

Curriculum Vitae

Adam F. Summers

New Mexico State University
Department of Animal and Range Sciences
PO Box 3003 MSC 3I
2980 Espina Street
Knox Hall Room 326
Las Cruces NM 88003
Phone: (575) 646-1549
Cell phone: (435) 730-0344
E-mail: asummers@nmsu.edu

Education

Ph.D. 2012. University of Nebraska-Lincoln; Lincoln, NE; Animal Science/Reproductive Physiology. Ph.D. Advisors: Drs. Richard N. Funston and Andrea S. Cupp, Dissertation: Beef cattle production: Understanding the effect of heifer development system, late gestation protein supplementation, and ovarian steroidogenic environment on productivity, reproduction, and longevity.

M.S. 2009. Utah State University; Logan, UT. Animal Science/Ruminant Nutrition. M.S. Advisor: Dr. Randell D. Wiedmeier, Thesis: The biological and economic effects of grazing spring-calving cow-calf pairs on improved irrigated pasture using creep supplementation.

B.S. 2007. Utah State University; Logan, UT. Major: Animal Science
Minor: Chemistry

Research Experience

Assistant Professor. July 2014- Present. Department of Animal and Range Sciences, New Mexico State University; Las Cruces, NM.

Post Doctoral Research Associate. 2013-2014. Department of Animal Science, University of Nebraska-Lincoln; Lincoln, NE. Mentor: Dr. Andrea S Cupp.

Graduate Research Assistant. 2009-2012. Department of Animal Science, University of Nebraska-Lincoln; Lincoln, NE. Graduate Assistant Mentors: Drs. Richard N Funston and Andrea S Cupp.

Graduate Research Assistant. 2008-2009. Department of Animal Dairy and Veterinary Science, Utah State University; Logan, UT. Graduate Assistant Mentor: Dr. Randell D Wiedmeier.

Undergraduate Research Assistant. 2007. Department of Animal Dairy and Veterinary Science, Utah State University; Logan, UT. Undergraduate Assistant Mentor: Dr. Randell D Wiedmeier.

Undergraduate Research Assistant. 2006-2007. Department of Animal Dairy and Veterinary Science, Utah State University; Logan, UT. Undergraduate Assistant Mentor: Dr. Tilak Dhiman.

GRADUATE AND UNDERGRADUATE STUDENT TRAINING

<u>Graduate Student</u>	<u>Previous Degree</u>	<u>Degree Objective</u>	<u>Graduation/ Expected</u>
1) Shelby Rosasco	BS, Fresno State	MS	Fall 2016
Thesis Topic: Effects of improved nutrient intake on growth, reproduction, and productivity of beef heifers			
Current job: Graduate Research Assistant NMSU, working towards PhD			
2) Matthew Herrington	BS, BYU-I	MS	Fall 2016
Thesis Topic: Association between antral follicle count and reproduction, performance, and feed efficiency in beef heifers			
Current job: Extension Farm Assistant Supervisor, University of Arizona			
3) Joslyn Beard	BS, NMSU	MS	Fall 2017
Thesis Topic: Effect of maternal stimuli during fetal development on beef progeny performance.			
4) Daniel Chavez	BS, NSMU	MS	Summer 2018
Thesis Topic: Managing cattle reproduction: The effect of estrous synchronization and natural service and artificial insemination beef cattle reproduction and economics.			
Current job: Ranch hand, family operated ranch			
5) Shelby Rosasco	MS, NMSU	PhD	Spring 2020
Dissertation Topic:			
6) Diego Garcia	BS, UT-Austin	MS	Spring 2019
Thesis Topic:			

Undergraduate Research

<u>Program</u>			
Adam Ustach		BS	Spring 2017
Larisa Estrada	Honors	BS	Spring 2017
Ceirrah Kassetas	HHMI	BS	Fall 2018
Sabrina Thuerauf		BS	Spring 2019

