

FOOD SAFETY & PRODUCT DEVELOPMENT LABORATORY

Past, Present & Future | 2007-2014



ANGELO STATE UNIVERSITY
MEMBER, TEXAS TECH UNIVERSITY SYSTEM

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Mission

The Meat and Food Science program at Angelo State University is committed to providing quality education, research and public outreach based on knowledge and skills essential to animal, meat and food sciences.

Goals

As part of the Agriculture Department's mission, the Food Safety and Product Development Laboratory has five central objectives:

- Offer quality classroom, laboratory and research experiences to undergraduate and graduate students with interests in meat, food, and agriculture sciences.
- Pursue research opportunities in food safety, shelf-life extension, meat quality and product development.
- Provide research results and educational opportunities to the public.
- Offer educational opportunities for public schools through outreach events.
- Receive recognition for the university through a nationally recognized teaching, research and judging program.

Brief History

In 2000, the Department of Agriculture, recognizing the need for a teaching and research facility in meat processing, began the task of raising funds for what eventually became known as the Food Safety and Product Development Laboratory (FSPD). In the Spring of 2004, ASU broke ground on the 1.8 million dollar harvest and fabrication facility that is still one of the newest and most well equipped university facilities of its kind. The first ASU students received hands on laboratory instruction in this facility in Fall of 2005. The FSPD Laboratory is an approximately 8,000 square foot complex adjacent to the Management, Instruction and Research (MIR) Center, about six miles north of San Angelo. The original facility includes a harvest floor, fabrication floor, sensory evaluation booths, a prep kitchen, commercial cooler/freezer, packaging room, classroom and retail room. In the Fall of 2008, the full-time position of Instructor and Coordinator of Meat and Food Science Programs was created and a full-time manager for the facility was selected. The manager directs and supervises the tasks and objectives of the FSPD under the direction of the faculty FSPD advisor. In 2011, new freezer and ingredient storage space was added to the existing facility and in 2012 the addition of an environmental controlled ageing cooler was completed. The Management, Instruction and Research Facility houses the Food Microbiology Laboratory and the Food and Muscle Analysis Laboratory. Due to increased growth of research, outreach and judging programs, a second full-time position was created in the Fall of 2012 expressly for the directed initiatives of the Meat and Food Science Programs (MFS) and FSPD. A Research Associate was hired in the Spring of 2013 to specifically support research, outreach and judging components while complementing the existing initiatives. The MFS Program and FSPD continue to grow and pursue the core goals of the program, department, university and system. The MFS program would like to thank our donors for their continued support of our program, students and faculty.

- Dodge Jones Foundation
- Mr. and Mrs. L.C. Hengst, Jr.
- Lone Star Beef Processors
- Southwest Meat Association
- Stripes, LLC.
- San Angelo Area Foundation
- HEB
- Mr. and Mrs. Donald Braden
- Mr. and Mrs. Clinton Hodges

Faculty/Staff

- **Dr. Kirk Braden**
 - Research Scientist and Associate Professor. *Specialty: Meat Science, Quality, Education and Safety.*
- **Dr. Loree Branham**
 - Research Scientist and Associate Professor. *Specialty: Food Microbiology, Safety and Education.*
- **Mr. Robert Cope**
 - Research Associate and Instructor. *Specialty: Meat Science and Safety.*
- **Mr. Michael Boenig**
 - Research Associate. *Specialty: Animal and Meat Science.*

Graduate Students

The Meat and Food Science program continues to attract quality graduate students from across multiple undergraduate disciplines. It has been a recent focus to recruit quality graduate students from outside of the ASU undergraduate population in attempt to grow, diversify and broaden the graduate program. This focus has met with success as increasing numbers of undergraduates from Texas Tech University, Texas A&M University as well as universities outside of the state are seeking graduate careers at ASU in the Department of Agriculture and more specifically Meat and Food Science. Additionally, graduate placement of students receiving a degree with emphasis in Meat and Food Science related fields is high with a majority of our graduates being greatly sought after in the research and development branches of major food companies across the country (Table 1).

Current

Thesis

- Bonnie Wallace
- Michael Schwartz
- Shanequa Sanders
- Lexus Weinheimer
- Hunter Britzke

Non-Thesis

- Sharla Schmidt

Graduated

Thesis

- Leo Batot
- Jennie Canon
- Kaci Foote
- Barbara Coty
- Whitney Bruha
- Troy Tarpley

Non-Thesis

- Chance Hundley
- Darci Owens
- Cassie Pfeiffer
- Kari Mulle

Table 1. M.S. Animal Science with Emphasis in Meat and Food Science ~ Graduate Placement

Student	Current Employer	Position
Leo Batot	LaBatt Foods	Research and Development
Whitney Bruha	Outback	Bartender
Jennie Canon	Bobby Cox Foods	Research and Development
Barbara Coty	Hillshire Brands	Research and Development
Kaci Foote-Janca	Greens Grocery	Management and Procurement
Chance Hundley	Self-Employed	Wildlife Outfitting
Kari Galm-Mulle	HEB	Research and Development
Darci Owens	HLSR	Livestock Director
Cassie Pfeiffer	USDA Rural Development	Area Technician

Undergraduate Student Assistants

In addition to the two full time positions of facility manager and research associate, the FSPD is staffed by multiple undergraduate student workers (Table 2). While these undergraduate students benefit the FSPD by providing the labor required to process animals for research and teaching, they themselves benefit in learning skills and knowledge they will use in their future occupations. While predominantly agriculture majors, the FSPD has employed a variety of majors including business and foreign languages. The student workers are exposed to both federal and state regulations and inspection methods and are taught a wide variety of meat processing methods for both raw and fully cooked products. In addition to the day to day processing, they are also engaged in both undergraduate and graduate level research covering a variety of subjects including product development, sensory evaluation and food safety. The various skills acquired during the student worker's tenure at the FSPD help facilitate their career preparedness and propels them to graduation more equipped for the job market. While a significant portion of the FSPD budget load is dedicated to student assistant salary, the management feels this is money well placed, in that it is providing these students with true experiential learning that will serve them in their future endeavors.

Table 2. Undergraduate Student Assistants 2007 - 2014

Year	# of Employees
2007	8
2008	8
2009	11
2010	15
2011	15
2012	13
2013	11
2014	14

Research

The fundamental research core of the MFS program and FSPD centers on that of meat and food quality, safety and education.

