

## MARITES A. SALES, PhD

e-mail: marites.sales1@gmail.com

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Scientific research professional with 10+ years of diverse research experience in molecular and cell biology, avian physiology and immunology, microbiology, plant pathology, weed physiology, cattle reproductive physiology, swine gut microbiome, food product development and quality control, and development communication

### Competencies

Molecular biology, immunology, and microbiology laboratory techniques	Collaboration
Bioinformatics data analysis	Laboratory, greenhouse, and/or farm personnel oversight
Design of experiments	Food product development
Mentoring and teaching	Sensory evaluation of food
Project management and prioritization	Quality control in food manufacturing
Methods development and optimization	Microsoft Office
Laboratory and personnel management	Research synthesis
Laboratory record keeping	Writing, editing, and publishing
Interviewing and hiring personnel	Event planning

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### Education

2009	PhD in Cell and Molecular Biology, University of Arkansas, Fayetteville, AR, USA
2001	MS in Applied Microbiology, Hokkaido University, Sapporo, Japan
1994-1999	MS in Development Communication, Visayas State University, Baybay, Leyte, Philippines (Part-time, academic credits earned)
1993	BS in Food Technology, Visayas State University, Baybay, Leyte, Philippines (Graduated <i>Cum laude</i> )

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### Work Experience

#### USDA-ARS-US National Poultry Research Center

950 College Station Road, Athens, GA, 30605

07/2023 – Present

#### Postdoctoral Research Support Staff

- Conducted extensive research on molecular mechanisms underlying myopathies in chickens, focusing on specific genetic mutations and their impact on cellular function
  - Investigated the effects of environmental factors on gene expression patterns by conducting experiments under different conditions (e.g., temperature variations or exposure to toxins)
  - Developed and optimized protocols for DNA/RNA extraction, purification, amplification, and sequencing from various biological samples including blood, tissue, and cell cultures
  - Designed and executed experiments to investigate the role of various proteins in signal transduction pathways, utilizing techniques such as PCR, Western blotting, and immunofluorescence
    - Validated new antibody reagents for use in immunohistochemistry assays through rigorous testing procedures involving positive/negative controls
  - Conducted in vitro cell culture experiments to investigate the effects of specific compounds or treatments on cellular viability, proliferation, or apoptosis
  - Evaluated the impact of various experimental treatments on gene expression patterns using high-throughput screening assays such as RNA-seq
- Optimized and implemented standard operating procedures and rigorous quality control measures for sample processing and laboratory workflows to improve efficiency, reduce costs, and minimize experimental variability to ensure consistency and reproducibility of experimental results
  - Implemented ensuring accuracy and reliability of experimental results and integrity of genetic material
- Managed laboratory operations including ordering supplies, maintaining equipment functionality, and ensuring compliance with safety regulations
- Collaborated with bioinformatics specialists to analyze large-scale genomic datasets obtained through next-generation sequencing technologies
- Contributed expertise during grant proposal writing process by providing experimental design input and preliminary data analysis results
  - Conducted literature reviews to stay up-to-date with the latest advancements in molecular biology research, incorporating relevant findings into experimental design and interpretation

- Assisted in the training/mentoring and supervision of undergraduate students and junior scientists by providing guidance on experimental design principles, troubleshooting techniques, and data interpretation methods

Skills applied: Avian cell culture, RT-PCR and qPCR using QuantStudio Pro 6, QIAcuity droplet digital PCR, ELISAs, cryostat tissue sectioning and immunohistochemistry, MiSeq (from library preparation to bioinformatics analysis), protein assays in Protein Simple (Jess), bioinformatics analyses using Ingenuity Pathway Analysis, DNA LaserGene, JMP, and online analysis software from the National Center for Biotechnology Information

### **University of Arkansas Center of Excellence for Poultry Science**

Fayetteville, AR, 72701

09/2017 – 02/2023

#### **Program Associate II**

- Basic research in poultry immunology and (auto)-inflammatory diseases, specifically whole animal, cellular and molecular procedures from assay development to data collection and analyses
- Pedigree breeding of six genetic lines of chickens as disease models for vitiligo, scleroderma, and obesity and maintaining up-to-date animal inventory
- Care of experimental animals and oversight of feed mill and farm crew
- Establishment and maintenance of avian tissue culture cell lines (melanocytes, macrophages, fibroblasts)
- Managed laboratory resources, including purchase of supplies, verifying transactions, and updating supply, chemical, and equipment inventory as well as lab safety training status of all lab members
- Developed and optimized laboratory protocols, including calculating molarity in preparing media solutions and reagents
- Maintained laboratory notebooks and digital records of sample collection, processing, and data analyses
- Set up Teaching Lab for graduate- and undergraduate-level lab courses on techniques used in immunology research

