O.E., A.J. Garmyn, **J.F. Legako**, D.R. Woerner, and M.F. Miller. 2019. Effects of extended aging on the flavor characteristics of grass and grain fed Australian beef longissimus thoracis. Reciprocal Meats Conference. Ft. Collins, CO.
92. Evers, D., A.J. Garmyn, **J.F. Legako**, D.R. Woerner, and M.F. Miller. 2019. Sensory descriptive attributes of grass and grain-fed Australian beef longissimus lumborum after extended wet-aging periods. Reciprocal Meats Conference. Ft. Collins, CO.
93. Pena, C., T. Cramer, B. Schilling, R. Miller, C. Kerth, **J. Legako**, D. Woerner, M. Nair, and J. Brooks. 2019. Beef flavor evaluation on top loin streaks, sirloin steaks, chuck roasts, and 80/20 ground beef over the retail case. Reciprocal Meats Conference. Ft. Collins, CO.
94. Milopoulos, J.T., M.R. Phelps, A.J. Garmyn, **J.F. Legako**, J.C. Brooks, and M.F. Miller. 2019. Volatile compounds of lamb longissimus and semimembranosus from Australia, New Zealand, and the United States. Reciprocal Meats Conference. Ft. Collins, CO.
95. Beyer, E.S., M.F. Miller, T.H. Davis, and **J.F. Legako**. 2019. The effect of grain and grass fed beef and chicken breasts consumption on the functional connectivity in the brain using resting state functional magnetic resonance imaging. Reciprocal Meats Conference. Ft. Collins, CO.
96. Fletcher, W.T., N.C. Fletcher, A.J. Garmyn, **J.F. Legako**, D.R. Woerner, and M.F. Miller. 2019. Investigation of beef brisket palatability from three USDA quality grades. Reciprocal Meats Conference. Ft. Collins, CO.
97. Sepulveda, C.A., A.J. Garmyn, **J.F. Legako**, and M.F. Miller. 2019. Effects of dry heat cookery method and quality grade on the palatability of beef strip loin steaks. Reciprocal Meats Conference. Ft. Collins, CO.
98. Cramer, T., **J.F. Legako**, and J.C. Brooks. 2019. Retail display lighting and packaging type may influence beef flavor and oxidative stability. Reciprocal Meats Conference. Ft. Collins, CO.
99. Dang, D., R. Briggs, **J. Legako**, K. Thornton, and S. Matarneh. 2019. The influence of muscle fiber type on beef tenderness. Reciprocal Meats Conference. Ft. Collins, CO.
100. Vierck, K.R., **J.F. Legako**, and J.C. Brooks. 2019. Impact of packaging and muscle type on beef flavor development. Reciprocal Meats Conference. Ft. Collins, CO.
101. Vierck, K.R., **J.F. Legako**, and J.C. Brooks. 2019. High oxygen packaging is detrimental to beef flavor and tenderness. ASAS-CSAS Annual Meeting, Austin, TX.
102. Setyabrata, D., S. Xue, K. Vierck, T. Cramer, **J. Legako**, and Y.H. Kim. 2019. Impacts of various dry-aging methods on meat quality and palatability attributes of

- beef loins from cull cow. International Congress of Meat Science and Technology. Potsdam, Germany.
103. **Legako, J.F.** 2020. Beef flavor chemistry and how it influences sensory perception. ASAS-CSAS Annual Meeting, Virtual.
 104. Tilton, T.J., L.W. Lucherk, T.G. O'Quinn, **J.F. Legako**, J.C. Brooks, and M.F. Miller. 2020. Relationship of volatile compounds and consumer sensory traits from New Zealand grass-fed and American grain-fed beef strip loins varying in marbling level and wet aging time. 66th International Congress of Meat Science and Technology – 73rd Reciprocal Meats Conference, Virtual.
 105. Bachler, J.T., **J.F. Legako**, and J.C. Brooks. 2020. Effects of aging on flavor attributes of single vacuum packaged beef steaks after wet aging. 66th International Congress of Meat Science and Technology – 73rd Reciprocal Meats Conference, Virtual.
 106. Gubbels, E., R.R. Salverson, C.L. Wright, K.M. Cammack, **J.F. Legako**, Z.K. Smith, J.K. Grubbs, K.R. Underwood, K.C. Olson, and A.D. Blair. 2020. Comparison of winter cow feeding strategies on offspring carcass characteristics and meat quality. 66th International Congress of Meat Science and Technology – 73rd Reciprocal Meats Conference, Virtual.
 107. Fletcher, W.T., B. Mills, A.J. Garmyn, **J.F. Legako**, D.R. Woerner, J.C. Brooks, and M.F. Miller. 2020. Investigation of rapid evaporative ionization mass spectrometry (REIMS) to characterize beef briskets. 66th International Congress of Meat Science and Technology – 73rd Reciprocal Meats Conference, Virtual.
 108. Vierck, K.R., **J.F. Legako**, J. Kim, B.J. Johnson, and J.C. Brooks. 2020. Packaging type impacts protein degradation and free amino acid production during postmortem storage in beef steaks. 66th International Congress of Meat Science and Technology – 73rd Reciprocal Meats Conference, Virtual.
 109. Hardcastle, N.C., **J.F. Legako**, J.C. Brooks, M.F. Miller, S.R. Pohlman, S.R. Howard, G. Dolezal, and D.R. Woerner. 2020. Beef abattoir water usage may be reduced through low-volume spray chilling without detrimental impacts on beef quality or salable yield. 66th International Congress of Meat Science and Technology – 73rd Reciprocal Meats Conference, Virtual.
 110. Mahagan, K.T., A.J. Garmyn, **J.F. Legako**, and M.F. Miller. 2020. A comparison of consumer response using paper and digital ballots for eating quality assessment of beef steaks. 66th International Congress of Meat Science and Technology – 73rd Reciprocal Meats Conference, Virtual.
 111. Barker, S.N., **J.F. Legako**, J.C. Brooks, and D.R. Woerner. 2020. Retail lighting and postmortem aging impact the palatability of vacuum packaged beef steaks. 66th International Congress of Meat Science and Technology – 73rd Reciprocal Meats Conference, Virtual.

112. Setyabrata, D., S. Xue, K. Vierck, **J. Legako**, B.R. Cooper, T.J. Sobreira, and Y.H.B. Kim . 2020. Investigation into mechanisms underpinning dry-aging impacts on beef quality attributes and flavor-related compounds. 66th International Congress of Meat Science and Technology – 73rd Reciprocal Meats Conference, Virtual.
113. Janssen, J.K., K.M. Cammack, **J.F. Legako**, J.K. Grubbs, K.R. Underwood, J. Hansen, C. Kruse, and A.D. Blair. 2020. Influence of bison finishing systems on carcass characteristics and meat quality. 66th International Congress of Meat Science and Technology – 73rd Reciprocal Meats Conference, Virtual.
114. Barker, S.N., **J.F. Legako**, J.C. Brooks, D.R. Woerner. 2021. Retail lighting and postmortem aging impact the flavor compounds of vacuum packaged beef steaks. Reciprocal Meat Conference, Reno, NV.
115. Clancy, M.D., J.C. Sarchet, E.R. Bechtold, D.A. Gredell, **J.F. Legako**, J.C. Brooks, M.F. Miller, and D.R. Woerner. 2021. Measuring the repeatability and accuracy of rapid evaporative ionization mass spectrometry (REIMS) using pork and multiple prediction techniques. Reciprocal Meat Conference, Reno, NV.
116. Horton, T.M., **J.F. Legako**, D.A. Gredell, B.A. Foraker, J.C. Brooks, S.D. Shackelford, T.L. Wheeler, M.F. Miller, D.R. Woerner. 2021. Evaluating the ability of rapid evaporative ionization mass spectrometry (REIMS) to quantify compounds related to beef quality. Reciprocal Meat Conference, Reno, NV.
117. Frink, J.L., H.M. Frobose, B.A. Foraker, L.K. Fuemiss, S.T. Howard, **J.F. Legako**, B.J. Johnson, M.F. Miller, and D.R. Woerner. 2021. Influence of sire breed of beef x dairy crossbred cattle on carcass traits, muscle fiber properties and eating quality. Reciprocal Meat Conference, Reno, NV.
118. Clancy, M.D., D.A. Gredell, T.M. Horton, B.A. Foraker, E.R. Bechtold, K. Underwood, B. Fields, M.F. Miller, **J.F. Legako**, D.R. Woerner. 2021. Real-time prediction of pork loin quality and palatability by metabolomic profile collected by rapid evaporative ionization mass spectrometry. Reciprocal Meat Conference, Reno, NV.
119. Moore, A.K., M.S. Hernandez, D.A. Vargas, D.R. Woerner, J.C. Brooks, **J.F. Legako**. 2021. Storage temperature and duration impact spoilage organism growth in vacuum packaged beef strip loins. Reciprocal Meat Conference, Reno, NV.
120. Foraker, B.A., B.J. Johnson, **J.F. Legako**, J.C. Brooks, R.J. Rathmann, M.F. Miller, D.R. Woerner. 2021. Divergent phenotypes of crossbred beef x dairy cattle minimally influence eating quality and carcass performance. Reciprocal Meat Conference, Reno, NV.
121. Frazier, K.N., T.M. Horton, T.L. Wheeler, S.D. Shackelford, D.A. King, **J.F. Legako**, J.C. Brooks, M.F. Miller, D.R. Woerner. 2021. 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. Reciprocal Meat Conference, Reno, NV.