Table 3. Program Publications 2007 - 2014

Publication Type	Total
Journal Articles	8
Abstracts/Proceedings	14
Final Reports	6
Progress Reports	9
Other (Manuals, White Paper etc.)	18
Presentations	13

Graduate and Undergraduate Research

Table 4. Graduate and Undergraduate Research 2007 - 2014

Degree	Total
Graduate Research	
Thesis	16
Non-Thesis	6
Undergraduate Research	15

Graduate Research

Masters of Science (Thesis)

- Shanon Wilber. 2008. The effect of zinc supplementation on feedlot performance and carcass characteristics of growing and finishing lambs. Angelo State University
- Mathew Menchaca. 2008. Effects of Juniper Consumption on Meat Quality in Boer-Cross Goats. Angelo State University
- John McEachern. 2008. The Effect if Feeding Distiller's Dried Grains to Market Lambs on Performance, Wool and Carcass Characteristics. Angelo State University
- Leo Batot. 2010. Effects of antioxidant application on color, oxidative stability and shelf life of beef striploin steaks in a retail case environment
- Kaci Foote. 2011. Development of microencapsulation technology for emulsions
- Jaron Nevins. 2011. Prevalence of Antibiotic Resistant Pathogens in Feral Hogs of Texas.
- Jennie Canon. 2011. Development of tenderization techniques for non-red beef cuts
- Barbara Coty. 2013. Development and consumer acceptance of a novel ready-to-eat lamb leg product
- Whitney Bruha. 2013. Prevalence and Antibiotic Susceptibility of *Salmonella* spp. in Feces and Carcasses of United States Lamb
- Kendall Capote. 2013. Effects of Dry Corn Gluten Feed on Performance and Carcass Characteristics of Feeder Lambs
- Troy Tarpley. 2014. Evaluation of Intramuscular fat and pork quality on the sensorial properties and consumer acceptance of pork *longissimus*
- Bonnie Wallace. 2014. Validation of various relative humidity levels on lethality of the indicator organism, *Pediococcus acidilactici*
- Michael Schwartz. 2015. Evaluation of extended ageing parameters on commodity beef and effects on shelf life and sensory attributes
- Lexus Weinheimer. 2016. Meat quality, tenderness and fatty acid profile traits of Akaushi cattle.
- Hunter Brietzke. 2016. Growth, performance and meat quality of Akaushi cattle.

Masters of Science (Non-thesis)

- Sam Schiwart. 2008. Effects of Electrical Stimulation on White-Tailed Deer Carcasses to Increase Tenderness. Angelo State University
- Chance Hundley. 2008. Effect of Various Antimicrobial Washes on *E. coli* O157 Inoculated Venison Steaks

- Cassie Pfeiffer. 2009. Perceptions of Alternative Protein Sources by the ASU Community
- Darci Owens. 2009. Antimicrobial Susceptibility of Escherichia coli isolates from whitetail deer and cattle on rangeland.
- Kari Galm. 2010. Development and Evaluation of a Quick Serve Restaurant Value-Added Beef Product
- Sharla Schmidt. 2014. Evaluation and Development of Sales and Marketing Plans for the Food Safety and Product Development Laboratory.

Undergraduate Research

- Darci Owens. 2007. Attitudes Regarding Food Safety in the Harvest of Wild Game.
- Multiple Students. 2007. Effects of Temperature on Microbial Shelf-Life Characteristics of Beef Snack Stick Product.
- Leo Batot. 2007. Modified Atmosphere Packaging.
- Kari Galm. 2008. Production of a Beef “Popcorn” Item.
- Kaci Foote. 2009. Fundamentals of Cheese Production.
- Jennie Canon. 2009. Development of a Food Science Day Camp for High School Students.
- Abel Cuellar. 2010. Evaluation of Antioxidants Application of Meat Products.
- Michael Schwartz. 2011. Evaluation of standardized cooking methods of lamb loin chops for preparation of sensory and WBS tenderness analysis.
- Kara Andrews. 2011. Retail shelf-life, sensory and tenderness evaluation of select Nilgai subprimals.
- Devon Absher. 2012. Functionality of evaluation of Beefcide.
- Gustavo Faz. 2013. Consumer Evaluation of Intramuscular Fat Content in Porkloins.
- Corey Schwartz and Devon Absher. 2014. Language Selection in the Meat Industry.
- Katriona Baker and Derrick Thivierge. 2014. Language Selection in the Meat Industry.
- Reid Braden and Kenneth Scott. 2014. Diet Selection and Diversity.
- Soyeon Lee and Kylee Werland. 2014. Diet Selection and Diversity.

Publications

Peer Reviewed Journal Articles

- Canon, J.A., L.A. Branham, R.P. Cope, B.L. Coty, M.W. Boenig, M.F. Miller and K.W. Braden. 2013. Effects of Various Tenderization Strategies on Non-Fed Beef Palatability and Tenderness. Submitted: Meat Science Ref. No. MEATSCI-D-13-00650. August 2013
- Coty, B., L.A. Branham, M. Schwartz, B. Wallace, M. Boenig and K. Braden. 2013. Development, Functionality, and Consumer Acceptance of a Novel, Ready-To-Eat Lamb Leg Product. Submitted: Meat Science Ref. No. MEATSCI-D-13-00649. August 2013
- Batot, L.M., J.A. Canon, K.L. Foote, M.F. Miller, R.M. Cope, L.A. Branham and K.W. Braden. 2012. Effects of Antioxidant Application and Retail Display on Sensory, Shelf Life and Oxidative Stability of Beef Striploin Steaks. Accepted Texas Journal of Agriculture and Natural Resources. March 2014

- McMillin, K.W., W. Tangkham, D. Preiss, R. Cope and K. Braden. 2011. Live and Carcass Traits and Cut Yields From Crossbred and Purebred Boer Wether Kid Goats. 57th International Congress of Meat Science and Technology, August 2011, Ghent, Belgium.
- T. R. Whitney and K. W. Braden. 2010. Substituting distillers dried grains for cottonseed meal in lamb finishing diets: II. carcass characteristics, meat fatty acid profiles, and sensory panel traits. Sheep and Goat Research Journal. Volume 25. p49-56.
- M.W. Menchaca, C.B. Scott, K.W. Braden, and C.J. Owens. 2010. Juniper Consumption Does Not Adversely Affect Meat Quality in Boer-Cross Goats. Rangeland Ecology and Management. 64:669-673.
- S.D. Roberts, C.R. Kerth, K.W. Braden, D.L. Rankins, Jr., L. Kriese-Anderson, and J.W. Prevatt. 2009. Finishing steers on winter annual ryegrass (*Lolium multiflorum* Lam.) with varied levels of corn supplementation I: Effects on animal performance, carcass traits, and forage quality. J. Anim. Sci. 87:2690-2699.
- Braden, K.W., J.R. Blanton Jr., J.L. Montgomery, E. van Santen, V.G. Allen, and M.F. Miller. 2007. Tasco supplementation: Effects on carcass characteristics, sensory attributes, and retail display shelf-life. J. Anim. Sci. 85:754-768.