Skills applied: Avian cell culture, RT-PCR and qPCR, ELISAs, flow cytometry, cryostat tissue sectioning and immunohistochemistry

### **University of Arkansas Department of Animal Science**

Fayetteville, AR, 72701

02/2014 – 08/2017

#### **Program Associate**

- Analyzed and quantified cytokine levels in steers with different genotypes subjected to transportation stress to determine effects of single nucleotide polymorphisms (SNP) on stress tolerance
- Developed a high-throughput system for processing and analysis of porcine gene expression to characterize effects of early-life exposure to environmental conditions
- Presented research protocols for approval by the Institutional Biosafety Committee prior to project start
- Wrote reports of research findings, published research results in scientific journals, and gave oral presentations at scientific conferences
- Additional responsibilities included preparation and delivery of materials for class-based instruction as part of a graduate-level course on laboratory techniques used in animal science research

Skills applied: PCR, qPCR, agarose gel electrophoresis, restricted fragment length polymorphism, DNA sequence analyses, SNP genotyping using KASP markers, and next-generation sequencing of the swine gut microbiome to identify differentially expressed microRNAs

### **University of Arkansas Department of Plant Pathology**

Fayetteville, AR, 72701

08/2011– 01/2014

#### **Program Associate**

- Supported National Clean Plant Network initiatives by conducting plant surveys for detection of viruses in berries
- Characterized a virus in a fungal parasite of a soybean cyst nematode
- Managed laboratory and greenhouse resources, including purchase of supplies, updating chemical inventory, troubleshooting equipment problems, ensuring lab safety, and optimizing protocols for high-throughput processing of plant samples for downstream applications
- Interviewed, hired, trained, and supervised laboratory personnel (undergraduate students on a work-study program); organized events to foster team building among lab members (8-10 every semester)

Skills applied: Maintenance of fungal cultures, Plant RNA/DNA extractions, RT-PCR, lab personnel management and development

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**University of Arkansas Department of Animal Science**

Fayetteville, AR, 72701

05/2009 – 07/2011

**Program Associate**

- Developed biomarkers for enhancing animal health, growth, and reproduction through genotyping of single nucleotide polymorphisms in genes related to cattle productivity and tolerance to fescue toxicity
- Managed laboratory resources, including purchase of supplies, inventory of chemicals, maintenance of equipment, ensuring the lab meets safety standards, and updating protocols
- Supervised and mentored graduate and undergraduate students on experimental planning and conduct of their research projects
- Wrote reports of research findings and published in scientific journals
- Reviewed papers of colleagues for publication in the Animal Science Report

Skills applied: PCR, qPCR, agarose gel electrophoresis, restricted fragment length polymorphism, DNA sequence

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**University of Arkansas Department of Crop, Soil, and Environmental Sciences**

Fayetteville, AR, 72701

08/2004 – 05/2009

**Graduate Assistant / PhD Student**

- Generated a transcriptome profile of the weedy rice in response to nitrogen supply to understand the genetic mechanisms underlying the weed's growth advantage over cultivated rice under nitrogen-limiting conditions. This project involved:
  - Designing and setting up of rice hydroponics under greenhouse conditions
  - Internship on microarray analysis with a rice genomics expert at the University of Maine, Bangor, ME
- Collaborated with peers in conduct of other research projects
- Trained and supervised both new graduate students and undergraduate research assistants on lab protocols needed to complete research projects

Skills learned: detection of polymorphisms in weed species using simple sequence repeat markers, PCR, agarose and acrylamide gel electrophoreses, DNA sequence analyses, best practices for laboratory record keeping

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**Visayas State University Office of the Director for Research and Extension**

