

Department of Animal Sciences and Industry
Kansas State University
Manhattan, KS66506-0201
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Michael Chao

CURRENT POSITION

Assistant Professor, Animal Science (Meat Science) August 2018 – present- Department of Animal Sciences and Industry, Kansas State University

- Research Interests: Cell membrane lipid chemistry and its relationship to meat tenderization process.

Assistant Professor, Animal Science (Meat Science) August 2015- June 2018- College of Agriculture, California State University-Chico

EDUCATION

University of Nebraska-Lincoln, Lincoln, NE

Ph.D., May, 2015

Major: Animal Science-Meat Science and Muscle Biology

- Dissertation: Impact of feeding wet distillers grains plus solubles and antioxidants on the basic mechanism of beef tenderization.

University of California-Davis, Davis, CA

M.S., June, 2011

Major: Animal Biology-Ruminant Nutrition

- Thesis: Biological enhancement of digestive function, health and performance of feedlot steers.

University of California-Davis, Davis, CA

B.S., June, 2007

Major: Animal Science: Livestock option

TEACHING EXPERIENCE

- **Instructor**

- California State University-Chico, Animal Science 276, Principles of Meat Science, Spring 2017 and Spring 2018
- California State University-Chico, Animal Science 350, Meat and Consumer, Fall 2015- Fall 2017
- California State University-Chico, Agriculture 490, Agricultural Experimental Design, Fall 2015- Spring 2018
- California State University-Chico, Animal Science 450, Food Safety and Quality Assurance, Spring 2016- Spring 2018
- California State University-Chico, Animal Science 110, Directed Work Experience: Animal Science, Spring 2016

- **Teaching Assistant**

- University of Nebraska-Lincoln, Animal Science 210, Animal Products, Fall 2014.

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- University of Nebraska-Lincoln, Animal Science 310, Fresh Meat, Fall 2011.
- University of California-Davis, Animal Science 144, Beef and Sheep Production, Spring 2011.
- University of California-Davis, Animal Science 1, Introduction to Animal Science, Fall 2010.
- **Advisor**
 - California State University-Chico Meat Science Quiz Bowl and Taste of RMC (Product development) Team, Summer 2016, 2017 and 2018.

FUNDED GRANTS

- **PI-Chao, M. D.** Collaborator Song, B – (2017). Determination of sensory and consumers' willingness-to-pay (WTP) of California skin-on goat meat comparing to Australian skin-on goat meat. California State University-Chico Research, Scholarship & Creative Activity Grant. Funding requested \$5,993, **funded**.
- **PI-Chao, M. D.** Co-PI -Philips, C. Collaborator – Woerner, D., and Yang X. (2017). Investigation of quality differences between purebred Dorper and commercial cross-bred lamb meat. California State University Agricultural Research Institute (ARI). Funding request \$ 35,158, **funded**.
- **PI-Chao, M. D.** (2016). Instructionally Related Activities (IRA) Fund (2016). Travel fund for meat science quiz bowl team to travel and compete at the annual Reciprocal Meat Conference. Funding requested \$7,000, **funded**.
- **PI-Chao, M.D.** (2015). Learning opportunities in ethnic food preparation. California State University-Chico Student Learning Fee. Requested fund \$35,969 –**funded**.
- **PI-Chao, M.D.** (2015). Improve goat harvest efficiency through an alternative goat harvest approach. California State University-Chico Research Stimulation Grant. \$10,000 – **funded**.

UNFUNDED GRANTS

- **PI-Chao, M. D.** Co-PI –Suman, S. and Calkins, C. (2017). Characterizing sarcoplasmic reticulum proteome and its relationship to beef tenderness. USDA Agriculture and Food Research Initiative (AFRI) Seed Grant. Funding request \$149,293 -**unfunded**
- **PI-Chao, M. D.** Co-PI Song, B. H. (2016). Development of a skin-on goat harvest approach to improve carcass yield, meet the increasing demand of Asian ethnic groups and address U.S. goat industry challenges. USDA Capacity Building Grants for Non-Land Grant Colleges of Agriculture (NLGCA). Funding requested \$149,998, **unfunded**.
- **PI-Chao, M. D.** (2016). Exploring International Meat Market Options for Fresh and Processed Meat Products. California State University-Chico Research, Scholarship & Creative Activity Grant. Funding requested \$5,200, **unfunded**.