GRADUATE AND UNDERGRADUATE STUDENT TRAINING COMMITTEES

<u>Graduate Student</u>	<u>Previous Degree</u>	<u>Degree Objective</u>	<u>Graduation/ Expected</u>
1) Leah Schmitz	BS, NMSU	MS	Spring 2015
2) Kelsey Quinn	MS, NMSU	PhD	Spring 2016
3) Lyndi Owensby	BS, NMSU	MS	Spring 2016
4) Stacia Prosser	BS, UCONN	MS	Spring 2016
5) Brandon Smythe	MS, NSMU	PhD	Fall 2017
6) Cheyenne Robinson	MS, OSU	PhD	Fall 2018
7) Caitlin Hebbert	BS, WTAMU	MS	Spring 2017
8) Bahaa Aloqaily	MS, OSU	PhD	Fall 2018
9) Stacia Prosser	MS, NMSU	PhD	Spring 2019

HONORS BESTOWED ON ADVISEES

1) Shelby Rosasco Wallace Memorial Scholarship, Neumann Scientific Paper Competition Winner, 2016; Western Section ASAS Applied Paper Competition 1st Place, 2016; Dean's Award of Excellence for Graduates, 2016.

2) Joslyn Beard Wallace Memorial Scholarship; Neumann Scientific Paper Competition 3rd Place, 2017; Dean's Award of Excellence for Graduates, 2017; Western Section ASAS 3-minute thesis competition 3rd Place, 2018.

3) Diego Garcia 1st place in the Master's Poster Contest for the 66th Annual Meeting of the Southwestern Branch of the Entomological Society of America 2018; Livestock Insect Workers Conference Travel Award Winner, 2018

Teaching Experience

Animal Science 504: Physiology Techniques, 2018- present (Spring EY), *New Mexico State University*, Las Cruces, NM.

Animal Science 428: Sheep Production, 2017- present (Spring OY), *New Mexico State University*, Las Cruces, NM.

Animal Science 250: Lambing Barn Management, 2016- present (Spring EY), *New Mexico State University*, Las Cruces, NM.

Animal Science 480/580: Environmental Physiology of Domestic Animals, 2015- present, *New Mexico State University*, Las Cruces, NM.

Animal Science 421: Physiology of Reproduction (Guest Lecturer), 2015, *New Mexico State University*, Las Cruces, NM. Discussed estrous synchronization, artificial insemination, and ovarian antral follicle development. Utilized reproductive tracts to allow students to practice proper AI technique and ultrasound to demonstrate conducting antral follicle counts and how these counts relate to expected fertility.

Animal Science 426: Beef Cattle Production: Cow-Calf Management, 2015- 2018, *New Mexico State University*, Las Cruces, NM.

Animal Science 423: Animal Breeding, 2014- present, *New Mexico State University*, Las Cruces, NM.

Animal Science 442/842: Endocrinology, 2011, 2013 (TA), *University of Nebraska-Lincoln*, Lincoln, NE. Responsible for developing case studies involving different endocrine glands and disorders throughout the semester. Led discussions and presented findings on the disorders discussed in the case studies. Lectured, graded student case study reports, and helped with test and presentation grading.

Animal Science 918: Growth and Development of Meat Animals (Guest Lecturer), *University of Nebraska-Lincoln*, Lincoln, NE. Responsible for creating and giving a lecture on epigenetics and fetal programming. Provide test question and assisted in grading criteria for test question.

Animal Science 485: Animal Systems Analysis, 2012 (TA), *University of Nebraska-Lincoln*, Lincoln, NE. Assisted in assignment development. Led classroom discussions on systems and systems thinking. Graded assignments and student presentations.

Animal Dairy and Veterinary Science 2080: Beef Production, 2009 (TA), *Utah State University*; Logan, UT. Responsible for overseeing lab portion of class where students practiced hands-on techniques such as conducting breeding soundness exams (BSE), freeze branding, branding, tattooing, and other animal handling and husbandry procedures.

Animal Dairy and Veterinary Science 2090: Sheep Production, 2005-2007 (TA), *Utah State University*; Logan, UT. Responsible for assisting student groups during labs teaching animal handling and husbandry techniques and oversaw lambing.