Baybay, Leyte, Philippines

06/1994 – 07/2004

**Media Production Specialist**

- Managing Editor of *Annals of Tropical Research*, a scientific journal published by the institution
- Assigned reviewers and editors for each manuscript; oversaw publishing and circulation of journal issues to subscribers and stakeholders
- Managed publication of research symposium proceedings, popular printed (newsletter, brochure) or audiovisual (video, radio clips) formats of relevant research generated by faculty
- Organized and coordinated a team of extension communicators to serve as liaison officers for their units

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**Hokkaido University Faculty of Agriculture**

Sapporo, Japan

07/1999– 08/2001

**Graduate Assistant / MS Student**

- Generated the first report on DNA repair homologs in the rice blast fungus (*Magnaporthe grisea*)

Skills learned: Culture and maintenance of fungal cells, DNA extraction from rice blast fungus, DNA cloning, DNA homologous repair, PCR, gel electrophoresis, DNA electroporation of *E. coli* cells, Southern blotting

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**San Miguel Corporation Shrimp Processing Plant**

Santa Fe, Bacolod City, Negros Occidental, Philippines

09/1993 – 05/1994

**Quality Control Technician**

- Monitored compliance with quality and production standards of the frozen shrimp products from raw material to transport, including sensory evaluation of the packaged product and laboratory assays to monitor compliance with microbial standards
- Developed and maintained collaborative partnerships with product development, contract growers and suppliers, production, packaging, and shipping crew, as well as vendors and other consumers

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**Department of Science and Technology-Region VIII**

Tacloban City, Philippines

06/1993 – 08/1993

**Science Research Assistant**

- Facilitated training-workshops on processing of food products using local ingredients
- Wrote a proposal for funding to establish a microbiology laboratory to provide diagnostic services to food processors

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**Visayas State College of Agriculture (now Visayas State University)**

Baybay City, Leyte, Philippines

06/1989 – 04/1993

**Undergraduate Student, Dept of Food Science and Technology**

- Conducted an undergraduate research project on developing a fermented food product inspired by an Indonesian peanut delicacy (*ontjom*) using cassava, a local root crop (*Manihot esculenta*)

Skills learned: maintaining fungal cultures used for fermentation, setting up and analyzing results of sensory evaluation by trained and consumer panels

04/1992 – 06/1992

**Undergraduate Intern, San Miguel Corporation Bacolod Shrimp Processing Plant, Bacolod City, Philippines**

- Documented the internship in a case study entitled “Black tiger prawn (*Penaeus monodon*) processing at the Bacolod Shrimp Processing Plant” and conducted a mini thesis entitled “Kinetics of the microbial contamination in shrimp”

Skills learned: quality control of a frozen food product line from raw material procurement to finished product delivery; sensory evaluation of packaged product; microbial counts from shrimp swab samples

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**Other Work Experience**
**2015 – 2024 Sensory Evaluation Panelist**

- 2023-2024 Trained Panelist for the Quality and Safety Assessment Research Unit at the USDA-ARS
- 2015-2023 Consumer Panelist for food and/or beverage products developed by the Department of Food Science-University of Arkansas-Division of Agriculture as a consumer panelist

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**Teaching Experience**

Every Spring Semester, 2018 – 2023: **Immunology in the Laboratory.** Laboratory course on foundational techniques used in immunological studies, including immunohistochemistry, ELISA, tissue culture, and flow cytometry. Center of Excellence for Poultry Science, University of Arkansas, Fayetteville, AR, USA.

Every Fall Semester, 2014 and 2015: **Advanced Analytical Methods in Animal Sciences Laboratory.** Seven-week session of lecture and lab classes on molecular biology techniques at the graduate level. Department of Animal Science, University of Arkansas, Fayetteville, AR, USA.

First Semester (Jun-Oct), 1998-1999: **Broadcast Speech and Communication.** One lecture on phonetics to undergraduate student majors in Broadcasting. Department of Development Communication, Visayas State College of Agriculture, Baybay, Leyte, Philippines.

Second Semester (Nov-Mar), 1998-1999: **Communication Skills.** Undergraduate level course on English. Department of Arts and Letters, Visayas State College of Agriculture, Baybay, Leyte, Philippines.