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- PI-Calkins, C.R. Co-PI – **Chao M.D.**, (2015). Oxidative stress, calcium homeostasis, muscle proteolysis and beef tenderness in cattle fed distillers grains. USDA Agriculture and Food Research Initiative - **unfunded**.

MANUSCRIPTS

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- **Chao, M.D.**, Domenech-Perez, K.I, Senaratne-Lenagala, L. S. and Calkins, C.R. (2017). Feeding wet distillers grains plus solubles to cattle contributes to sarcoplasmic reticulum membrane instability. *Animal Production Science*. <http://dx.doi.org/10.1071/AN16784>
 - **Chao, M.D.**, Domenech-Perez, K. I., Voegelé, H. R., Kunze, E. K. and Calkins, C. R. (2017). Effects of dietary antioxidant supplementation of cattle finished with 30% wet distillers grains plus solubles on fatty acid profiles and display life. *Animal Production Science*. <http://dx.doi.org/10.1071/AN16719>
 - **Chao, M.D.**, Domenech-Perez, K. I. and Calkins, C.R. (2017). Feeding vitamin E may reverse sarcoplasmic reticulum membrane instability contributed by feeding high concentration of wet distillers grains plus solubles to cattle. *Professional Animal Scientist*, **33:12-23**. - **Selected by the editor-in-chief of *The Professional Animal Scientist* to be designated as Editor's Choice for February, 2017 issue on the journal's website.**
 - Domenech-Perez, K.I., Varnold, K.A. Semler, M.E., **Chao, M.D.**, Erickson, G.E. and Calkins, C.R. (2017). Impact of feeding de-oiled wet distillers grains plus solubles on beef shelf-life. *Journal of Animal Science*, **95:709-717**.

RESEARCH REPORTS

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- **Chao, M.D.**, Domenech-Perez, K.I and Calkins, C.R. (2016). Feeding vitamin E may reverse sarcoplasmic reticulum membrane instability caused by feeding wet distillers grains plus solubles to cattle. *Nebraska Beef Report*, MP103, pp 170-172.
 - **Chao, M.D.**, Domenech-Perez, K.I, Voegelé, H.R., Kunze, E.K. and Calkins, C.R. (2016). Effects of dietary antioxidant supplementation on cattle finished with 30% wet distillers grains plus solubles on fatty acid profiles and display life. *Nebraska Beef Report*, MP103, pp 167-169.
 - Domenech-Perez, K.I, **Chao, M.D.**, Buntyn, J., Schmidt, T. and Calkins, C.R. (2016). Impact of supplementing cattle with Omni-Gen-AF at the receiving or finishing phase on beef shelf-life. *Nebraska Beef Report*, MP103, pp 161-163.
 - **Chao, M.D.**, Domenech-Perez, K.I and Calkins, C.R. (2015). A basic mechanism of beef tenderization: Feeding wet distillers grains plus solubles contributes to sarcoplasmic reticulum membrane instability. *Nebraska Beef Report*, MP101, pp 117-119.
 - Domenech-Perez, K.I., Varnold, K.A. Semler, M.E., **Chao, M.D.**, Jones, T.F., Erickson, G.E., and Calkins, C.R. (2014). Effect of feeding de-oiled wet distillers grains plus solubles on beef fatty acid profiles. *Nebraska Beef Report*, Paper 790.

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- Domenech-Perez, K.I., Varnold, K.A. Semler, M.E., **Chao, M.D.**, Jones, T.F., Erickson, G.E., and Calkins, C.R. (2014). Effect of feeding de-oiled wet distillers grains plus solubles on beef oxidation and tenderness. *Nebraska Beef Report*, Paper 791.
- Varnold, K.A., Calkins, C.R., Nuttelman, B.L., Senaratne-Lenagala, L. S., Stevenson, J. H., Semler, M. E., **Chao, M.D.**, Jones, T.F., and Erickson, G.E. (2014). The effects of diet on the biochemical constituents of beef. *Nebraska Beef Report*, Paper 803.
- Hosch, J. J., Varnold, K.A., Senaratne-Lenagala, L. S., Hergenreder, J.E., Semler, M. E., **Chao, M.D.**, and Calkins, C.R. (2013). Variation in composition and sensory properties for beef short ribs. *Nebraska Beef Report*, Paper 747.
- Hosch, J. J., Varnold, K.A., Senaratne-Lenagala, L. S., Semler, M. E., **Chao, M.D.**, and Calkins, C.R. (2013). Development of 2-rib and 3-rib beef chuck subprimal. *Nebraska Beef Report*, Paper 745.
- Semler, M. E., **Chao, M.D.**, Hosch, J. J., Varnold, K.A., Senaratne-Lenagala, L. S., and Calkins, C.R. (2013). Color and sensory properties of beef steaks treated with antimicrobial sprays. *Nebraska Beef Report*, Paper 750.
- Hosch, J. J., Varnold, K.A., Senaratne-Lenagala, L. S., Semler, M. E., **Chao, M.D.**, and Calkins, C.R. (2013). An evaluation of the extended sirloin cap coulotte, *Nebraska Beef Report*, Paper 748.