122. Frink, J.L., C.A. Mairena, B.A. Foraker, L.K. Fuerniss, S.T. Howard, **J.F. Legako**, B.J. Johnson, M.F. Miller, D.R. Woerner. 2021. Characterizing carcass conformation, quality attributes and muscle fiber properties of beef x dairy crossbred cattle. Reciprocal Meat Conference, Reno, NV.
123. Loomas, K.R., S.E. Blandon, D.A. Vargas, D.E. Casas, A. Echeverry, M.F. Miller, C.E. Carpio, M.X. Sanchez-Plata, **J.F. Legako**. 2021. Efficacy of lactic acid interventions at and above regulatory allowable uptake levels on the reduction of pathogenic bacteria. Reciprocal Meat Conference, Reno, NV.
124. Tuell, J.R., M.J. Nondorf, M. Abdelhaseib, D. Setyabrata, **J.F. Legako**, Y.H.B. Kim. 2021. Muscle-specific impacts of fresh beef tumbling on meat quality, palatability, and proteolytic attributes of sirloin muscles. Reciprocal Meat Conference, Reno, NV.
125. Hernandez, M.S., D.R. Woerner, J.C. Brooks, **J.F. Legako**. 2021. Descriptive and consumer sensory characterization of beef strip loins wet aged in different temperature environments and duration. Reciprocal Meat Conference, Reno, NV.
126. Barker, S.N., T.C. Jackson, J.T. Richeson, J.A. Carroll, N.C. Burdick Sanchez, P.R. Broadway, **J.F. Legako**. 2022. Evaluation of antioxidant capacity in receiving beef calves challenged with lipopolysaccharide (LPS). American Society of Animal Science Annual Meeting. Lexington, KY.
127. Frazier, K.N., **J.F. Legako**, J.C. Brooks, M.F. Miller, D.R. Woerner. 2022. An assessment of carcass hot fat trimming to improve carcass composition, quality and chilling rate. Reciprocal Meat Conference, Des Moines, IA.
128. Frobose, H., A. Norwood, A. Petry, D. Gredell, **J.F. Legako**, M.F. Miller, J.C. Brooks, D.R. Woerner. 2022. Evaluating the effect of diet and sex on fresh pork belly and bacon characteristics. Reciprocal Meat Conference, Des Moines, IA.
129. Teterud, C.N., S. Hernandez, **J.F. Legako**. 2022. Characterizing the volatile flavor profile of beef liver to elucidate the development of liver-like flavor in whole muscle beef cuts. Reciprocal Meat Conference, Des Moines, IA.
130. Wilson, R., J.C. Sarchet, T.M. Horton, **J.F. Legako**, M.F. Miller, J.C. Brooks, D.R. Woerner. 2022. Evaluating variance (CV) of metabolic profiles of beef generated by rapid evaporative ionization mass spectrometry (REIMS). Reciprocal Meat Conference, Des Moines, IA.
131. Horton, T.M., A. Mendizabal, B.N. Harsh, A.C. Dilger, **J.F. Legako**, M.F. Miller, J.C. Brooks, D. Boler, D.R. Woerner. 2022. Separation of pork loins and chops using rapid evaporative ionization mass spectrometry (REIMS) effect on quality and sensory attributes. Reciprocal Meat Conference, Des Moines, IA.
132. Frobose, H.M., T.A. Whitewood, A.L. Petry, J.C. Brooks, D.A. Gredell, **J.F. Legako**, M.F. Miller, D.R. Woerner. 2022. Evaluating rapid evaporative ionization mass spectrometry (REIMS) as a novel, minimally invasive, real-time method for assessing

- pork belly quality and fat composition. Reciprocal Meat Conference, Des Moines, IA.
133. Blandon, S.E., D.A. Vargas, M.F. Miller, C.E. Carpio, M.X. Sanchez- Plata, **J.F. Legako**. 2022. Effect of Antimicrobial interventions at and above regulatory levels on the quality of ground beef. Reciprocal Meat Conference, Des Moines, IA.
 134. Thompson, T., **J.F. Legako**, J.C. Brooks, M.F. Miller, D.R. Woerner. 2022. Determination of optimum practices of beef steaks. Reciprocal Meat Conference, Des Moines, IA.
 135. Frazier, K.N., **J.F. Legako**, J.C. Brooks, M.F. Miller, D.R. Woerner. 2022. An assessment of carcass hot fat trimming to improve carcass composition, quality, and chilling rate. Reciprocal Meat Conference, Des Moines, IA.
 136. Barker, S.N., **J.F. Legako**, K.E. Hales, N.S. Long, J.A. Carroll, N.C. Burdick Sanchez, P.R. Broadway. 2022. Preharvest health treatment effects on post-harvest tenderness, lean color, and antioxidant capacity. Reciprocal Meat Conference, Des Moines, IA.
 137. Loomas, K., S. Hernandez, D. Woerner, C. Brooks, **J. Legako**. 2022. Lipid profile in ground beef compared to plant-based protein alternatives. Reciprocal Meat Conference, Des Moines, IA.
 138. Hernandez, S., B. White, **J. Legako**. 2022. Development of volatile flavor compounds in wet pet food processed at different retort parameters. Reciprocal Meat Conference, Des Moines, IA.
 139. Hernandez, S., D.R. Woerner, J.C. Brooks, **J.F. Legako**. 2022. Comparison of the volatile flavor profile of ground beef and plant-based meat alternatives. Reciprocal Meat Conference, Des Moines, IA.
 140. Sarchet, J.C., M. Hernandez- Sintharakao, M.N Nair, D.A. Gredell, **J.F. Legako**, M.F. Miller, J.C. Brooks, D.R. Woerner. 2022. Predicting animal identity and age of longissimus lumborum steaks using rapid evaporative ionization mass spectrometry (REIMS). Reciprocal Meat Conference, Des Moines, IA.
 141. Cooke, M., J.C. Brooks, **J. Legako**, M.F. Miller, D.R. Woerner. 2022. The effects of grind plate size, blend time, and patty-forming equipment on ground beef texture. Reciprocal Meat Conference, Des Moines, IA.
 142. Barker, S.N., T.C. Jackson, J.T. Richeson, J.A. Carroll, N.C. Burdick Sanchez, P.R. Broadway, **J.F. Legako**. 2022. Evaluation of plasma oxidation products in beef calves challenged with lipopolysaccharide (LPS) following methionine supplementation. American Society of Animal Science Annual Meeting. Oklahoma City, OK.
 143. Bowen, B.M., C. Sassar, N.C. Burdick Sanchez, P.R. Broadway, J.A. Carroll, **J.F. Legako**, A.L. Petry. 2023. Investigating the role of soybean meal and its innate bioactive compounds on nursery pig systemic health, inflammatory markers, and

- gastrointestinal physiology. Accepted for oral presentation at the 2023 ASAS Midwest Meetings.
144. Bowen, B.M., C. Sassar, N.C. Burdick Sanchez, P.R. Broadway, J.A. Carroll, **J.F. Legako**, A.L. Petry. 2023. Evaluating the influence of soybean meal and its bioactive compounds on nutrient utilization, fermentation, and gastrointestinal metabolites of nursery pigs. Accepted for oral presentation at the 2023 ASAS Midwest Meetings.
 145. Mitchell, T.M., N.C. Burdick Sanchez, J.A. Carroll, P.R. Broadway, **J.F. Legako**, Amy L. Petry. 2023. Assessing the ability to immunomodulate the innate immune system and oxidative status of weaned pigs through a prenatal lipopolysaccharide challenge. Accepted for oral presentation at the 2023 ASAS Midwest Meetings.
 146. Self, R.M., B.M. Bowen, K. Miller, T.M. Mitchell, T.A. Crome, H. Miller, **J.F. Legako**, A.L. Petry. 2023. The effect of soybean meal and its functional compounds on growth performance, fecal scores, and fecal characteristics of nursery pigs. Accepted for poster presentation at the 2023 ASAS Midwest Section Meetings.
 147. Kohl, K.B., N.C. Burdick Sanchez, P.R. Broadway, J.A. Carroll, **J.F. Legako**, S.N. Barker, T. Dobbins, S. Hernandez, K. Loomas, C.L. Bratcher. 2023. Impact of different stressors on physiological and immunological variables. ASAS Southern Section Meetings.
 148. Beer, L.C., M.S. Hernandez, A. Gorman, **J.F. Legako**, L. Lambrakis, and B.L. White. 2023. Raw material shelf life impacts the performance and palatability of pet food. Oral Presentation. Petfood Forum. Kansas City, MO.
 149. White, B.L., L.C. Beer, M.S. Hernandez, **J.F. Legako**, W. Nelson, J. Kraus, and L. Lambrakis. 2023. Wet pet food processing influences nutrient retention, finished product characteristics, and feline palatability. Petfood Forum. Kansas City, MO.
 150. Setyabrata, D., J. Rodriguez, A. Rivera Pitti, C. Taylor, T. Dobbins, P. Dias Morse, K.R. Vierck, J.W. Yancey, **J.F. Legako**. 2023. Impact of product size and subsequent consumer freezing on color and water holding capacity of different beef muscles. Reciprocal Meat Conference. St. Paul, MN.
 151. Loomas, K., D. Woerner, B. Boher, T. Brown, H. Bruce, M. Duarte, **J. Legako**. 2023. Evaluation of rapid evaporative ionization mass spectrometry (REIMS) for slice shear force tenderness category predication in beef steaks. Reciprocal Meat Conference. St. Paul, MN.
 152. Dobbins, T.W., M.S. Hernandez, N.C. Burdick Sanchez, P.R. Broadway, J.A. Carroll, T.M. Mitchell, **J.F. Legako**. 2023. Metabolic profiling of the longissimus dorsi of weaned piglets following pre-and postnatal lipopolysaccharide challenges. Reciprocal Meat Conference. St. Paul, MN.
 153. Hernandez, M.S., D.R. Woerner, J.C. Brooks, M.F. Miller, **J.F. Legako**. 2023. Descriptive flavor and texture profile of ground beef and plant-based meat alternatives. Reciprocal Meat Conference. St. Paul, MN.
 154. Hernandez, S., D.R. Woerner, J.C. Brooks, M.F. Miller, **J.F. Legako**. 2023. Influence of wet aging temperature and duration on vacuum-packaged beef longissimus and exudate. Reciprocal Meat Conference. St. Paul, MN.