Abstracts and Proceedings

- Samuelson, K., C. Scott, M. Salisbury, M. Schwartz, C. Owens, L. Branham, R. Cope, M. Boenig and K. Braden. 2014. The Effects of Corn Gluten Feed on Performance, Carcass Characteristics and Sensory of Feeder Lambs. In: Proc. 67th. Recip. Meats Conf., Madison, WI.
- Tarpley, T., L. Branham, R. Cope, M. Boenig, M. Schwartz, B. Wallace, S. Sanders and K. Braden. 2014. Multi-State Consumer Acceptance of Porkloin Chops of Varied Intramuscular Lipid Content. In: Proc. 67th Recip. Meats Conf., Madison, WI.
- Bruha, W., K. Braden, B. Wallace, M. Schwartz and L. Branham. 2013. Prevalence and Serogroup Type of *Salmonella* spp. in Feedlot Lamb Fecal and Hide Samples Before and After Harvest. In: Proc. 66th Recip. Meats Conf., Auburn, AL.
- Coty, B., L. Branham, R. Cope, M. Schwartz, B. Wallace and K. Braden. 2013. Development, Functionality, and Consumer Acceptance of a Novel Ready-to-Eat Lamb Leg Product. In: Proc. 66th Recip. Meats Conf., Auburn, AL.
- Wallace, B., M. Schwartz, R. Cope, M. Boenig, L. Branham and K. Braden. 2013. Retail Shelf-Life, Microbial Shelf-Life, Sensory and Warner Bratzler-Shear Force Analysis of Selected Nilgai (*Boselaphus Tragocamelus*) Muscle. In: Proc. 66th Recip. Meats Conf., Auburn, AL.

-McMillin, K.W., K.W. Braden, J.C. Gregorie, M.A. Persica III, and J.N. Maynard. 2013. Live Animal and Carcass Evaluation of Market Goats. In: Proc. of Amer. Soc. Anim. Sci. Indianapolis, IN.

-Canon, J., B. Coty, R. Cope, L. Branham and K. Braden. 2012. Effects of Various tenderization Strategies on Non-fed Beef Palatability and Tenderness. In: Proc. 65th Recip. Meats Conf., Fargo, ND.

-Scott, H.M., P. Boerlin, L.A. Branham, T. Brashears, V. Fajt, S. Gow, Y. Gröhn, G. Loneragan, S. McEwen, P. Morley, B. Norby and R. Reid-Smith. 2012. Practical Interventions to Effectively Manage Antibiotic Resistance in Beef and Dairy Cattle Systems: A Fully Integrated Approach. United States Department of Agriculture, National Institute of Food and Agriculture Annual Research Meeting.

-Foote, K.L, J.A. Canon, B. Coty, R.M. Cope, L.A. Branham and K.W. Braden. 2011. Development of a functional multivitamin microcapsule to be utilized in a ready to eat meat product. In: Proc. 64th Recip. Meats Conf., Manhattan, KS.

-Batot, L.M., J.A. Canon, K.L. Foote, M.F. Miller, R.M. Cope, L.A. Branham and K.W. Braden. 2011. Effects of antioxidant application and retail display on sensory, shelf life and oxidative stability of beef striploin steaks. In: Proc. 64th Recip. Meats Conf., Manhattan, KS.

-Nevins, J.W., D.A. Steele, L.A. Branham, C.B. Scott, and C.J. Owens. 2011. Prevalence of antibiotic resistant pathogens in feral hogs of Texas. Texas Section Society for Range Management Annual Meeting, San Angelo, Texas.

-K.W. McMillin, W. Tangham, D. Preiss, R. Cope, and K. Braden. 2010. Live and carcass traits and cut yields from crossbred and purebred Boer wether kid goats. International Congress of Meat Science and Technology.

-T. R. Whitney, L. M. Batot and K. W. Braden. 2010. Substituting distillers dried grains for cottonseed meal in lamb finishing diets: Carcass characteristics, meat fatty acid profiles, and sensory panel traits. 2010. In: Proc. 63rd Recip. Meats Conf., Lubbock, Texas.

Final Reports

-Branham L.A. and T. Brashears. 2012. Practical interventions to effectively manage antibiotic resistance in beef and dairy cattle systems: a fully integrated approach; Objective 6 Update. United States Department of Agriculture; Project Evaluation Committee.

-Branham, L.A. and K.W. Braden. 2012. Beef Safety Outreach Program – Food Safety and Quality Challenges to Direct Marketing Beef Producers. Final Report. National Cattlemen Beef Association.

-Branham, L.A. and K.W. Braden. 2012. Beef Safety Outreach Program – Food Safety and Quality Challenges to the Food Service Industry. Final Report. National Cattlemen Beef Association.

-Braden, K.W., L.A. Branham, and R.M. Cope. 2012. Retail Shelf-Life, Microbial Shelf-Life, Sensory and Warner Bratzler-Shear Force Analysis of Selected Nilgai Muscle. Final Report. Specialty Meats of Texas.

-Braden, K.W., L. Batot and L.A. Branham. 2010. Effects of an atomized antioxidant treatment on striploin quality and shelf-life. Angelo State University, Research Enhancement Grant.

-Branham, L.A., and K.W. Braden. 2009. Evaluation of Shelf Stability of Beef Snack Stick, Angelo State University, Research Enhancement Grant.

Progress Reports

-The Effect of Zinc Supplementation on Feedlot Performance and Carcass Characteristics of Growing and Finishing Lambs. 2008. Wilber, S., B.J. May, M.W. Salisbury, C.B. Scott and K. W. Braden. Progress Report R-12. P120-126.

-Final Report: Effects of Temperature on Microbial Shelf-Life Characteristics of Beef Snack Stick Product. 2011. Branham, L.A. and K. W. Braden. Progress Report R-13. P130-134.