SCIENTIFIC ABSTRACTS

- **Chao, M.D.**, Perez, J., Ramirez, D., Garcia, P. (2018). Evaluation of skin-on goat meat processing on yield, processing time and Chinese consumer preference in the U.S., *Proceedings of 64th International Congress of Meat Science and Technology*, Melbourne, Australia.
- Villatoro, K.M., Bauer, Z., Duarte, T.L., **Chao, M.D.**, Yang, X. (2018). Comparison of nutrient composition, quality, and sensory differences among Dorper, domestic commercial crossbred and Australian commercial crossbred lamb meat, *Proceedings of 71st Reciprocal Meats Conference*, Kansas City, MO.
- Perez, J., Ramirez, D., Garcia, P., Yang, X. and **Chao, M.D.** (2018). Sensory evaluation of California and Australian skin-on goat meat from Chinese consumers in California. *Proceedings of 71st Reciprocal Meats Conference*, Kansas City, MO.
- Garcia, P. and **Chao, M.D.** (2017). Evaluation of an alternative skin-on goat harvesting method on meat yield and processing time. *Proceedings of 70th Reciprocal Meats Conference*, College Station, TX.
- Herrera, N. J., Kunze, E. K. Domenech-Perez, K. I., **Chao, M.D.** and Calkins, C. R. (2016). The Mechanism by which Marbling Affects Beef Tenderness. *Proceedings of 69th Reciprocal Meats Conference*, San Angelo, TX.
- Kunze, E. K., Herrera, N. J., Domenech-Perez, K. I., **Chao, M.D.** and Calkins, C. R. (2016). The Influence of Diet on Calcium Flux in Fresh Beef – A Possible Mechanism to Alter Beef Tenderness. *Proceedings of 69th Reciprocal Meats Conference*, San Angelo, TX.

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- Domenech-Perez, K. I., Calkins, C. R., **Chao, M.D.**, Buntyn, J. and Schmidt T. (2016). Impact of Supplementing Cattle with OmniGen-AF at the Receiving or Finishing Phase on Beef Shelf-life. *Proceedings of 69th Reciprocal Meats Conference*, San Angelo, TX.
- **Chao, M.D.**, Domenech-Perez, K. I., Voegele, H. R., Kunze, E. K. and Calkins, C. R. (2015). Effects of dietary antioxidant supplementation of cattle finished with 30% wet distillers grains plus solubles on fatty acid profiles and display life. *Proceedings of 68th Reciprocal Meats Conference*, Lincoln, NE.
- **Chao, M.D.**, Domenech-Perez, K.I., and Calkins, C.R. (2015). Feeding antioxidants may reverse sarcoplasmic reticulum membrane instability contributed by feeding high concentration of wet distillers grains plus solubles. *American Society of Animal Science Midwest Section*, Des Moines, IA.
- **Chao, M.D.**, Domenech-Perez, K.I., and Calkins, C.R. (2014). A hypothesis on beef tenderization. *Proceedings of 60th International Congress of Meat Science and Technology*, Punta Del Este, Uruguay.
- **Chao, M.D.**, Domenech-Perez, K.I., and Calkins, C.R. (2014). A basic mechanism of beef tenderization: Feeding wet distillers grains plus solubles contributes to sarcoplasmic reticulum membrane instability. *Proceedings of 67th Reciprocal Meats Conference*, Madison, WI.
- Domenech-Perez, K.I., Calkins, C.R., **Chao, M.D.**, Semler, M.E., Varnold, K.A., and Erickson, G.E. (2013). Effect of feeding de-oiled wet distillers grains plus solubles on beef oxidation. *Proceedings of 66th Reciprocal Meats Conference*, Auburn, AL.
- Varnold, K.A., Calkins, C.R., Nuttelman, B.L., Senaratne, L. S., Stevenson, J. H., Semler, M. E., **Chao, M.D.**, and Erickson, G.E. (2013). Background grazing, supplementation, finishing diet and aging affect biochemical constituents of beef bottom round steaks. *Journal of Animal Science*, 91:96 (Suppl. 2) and *proceedings of 66th Reciprocal Meats Conference*, Auburn, AL.
- Semler, M. E., **Chao, M.D.**, Hosch, J. J., Varnold, K.A., Senaratne, L. S., and Calkins, C.R. (2012). Color and sensory properties of beef steaks treated with antimicrobial sprays. *Proceedings of 65th Reciprocal Meats Conference*, Fargo, ND.
- Hosch, J. J., Calkins, C.R., Varnold, K.A., Senaratne L. S., Semler, M. E., and **Chao, M.D.** (2012). Variation in composition and sensory properties for beef short ribs. *Proceedings of 65th Reciprocal Meats Conference*, Fargo, ND.