155. Sepulveda, C.A., D.R. Woerner, **J.F. Legako**, M.F. Miller. 2023. Use of principal component analysis (PCA) to visualize a trained panel strip loin evaluation data. Reciprocal Meat Conference. St. Paul, MN.
156. Carlock, A., M. Miller, C. Sepulveda, **J. Legako**, D. Woerner. 2023. Trained sensory evaluation of beef longissimus lumborum steaks from varying quality grades. Reciprocal Meat Conference. St. Paul, MN.
157. Mairena, C.A., T.M. Horton, M.F. Miller, B.J. Johnson, **J.F. Legako**, M.N. Nair, C. Brooks, D.R. Woerner. 2023. Evaluating the impact of early postmortem temperature variation on beef muscle tenderness and color development. 2023. Reciprocal Meat Conference. St. Paul, MN.
158. Barker, S.N., N.S. Long, K.E. Hales, J.A. Carroll, N.C. Burdick Sanchez, P.R. Broadway, **J.F. Legako**. 2023. Principal component analysis of measures of meat quality related with incidence of bovine respiratory disease (BRD). Reciprocal Meat Conference. St. Paul, MN.
159. Eckhardt, M., T. Brand, S. Hernandez, **J. Legako**, T. Lawrence, S. Salami, B. Tas, T. Tennant, L. Lucherik. 2023. Effect of garlic-citrus cattle feed supplementation upon consumer sensory evaluation, descriptive trained sensory evaluation, and volatile analyses of beef steaks and patties. Reciprocal Meat Conference. St. Paul, MN.
160. Wagner, R.P., T.M. Hays, T.M. Horton, W.C. Kayser, P.J. Rincker, J.C. Brooks, **J.F. Legako**, M.F. Miller, B.J. Johnson, D.R. Woerner. 2023. Effects of lubabegron fed to Holstein steers during the finishing period on beef quality and sensory components. Reciprocal Meat Conference. St. Paul, MN.
161. Norwood, A., A. Mendizabal, T.M. Horton, B.A. Foraker, C.E. Carpio, **J.F. Legako**, J.C. Brooks, M.F. Miller, D.R. Woerner. 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. 2023. Reciprocal Meat Conference. St. Paul, MN.
162. Wilson, R., T.G. Nagarja, M. Enns, S. Speidel, W.L. Crossland, J.O. Sarturi, **J.F. Legako**, M.F. Miller, J.C. Brooks, B.J. Johnson, D.R. Woerner. 2023. Effects of liver abscess on carcass performance in beef x dairy crossbred cattle. Reciprocal Meat Conference. St. Paul, MN.
163. Cooke, M.E., K.N. Frazier, T.M. Horton, J.C. Brooks, **J.F. Legako**, M.F. Miller, D.R. Woerner. 2023. An assessment of carcass hot fat trimming to improve carcass chilling and carcass quality. Reciprocal Meat Conference. St. Paul, MN.
164. Carpenter, B.J., T.W. Dobbins, M.S. Hernandez, S.N. Barker, K.R. Loomas, **J.F. Legako**. 2023. Evaluation of ground beef color under nitric oxide modified atmosphere in comparison with carbon monoxide, and high oxygen modified atmospheres. Reciprocal Meat Conference. St. Paul, MN.
165. Sarchet, S.L., D.R. Woerner, **J.F. Legako**, J.C. Brooks, M.F. Miller. 2023. Profiling sensory and microbial characteristics associated with the shelf- life of bulk packaged, previously frozen, enhanced USDA choice beef sirloin steaks. Reciprocal Meat Conference. St. Paul, MN.

Invited

Technical reports: total of 1

1. **J. F. Legako.** 2016. Elucidation of beef flavor character from flavor precursor compounds. White Paper - National Cattlemen's Beef Association. Centennial, CO.

Other publications: total of 12

1. McClellan, J., **J.F. Legako**, S. Martini, K. Allen, and H. Ban. 2015. "Physical, thermal properties of beef steaks within different quality grades" The National Provisioner <https://www.provisioneronline.com/articles/102560-physical-thermal-properties-of-beef-steaks-within-different-quality-grades>.
2. **Legako, J.F.** 2016. "Not all forage-finished beef is created equal" Hay & Forage Grower Aug./Sep. 2016: 31(5).
3. Martini, S. and **J.F. Legako**. 2017. "Flavor profile of meats: developing a lexicon and understanding flavor differences between grass- and grain-fed beef" Inform Magazine – Latin America Update Feb. 2017: 28(2).
4. **Legako, J.F.** 2018. "Myth: A product spoils on the date listed on the package" Meat Mythercrushers <https://www.youtube.com/watch?v=rJlJb3v95VE&feature=youtu.be>.
5. **Legako, J.F.** 2019. "Consumer appeal: The role of color in meat flavor and palatability" Meatingplace <https://www.meatingplace.com/Industry/TechnicalArticles/Details/85002>.
6. Gredell, D.A., J.H. McHenry, D.R. Woerner, **J.F. Legako**, T.E. Engle, J.C. Brooks, J.D. Tatum, and K.E. Belk. 2019. "Utilization of dry-aged beef in premium ground beef blends" The National Provisioner <https://www.provisioneronline.com/articles/107909-utilization-of-dry-aged-beef-in-premium-ground-beef-blends>.
7. Setyabrata, D., J. Lee, S. Martini, **J.F. Legako**, T.J.P. Sobreira, and Y.H. Kim. 2019. "Hunting compounds crucial to dry aging flavor" The National Provisioner <https://www.provisioneronline.com/articles/107279-hunting-compounds-crucial-to-dry-aging-flavor>.
8. Fuhrman, E. (featuring quotes from **J.F. Legako**). 2019. "Use of natural ingredients to extend shelf life of meat products" The National Provisioner <https://www.provisioneronline.com/articles/108278-use-of-natural-ingredients-to-extend-shelf-life-of-meat-products>.
9. Mermelstein, Neil. (featuring quotes from **J.F. Legako**). 2019. "Applying metabolomics to food research" Food Technology Feb. 2019: p. 74-76.
10. Franklin, Aaron, and Jordan Mackay (featuring quotes from **J.F. Legako**). 2019. "Franklin Steak: Dry-aged, Live-fired, Pure Beef." Potter/Ten Speed/Harmony/Rodale. ISBN-13: 9781984857125.
11. **Legako, J.F.**, S. Van Vliet. 2023 "Exploring the Meat Matrix" AMSA- Podcast.
12. Burdick Sanchez, N., T. Mitchell, R. Broadway, A. Petry, **J. Legako**, and J. Carroll. 2024. Changing immunity in piglets prior to birth. National Hog Farmer. Jan./Feb. Issue.

INVITED PRESENTATIONS AND LECTURES total of 24

1. **Legako, J.F.** 2014. Intermountain Beef 3910, Logan, UT. Extension Program. Title: Beef Consumption. Audience: beef producers.
2. **Legako, J.F.** 2014. Simplot Land & Livestock. Grandview, ID. Industry presentation. Title: Beef flavor chemistry. Audience: ownership and industry professionals.
3. **Legako, J.F.** 2015. Multistate Experiment Station Project (W3177), Lincoln, NE. Title: Utah Station Update. Audience: academic professionals.
4. **Legako, J.F.** 2015. Reciprocal Meat Conference, Lincoln, NE. Concurrent Technical Session. Title: The basic science of beef flavor. Audience: animal and meat science professionals.
5. **Legako, J.F.** 2016. Simplot Land & Livestock. Grandview, ID. Industry presentation. Title: Beef research update. Audience: ownership and industry professionals.
6. **Legako, J.F.** 2016. Multistate Experiment Station Project (W3177), St Louis, MO. Title: Utah Station Update. Audience: academic professionals.
7. **Legako, J.F.** 2016. US Meat Export Federation Ground Beef Seminars – Lima, Peru. Audience: restaurant owners, chefs, and meat processors.
8. **Legako, J.F.** 2016. US Meat Export Federation Ground Beef Seminars – Bogota, Colombia. Audience: restaurant owners, chefs, and meat processors.
9. **Legako, J.F.** 2016. US Meat Export Federation Ground Beef Seminars – Medellin, Colombia. Audience: restaurant owners, chefs, and meat processors.
10. **Legako, J.F.** 2017. Charles Sturt University, Wagga Wagga, Australia. Academic presentation. Title: Beef Flavor. Audience: academic professionals and students.
11. **Legako, J.F.** 2017. Reciprocal Meat Conference, College Station, TX. Concurrent Technical Session. Post-mortem product handling and beef flavor chemistry. Audience: animal and meat science professionals.
12. **Legako, J.F.** 2017. Agri-Food and Biosciences Institute, Belfast, Northern Ireland. Workshop, The Science of Flavoursome Beef. Recent beef flavor research. Audience. Academics and industry professionals.
13. **Legako, J.F.** 2018. International Production and Processing Expo, Atlanta, GA. Meat Quality Workshop – The taste of beef. Defining Beef Flavor. Audience: Industry professionals.
14. **Legako, J.F.** 2018. Institute of Food Technologists Annual Event, Chicago, IL. Symposium. The Use of ‘Omics’ for evaluating meat quality – Assessment of meat flavor through metabolomics. Audience: Academics and industry professionals.
15. **Legako, J.F.** 2019. International Production and Processing Expo, Atlanta, GA. Meat Quality Workshop – The taste of beef. Title: Role of color in meat flavor and palatability. Audience: Industry professionals.
16. **Legako, J.F.** 2019 American Society of Animal Science, Austin, TX. Effect of altering fatty acid profile on fresh meat palatability. Audience: Academic and Industry professionals.