Professional Membership

American Society of Animal Science

Gamma Sigma Delta

Society for the Study of Reproduction

Service to Societies

2018- Present Western Section ASAS Graduate Competition Committee Chair
2017-Present Beef Reproduction Task Force, Committee member
2016- Present Western Section ASAS Graduate Competition Committee member
2015 Western Section ASAS Graduate Student Lunch and Learn- Panel member
2014 SSR Co-chair “Nutrition & Reproduction” Platform
2014- present Ad hoc Abstract Reviewer SSR
2013 SSR trainee bylaws committee member
2011 SSR Co-chair “Reproductive Research and Its Impact on Feeding the World’s Hungry”
Minisymposium

Ad hoc Journal Reviewer

2016- Reviewer Beef Farmers of Ontario, Livestock Research Innovation Corporation Grant
2016- Present Domestic Animal Endocrinology
2016- Present Animal
2014- Present PLOS ONE
2013- Present Journal of Animal Science

Honors and Awards

Western Section American Society of Animal Science, Applied Animal Science Paper, 1st place, 2016.
Poster presentation finalist, Molecular Mechanisms of Disease retreat, 2013
Recipient Animal Reproduction in Agriculture Research Fellowship, Society for the Study of
Reproduction, 2013
Western Section American Society of Animal Science, Applied Animal Science Paper, 2nd place, 2013
Recipient Midwest ASAS Young Scholar Award, 2013.
Larry Ewing Trainee Travel Fund, Recipient, Society for the Study of Reproduction, 2012, 2013.
Western Section American Society of Animal Science, Applied Animal Science Paper, 3rd place, 2012.
Arthud Travel Fund, Recipient, University of Nebraska Lincoln, 2012.
Whitmore Student Support Travel Funds. Recipient, University of Nebraska Lincoln. 2010.
Western Section American Society of Animal Science, Applied Animal Science Paper, 1st place, 2010.
Western Section American Society of Animal Science, Applied Animal Science Paper, 2nd place, 2010.
Recipient J. Grant Broadbent Scholarship, Utah State University, 2005-07.

GRANTS AND FELLOWSHIPS

Funding secured (\$103,677.50; Lead PI = \$58,803)

Industry funding

“Effects of ZinMet on growth, reproduction, and antibody titers of growing Holstein heifers” submitted
fall 2015 to **Global Animal Products Inc.** Lead PI: Sergio Soto. Co-PI: Adam Summers. **Requested
amount: \$44,874.50.**

“Using CIDRs as a way of improving reproductive efficiency in low fertility heifers”. Submitted to Zoetis
Animal Health in spring 2016. Lead PI: Adam Summers. **In kind donation \$3,769**

“Using CIDRs as a way of improving reproductive efficiency in low fertility heifers” and “Comparison of
Lutalyse and HighCon Lutalyse on AI and Final Pregnancy Rates in Bos taurus and Bos indicus cattle
breeds”. Submitted to Zoetis Animal Health in spring 2017. Lead PI: Adam Summers. **In kind donation
\$12,034**

University funding

“Impact of level of undegradable protein supplementation during late gestation on progeny performance” submitted spring 2016 to **Agricultural Experiment Station Graduate Research Award**. PI: Adam Summers. **Requested: \$43,000.**

Funding requested

Federal Grants

“The influence of improved nutrient intake prior to the breeding season on ovarian function in beef heifers” **USDNA NIFA Predoctoral Grant**. Lead PI: Shelby Rosasco. Primary Mentor: Adam Summers. Requested amount: **\$99,805. Pending.**

“Effects of supplemental arginine on female resilience to nutritional inadequacy”. **USDA/NIFA/AFRI Foundational Program**. Lead PI: EJ Scholljegerdes. Co-PI: Adam Summers. Requested amount: **\$199,925. Pending.**

“Strengthen the ability to graduate Hispanic students for nation's food, agriculture and natural resource scientific and professional work force” Submitted spring 2018 **USDA/NIFA/ Hispanic Serving Institutions Education Grants**. Lead PI: Sergio Soto. Co-PI: Adam Summers. **Requested amount: \$983,210. Pending.**

“Development of a precision agriculture system for sustainable small ruminant farming in Wisconsin and Minnesota”. Submitted Fall 2017 to **USDA NCR SARE Pre-proposal**. Lead PI: Andres Cibils. Co-PI Adam Summers.