-Effects of Antioxidant Application and Retail Display on Sensory, Shelf-Life and Oxidative Stability of Beef Striploin Steaks. 2011. Batot, L.M., J.A. Canon, K.L. Foote, M.F. Miller, R.P. Cope, L.A. Branham and K.W. Braden. Progress Report R-13. P135-148.

-Development of a Functional Multivitamin Microcapsule to be Utilized in a Ready-to-Eat Meat Product. 2011. Foote, K.L., J.A. Canon, B. Coty, R.P. Cope, L.A. Branham and K.W. Braden. Progress Report R-13. P149-166.

-Juniper Consumption does not Adversely Affect Meat Quality in Boer-Cross Goats. 2011. Menchaca, M.W., C.B. Scott, K.W. Braden, C.J. Owens and L.A. Branham. Progress Report R-13. P6-12.

-Development and Evaluation of a Quick Serve Restaurant Value-Added Beef Product. 2011. Mulle, K. A., L.A. Branham and K.W. Braden. Progress Report R-13. P167-175.

-Owens, D., L.A. Branham, and Cody Scott. 2011. Antibiotic Resistance in Whitetailed Deer and Range Cattle Sharing the Same Rangeland.. Angelo State University 2011 Progress Report. Publication No. R-13. P167-175.

-Owens, D. and L.A. Branham. 2011. Knowledge and Attitudes Regarding Food Safety in the Harvest of Wild Game. Angelo State University 2011 Progress Report. Publication No. R-13. P206-210.

-Hundley, C., D. Owens and L.A. Branham. 2011. Effectiveness of Various Spray Treatments in the Removal of Escherichia coli on Inoculated Venison Steaks. Angelo State University 2011 Progress Report. Publication No. R-13. P211-214.

Book Chapters

-Braden, K.W. 2014. *The Science of Meat Quality*. Converting Muscle to Meat – The Physiology of Rigor. Wiley-Blackwell.

Other Publications

-Braden, K., R. Cope, M. Boenig and L. Branham. 2013. Procedures and Protocols Manual.

-Braden K.W. 2012. Production, Harvest, Fabrication and Marketing of Sheep/Lamb Products. CNFA Farmer-to-Farmer Program Ukraine.

-Branham, L.A. and K.W. Braden. 2012. Beef Safety Outreach Program – Food Safety and Quality Challenges to Direct Marketing Beef Producers. Workshop Curriculum. National Cattlemen Beef Association.

-Branham, L.A. and K.W. Braden. 2012. Beef Safety Outreach Program – Food Safety and Quality Challenges to the Food Service Industry. Workshop Curriculum. National Cattlemen Beef Association.

-Branham, L.A. 2010. Livestock Anatomy and Physiology Laboratory Manual. Text and Illustrations.

-Branham, L.A. 2009. Angelo State University Food Microbiology Safety and Protocols Manual.

-Braden, K., R. Cope, M. Boenig and L. Branham. 2013. Procedures and Protocols Manual Food Safety and Product Development Lab.

-Braden, K. 2012. Lecture Manual. FSCI 4446 Introduction to Meat Science.

-Braden, K. 2011. Lecture Manual. ASCI 3241 Livestock and Meat Evaluation.

-Braden, K., M. Boenig, T. Tarpley, L. Weinheimer. 2013. Lecture Manual. ASCI 3241 Meat Evaluation.

-Braden, K. and T. Tarpley. 2012. Lecture Manual FSCI 4447 Introduction to Processed Meats.

-Braden, K., M. Boenig, M. Schwartz and R. Cope. 2012. Laboratory Manual FSCI 4446 Introduction to Meat Science.

-Braden, K., M. Boenig and R. Cope. 2012. Lecture and Laboratory Manual ASCI 2241 Live Animal Carcass Evaluation.

-Braden, K. 2011. Procedures and Operating Protocols Manual. Specialty Meats of Texas.

Multimedia Productions

-ASU Intercollegiate Meats Judging Specifications Video – 2008

-Departmental Recruiting Video - 2014

Scholarly Presentations (Research and Extension)

- Kenya Mission 2013 - Food Safety Training, Kitale, Kenya. 2013

Title: Food Safety with limited resources.

- Kids Eat FREE. 2009-2014

Title: Food Safety for Summer Food Programs

-Meat Goat Field Day, Harper, Texas. 2012

Title: ASU Current and Future Research and Update: USDA Meat Goat Project.

- CNFA Farmer-to-Farmer Program - Ukraine. 2012

Title: Production, Harvest, Fabrication and Marketing of Sheep/Lamb Products.

- Beef Safety Outreach Program. 2012

Title: Food Safety and Quality Challenges to Direct Marketing Beef Producers

- Beef Safety Outreach Program. 2012

Title: Food Safety and Quality Challenges to the Food Service Industry

-Laura Bush Institute for Women's Health. 2011

Title: Holiday Food Safety

-National Institute for Animal Agriculture. 2011 Annual Conference

Title: The Current Lamb Industry: Adapting to a Rapid-Paced Consumer Market

-National Institute for Animal Agriculture. 2011 Annual Conference

Title: Food Safety: Do Consumers Understand Their Role?

-Laura Bush Institute for Women's Health. 2011

Title: This Much not That Much: Is there really such thing as a bad food?

- University of Chihuahua, Mexico. 2010

Title: Research, Teaching and Outreach Collaboration

-Texas Agrilife Extension and Texas Department of Agriculture, 2010 Chefs Tour

Title: Meat Quality and Related Issues

- Texas Agrilife Extension and Texas Department of Agriculture, 2010 Chefs Tour
Title: Food Safety at the Food Processing and Service Levels

- District 7 4-H Beef Field Day. 2009
Title: Beef Carcass Evaluation

- District 7 4-H Beef Field Day. 2009
Title: Beef Processing and Preparation Food Safety

- ASU Retired Faculty Annual Meeting. 2008
Title: Meat Quality and Related Issues

- Summer 4-H Camp. 2008
Title: Introduction to Meat Science

- Texas Sheep and Goat Raisers Annual Convention. 2007
Title: Value-Added Lamb Product Development.
- Texas Hair Sheep Cooperative Meeting. 2007
Title: Labeling Concerns and Procedures for Red Meats

Teaching

Central to the Food Safety and Product Development Laboratory (FSPD) are its objectives and goals. Perhaps one of the most integral components of the services incorporated through the FSPD is the function of teaching. Through careful strategic planning and the continued drive to excel at preparing young pre-professionals for rewarding careers, the facility has successfully allowed for the incorporation of undergraduate and graduate teaching with quality research and outreach opportunities. The integration of undergraduate and graduate teaching with research, outreach, experiential learning and service learning is essential to the development of quality pre-professionals. The FSPD is truly a unique environment where the principals of teaching are consistently merged and integrated with hands-on practice, thought and theory.