17. **Legako, J.F.** 2020 American Society of Animal Science, Virtual. Beef flavor chemistry and how it influences sensory perception. Audience: Academic and Industry professionals.
18. **Legako, J.F.** and S.N. Barker. 2022. USDA-ARS Livestock Issues Research Unit Open House, Lubbock, TX. Collaborative efforts with focus on meat quality. Audience: Academic, Administration, and Industry.
19. **Legako, J.F.** 2022. North American Meat Institute - Meat Industry Safety Conference. Efficacy of common antimicrobial interventions at and above regulatory allowable pick-up levels. Audience: Industry.
20. **Legako, J.F.** 2022. Texas A&M University – Animal Science Graduate Seminar. Evolving to address complex issues in meat science. Audience – faculty and graduate students.
21. **Legako, J.F.** 2023. American Meat Science Association- AMSA Research Forum Discussion. What Parameters are Most Important when Designing Flavor Research. Audience: Academic and Industry professionals.
22. **Legako, J.F.** 2023. Tyson Foods – Lectureship Series. Opportunities to address consumer values through product optimization. Audience: Industry professionals.
23. **Legako, J.F.** 2023. Reciprocal Meats Conference, St. Paul, MN. Concurrent Technical Session - Alteration of Flavor Related Compounds by Fresh Meat Packaging and Storage Conditions. Audience: Academic and Industry professionals.
24. **Legako, J.F.** 2023. Reciprocal Meats Conference, St. Paul, MN. Reciprocation Session - Identifying the Needs for Frozen Beef and Consideration Towards Best Practices. Audience: Academic and Industry professionals.

GRADUATE STUDENT COMMITTEES

Completed:

Chaired: total of 12

M.S.

1. Arkopriya Chail. 2015. *Effects of beef finishing diets and muscle type on meat quality, fatty acids, and volatile compounds.*
2. Jose Gardner. 2017. *Effects of gestational dietary intake during the second trimester on calf growth and early feedlot performance of offspring.*
3. Kourtney Gardner. 2017. *Effect of quality grade, degree of doneness, and grinding on beef flavor development.*
4. ToniRae Gardner. 2017. *Physical and thermodynamic properties of cooked beef steaks of different quality grades, thickness, and grill surface temperatures.*
5. Jacqueline Ponce. 2018. *Impacts of packaging type on beef flavor.*

6. Jessie McClellan. 2019. *The thermal and physical properties of beef steaks based on variations in intramuscular fat and degree of doneness.*
7. Samantha Barker. 2021. *Evaluation of beef steak palatability and flavor contributing compounds following retail display in vacuum rollstock packaging under fluorescent or light emitting diode lighting.*
8. Sebastian Hernandez. 2021. *Influence of aging temperature and duration on spoilage organism growth, proteolytic activity, and related chemical changes in vacuum-packaged beef longissimus.*
9. Sabrina Blandon. 2022. *Efficacy of common antimicrobial interventions at an above regulatory allowable pick-up levels.*
10. Kaitlyn Loomas. 2023. *Evaluation of rapid evaporative ionization mass spectrometry (REIMS) for the prediction of slice shear force and biochemical markers of tenderness in beef Longissimus lumborum steaks.*
11. Ravali Chenchrapu. 2023. Non-thesis.

Ph.D.

1. Kelly Vierck. 2020. *Post-harvest influences on beef flavor development and tenderness.*

Co-chaired: total of 5

M.S.

1. K. Nyquist. 2018. *Palatability and objective juiciness of multiple beef muscles.*
2. R. Priest. 2019. *Flavor profiles and traits of crossbred dairy cattle.*
3. S. Quarnberg. 2019. *Effects of mid-gestation nutrient restriction on carcass measurements and meat quality of resultant offspring.*
4. T. Thompson. 2023. *Determination of Optimum Freezing Practices for Beef Whole Muscle Steaks.*

Ph.D.

1. S. Mallick. 2019. *Effects of oven temperature and degree of doneness in flavor development of beef steaks.*

Committee member of: total of 44

M.S.

1. Lance Pitcher. 2014. *Beef average daily gain and enteric methane emissions on Birdsfoot trefoil, Cicer milkvetch, and Meadow brome pastures.*
2. Abdulla Kahn. 2014. *Effects of processing and packaging modifications on the quality and shelf-life of meats.*

3. Zhou Fang. 2016. *Effects of carboxymethyl-lysine in heat processed foods on plasma metabolome in mice.*
4. Tanner Adams. 2016. *Identifying the influence of cattle production history and lean muscle characteristics on specific beef flavor attributes.*
5. Caroline Kirby. 2016. *Consumer sensory and precursor compound evaluation of three beef muscles from three USDA quality grades aged for two wet-aging periods on beef flavor acceptability.*
6. Jillian Milopoulos. 2018. *Influence of concentrate feeding prior to grass-finishing on beef quality.*
7. Nicholas Hardcastle. 2018. *Palatability of Honduran beef.*
8. Jessie Berger. 2018. *Effect of dry-aging on physicochemical and quality attributes of grass-fed beef loins.*
9. Cesar Sepulveda. 2018. *Effect of cooking method and quality grade on the juiciness, tenderness, and flavor of beef strip loin steaks.*
10. Erin Beyer. 2019. *The effect of grain and grass fed beef and chicken breast consumption on the functional connectivity in the brain using resting functional magnetic resonance imaging.*
11. Tim Musa. 2019. *Effects of extended aging on the flavor characteristics of grass and grain fed Australian beef longissimus thoracis.*
12. Nikole Ineck. 2019. *Effects of bovine maternal nutrient restriction on offspring microRNA, mRNA expression, and muscle fiber type.*
13. Danielle Evers. 2019. *The effects of diet and aging of Australian longissimus lumborum on beef flavor.*
14. Emily Mahalite. 2019. *Effects of lactic acid submersion of beef trimmings stored 24 or 48 h and subsequent chub storage duration on initial ground beef odor and color during retail display.*
15. Tommy Fletcher. 2020. *Investigation of Beef Brisket Palatability from Three USDA Quality Grades.*
16. Cole Perkins. 2020. *The effect of enhancement with a high-oleic sunflower oil emulsion on product composition, fatty acid profile and sensory analysis, in beef strip loins of varying quality.*
17. Kyle Mahagan. 2020. *A comparison of consumer response using paper and digital ballots for eating quality assessment of beef steaks.*
18. Hector Garnica. 2020. *U.S. Consumer Assessment and quality factors of Australian beef navels processed as beef bacon and corned beef.*
19. Taylor Horton. 2020. *Evaluating rapid evaporative ionization mass spectrometry (REIMS) as a novel, real-time method for measuring and predicting beef flavor and nutritional value.*

20. Reganne Briggs. 2020. *Effects of premortem stress on heat shock protein abundance, oxidation, and color in the Longissimus lumborum of Holstein steers following harvest.*
21. Emmy Bechtold. 2021. *Validating the ability of REIMS to differentiate lamb flavor performance based on consumer preference.*
22. Ben Mills. 2021. *Analysis of the 2015 and 2018 National Meat Case Study: Marketing, Packaging Type, and Length of the Retail Case.*
23. Jordan Bachler. 2021. *Effects of aging on flavor attributes of single vacuum packaged beef steaks after wet aging.*
24. Emma Mortensen. 2021. *Nutrient analysis of USDA Prime beef cuts.*
25. Hannah Frobose. 2022. *Evaluating the effect of diet and sex on bacon and fresh pork belly quality and the ability of rapid evaporative ionization mass spectrometry (REIMS) as a novel, minimally invasive, real-time method for assessing pork belly quality and fat composition.*
26. Daniela Chavez-Velado. 2022. *Bio-mapping Salmonella and Campylobacter Loads in three Commercial Broiler Processing Facilities in The United States to Identify Intervention Points and Develop Statistical Process Control Parameters for Food Safety Management.*
27. Nathan Long. 2022. *Investigating the emergence and ecology of antimicrobial resistant Salmonella enterica, Enterococcus spp., and Escherichia coli in high-risk beef cattle.*
28. Chandler Sarchet. 2022. *Evaluating the Ability of Rapid Evaporative Ionization Mass Spectrometry to Predict the Palatability of Long Aged Beef Cuts.*
29. Katherine Bugenhagen. 2022. *Evaluation of extended aging type and cooking practices on palatability of beef steaks.*
30. Shae Lynn Sarchet. 2023. *Using Rapid Evaporative Ionization Mass Spectrometry (REIMS) to Evaluate Shelf Life Characteristics of Previously Frozen, Enhanced USDA Choice Beef Sirloin Steaks.*
31. Marcee Cooke. 2023. *Evaluating the influence of Holstein vs. Angus Dam genetics in Wagyu crossbreeding scenarios on beef quality.*
32. Carlos Mairena Luna. 2023. *Evaluating the impact of early postmortem temperature variation on beef muscle tenderness and color development.*
33. Conner McKinzie. 2023. *Analysis of instrument grading technology on ribeye area predictions AND the effect of bloom time on carcass traits utilizing the VBG-7L and the VBG-SmartCam.*
34. Taylor McKinzie. 2023. *Comparison of beef palatability from young and mature grain fed cattle of varying marbling scores.*

Ph.D.