“Timing and level: Impact of maternal supplementation on female progeny fertility”. Foundation for Food and Agriculture Research New Innovator Program. Submitted spring 2017. Lead PI: Adam Summers. **Requested: \$589,358.** Grant was well received but not funded.

“Strengthen the ability to graduate Hispanic students for nation's food, agriculture and natural resource scientific and professional work force” Submitted spring 2017 **USDA/NIFA/ Hispanic Serving Institutions Education Grants**. Lead PI: Sergio Soto. Co-PI: Adam Summers. **Requested amount: \$999,410.** Grant was not funded.

“Effect of growth promoting implants on mechanisms controlling beef heifer reproductive efficiency”. **USDA/NIFA/AFRI Foundational Program**. Lead PI: Adam Summers. Co-PIs: Scholljegerdes, Hernandez-Gifford. **Requested: \$149,303.** Grant was not funded.

“Effect of organic mineral supplementation prior to artificial insemination and superovulation on ewe reproductive efficiency”. **USDA National Sheep Industry Improvement Center**. Lead PI: Adam Summers. Co-PIs: Scholljegerdes. **Requested: \$21,164.** Grant was not funded.

“Effect of exogenous progestins on ovarian steroidogenic enzyme activity and oocyte quality” Submitted in spring 2013 to the **USDA/NIFA/AFRI Postdoctoral Fellowship**. PI: Adam Summers. **Requested amount: \$135,093.** Grant was well received but not funded.

Industry funding

“Determining the effects of distillers grains supplementation during early to mid-gestation on progeny heifer ovarian reserve and potential lifetime fertility” submitted in spring 2012 to **Nebraska Corn Board**. Lead PI: Andrea Cupp. Co-PI Adam Summers. **Requested amount \$113,748.** Grant was not funded.

University funding

“Development of a precision agriculture system for sustainable small ruminant production in pastoral systems of the United States and West Africa”. Submitted Fall 2017 to **NMSU Vice President for Research**. Lead PI: Andres Cibils. Co-PI Adam Summers **Requested: \$39,999.90**. Grant was not funded

“Management factors influencing beef cattle productivity, longevity, and producer profitability” submitted spring 2016 to **Agricultural Experiment Station Graduate Research Award**. PI: Adam Summers. **Requested: \$44,000**. Grant was not funded.

INVITED TALKS

Ag Degree Days. Managing small ruminant reproduction. Sheep and Goat Symposium. NMSU Cooperative Extension. Las Cruces, NM October 18, 2018.

Beef Reproduction Task Force. Management decisions impacting reproduction and longevity in the Southwest. Applied Reproductive Strategies in Beef Cows Annual Meeting. Ruidoso, NM. August 29, 2018.

University of Nebraska- Lincoln Physiology Group. Opportunities for enhancing reproductive success and cow longevity. Lincoln, Nebraska. July 26, 2018.

Cactus Beef Symposium. Opportunities for enhancing reproductive success and cow longevity through heifer development. CSAS-ASAS Annual Meeting. Vancouver, BC, Canada July 9, 2018.

US Beef Academy. Beef Reproduction: Anatomical overview and factors influencing fertility. Corona, NM. May 17, 2018.

US Beef Academy. Estrous Synchronization in Cows and Heifers. Corona, NM. May 17, 2018.

NMSU STEM-H Student Support Services. Tips for Majoring in Animal Science. November 8, 2017

New Mexico Youth Ranch Camp. Welcome to the Future- advanced applied technologies in reproduction. New Mexico State University Cooperative Extension. June 12, 2017.