In 2000, the food service industry provided nearly 10 million jobs in the United States. Of those jobs, around 1.5 million are found in food manufacturing with another 670,000 employed by food distributors. Many of these jobs include Research and Development, Marketing and Sales, Quality Control and Food Safety and General Managerial positions. These are sectors of the Food Industry which the Meat and Food Science program at Angelo State University targets as potential employers of our graduates. After an extensive search on multiple Food Industry websites and speaking with professionals in the industry, the Department of Agriculture at Angelo State University began the process of adding a Bachelors of Science Degree in Food Animal Science and Marketing in 2010. The degree was completed and officially offered in 2011. The degree meets the needs of not only our

graduates but also the growing food industry. After multiple conversations with industry professionals, it is evident that Meat and Food Science programs are effectively training students for careers in the industry. However, it is common for industry professionals to voice concerns centering on the lack of knowledge and skills in the marketing and business management disciplines. Individuals throughout the Meat and Food Science Industry agree that a Meat, Food and Animal Science knowledge base comingled with marketing and sales is highly beneficial to interested pre-professionals and the industry. The Institute of Food Technologists and Meat Science Association websites have monthly job postings containing announcements for college graduates. These positions have qualification requirements of not only knowledge of food production, but also at least a base understanding of marketing and sales of the products the companies produce. The Food Animal Science and Marketing degree provides graduates in the department with an advantage over graduates from other institutions which offer programs centering solely on food production. The Institute of Food Technologists conducted a survey in 2007 looking at the distribution of salaries and jobs within the wide scope of the "Food Industry". Of the 3,078 respondents, when asked what type of college degree they had obtained before entering the Food Industry, the top three responses were 44% Food Science/Technology, 12% Agriculture, and 8% Business/Marketing. The FASM degree is the first in the state to target all three of these areas within one degree. The median beginning salary within the Food Industry for graduates with a Bachelors of Science degree was \$45,800. This potential starting salary combined with job security of the Food Industry enhances the benefits of the degree to potential ASU students.

Courses

Table 5. Courses for B.S. in Food Animal Science and Marketing.

FOOD SCIENCE REQUIREMENTS		GENERAL EDUCATION REQUIREMENTS	
COURSE	HRS	COURSES	HRS
FSCI 1329 (INTRO)	3	ENG 1301	3
FSCI 4344 (SANITATION)	3	ENG 1302	3
FSCI 4345 (FOOD MICRO.)	3	SOPH LIT	3
FSCI 4350 (ISSUES)	3	HIST 1301	3
FSCI 4391 (RES.) or AG 4091	3	HIST 1302	3
FSCI 4446 (MEATS)	4	POLS 2301	3
FSCI 4447 (PROCESSED)	4	POLS 2302	3
	23	COMM 2301	1
		MATH 1302, 1324 or 1333	3
		ARTS, DRAMA, MUSIC	3
		CHEM 1301	3
		CHEM 1101	1
		BIO 1410	4
		ASCI 1351 or BCIS 1305	3
		AGEC 1331 (INTRO AG ECO)	3
			44
ANIMAL SCIENCE REQUIREMENTS		OTHER REQUIREMENTS	
COURSE	HRS	COURSES	HRS
ASCI 1341 (PRINCIPLES)	3	CHEM 2353	3
ASCI 2241 (LIVE/CARC)	2	CHEM 2153	1
ASCI 3332 (NUTRITION)	3	CHEM 3331	3
ASCI 3349 (A&P)	3		7
ASCI 3443 (GENETICS)	4		
ASCI 4344 (REPRO)	3		
ASCI 4181 (SEMINAR)	1		
	19		
AG ECON / MARKETING REQUIREMENTS		ELECTIVES	
COURSE	HRS	COURSE	HRS
AGEC 3330 (AG MARK.)	3		
AGEC 4342 (AG STATS)	3		
MKT 3321 (MARKETING)	3		
MRT 3322 (CONSUMER BEHAV)	3		
MKT 3323 (SALES MANAGEMENT)	3		
	15		
			6
MUST CHOOSE 2 OF THE FOLLOWING			
COURSE	HRS		
MKT 3326 (RETAILING)	3		
ASCI 4343 (BEEF CATTLE)	3		
ASCI 4342 (SHEEP & GOAT)	3		
ASCI 4345 (BEHAVIOR)	3		
	6		

Table 6. Courses Taught Through the FSPD from Fall 2007- Spring 2013

Course Number	2007		2008		2009		2010		2011		2012		2013	
	ENR	CH	ENR	CH	ENR	CH	ENR	CH	ENR	CH	ENR	CH	ENR	CH
FSCI 1329	40	120	34	102	21	63	36	108	35	105	60	180	46	138
ASCI 2241			73	146	60	120	80	160	73	146	82	164	71	105
FSCI 3300													9	27
FSCI 4345	10	30			5	15			8	24				
FSCI 4350					13	39			10	30			21	63
FSCI 4391	3	9	4	12	6	18	1	3	1	3	9	27	4	12
FSCI 4446	44	176	43	171	41	164	42	168	48	192	67	268	67	268
FSCI 4447			8	32	5	20	6	24			7	28		
FSCI 5345					2	6			3	9				
FSCI 5350									1	3				
FSCI 5447					2	8	3	12			3	12		
FSCI 6320									11	33			5	15
FSCI 6329			14	42	7	21			9	27				
ASCI 6346			7	21			6	18			7	21		
Totals	97	335	183	526	162	474	174	493	199	572	235	700	223	628
Total Enrollment		1273												
Total Credit Hours		3728												