1. Jeta Kadamine. 2018. *Effect of high intensity ultrasound on the crystallization behavior of interesterified fats.*
2. Loni Lucherck. 2019. *Palatability of grass-finished and grain-finished beef strip loin steaks of varying intramuscular fat levels and wet aging treatments.*
3. Keelyn Hanlon. 2019. *Evaluation of the fresh beef bacterial community through processing retail display conditions using 16S rRNA gene amplification sequencing.*
4. Phil Urso. 2020. *The evaluation of zinc methionine and chromium supplementation on rumen parameters, amino acid uptake, performance, and carcass characteristics in beef steers.*
5. Justin Johnston. 2020. *Investigation of Beef Brisket Palatability From Two Countries: Australia and the United States.*
6. Nicholas Hardcastle. 2020. *Understanding the impact of reduced water use beef spray chilling system on beef carcass quality and saleable yield.*
7. Darwin Cuellar. 2021. *Evaluation of microwave technology as a food safety intervention to reduce pathogenic and spoiling microorganisms.*
8. Derico Setyabrata. 2021. *Characterization of dry-aged meat flavor precursors and liberation mechanism through a metabolomics approach.*
9. Juanfra De Villena. 2022. *Novel Approach for Pathogen Control and Food Safety Management in Poultry Processing: Biomapping Indicator and Pathogen Loads in High and Low Level Antimicrobial Intervention Schemes.*
10. Cesar Sepulveda. 2023. *Evaluation of variability of Rapid Evaporative Ionization Mass Spectrometry (REIMS) applied on different muscles of ribeye roles and strip loin steaks and to determine the ability of REIMS and machine learning algorithms to predict instrumental color and eating quality characteristics.*

External reviewer: total of 0

In Progress:

Chair: total 6

M.S.

- | | |
|-----------------|---|
| 1. N. Koemel | Anticipated completion date: Spring, 2024 |
| 2. B. Carpenter | Anticipated completion date: Spring, 2026 |

Ph.D.

- | | |
|-----------------|---|
| 1. S. Barker | Anticipated completion date: Spring, 2024 |
| 2. S. Hernandez | Anticipated completion date: Spring, 2025 |
| 3. T. Dobbins | Anticipated completion date: Spring, 2026 |
| 4. E. Neal | Anticipated completion date: Spring, 2027 |

Co-chaired: total of 1

M.S.

Ph.D.

1. S. Blandon Anticipated completion date: Spring, 2026

Committee member of: total of 2**M.S.**

1. N.H. Wahyu Firdaus Anticipated completion date: Fall, 2024
2. Reagan Wagner Anticipated completion date: Spring, 2024

Ph.D.

- 1.

Visiting International Graduate Students: total of 1

1. R. Rizzieri, M.S.
São Paulo State University – UNESP
São Paulo, Brazil

Visiting Scientist: total of 0**UNDERGRADUATE ADVISING**

Undergraduate academic advising: Average of 12 Food Science students each academic year since 2017 to 2020.

Undergraduate research mentor: total of 13

1. Tyler Nelson – Food Science, Utah State University
2. ToniRae Gardner – Food Science, Utah State University
3. Jesse Speckman – Mechanical Engineering, Utah State University
4. Nicole Ineck – Animal Science, Utah State University
5. Krista Yardley – Food Science, Utah State University
6. Talya Murphy – Food Science, Utah State University
7. Jeff Briscoe – Animal Science, Utah State University
8. Colton Smith – Food Science, Texas Tech University
9. Alex Moore – Food Science, Texas Tech University
10. Adison, Moyer – Chemical Engineering, Texas Tech University
11. Claire Teterud – Food Science, Texas Tech University
12. Benjamin Carpenter – Food Science, Texas Tech University
13. Ashlynn Messer – Food Science, Texas Tech University

TEACHING RESPONSIBILITIES

1. Courses taught at Texas Tech University
 - a. FDSC 4303/5303 – *Food Chemistry*, 3 credits
 - b. ANSC 5401 – *Experimental Techniques in Meat Chemistry & Muscle Biology*, 4 credits
 - c. FDSC 3302/5302 – *Advanced Food Analysis*, 3 credits
 - d. FDSC 2302 – *Elementary Food Analysis*, 3 credits
 - e. ANSC 3403 – *Selection, Care, Processing, and Cooking of Meats*, 4 credits
 - f. ANSC 5304 – *Animal Growth and Development*, 3 credits
2. Courses taught at Utah State University
 - a. NDSF 5500/6500 – *Food Analysis*, 4 credits
 - b. NDSF 5020/6020 – *Meat Technology & Processing*, 4 credits

**FIVE YEAR SUMMARY OF TEACHING EVALUATIONS FOR
Jerrad F. Legako**

Term/Class	Number of Students	Instructor followed Course objectives <u>Mean</u>	Overall Instructor Effectiveness <u>Mean</u>	Course a valuable learning experience <u>Mean</u>
Spring 2019				
FDSC 2302	10	4.5	4.5	4.5
Summer 2019				
ANSC 5401	6	5.0	4.0	4.3
Fall 2019				
FDSC 4303	22	4.6	4.4	4.4
FDSC 5303	1	Too Few Responses		
Summer 2020				
ANSC 5401	7	4.7	4.3	4.3
Fall 2020				
FDSC 4403	5	4.2	4.2	4.2
FDSC 5403	3	Too Few Responses		
Spring 2021				
FDSC 4402	12	4.7	4.7	4.7
Summer 2021				
ANSC 5401	8	3.7	4.3	4.7
Fall 2021				
FDSC 4403	7	4.8	4.8	4.8
FDSC 5403	2	Too Few Responses		
Spring 2022				

FDSC 4402	7	4.5	4.4	4.4
FDSC 5402	3	Too Few Responses		
ANSC 3403	119	4.1	3.9	3.7
ANSC 5304	15	4.9	4.9	4.6
Summer 2022				
ANSC 3403	53	4.6	4.5	4.3
ANSC 5401	10	4.5	4.4	4.4
Fall 2022				
FDSC 4403	9	4.7	4.3	4.4
FDSC 5403	8	4.9	4.8	4.8
Spring 2023				
FDSC 4402	5	5.0	4.8	4.8
FDSC 5402	12	4.8	4.4	4.6
Summer 2023				
ANSC 3403	56	4.6	4.4	4.4
Fall 2023				
FDSC 4403	3	Too Few Responses		
FDSC 5403	10	4.7	4.7	4.7
Total	381	4.6	4.5	4.5

1 = Strongly disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Strongly agree

Other Teaching Responsibilities

1. Utah State Meat Science Quiz Bowl Team – Advisor, 2014 to 2016.
2. TTU Animal Science Academic Quadrathlon Team – Advisor, 2016 to 2019.

GRANTS AND AWARDS: total funded \$8,628,910

Funded:

2011

1. Brooks, J.C., **J.F. Legako**, M.F. Miller, and T.T.N. Dinh. Prediction of beef flavor by precursor and volatile compounds. National Cattlemen's Beef Association. \$81,759 (\$0; student, Effort % ineligible).

2012

1. Brooks, J.C., K. Adhikari, **J.F. Legako**, T. Dinh, and M.F. Miller. Evaluation of beef strip steaks of three quality grades by trained and consumer panels. National Cattlemen's Beef Association. \$21,478 (\$0; student, Effort % ineligible).

2013

1. Miller, M.F., J.C. Brooks, R. Rathmann, A. Garmyn. T.G. O'Quinn, and **J.F. Legako**. Consumer hedonic evaluation of steaks aged for 14 or 21 days postmortem from high quality, black-hided British finishing steers fed zilpaterol

hydrochloride, ractopamine hydrochloride, or no β -AA. Merck Inc. \$98,640 (\$0; Post-doc, Effort % ineligible)

2. O'Quinn, T.G., **J.F. Legako**, J.C. Brooks, M.F. Miller. Development of an objective measure of beef juiciness that compliments current industry measures of tenderness. National Cattlemen's Beef Association. \$28,500 (\$0; Post-doc, Effort % ineligible).
3. Brooks, J.C., **J.F. Legako**, T.T.N. Dinh, and M.F. Miller. Precursors of beef flavor. National Cattlemen's Beef Association. \$86,438 (\$25,200).
4. Brothersen, C., D. McMahon, **J.F. Legako**, and S. Martini. Comparison of milk oxidation by exposure to LED and fluorescent light. National Dairy Council. \$12,570 (\$1,400).
5. MacAdam, J., S. Martini, and **J.F. Legako**. Sensory and chemical composition of beef from cattle finished on forage and conventional feedlot diets. Utah Agricultural Experiment Station Grants Program. \$20,000 (\$4,000).
6. **Legako, J.F.**, J. MacAdam, and K. Yardley. Comparisons of lipid oxidation products of three beef retail cuts from cattle finished on forage and conventional feedlot diets. Utah State University Undergraduate Research and Creative Opportunities Program. \$500 (\$500).
7. **Legako, J.F.**, J. MacAdam, and T. Murphy. Instrumental color and visual evaluation of three beef retail cuts from cattle finished on forage and conventional diets. Utah State University Undergraduate Research and Creative Opportunities Program. \$500 (\$500).
8. **Legako, J.F.** Relationships between beef palatability, quality and oxidation end-products of conventional and grass-finished beef. Utah Agricultural Experiment Station Project. \$6,000 (\$6,000).