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**Volunteer Service**

2023-Date *Laudato Si* Creation Care Team, Catholic Center at the University of Georgia

2023 Member, Athens Choral Society

2011-2020 Member, University of Arkansas Master Chorale

2013-2023 Reviewed/Proofread papers for publication of colleagues in the University of Arkansas-Division of Agriculture

- The lung microbiome associated with different sub-types of AECOPD in a Chinese cohort
- Sex-Dependent Effects of Caecotrophy on Gut Microbiome and Growth in Rex Rabbit (*Oryctolagus cuniculus*)
- Morphological variability of *Phyllocoptes adalius* female forms (Acari: Eriophyoidea), with a supplementary description of the species, Systematic and Applied Acarology 2016, 21(2):181-194
- New Eriophyoid Mites (Acari: Eriophyoidea) from Silver Fir (*Abies alba* Mill.) in Poland, Annales Zoologici (Warszawa) 2014 64(2): 251-265.

- Demographic parameters of *Phyllocoptes adalius* (Acari: Eriophyoidea) and influence of insemination on female fecundity and longevity, *Experimental and Applied Acarology* 2014, 63 (3):349-360.
  - *Plasmopara halstedii* virus causes hypovirulence in *Plasmopara halstedii*, the downy mildew pathogen of the sunflower, *Plant Disease* 2013
- 2011-2019 Volunteer, Walton Arts Center, Fayetteville, AR
- 2015 Judge, MS Oral Presentation, Gamma Sigma Delta Research Competition
- 2014 Judge, PhD Oral Presentation, Gamma Sigma Delta Research Competition
- 2012 Member, APS Committee on Virology and Committee on Equality and Diversity
- 2011 Judge, MS Oral Presentation, Gamma Sigma Delta Research Competition  
Mentor, ASPB Master Planting Science Team
- 2010 Reviewer, *Effects of Heat Shock Protein 70 Haplotype and Tall Fescue Variety on Bull Sperm Characteristics*, Animal Science Report
- 2009 Reviewer, *Cardamine corymbosa (Brassicaceae): New to the United States*, Weed Technology  
Reviewer, *Molecular Basis of Resistance to ALS-Inhibitor Herbicides in Greater Beggarticks*, Weed Science: Sep 2009, Vol. 57, No. 5, pp. 474-481
- 2006 Reviewer, *Characterization of Spontaneous Crosses between Clearfield Rice (Oryza sativa) and Red Rice (Oryza sativa)*, Weed Technology: Jul 2006, Vol. 20, No. 3, pp. 576-584.

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**Professional Affiliations/Memberships**

- 2019-2022 PanAmerican Society for Pigment Cell Research
- 2015-2022 American Association of Immunologists
- 2009-2017 American Society for Animal Science
- 2007-2017 Gamma Sigma Delta Honor Society for Agriculture
- 2011-2014 American Phytopathological Society
- 2007-2009 American Society for Plant Biology
- 2007-2008 International Weed Science Society
- 2006-2008 Member, International Culture Team, University of Arkansas
- 2004-2009 Weed Science Society of America/Southern Weed Science Society
- 2004 American Association for the Advancement of Science
- 1997-Date Focolare Movement (Branch of the Women Volunteers), a spirituality-based international organization that works towards social justice, dialogue, and unity
- 1995 – Date Lifelong member of the Polyphonics choral group
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**Training, coursework and workshops or conferences not listed elsewhere**
**2022**

- iLEAD (Internal Leadership Program) Cohort II, University of Arkansas System-Division of Agriculture

**2019**

- MHC Typing, Janet Fulton Lab, HyLine International, Dallas Center, IA, March 18-22

**2017**

- FlowJo instrument and analysis software
- Poultry breeding (artificial insemination)
- Growing feather injection
- Cryostat sectioning of tissues for immunohistochemical staining
- Tissue culture techniques (chicken melanocytes, macrophages, myocytes)

**2016**

- Bioinformatics (for RNASeq data analyses, e.g. bowtie, TopHat2, HTSeq, MiRDeep2) conducted by the Arkansas High Performance Computing Center
- Adult First Aid/CPR/AED Certification Training at the University of Arkansas HPER, April 26
- Annual Meeting of the American Association on Immunologists, Seattle, WA, May 13-16

**2015**

- Research Commercialization Forum, Walton Business School, August 2015. The forum equipped participants with skills to commercialize technologies generated by research at the University of Arkansas to create a sustainable knowledge-based economy in Arkansas.