ENR – Enrollment
CH – Credit Hours

Intercollegiate Meats Judging

The ASU Intercollegiate Meats Judging program has steadily grown since the first team was formed in 2005 (Table 7). Through many hours, days and weeks of practicing; the program has reached a point of achievement. Due in part to diligence of students, staff and faculty and the continued support of the FSPD, the Intercollegiate Meats Judging Team has become a consistent Top 5 Nationally Ranked team. This success can be partially attributed to the growth of the Department of Agriculture’s Judging Program. Additionally, the ability to coordinate practice scheduling with the FSPD production and various course laboratories more efficiently provides product for the teams to utilize during practice in order to hone needed skills and be ultra-competitive. With this recent success and the addition of support staff, the program has sparked interest in the students to become more active within the department and university. The current projected participation on the 2015 Intercollegiate Meats Judging Team is an impressive 10 students with multiple 2-year college recruits. The unique opportunity exists to prepare these students for rewarding careers and lives through an array of intensive personal and professional growth. Meat judging at the collegiate level prepares students for their future by providing much needed skills such as time management, decision making, and teamwork as well as providing

students with industry contacts. With the benefits obtained from the judging experience, the participants are poised to succeed in any field after graduation. Past members of ASU's Meats Judging Program, regardless of the short history, serve as role models for upcoming students as they are living proof that these programs assist students in attaining levels of education, experience and perseverance that are certainly cornerstones in the work place. Past students are graduating from Veterinary School, leaders in large meat processing companies, research and development specialists in large meat and food industry companies and more importantly, these alumni reflect the young professionals ASU aims to produce. The alumni are certainly one of our greatest assets as they will continue to reflect the quality of an ASU education and pass that pride and knowledge on to interested young men and women, becoming our strongest recruiters.

Table 7. Members of ASU Meat Judging Teams

Year	Team Members				
2007		Jennie Canon	Henry Dissler	Kari Hudspeth	Katie Lee
	Coach(s)	Michele Sanchez Dr. Kirk Braden			
2009		Mark Baxter	Skylar Kyzar	Heather Tschirhart	Jeanette Redmon
	Coach(s)	Dr. Kirk Braden	Jennie Canon		
2011		Devin Absher	Kara Andrews	Clinton Bippert	Michael Schwartz
	Coach(s)	Travis Shannon Jennie Canon	Kirk Braden		
2012		Kameron Haecker	Kylee Werland	Caitlyn Van Slambrouck	Darren Seidel
	Coach(s)	William Meyer Michael Boenig	Dr. Kirk Braden		
2013		Clay Kelley	Clayton Meyerhoff	Derrick Thivierge	Ty Crooks
	Coach(s)	Sondra Lohse Troy Tarpley	Michael Boenig	Dr. Kirk Braden	
2014		Katie Austin	Danielle Freeman	Bryce Patton	Savina Robles
	Coach(s)	Matt Murdoch Lexus Weinheimer	Dalton Zipp Michael Boenig	Dr. Kirk Braden	

Outreach

Outreach has been purposefully integrated into more than one of the FSPD goals, specifically: providing research results and educational opportunities to the public and offering educational opportunities for public schools through outreach events. Since its

inception, the FSPD has pursued a variety of outreach events targeting a wide assortment of community populations. These events are supported and encouraged by the campus wide Quality Enhancement Plan (QEP) initiative of increasing and improving the community outreach efforts made by Angelo State University.

Outreach events provide a number of learning opportunities for our students, faculty and the surrounding communities. Such events include Meat Quality and Safety Workshops, helping coach high school meats judging teams and providing 4-H and FFA formatted meats judging contest, just to name a few. Through participation in these community outreach events, our students are developing leadership skills and a desire to contribute back to the community which they are a part of. These skills and attributes are employee characteristics sought after by industry leaders. In addition to the benefits of student development, some of the contacts made through these outreach events have developed into beneficial funding sources and research opportunities for the Meat and Food Science Program. For example, a local lamb producer who attended one of our safety workshops volunteered his facilities and livestock to participate in a master’s level food safety thesis project and donated a substantial amount of product which was used in a product development thesis project, both in 2013. This relationship has continued to develop into a mutually beneficial association for both the producer and the students and faculty of the Meat and Food Science Program at ASU. Below is a table (Table 8.) showing total number of outreach events held since 2007.

Table 8. Total number of outreach events 2007-2014.

Outreach Type	Total number of events
Workshops	30
Coaching	5
Contests	23
Food Safety Trainings	9

Workshops

Below is a partial list of workshops and food safety trainings which faculty, staff and students of the Meat and Food Science program either fully conduct or contribute to as part of their outreach efforts.

- Beef Safety and Quality Workshop for Direct Marketers
- Beef Safety and Quality Workshop for Food Service Establishments
- Kids Eat Free! Summer Lunch Program Food Safety Lecture
- Food Protection Management Food Safety Training (as part of the established Texas AgriLife Extension Program)
- Beef Quality presentation as part of the Go Texas - Chef’s Tour
- Summer Grilling Presentation – Angelo State University Alumni Association

Judging and Coaching

Outreach to Texas youth through judging contests and collaborative coaching is an opportunity to not only provide a service to area youth but also to act as a recruitment tool for the university's judging program. Students from across the state get to experience what ASU has to offer while participating in 4-H and FFA contest hosted at the ASU FSPD. Angelo State University and the FSPD have truly been great advocates of providing quality education to its students and to the community for years. Outreach is diverse for a regional comprehensive university and encompasses classes and workshops for adults and a large proportion of programs for teaching the youth of Texas. One of the central elements of FSPD outreach to date is centered on judging programs. These programs have been a vital tool for reaching these students that have an interest in meats judging through their local 4-H and/or FFA chapters. The FSPD staff, judging team coaches and team members actively assists County Agents and Vocational Agriculture teachers through providing them with quality product for teaching and practice. These students go on to compete in competitions all across the state. Over the past five years, we have had numerous FFA and 4-H groups come through the facility to practice and enhance their skills. We have also been honored to be able to provide knowledgeable students to help coach and assist local county 4-H and FFA groups. In 2014 we developed a working articulation with Cisco College (CC) and are currently assisting CC to start a Intercollegiate Meats Judging program. We work closely with CC providing program input, guidance and a trained undergraduate student assistant coach. In addition to having these students and coaches come here, we are able to use it as a prime recruiting tool to showcase what the ASU Agriculture Department has to offer for their individual futures.

Contests

Table 9. Total number of students exposed to the FSPD through meats judging contests.