2014

1. **Legako, J.F.**, C. Carpenter, D. Zobell, D. Feuz, and K. Rood. Enhancement of beef carcass quality through fetal programming: adopted to Intermountain West production systems. Utah Agricultural Experiment Station Grants Program. \$20,000 (\$20,000).
2. **Legako, J.F.** Relationships between beef palatability, quality and oxidation end-products of conventional and grass-finished beef. Utah Agricultural Experiment Station Project. \$6,000 (\$6,000).
3. Zobell, D., **J.F. Legako**, C. Carpenter, D. Feuz, and K. Rood. Impacts of calving season and reduced dietary intake during gestation on cows of similar genetics. Utah Extension Grants Program. \$10,000 (\$8,000).
4. Brooks, J.C., **J.F. Legako**, D.R. Woerner, J.D. Tatum, K.E. Belk, R. Miller, C. Kerth, and S. Smith. Investigation of beef flavor. National Cattlemen's Beef Association. \$70,000 (\$0; no sub-contract).
5. Woerner, D.R., **J.F. Legako**, J.D. Tatum, R.J. Delmore, and K.E. Belk. Identifying the influence of cattle production history and lean muscle

characteristics on specific beef flavor attributes. National Cattlemen's Beef Association. \$139,184 (\$40,950).

6. **Legako, J.F.** Elucidation of beef flavor character from flavor precursor compounds. National Cattlemen's Beef Association. \$32,000 (\$32,000).
7. **Legako, J.F.** Beef flavor kinetics and thermophysical properties of whole muscle and ground beef. National Cattlemen's Beef Association. \$106,825 (\$106,825).

2015

1. **Legako, J.F.** Relationships between beef palatability, quality and oxidation end-products of conventional and grass-finished beef. Utah Agricultural Experiment Station Project. \$6,000 (\$6,000).
2. Martini, S., K. Allen, B. Nummer, and **J.F. Legako**. Professional Rancimat. Utah State University Office of Research and Graduate Studies Equipment Grant. \$11,000 (\$0; no-subcontract).
3. **Legako, J.F.** and H. Ban. Thermodynamics of steaks of different thickness and USDA Quality Grade cooked on grills of different temperatures to the same internal temperature. National Cattlemen's Beef Association. \$30,000 (\$30,000).
4. **Legako, J.F.** and T.G. O'Quinn. The effect of beef strip loin enhancement, USDA quality grade and degree of doneness on volatile flavor compounds. National Cattlemen's Beef Association. \$41,089 (\$36,089).
5. Woerner, D.R., **J.F. Legako**, J.D. Tatum, J.N. Martin, R.J. Delmore, and K.E. Belk. Phase I -Identifying the influence of rate of cooking, cooking temperature, and degree of doneness on factors contributing to beef flavor and tenderness. National Cattlemen's Beef Association. \$89,894 (\$0; no sub-contract).
6. **Legako, J.F.** Validation of quantitative methods for determination of heterocyclic amines and polycyclic aromatic hydrocarbons from beef. National Cattlemen's Beef Association. \$11,055 (\$11,055).

2016

1. **Legako, J.F.**, K. Thornton, C. Carpenter, and K. Rood. Impacts of bovine maternal nutrition on progeny gene expression and skeletal muscle ultrastructure during the feedlot growth phase. Utah State University Office of Research and Graduate Studies Research Catalyst Grant. \$20,000 (\$20,000).
2. Ward, R.E., **J.F. Legako**, M. Lefevre, B. Tarbet, and A. Benninghoff. PTV/OCI for GC. Utah State University Office of Research and Graduate Studies Equipment Grant. \$7,341 (\$0; no sub-contract).
3. **Legako, J.F.** and T.G. O'Quinn. Determination of objective and subjective juiciness among multiple beef muscles. \$49,613 (\$39,613).
4. **Legako, J.F.**, D.R. Woerner, J.D. Tatum, J.N. Martin, R.J. Delmore, and K.E. Belk. Phase II -Identifying the influence of rate of cooking, cooking temperature, and degree of doneness on factors contributing to beef flavor and tenderness. National Cattlemen's Beef Association. \$120,417 (\$89,472).

5. Brooks, J.C. and **J.F. Legako**. The influence of meat packaging on beef flavor. National Cattlemen's Beef Association. \$79,205 (\$20,625).
6. Woerner, D.R., D. Gredell, **J.F. Legako**, J.D. Tatum, J.N. Martin, R.J. Delmore, A. Heuberger, and K.E. Belk. Identifying the influence of post-mortem aging length and method on flavor and tenderness of beef strip loins. National Cattlemen's Beef Association. \$45,612 (\$6,400).

2017

1. Brooks, J.C. and **J.F. Legako**. The Influence of Retail Display Lighting and Packaging System on Beef Flavor. National Cattlemen's Beef Association. \$99,512 (\$46,756).
2. **Legako, J.F.** and J.C. Brooks. Studies in cookery and beef flavor development. National Cattlemen's Beef Association. \$94,311 (\$47,155.5).
3. Martini, S., P. Birkin, T. Truscott, C. Akoh, and **J.F. Legako**. Understanding bubble dynamics in fats and oils to improve the physicochemical quality of sonicated lipids. USDA NIFA AFRI – Foundational Program. \$454,404 (\$5,865).
4. Kim, Y., **J.F. Legako**, R. Lemenager, A. Liceaga, M. Singh, B. Cooper, S. Martini, and J. Smith. Value-added beef from low quality beef optimized dry-aging to improve palatability attributes and profitability of cull cow beef. USDA NIFA AFRI – Foundational Program. \$363,822 (\$35,850).

2018

1. Thornton-Kurth, K., **J.F. Legako**, P.R. Broadway, N. Burdock-Sanchez, and J. Carroll. Effects of pre-mortem stress on heat shock protein expression and oxidation relative to meat quality. USDA NIFA AFRI – Foundational Program. \$149,879 (\$10,916).
2. Vierck, K.R., J.C. Brooks, and **J.F. Legako**. Determination of packaging type influence on proteolysis, beef flavor contributing free-amino acids, and final beef flavor character. National Cattlemen's Beef Association. \$51,852 (\$31,111.2)
3. Miller, R.K., C.R. Kerth, D.R. Woerner, J.C. Brooks, and **J.F. Legako**. Beef flavor audit. National Cattlemen's Beef Association. \$243,000 (\$48,750)
4. Miller, R.K., C.R. Kerth, Luis Tedeschi, S.B. Smith, D.R. Woerner, J.C. Brooks, and **J.F. Legako**. Predicting Beef Flavor Differing in Lipid Heat Denaturation and Maillard Reaction Products. National Cattlemen's Beef Association. \$97,300 (\$8,187.5).
5. Woerner, D.R., **J.F. Legako**, J.C. Brooks, J.E. Prenni, T.L. Wheeler, S.D. Shackelford, D.A. King, and K.E. Belk. Evaluating Rapid Evaporative Ionization Mass Spectrometry (REIMS) as a novel, real time method for measuring and predicting beef flavor, tenderness, and nutritional value. National Cattlemen's Beef Association. \$89,980 (\$22,495).

2019

1. Woerner, D.R., **J.F. Legako**, J.C. Brooks, and M.F. Miller. Evaluating REIMS As A Novel, Minimally Invasive, Real Time Method For Predicting The Effects Of

- Aging On Beef Tenderness, Flavor, And Juiciness. USDA NIFA – Cooperative State Research Education and Extension Service. \$293,999 (\$88,199.7).
2. Echeverry, A., D.R. Woerner, **J.F. Legako**, and M.F. Miller. Use of interventions for pork quality: Increasing storage life and safety of fresh head meat and tongues destined for export markets. National Pork Board. \$149,276 (\$29,855).
 3. Woerner, D.R., **J.F. Legako**, J.C. Brooks, B.J. Johnson, and M.F. Miller. Understanding the influence of beef x dairy crossbred cattle on eating quality, retail display life, and chemical composition in beef strip loins. National Cattlemen's Beef Association. \$111,208 (\$13,345).
 4. Woerner, D.R., **J.F. Legako**, J.C. Brooks, and M.F. Miller. Understanding the impact of reduced water use beef spray chilling system on beef carcass quality and saleable yield. National Cattlemen's Beef Association. \$139,202 (\$22,272).
 5. **Legako, J.F.**, J.C. Brooks, and D.R. Woerner. Evaluation of beef steaks in vacuum skin packaging for palatability. National Cattlemen's Beef Association. \$68,578 (\$34,289).
 6. Woerner, D.R., **J.F. Legako**, J.C. Brooks. Validating the ability of REIMS to differentiate lamb flavor performance based on consumer preference. American Lamb Board. \$59,800 (\$17,940).
 7. Woerner, D.R. **J.F. Legako**, and J.C. Brooks. Evaluating Rapid Evaporative Ionization Mass Spectrometry (REIMS) As A Novel, Minimally Invasive, Real Time Method for Accessing Pork Belly Quality and Fat Composition. National Pork Board. \$141,677 (\$43,503).
 8. Sanchez, M., B.J. Johnson, **J.F. Legako**, D.R. Woerner, and M.F. Miller. Quality and Food Safety Assessments of cell based muscle tissue. New Harvest Inc. \$136,500 (\$13,650).