**2012**

- siRNA cloning
- Annual Meeting of the American Phytopathological Society, Rhode Island
- Coursework in Plant Virology (non-credit), Fall 2012
- RNA analyses using BioRad's Experion Automated Electrophoresis System, POSC, Erf Lab

**2011**

- Double-stranded RNA (dsRNA) extraction to detect viruses in plant and fungal tissue
- Immunoblotting for virus detection
- Small Fruit Crop Workshop

**2010**

- Coursework in Advanced Immunology (Lecture and Laboratory)
- Joint Annual Meeting of the American Society for Animal Science (and other societies), Denver, CO, Jul 11-15
- Webinars
  - Harnessing the power of high-resolution melting genetic analysis: From bench to clinic, BioRad, Aug 11
  - Instrumentation and techniques for stem cell research and discovery, August 18
  - Exploring genetic diversity: Mapping the genetic landscape through NGS, Aug 31

**2009**

- Promoting Diversity and Inclusion in the University of Arkansas
- Coursework in Animal Physiology
- KASP SNP genotyping assay (allelic discrimination) using KASP chemistry on the StepOnePlus Real-time PCR Machine (Applied Biosystems)

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**Peer-reviewed Publications**

- DM Falcon, KA Byrne, **MA Sales**, and GF Erf. 2024. Spontaneous immunological activities in the target tissue of vitiligo-prone Smyth and vitiligo-susceptible Brown lines of chicken. *Front. Immunol.* 2024, 14. <https://doi.org/10.3389/fimmu.2024.1386727>
- AJ Rossi, JM Santamaria, CN Beck, **MA Sales**, BM Hargis, GT Isaias, and GF Erf. 2023. The Immuno-Suppressive Effects of Cyclic, Environmental Heat Stress in Broiler Chickens: Local and Systemic Inflammatory Responses to an Intradermal Injection of Lipopolysaccharide. *Vet. Sci.* 2024, 11, 16. <https://doi.org/10.3390/vetsci11010016>
- MM De Souza, DA Koltas, H Beiki, **M Sales**, et al. 2022. Early life exposure of pigs to topsoil alters miRNA and mRNA expression in peripheral blood mononuclear cells. *Frontiers Genet.* doi: 10.3389/fgene.2022.886875.
- CE French, **MA Sales**, et al. 2020. Local and systemic inflammatory responses to lipopolysaccharide in broilers: new insights using a two-window approach. *Poultry Sci* 99(12): 6593-6605.
- A Dhamad, E Greene, **M Sales**, et al. 2019. 75-kDa glucose-regulated protein (GRP75) is a novel molecular signature for heat stress response in avian species. *Am J Physiol.* doi: 10.1152/ajpcell.00334.2019.
- T Tsai, **MA Sales**, et al. 2018. Isolated rearing at lactation increases gut microbial diversity and improves post-weaning performance in pigs. *Frontiers Microbiol.* doi: 10.3389/fmicb.2018.02889.
- MA Sales**, et al. 2013. Effects of forage type, body condition, and single-nucleotide polymorphisms in the bovine cytochrome p450 regulatory region on cow productivity. *J Animal Physiol Animal Nutr* 97(1): 91–96.
- MA Sales**, KY Murphy, CF Rosenkrans, et al. 2011. Effects of forage type, body condition, and single nucleotide polymorphisms in the bovine cytochrome p450 regulatory region on cow productivity. *J. Anim. Physiol. Anim. Nutr.* doi:10.1111/j.1439-0396.2011.01246.x
- MA Sales**, NR Burgos, EE Gbur, et al. 2011. Morphological and physiological responses of weedy red rice (*Oryza sativa* L.) and cultivated rice (*O. sativa*) to N supply. *Am. J. Plant Sci.* 2:569-577.
- ML Looper, **MA Sales**, CF Rosenkrans, et al. 2010. Effects of body condition on measures of intramuscular and rump fat, endocrine factors, and calving rate of beef cows grazing common bermudagrass or endophyte-infected tall fescue. *J. Anim. Sci.* 88 (12): 4133-4141.