Contest Name	2007	2008	2009	2010	2011	2012	2013
San Angelo Stock Show	76	96	67	102	99	94	105
West Region 4-H (6,7,10)	31	34	43	32	43	52	47
Angelo State University CDE						130	127
Texas State Invitational ¹						120	148
Total to Date	107	130	110	134	142	396	427
Grand Total							1446

¹FSPD provided product and officials for the Texas State University Invitational

Community Partners

- Sterling Lamb
- Winter's Beef
- ASU Alumni Association
- HEB
- United Supermarkets
- The Market at Pinkies
- LoneStar Beef
- J's Custom Processing

Funding

Table 10. Funding totals for Internal and External Research Grant Support

Award	Granting Agency									
	HEAF/IE		REP		NCBA		USDA		SMT	
	Year	Amount	Year	Amount	Year	Amount	Year	Amount	Year	Amount
Branham et al.	2007	18,000								
Braden et al.	2010	14,000								
Branham et al.			2009	3,700						
Batot et al.			2010	7,404						
Branham et al.			2012	12,650						
Braden et al.			2013	14,000						
Branham et al.					2012	3,000				
Branham et al.					2012	3,000				
Whitney et al.							2008	23,000		
Scott et al.							2010	44,582		
McMillin							2010	9,000		
Brashears et al.							2012	110,000		
Braden et al.							2013	270,000		
Braden et al.									2011	5,200
Total to Date		32,000		37,754		6,000		456,582		5,200
Grand Total										537,536

Funded

Extramural Funding

- Braden, K.W. and L.A. Branham. 2013. Development of Tomorrow's Meat and Food Scientist: A Program to Recruit and Retain Underrepresented Students. Hispanic Serving Institution-United States Department of Agriculture –Agriculture and Food Research Initiative. Funded - \$270,000
- Brashears, M.T., M. Brashears, L.A. Branham, E. Dormedy, M.Baker, G. Loneragan, K. Nightingale, and M. Miller . 2012. Building Laboratory and Intellectual Capacity in order to Effectively Detect and Reduce Salmonella in the Food Supply. Funded Pending Final IRB Approval. United States Department of Agriculture, National Institute of Food and Agriculture - Total Award - \$750,000; Angelo State University Sub-Award - \$110,000
- Branham, L.A. and K.W. Braden. 2012. Beef Safety Outreach Program – Food Safety and Quality Challenges to Direct Marketing Beef Producers. National Cattlemen Beef Association. Funded - \$3,000
- Branham, L.A. and K.W. Braden. 2012. Beef Safety Outreach Program – Food Safety and Quality Challenges to the Food Service Industry. National Cattlemen Beef Association. Funded - \$3,000
- Retail shelf-life, sensory and tenderness evaluation of Nilgai as an alternative protein source. 2011. Braden K.W., Branham, L.A., and R. Cope. Specialty Meats of Texas. - \$5,200
- Scott, HM., P. Boerlin, L. Branham, V. Fajt, S. Gow, Y. Grohn, G. Loneragan, S. McEwan, P. Morley, B. Norby, R. Smith. 2010. Practical interventions to effectively manage antibiotic resistance in beef and dairy cattle systems: a fully integrated approach. Total Award - \$2,000,000; Angelo State University Sub-Award - \$44,582.

- McMillin, K.W., J. Gillespe, R. Harrison, F. Malekian, F. Pinkerton, J. Gager, S. Gebrelul, K. Braden, G. Kannan, S. Solaiman, and A. Peischel. Enhanced economic benefits for meat goat producers through production, meat yield and palatability, and consumer information. 2010. \$497,558.33 USDA-AFRI. ASU Subaward - \$9,000.00 (\$18,000 when product is included)
- Whitney, T., M. Salisbury and K.W. Braden. Supplemental Distillers Dry Grains in Lambs. 2008. ASU Subaward - \$23,000.00

University Research Grants

- Braden, K.W., R. Cope, M. Boenig and L.A. Branham. 2013. Consumer and Retail Case Evaluation: Determining Consumer Attitudes and Cookery Behavior. Research Enhancement Grant, Angelo State University. Funded - \$ 14,460.00
- Branham, L.A., K.W. Braden, J.W. Dickison, and R. Cope. 2012. Development, Functionality and Consumer Acceptance of a Novel Ready –To –Eat Lamb Product. Research Enhancement Grant, Angelo State University. Funded - \$ 12,650.00
- Braden, K., L.A. Branham, and R. Cope. Effects of Atomized Antioxidant on Sensory, Shelf-life, Oxidative Stability and Microbial Stability of Striploin Steaks. 2010. Angelo State University, Research Enhancement Grant. \$8,000.00
- Braden, K. *HEAF Funds* – Research and Freezer Storage Expansion. 2010. Angelo State University. \$14,000.00
- Branham, L. and K. Braden. Evaluation of Shelf Stability of Beef Snack Stick. 2009. Angelo State University, Research Enhancement Grant. \$3,700.00
- Braden, K. *HEAF Funds* – Acquisition of Processed Meats Capabilities for Development of New Course. 2006. Angelo State University. \$16,000.00

Proposed

- Murimi, M., D. Reed, S. Dodd, T. Brashears, M. Brashears, C. McKenney, S. Lonnergan, L. Branham and K. Braden. 2014. Multidisciplinary project to enhance the quality of food and agricultural higher education in combating food insecurity and improving food safety at local and international levels. USDA-NIFA-CGP. Funds Requested - \$725,000. ASU Sub-Award \$98,000 – Under Review
- Brashears, M., T. Brashears, L. Garcia, M. Miller, K. Braden and L. Branham. 2013. Multicultural Scholars: Enhancing Diversity in Food and Agricultural Sciences. USDA-NIFA-MSP. Funds Requested - \$400,000. ASU Sub-Award \$200,000 – Under Review
- Brashears, T., M. Brashears, E. Irlbeck, G. Loneragan, K. Nightingale, L. Branham, L. Thompson, M. Miller, S. Frazee, M. San Francisco. 2013. Sowing HOPE: Developing a Generation of Agricultural Change Agents in the Battles for Food Safety and Food Security. USDA-NIFA. Funds Requested – ASU Sub-Award – \$115,000 – Not Funded
- Braden, K.W., L. Garcia and L.A. Branham. 2013. National Consumer and Retail Case Evaluation; Determining Consumer Attitudes and Cookery Behavior. National Pork Board Research Program. Funds Requested - \$65,480 – Not Funded
- Miller, M.F., C. Brooks, K. Braden et al. 2011. National Pork Board Retail Survey. National Pork Board. \$8,000.00 - Not Funded