2020

1. **Legako, J.F.**, D.R. Woerner, J.C. Brooks, K. Nightingale, M. Sanchez, and A. Echeverry. Efficacy of common antimicrobial interventions at and above regulatory allowable pick up levels. Foundation for Meat & Poultry Research & Education. \$87,328 (\$43,664).
2. Woerner, D.R., T.L. Wheeler, S.D. Shackelford, D.A. King, **J.F. Legako**, J.C. Brooks, and A. Echeverry. 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. Foundation for Meat & Poultry Research & Education. \$41,687 (\$4,168.7).
3. Woerner, D.R., L.D. Thompson, and **J.F. Legako**. Nutrient analysis of Prime beef cuts. National Cattlemen's Beef Association. \$88,891 (\$8,889.1).
4. **Legako, J.F.**, H. Bruce, B. Bohrer, D.R. Woerner, and T.R. Brown. Validation of rapid evaporative ionization mass spectrometry (REIMS) for tenderness prediction. Canadian Beef Cattle Research Council (BCRC). \$109,328 (\$54,664).
5. **Legako, J.F.**, J.C. Brooks, and D.R. Woerner. Optimization of beef wet aging to maximize tenderness and flavor. National Cattlemen's Beef Association. \$82,640 (\$41,320).

6. Woerner, D.R., **J.F. Legako**, B.J. Johnson, J.C. Brooks, M.F. Miller, R. Rathmann, and K. Hales. Understanding the effect of phenotype expression in the dairy beef model on beef quality. National Cattlemen's Beef Association. \$87,640 (\$8,764).
7. Vierck, K.R., **J.F. Legako**, J.C. Brooks, and D.R. Woerner. Utilization of sous vide cooking applications to improve palatability. Arkansas Beef Council. \$24,500 (\$9,000).
8. Vierck, K.R., and **J.F. Legako**. Determination of eating quality of boneless and bone-in short loins following extended aging. Arkansas Beef Council. \$21,250 (\$5,250).

2021

1. **Legako, J.F.**, D.R. Woerner, and J.C. Brooks. Dissemination of beef palatability research as it relates to cookery. National Cattlemen's Beef Association. \$28,526 (\$19,968).
2. Brooks, J.C., **J.F. Legako**, and D.R. Woerner. Dissemination of beef flavor research. National Cattlemen's Beef Association. \$8,950 (\$1,790).
3. Woerner, D.R., **J.F. Legako**, and J.C. Brooks. Flavor research publication support. National Cattlemen's Beef Association. \$31,312 (\$6,262).
4. **Legako, J.F.** Evaluation of Oxidative Stress Markers in Beef Cattle following a LPS challenge. USDA-ARS. \$30,000 (\$30,000).
5. **Legako, J.F.**, D.R. Woerner, and J.C. Brooks. Sensory and chemical characterization of ground beef and plant-based alternative proteins. National Cattlemen's Beef Association. \$101,594 (\$60,956).
6. Woerner, D.R., **J.F. Legako**, J.C. Brooks, and M.F. Miller. An assessment of carcass hot fat trimming to improve carcass chilling and carcass quality. National Cattlemen's Beef Association. \$45,312 (\$9,062).
7. **Legako, J.F.**, D.R. Woerner, and J.C. Brooks. Determination of optimum practices for frozen whole muscle steaks. National Cattlemen's Beef Association. \$45,309 (\$27,185).
8. Hales, K., D.R. Woerner, **J.F. Legako**, and V. Machado. Novel strategies to improve the understanding of liver abscess formation in beef cattle. Foundation for Food and Agricultural Research. \$250,000 (\$7,500).
9. Woerner, D.R., and **J.F. Legako**. Evaluating the impact of early postmortem temperature variation on beef muscle tenderness and color development. National Cattlemen's Beef Association. \$39,176 (\$9,794).
10. Brooks, J.C., **J.F. Legako**, and D.R. Woerner. National Beef Tenderness Survey. National Cattlemen's Beef Association. \$21,500 (\$7,095).
11. Gifford, C.L., **J.F. Legako**, D.R. Woerner, and N. Moustaid-Moussa. A scoping review of low carbohydrate diets with dietary animal protein components on cardiometabolic risk. National Cattlemen's Beef Association. \$34,606 (\$5,769).

2022

1. **Legako, J.F.**, and D.R. Woerner. Characterization of beef lipids in comparison with plant-based alternatives. National Cattlemen's Beef Association. \$95,798 (\$67,058).
2. Miller, M.F., D.R. Woerner, and **J.F. Legako**. L.GEN.2000 Development of genomic multi-breed eating quality trait estimates using shared global data. Meat & Livestock Australia -Subaward from University of New England, Australia. \$603,960 (\$199,307).
3. **Legako, J.F.**, J.C. Brooks, D.R. Woerner, M. Sanchez, K. Hanlon, and T.R. Brown. Beef quality evaluation following extended storage or double freezing. National Cattlemen's Beef Association. \$59,020 (\$25,412).
4. D. Setyabrata, K.R. Vierck, J.W.S. Yancey, and **J.F. Legako**. Impact of product size and subsequent freezing on meat quality and palatability of different beef muscles. National Cattlemen's Beef Association. \$52,833 (\$9,600).

2023

1. **Legako, J.F.**, D.R. Woerner, M.F. Miller, and J.C. Brooks. Meta-analysis to determine the contribution of intramuscular fat to beef palatability. National Cattlemen's Beef Association. \$10,000 (\$7,000).
2. **Legako, J.F.**, D.R. Woerner, and J.C. Brooks. Evaluating the efficacy of Nitric Oxide-Modified Atmosphere Packaging (NO-MAP). National Cattlemen's Beef Association. \$68,296 (\$47,807).
3. **Legako, J.F.**, D.R. Woerner, M.F. Miller, and J.C. Brooks. Evaluation of beef tissue oxidative status, color stability, and metabolic profile from carcasses of varied instrumental color categories assessed in a commercial processing facility. National Cattlemen's Beef Association. \$74,596 (\$44,757).
4. Vierck, K.R., D. Setyabrata, and **J.F. Legako**. Impact of two retail display case types on the color stability and shelf life of beef steaks in three packaging schemes. National Cattlemen's Beef Association. \$65,048 (\$7,200).
5. Woerner, D.R., J. Sarturi, W. Crossland, R. Rathmann, K. Hales, **J.F. Legako**, C. Bratcher, and B. Johnson. Modeling for genomic, blood, and microbiological markers for liver abscesses in fed beef cattle. Foundation for Food & Agriculture Research. \$300,000 (\$15,000).
6. Brashears, M., M. Sanchez, M. Miller, **J.F. Legako**, A. Calle, and B. Awosile. Developing a Quantitative Salmonella Baseline and Characterizing Salmonella Isolates from Ground Beef in the United States. Foundation for Meat and Poultry Research and Education. \$411,925 (\$20,596).
7. Woerner, D.R., C. Kerth, R.K. Miller, T.G. O'Quinn, and **J.F. Legako**. Beef flavor characterization of Gluteus medius, Biceps femoris, and Semimembranosus during extended aging. National Cattlemen's Beef Association. \$236,600 (\$64,575).

8. Huff-Lonergan, E., **J.F. Legako**, M.N. Nair, R. Ramanathan, S. Ricke, and R. Maddock. A Conference Grant to Support Meat and Muscle Biology Symposia at the Reciprocal Meat Conference in 2023 and 2024. USDA AFRI. \$50,000 (\$0).
9. **Legako, J.F.**, D.R. Woerner, and L. Fischer. Industry assessment of beef aging and product handling practices. National Cattleman's Beef Association. \$46,651 (\$23,326).
10. Hernandez, M.S., B.J. Johnson, D.R. Woerner, and **J.F. Legako**. A multi-omics approach to understanding marbling deposition variation between muscles. National Cattleman's Beef Association. \$99,651 (\$69,756).
11. Woerner, D.R., **J.F. Legako**, J.C. Brooks, and M.F. Miller. Assessing the impact of feeding lubabegron fumarate (Experior) on postmortem aging, tenderness, sensory attributes, and steak yield of beef strip loins. National Cattlemen's Beef Association. \$99,746 (\$14,962).
12. **Legako, J.F.** National Bio & Agro-defense Facility Laboratorian Training Program. USDA APHIS. \$749,488 (\$749,488).
13. **Legako, J.F.** Global Exchange Research Faculty Seed Grants. International Affairs, Texas Tech University. \$3,500 (\$3,500).

Cash and Gifts-in-Kind

Funded:

2010

1. Brooks, J.C., **J.F. Legako**, M.F. Miller. Determination of volatile flavor compounds from Australian Grass-Fed Beef. Meat and Livestock Australia. \$30,000 (\$0; student, no sub-contract).

2012

1. Brooks, J.C. and **J.F. Legako**. Determination of volatile flavor compounds among various beef whole muscle grinds. Colorado State University. \$8,250 (\$0; student, no sub-contract).

2013

1. Brooks, J.C. and **J.F. Legako**. Determination of volatile flavor compounds among fresh and dry aged ground beef clods. Colorado State University. \$4,000 (\$0; Post-doc, no sub-contract).

2014

1. **Legako, J.F.** Sensory characteristics of beef from varied sire lines, Year I. Simplot Land and Livestock. \$23,906 (\$23,906).

2015

1. **Legako, J.F.** Determination of volatile compounds from fed and non-fed mature cow meat. Texas Tech University. \$7,200 (\$7,200).

2. **Legako, J.F.** Warner-Bratzler shear force analysis of beef steaks. Simplot Land and Livestock. \$1,110 (\$1,110).
3. **Legako, J.F.** Sensory characteristics of beef from varied sire lines, Year II. Simplot Land and Livestock. \$28,652 (\$28,652).
4. **Legako, J.F.** Determination of fatty acids from beef. South Dakota State University. \$1,200 (\$1,200).