INVITED WHITE PAPERS

- Herrera, N.J., **Chao, M.D.**, Wilkerson, E.K. and Calkins, C.R. (2016). Relationship of superoxide dismutase activity to tenderness of Prime and Select-grade beef, National Provisioner, December, 2016.
- **Chao, M.D.** and Calkins, C.R. (2014). Mechanism of tenderization in distillers grains-fed cattle. National Provisioner, November, 2014.

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PROFESSIONAL ACTIVITIES

- Translator
 - US Meat Export Federation and USDA Food Safety and Inspection Service, assisted Taiwanese government officials to audit 4 lamb plants across the U.S. in preparation for Taiwan to open lamb import (October, 2014).
 - Nebraska Department of Ag, Lincoln, NE – Assist Chinese beef buyers to connect with U.S. meat companies and feedlots in the Midwest (April, 2013).
 - US Meat Export Federation and USDA Food Safety and Inspection Service, assisted Taiwanese government officials to audit 3 major beef plants in the Midwest (November, 2011).
 - US Meat Export Federation, led a Taiwanese media group to New York, Denver and San Francisco to experience wholesomeness of U.S. beef (May, 2010).
- Internships and entry level work experiences
 - Research Technician, TenderSpec LLC., Lincoln, NE– Collected samples and verified results for tenderness predicting camera with slice shear force (June, 2012-December, 2012).
 - Intern, US Meat Export Federation-Denver headquarter, Denver, CO – Created informative fact sheets and marketing materials, translated for food service teams from China and Taiwan, as well as gather imperative information on trade barriers (May, 2013 – August, 2013).
 - Intern, US Meat Export Federation-Taiwan Office, Taipei, Taiwan (March, 2009-September, 2009).
 - Junior Specialist, University of California Davis, Animal Science Department, Davis, CA (October, 2008- March, 2009) - Developing PC Ranch, a rancher decision assisting program.
 - Manager Assistant Level II, University of California Davis, Feedlot, Animal Science Department, Davis, CA (August, 2007- June, 2008) – UC Davis beef unit and feedlot management.

PROFESSIONAL MEMBERSHIP

- Member of American Meat Science Association (2011-present).
- Member of American Society of Animal Science (2011-present).

COMMITTEES AND SERVICES

- National
 - Reciprocal Meat Conference Planning Committee, 2015-present
 - Reviewer for Meat Science and Muscle Biology, 2016-present.
 - Number of articles reviewed -3

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- Reviewer for Journal of Animal Science, 2015 – present.
 - Number of articles reviewed -8
- Reviewer for Animal Production Science, 2016 – present.
 - Number of articles reviewed -2
- Reviewer for International Journal of Food Science and Technology, 2017-present
 - Number of articles reviewed -2
- Regional
 - Organizer, Meat Judging Contest, Chico State and Butte College FFA Field Day, March 2016-March 2018
 - Judge, California Meat Processors Association Processed Meat Contest, February, 2016- February 2018
 - Sierra Oro Farm Passport Weekend, Organize and supervise the meat lab tours and sample tasting program (October, 2015- October 2017).
- University
 - Chico STEM Connections Collaborative Faculty Supervisor, 2017
 - Instructionally Related Activity Committee, August 2017 – May 2018
 - College of Agriculture Curriculum Committee, August 2016 – May 2018
 - Student Awards for Research and Creativity Committee, Summer 2016 – Summer 2017
 - Student Learning Fee Committee, August 2016 – May 2018
 - University Farm Committee, August 2016 – May 2018