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**Research Series 584. Annual Animal Science Report. University of Arkansas-Division of Agriculture**

- MA Sales**, ML Looper, CF Rosenkrans, et al. 2010. Effects of genotype on body weight, cortisol, and prolactin in steers grazing toxic or non-toxic endophyte-infected tissue.
- BC Williamson, **MA Sales**, Rosenkrans, C. F. et al. 2010. Identification of single nucleotide polymorphisms of the lactate dehydrogenase-B gene and association with cow and calf performance.
- KY Murphy, **MA Sales**, CF Rosenkrans, et al. 2009. Polymorphisms in the regulatory region of bovine cytochrome P450.
- MJ Larson, **MA Sales**, CF Rosenkrans, et al. 2009. Effects of forage type and single nucleotide polymorphisms in bovine CYP3A28 on beef cow milk traits.

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## Reports for the Arkansas Soybean Promotion Board

- MA Sales** and IE Tzanetakakis. 2013 (Winter Report). Detection and characterization of mycoviruses in a soybean cyst nematode biocontrol agent with commercialization potential (Year 2).
- MA Sales** and IE Tzanetakakis. 2012 (Winter Report). Detection and characterization of mycoviruses in a soybean cyst nematode biocontrol agent with commercialization potential (Year 1).
- IE Tzanetakakis, J Rupe, **MA Sales**, et al. 2011 (Winter Report). Identification of the factors that cause soybean green bean syndrome.

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## Conference Papers

- DM Falcon, **MA Sales**, et al. 2019. Melanocyte-specific Th1-like initiating- and recall-responses in growing feathers of Smyth chickens with autoimmune vitiligo. Annual Meeting of the Pan-American Society for Pigment Cell Research. Bar Harbor, Maine.
- A Rodriguez, J Hiltz, **M Sales**, et al. 2018. Successful rescue and establishment of avian models expressing spontaneous autoimmune diseases: systemic sclerosis/ scleroderma and Hashimoto's thyroiditis. Annual Meeting of the Arkansas Biosciences Institute, Little Rock, AR, on September 25, 2018.
- MA Sales**, et al. 2016. Cytochrome P450 Polymorphisms Influence Growth and Immune Function of Dairy Heifers Grazing Stockpiled Endophyte-Infected Tall Fescue", Annual Meeting of the Animal Science Society-Southern Section, San Antonio, TX, on February 6-9, 2016.
- MA Sales**, et al. 2016. Polymorphisms in Stress-Related Genes Affect Body Weights of Angus-Based Crossbred Cows at Weaning, Annual Meeting of the Animal Science Society-Southern Section, San Antonio, TX, on February 6-9, 2016.
- LR Meyer, **MA Sales**, et al. 2016. Relationships between Prolactin Genotypes and Dairy Heifer Growth and Development, Annual Meeting of the Animal Science Society-Southern Section, San Antonio, TX, on February 6-9, 2016.
- LR Meyer, JG Powell, BR Kutz, KS Anschutz, **MA Sales**, et al. 2016. Relationships between prolactin genotypes and beef cow profitability, Annual Meeting of the Animal Science Society-Southern Section, San Antonio, TX, on February 6-9, 2016.
- T Tsai, H Kim, **MA Sales**, et al. 2016. Effect of Topsoil Exposure during Lactation on Subsequent Performance and Abundance of Innate and Adaptive Immune Cells in Pigs, Annual Meeting of the Animal Science Society-Midwest Section, Des Moines, IA, on March 12-17, 2016.
- T Tsai, H. Kim, **MA Sales**, et al. 2016. Effect of rearing strategies during lactation on growth performance and the population of innate and adaptive immune cells in pigs from pre-weaning to market, Annual Meeting of the Animal Science Society-Midwest Section, Des Moines, IA, on March 12-17, 2016.
- X Wang, T Tsai, **MA Sales**, et al. 2016. Evaluation of Porcine IPEC-J2 Cell Line Immune Response to *Escherichia coli* (0111:B4) Lipopolysaccharide, Annual Meeting of the Animal Science Society-Midwest Section, Des Moines, IA, on March 12-17, 2016.
- MA Sales**, et al. 2015. Associations among Cytochrome P450 3A28 Polymorphisms, Anabolic Steroids, and Stress Response of Calves. Abstracts of the American Society of Animal Science - Southern Section. Annual Meeting and Conference, Atlanta, GA on January 31 – February 3, 2015. p. 38.
- MA Sales**, et al. 2014. Effects of genotype and transportation stress on cytokine gene expression in steers. Annual Meeting of the American Society for Animal Science, Kansas City, Missouri.