2016

1. **Legako, J.F.** Consumer sensory evaluation of lamb chops. Texas Tech University. \$5,000 (\$5,000).
2. **Legako, J.F.** Sensory characteristics of beef from varied sire lines, Year III. Simplot Land and Livestock. \$23,011 (\$23,011).

2017

1. **Legako, J.F.** Sensory evaluation of enhanced beef steaks. JBS-USA. \$5,000 (\$5,000).

2018

1. **Legako, J.F.** Sensory characterization of beef. Simplot Land & Livestock. \$11,550 (\$11,550).

2019

1. **Legako, J.F.** Fatty acid analysis of chicken. Sam Houston State University. \$1,950 (\$1,950).
2. **Legako, J.F.** Nutrient analysis of beef. Teys-USA. \$5,021 (\$5,021).
3. **Legako, J.F.** Shelf-life analysis of beef. Teys-USA. \$19,190 (\$19,190).
4. **Legako, J.F.** Fatty acid and cholesterol analysis of beef and bison. South Dakota State University. \$13,500 (\$13,500).
5. **Legako, J.F.** Fatty acid analysis of beef. Kansas State University. \$3,000 (\$3,000).
6. **Legako, J.F.** Shelf-life analysis of beef. Teys-USA. \$5,700 (\$5,700).
7. **Legako, J.F.** Shelf-life and sensory analysis of beef. JBS-USA. \$8,400 (\$8,400).

2020

1. **Legako, J.F.** Shelf-life and sensory analysis of bacon. Food Safety Net Services. \$5,729.40 (\$5,729.40).
2. **Legako, J.F.** Trained sensory evaluation of beef. Purdue University. \$3,000 (\$3,000).

2021

1. Woerner, D.R., **J.F. Legako**, M.F. Miller, T.D. Pringle, A. Stelzleni, J. Gonzalez, and H. Thippireddi. Evaluating the shelf life of fresh, vacuum-sealed beef sub primals in retail and dark storage. Sealed Air. \$63,700 (\$15,925).
2. Woerner, D.R., **J.F. Legako**, M.F. Miller, T.D. Pringle, A. Stelzleni, J. Gonzalez, and H. Thippireddi. Evaluating the shelf life of fresh, vacuum-sealed pork sub primals in retail and dark storage. Sealed Air. \$47,412 (\$11,853).

3. **Legako, J.F.** Storage hexanal content of bacon bits. Food Safety Net Services. \$700 (\$700).

2022

1. **Legako, J.F.** Volatile analysis of wet petfood. Simmons Pet Food. \$15,050 (\$15,050).
2. **Legako, J.F.** Beef quality, shelf-life, and chemical assessment. Mootral Company via West Texas A & M. \$19,900 (\$19,900).
3. **Legako, J.F.** Volatile and fatty acid analysis. University of Idaho. \$3,000 (\$3,000).
4. **Legako, J.F. and D.R. Woerner.** Volatile analysis and REIMS analysis of beef. Idaho Beef Council via University of Idaho. \$6,930 (\$3,465).

2023

1. **Legako, J.F.** Sugar analysis. University of Missouri. \$15,000. (\$15,000).
2. **Legako, J.F.** Volatile Fatty Acid Analysis. USDA-ARS. \$3,700. (\$3,700).
3. **Legako, J.F.** Color/Shelf-life trial. West Texas A&M University. \$1,500 (\$1,500).
4. **Legako, J.F.** TBAR analysis of serum. South Dakota State University. \$2,775 (\$2,775).
5. **Legako, J.F.** Volatile analysis of raw and cooked wet petfood. Simmons Pet Food. \$10,650 (\$10,650).
6. **Legako, J.F.** Free amino acid analysis of beef. University of Nebraska. \$840 (\$840).

SERVICE TO PROFESSIONAL ORGANIZATIONS

National:

1. Journal of Animal Science, Ad hoc reviewer.
2. Meat Science Journal, Ad hoc reviewer.
3. Journal of Agricultural & Food Chemistry, Ad hoc reviewer.
4. Journal of Dairy Science, Ad hoc reviewer.
5. Trends in Food Science & Technology, Ad hoc reviewer.
6. International Journal of Food Science & Technology, Ad hoc reviewer.
7. Journal of the Science of Food & Agriculture, Ad hoc reviewer.
8. Food Reviews International, Ad hoc reviewer.
9. Journal of the American Oil Chemists' Society, Ad hoc reviewer.
10. Food Research International, Ad hoc reviewer.
11. Meat & Muscle Biology, Ad hoc reviewer.
12. Livestock Science, Ad hoc reviewer.
13. Journal of Processing and Preservation, Ad hoc reviewer.
14. Molecules, Ad hoc reviewer.

15. American Meat Science Association Distinguished Teaching Award Selection Committee, 2012.
16. Reciprocal Meats Conference Planning Committee, Auburn, AL, 2012-2013.
17. Vice-chair scientific abstracts, Reciprocal Meats Conference, 2012-2013.
18. Chair of scientific abstracts and graduate student poster competition, Reciprocal Meats Conference, 2013-2014.
19. American Meat Science Association Quiz Bowl Committee, 2014-2015.
20. Reciprocal Meats Conference Planning Committee, Lincoln, NE, 2014-2015.
21. American Meat Science Association Scientific Information Committee, 2014-present.
22. American Meat Science Association Journal Committee, 2015-2016.
23. Reciprocal Meats Conference Abstract Review, 2016-2017.
24. American Animal Science Association, Joint Annual Meeting Abstract Review, 2016.
25. Meat Science and Muscle Biology Research Symposium Moderator: American Society of Animal Science, Joint Annual Meeting. Salt Lake City, UT, 2016.
26. American Society of Animal Science, Southern Section, Meat Science Committee, 2017-2020.
27. Institute of Food Technologists, Muscle Foods Division, Poster Competition Judge, 2017.
28. Institute of Food Technologists, Muscle Foods Division, Committee member at large, 2017-2020.
29. American Meat Science Association Research Protocols Committee, 2017-present.
30. Institute of Food Technologists, Muscle Foods Division, Committee Chair Elect. 2019-2020.
31. Institute of Food Technologists, Muscle Foods Division, Committee Chair. 2020-2021.
32. Institute of Food Technologists, Muscle Foods Division, Committee Past-Chair. 2021-2022.
33. Meat and Muscle Biology Journal Editorial Board Member. 2022-2025.

Regional:

1. IFT-Bonneville Food and Candy Expo Poster Competition, Judge and organizer, 2014-2016.

State:

1. Utah Agricultural Experiment Station Project Proposal Reviewer, 2015.
2. Utah Agricultural Experiment Station Project Proposal Reviewer, 2016.

CONSULTING ACTIVITIES

1. Food Safety Net Services

SERVICE TO

UNIVERSITY:

1. Honors and Awards Council - College of Agriculture Sciences and Natural Resources Representative, Texas Tech University. 2021- present.

COLLEGE:

2. College of Agriculture and Applied Sciences Curriculum Committee, representative for Nutrition, Dietetics, & Food Sciences Department, Utah State University. Member, 2015-2016.
3. Search committee, Extension Assistant Professor, Beef Production Specialist, Animal Dairy, & Veterinary Sciences Department, Utah State University. Member, 2015-2016.
4. Texas FFA Food Science Career Development Event State Contest – Official Judge and Co-Superintendent. 2019.
5. College of Agriculture Sciences and Natural Resources Institutional Effectiveness Committee, Texas Tech University. 2019-present.
6. Texas FFA Food Science Career Development Event State Contest –Superintendent. 2020- present.
7. Davis College of Agriculture Sciences and Natural Resources, Texas Tech University. Associate Dean of Research Search Committee Member. 2023.

DEPARTMENT:

1. Utah State University, Nutrition, Dietetics, & Food Science, Undergraduate Scholarship Committee, 2013-2016.
2. Utah State University, Food Science Curriculum Committee, 2013-2016.
3. Bob Albin Graduate Student Poster Competition Judge, Texas Tech University, 2016.
4. Search committee member – Cargill Professorship in Meat Science – Animal and Food Sciences, Texas Tech University, 2018.
5. Food Science Scholarship Committee. Department of Animal and Food Sciences, Texas Tech University. 2018-present.
6. Food Science Curriculum Assessment. Department of Animal and Food Sciences, Texas Tech University. 2019.
7. Graduate Coordinator. Department of Animal and Food Sciences, Texas Tech University. 2020-present.
8. Interim Associate Department Chair. Department of Animal and Food Sciences, Texas Tech University. 2021-present.

9. Search Committee Chair – Assistant Professor of Practice – Reproductive Physiology, Department of Animal and Food Sciences, Texas Tech University. 2022.
10. Search Committee Chair – Assistant Professor of Meat Science, Department of Animal and Food Sciences, Texas Tech University. 2024.
11. Search Committee Chair – Assistant/Associate Professor of Nutrition and Microbial Ecology, Department of Animal and Food Sciences, Texas Tech University. 2024.
12. Search Committee Chair – Associate Professor of Meat Science – Mark and Celia Miller Endowed Chair for Teaching Excellence, Department of Animal and Food Sciences, Texas Tech University. 2024.
13. Search Committee Chair – Assistant Professor of Practice – Swine Production, Department of Animal and Food Sciences, Texas Tech University. 2024.

INDUSTRY:

1. Review of extension fact sheets, 2013.
2. Intermountain Beef 3910, organizing committee & speaker, 2014.
3. Texas Tech University Meat School en Español, speaker, 2017-present.
4. US Meat Export Federation Meat 101 for Retailers from Latin America, speaker, 2018.
5. Texas Tech University Teys Australia Meat School, speaker, 2018-2019.

OTHER:

1. External Grant Reviewer, Agriculture and Agri-Food Canada, 2016.