- Loneragan, G., L. Kieth, T. Lawrence, E. Murano, B. Norby, M. Scott, M. Brashears, T. Brashears, C. Brooks, J. Ulmer, A. Echeverry, P. Takhar, L. Branham, D. Jaroni, S. Hurd, A. O'Connor, J. Dickson, S. Sapp, K. Nightingale, K. Belk, P. Morley, and S. Russell. 2010. Comprehensive system-based approaches to reduce STEC-associated illness: a risk-informed, integrated farm-to-fork initiative. Funds requested- \$25,000,000. ASU Sub-Award \$311,000 – Not Funded
- Braden, K., S. Howry and R. Cope. 2010. Development, Consumer Acceptance and Marketing of a Novel RTE Lamb Leg Roast. ASU Faculty Research Enhancement. \$13,000.00 - Not Funded
- Braden, K., L. Branham, R. Cope and M. Miller. 2010. Development and evaluation of enzymatic tenderization technologies for use in specified non-fed beef muscle. Texas Beef Council. \$24,000.00 - Not Funded
- Braden, K and L. Branham. 2009. Effects of antioxidant application on color, oxidative stability and shelf life of beef striploin steaks in a retail case environment. USDA-AFRI. \$40,000.00 - Not Funded
- Braden, K and B. May. 2008. Development of Value-Added Lamb Products. American Lamb Board. \$19,000.00 - Not Funded

Table 11. Funding totals for Meat and Food Science Program Support from gifts and endowments.

Donor or Endowment	2007	2008	2009	2010	2011	2012	2013	2014
SMA ¹		1,000	1,000	1,000	1,000	1,000	1,000	1,000
SMT ²					1,000			
Sterling Lamb					2,000			
Cargill			2,000					
Hengst Family			2,000					
Braden Family	2,000	2,000						
SAAF ³							50,000	37,500
HEB ⁴							30,000	
Anonymous Donor ⁵							12,500	
Wilde Endowment ⁶						4,000	6,000	
Dodge Jones Endowment	13,000	19,000	11,600	11,600	11,900	12,500	12,800	13,000
LoneStar Beef ⁷								25,000
Anonymous Donor ⁷								25,000
Stripes LLC.								12,500
Total to Date	15,000	22,000	16,600	12,600	15,900	17,500	112,300	114,000
Grand Total								326,300

¹Southwestern Meat Association

²Specialty Meats of Texas

³San Angelo Area Foundation – Funds for Product Development Initiative Project

⁴HEB – Funds for Product Development Initiative Project

⁵Funds for Product Development Initiative Project

⁶Endowment corpus completed

⁷Funds for Product Development Initiative Project

Production Overview, Food Safety and Product Development Laboratory

Through strategic initiatives, departmental growth and demand for research/outreach services, the FSPD has experienced steady growth since 2007. There are several channels in which this growth has been accomplished. First is the number of courses which utilize the FSPD. In 2007, there was ANSC 2241, (Livestock and Carcass Evaluation), and ANSC 4446, (Meats). Since the addition of the B.S. Degrees in Food Animal Science and Marketing and Agriculture Science and Leadership, there are now new opportunities for increased student use of the facility. Courses created were FSCI 4447, and FSCI 3300. Additionally, through strategic outreach and research goals, the FSPD is in the process of developing the Product Innovation Initiative. Through these services and our outreach endeavors, we have been able to assist Sterling Lamb, Specialty Meats of Texas, Winters Family Beef and Jacoby Brand Beef with various components of agricultural products production and marketing. The Sterling Lamb project was targeted to direct market lambs, and Specialty Meats of Texas has worked in conjunction with the King Ranch and others in the area to attempt to control populations of Nilgi antelope through a mobile harvest facility. The ASU FSPD facilitated oversight and fabrication of carcasses. The FSPD has also hosted various workshops to improve agricultural awareness with a focus on sheep and goats, food safety, and product marketing. Lastly is our outreach to our local livestock producers. By providing the service of custom harvesting livestock, we are able to continually provide fresh product which we may evaluate in labs. The numbers have continually grown as seen in Table 12 below. Because of the capability of this facility, we have been able to steadily increase the hands-on involvement of student workers, which increases both undergraduate and graduate education. We have actually increased the number of student assistants while working through budget reduction. The experience provided to the students gives them a stronger foundation and an edge against the competition in the job market after graduation. The FSPD Laboratory is unique as it is under federal and state inspection, thus allowing our students a greater diversity of knowledge and experience. They are able to work with the inspection process first hand as well as visiting with front line inspectors about their job possibilities. All of these areas have aided in the growth of production for the ASU FSPD. We are now at a point where we plan to work to maintain the production in order to support and fund graduate and undergraduate education and research. Through increased production we have had a great opportunity to bring the Angelo State University Food Safety and Product Development Laboratory out to the industry which is looking for graduates to fill positions across an array of opportunities. The future is strong!

Table 12. FSPD Animal Harvest and Production FY 11-12, FY 12-13 and FY 13-14.

Year	Pork	Beef	Lamb	Goat	Total Animals
2011-2012	66	82	99	51	298
2012-2013	163	102	102	18	384
2013-2014	165	117	106	45	433
Total	394	301	307	114	1,115

Table 13. FSPD Revenue 2007 - 2013

Fiscal Year	Revenue	Annual increase
2013	\$142,771.71	\$28,956.74
2012	\$113,814.97	\$26,732.15
2011	\$87,082.82	\$30,821.29
2010	\$56,261.53	\$1,356.06
2009	\$54,905.47	\$9,595.79
2008	\$45,309.68	\$8,182.13
2007	\$37,127.55	

Future Goals

In coordination with the university, department and facility goals – the following program targets were developed at the 2013 planning meeting.

Table 140. Yearly, 6 year and 10 year program goals compiled for research, teaching and outreach.

	Yearly (per year)	6 year(2020)*	10 year(2024)*
Research Publications			
<i>Abstracts/Presentations</i>	2	14	22
<i>Journal Articles</i>	1	7	11
External and Internal Funding			
Totals			
<i>External Funding</i>	-	\$1,000,000	\$1,200,000
<i>Internal Funding</i>	-	\$200,000	\$300,000
Undergraduate Program			
<i>New FASM undergraduates</i>	5	35	55
<i>Undergraduate Research</i>	2	12	22
<i>New Course/ Update</i>	1	6	All courses updated
Graduate Program			
<i>Graduate Student (Program)</i>	1	6	10
Outreach Events			
<i>Judging contests</i>	3	21	33
<i>Educational</i>	3	21	33
<i>ASU Events</i>	10	70	110
<i>Public</i>	10	70	110

*Cumulative Totals – Some students will have graduated

Angelo State University
Food Safety & Product
Development Laboratory