INVITED TALKS AND INTERVIEWS

- Moderators
 - 69th and 71st Reciprocal Meat Conference (RMC), June, 2016 and 2018
- Presentations
 - Sino-US Cattle development forum, Arun Banner, Inner Mongolia, People Republic of China, July, 2018
 - Western States Dorper Association Dorper Sales “Dorper lamb carcass grading”, Chico, May, 2017.
 - UC Davis Animal Science Career Symposium – “Sharing your experience in today’s Animal Science job market”, Davis, February, 2017.
 - Chico State Sheep and Goat Educational Day “Merguez- making North African lamb sausage at your home”, Chico, CA, February 2016.
 - Chico State Beef Symposium, “Adding value to under-valued beef sub-primals”, Chico, CA, February 2016.
 - Goat Education Day, “Development of an ethnic-based value-added goat harvest process”, Red Bluff, CA, November, 2015.

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- Interviews
 - K-State research and Extension “Agriculture Today”, August, 2018
 - DTN Progressive Farmer, “Distillers Grains May Lead To Beef That is More Tender”, October, 2015.
- Popular Press
 - **Chao, M.D.** (2017) Higher Education – Meat Science Program at California State University, Chico, Independent Processors, July 2017.
 - **Bauer, Z.** and Chao, M.D. (2017) From the Farm – CSU, Chico Meats Lab, The Farm Shovel -Butte County Farm Bureau, March 2017. <https://blog.buttefarmbureau.com/2017/03/21/from-the-farm-csu-chico-meats-lab/>

HONORS/AWARDS

- UNL Lowe & Mavis Folsom Distinguished Doctoral Dissertation Award, April, 2016 – best dissertation of the year.
- Reciprocal Meat Conference Graduate Student Poster Competition, 3rd place, PhD division, June, 2014.
- UNL Larrick-Whitmore Graduate Student Travel Grant, May, 2014.
- American Meat Science Association Kinsman International Award, May, 2014.
- UNL Milton E. Mohr Fellowship, April, 2013.
- International Stockmen’s Educational Foundation Travel Fellowship, January, 2013.
- CA American Registry of Professional Animal Scientists (ARPAS) Memorial Fund Scholarship, October, 2010.
- UC Davis K. Humphries Memorial Scholarship, August, 2010.
- California Cattlemen Association Feeder Council and Allflex USA Scholarship, June, 2010.
- California Animal Nutrition Conference (CANC) Student Poster Competition, 2nd place, May, 2010.

PROFESSIONAL DEVELOPMENT

- Attended Faculty Writing Boot Camp, May 2017.
- Put CSU Chico on American Meat Science Association’s graduate program list (<http://www.meatscience.org/students/graduate-programs/california-state-university-chico>)
- Attended Faculty Advisor Collaboration & Training (FACT), Chico, CA, May, 2017.
- Attended Improving Teaching Practice FLC, Chico, CA, Jan.- May, 2017.
- Attended CSU Chico Academic E-Learning Cohort 8 to improve and redesign AGRI 490, Chico, CA, June, 2016.
- Attended Train the Trainer HACCP Workshop, College of Sequoia, Tulare, CA, October, 2015 - became an certified HACCP instructor and put Chico State as one of the Accredited Introductory HACCP Programs accredited by International HACCP Alliance (<http://www.haccpalliance.org/sub/intro-course.html>).

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- Became the Chico State contact person for **USDA Cochran Fellowship Program**- The program aims to train government officials from developing countries in biotechnology and food safety to continue U.S. engagement in policy making from these countries – contacted by Phuong Mai, International Program Specialist, USDA Foreign Agricultural Service, summer 2016-present.
- Invited to attend the **USDA W-3177 regional research committee meeting (Improve the competitiveness of US Beef)** to form collaborative research relationship with animal scientists from land-grant universities, May 2016.
- Attended the 62nd International Congress of Meat Science and Technology at Bangkok, Thailand and **established valuable collaborative relationships with meat scientists from USA and many other countries**, August 14th - 19th, 2016.