US Beef Academy. Estrous Synchronization in Cows and Heifers. Corona, NM. May 17, 2017.

US Beef Academy. Estrous Synchronization in Cows and Heifers. Corona, NM. July 13, 2016.

New Mexico Youth Ranch Camp. Welcome to the Future- advanced applied technologies in reproduction. New Mexico State University Cooperative Extension. June 6, 2016.

Reproduction Symposium. Anatomy of the Bovine Reproductive Tract. Union County Cooperative Extension. Clayton NM. April 7, 2016.

Reproduction Symposium. Estrous Cycle of a Cow. Union County Cooperative Extension. Clayton NM. April 7, 2016.

Reproduction Symposium. Estrus Synchronization. Union County Cooperative Extension. Clayton NM. April 7, 2016.

Reproduction Symposium. Estrous Cycle of a Cow. Union County Cooperative Extension. Clayton NM. November 17, 2015.

Reproduction Symposium. Estrus Synchronization. Union County Cooperative Extension. Clayton NM. November 17, 2015.

Cattle Pregnancy Diagnosis School. Estrus Synchronization: A Tool to Shorten Postpartum Interval. Acoma Cattle Growers Association. Acoma Pueblo, NM. October 13, 2015.

US Beef Academy. Estrous Synchronization in Cows and Heifers. Corona, NM. July 15, 2015.

Sheep and Goat Reproductive Technologies Seminar. Introduction to Sheep and Goat Reproduction. Corona, NM. May 27, 2015.

Sheep and Goat Reproductive Technologies Seminar. Estrus Synchronization. Corona, NM. May 27, 2015.

Zoetis Cattlemen's College. Advancements to Improve Reproductive Performance. Albuquerque, NM. December 4, 2014.

Cattle Pregnancy Diagnosis School. Estrus Synchronization: A Tool to Shorten Postpartum Interval. Hidalgo Cooperative Extension. Lordsburg, NM. September 24, 2014.

Ag Days Degree. Estrous Synchronization for Reproductive Management of a Cow Herd. New Mexico State University. Las Cruces NM. August 28, 2014.

Molecular Mechanisms of Disease Seminar Series. Altered theca gene expression and ovarian follicular development in cows with follicular fluid androgen excess. University of Nebraska-Lincoln. November 21, 2013.

Gilbert Greenwald Annual Reproductive Symposia. Altered theca gene expression and ovarian follicular development in cows with follicular fluid androgen excess. University of Kansas Medical Center, October 17-18, 2013.

Peer Reviewed Publications: 20

JK Beard, GA Silver, EJ Scholljegerdes, **AF Summers**. 2018. The effect of precipitation received during gestation on progeny performance in *Bos indicus* influenced beef cattle. *T Anim. Sci.* (In press)

BG Smythe, ME Wise, A. Cibils, D. VanLueeuwen, **AF Summers**, and EJ Scholljegerdes. 2018. Growth and reproductive performance of beef-cattle as influenced by controlled and uncontrolled populations of horn flies (Diptera: Muscidae). *J Econ Entomol.* (In press)

AF Summers, SL Rosasco, EJ Scholljegerdes. 2018. Opportunities for enhancing reproductive success and cow longevity through heifer development. *J. Anim. Sci.* (In Press).

AJ Roberts, A Gomes da Silva, RA Vraspir, **AF Summers**, TW Geary, RN Funston. 2017. Developmental and reproductive characteristics of beef heifers classified by pubertal status at time of first breeding. *J Anim. Sci.* 95:5629-5636.

BG Smythe, S Urias, ME Wise, EJ Scholljegerdes, AF Summers, DW Bailey. 2017. Comparing visual and digital counting methods to estimate horn fly (Diptera: Muscidae) populations on cattle. *J Medical Entomol.* 1-5. doi: 10.1093/jme/tjw248

- SM Romereim, **AF Summers**, WE Pholmeier, P Zang, XY Hou, HA Talbott, RA Cushman, JR Wood, JS Davis, AS Cupp. 2017. Transcriptomes of Bovine Ovarian Follicular and Luteal Cells. Data in Brief. 10:335-339. <http://dx.doi.org/10.1016/j.dib.2016.11.093>.
- SM Romereim, **AF Summers**, WE Pholmeier, P Zang, XY Hou, HA Talbott, RA Cushman, JR Wood, JS Davis, AS Cupp. 2016. Gene expression profiling of bovine ovarian follicular and luteal cells provides insight into cellular identities and functions. *Mol. Cell. Endocrinol.* 439: 379-394.
- EJ Scholljegerdes, **AF Summers**. 2016. How do we identify energetically efficient grazing animals? *J Anim. Sci.* 94: suppl. 6: 103-109.
- HN Nielson, **AF Summers**, RN Funston. 2016. A comparison of two implant protocols; Synovex-Choice/Synovex-Plus vs. Synovex-S/Revalor-S on steer feedlot performance and carcass characteristics. *Prof. Anim. Sci.* 32:63-66.
- AF Summers**, TL Meyer, RN Funston. 2015. Impact of supplemental protein source offered to primiparous heifers during gestation on I. ADG, feed intake, calf birth BW, and rebreeding. *J. Anim. Sci.* 93: 1865-1870.
- AF Summers**, AD Blair, RN Funston. 2015. Impact of supplemental protein source offered to primiparous heifers during gestation on II. Progeny performance and carcass characteristics. *J. Anim. Sci.* 93: 1871-1880.
- AF Summers**, WE Pohlmeier, KM Sargent, BD Cole, RJ Vinton, SG Kurz, RM McFee, RA Cushman, AS Cupp, JR Wood. 2014. Altered theca and cumulus oocyte complex gene expression, follicular arrest and reduced fertility in cows with dominant follicle follicular fluid androgen excess. *PLoS ONE.* 9(10): e110683. doi:10.1371/journal.pone.0110683.
- AF Summers**, SP Weber, HA Lardner, RN Funston. 2014. Effect of beef heifer development system on average daily gain, reproduction and adaptation to corn residue during first pregnancy. *J. Anim. Sci.* 92: 2620- 2629.
- JD Harms, **AF Summers**, JA Musgrave, and RN Funston. 2014. Effect of two ovulation synchronization protocols on reproductive performance of May calving cows. *Prof. Anim. Sci.* 30: 497-501.
- RA Vraspir, **AF Summers**, D O'Hare, RN Funston. 2013. Comparison of melengestrol acetate and controlled internal drug-release long-term progestin-based synchronization protocols on fixed-time artificial-insemination pregnancy rate in beef heifers. *Proc Anim. Sci.* 29:575-579.
- RN Funston, **AF Summers**. 2013. Effect of prenatal programming on heifer development. *Vet. Clin. N. Am.* 29(3):517-536.
- RN Funston and **AF Summers**. 2013. Epigenetics: Setting Up Lifetime Production of Beef Cows by Managing Nutrition. *Ann. Rev. Anim. Biosci.* 1:339-363.
- RW Wiedmeier, JJ Villabla, **A Summers**, FD Provenza. 2012. Eating a high-fiber diet during pregnancy increases intake and digestibility of a high-fiber diet by offspring in cattle. *Anim. Feed Sci. Tech.* 177:144-151.

RN Funston, **AF Summers**, and AJ Roberts. 2012. Implications of nutritional management for beef cow/calf systems. *J. Anim. Sci.* 90:2301-2307.

AF Summers, KH Ramsay, and RN Funston. 2010. The effects of maternal nutrition on steer progeny performance. *Prof. Anim. Sci.* 27: 251- 256.

Journal Abstracts: 38

AF Summers, SL Rosasco, EJ Scholljegerdes. Opportunities for enhancing reproductive success and cow longevity through heifer development. CSAS-ASAS Annual meeting 2018.

D Garcia, **AF Summers**, BG Smythe. Evaluating the synergistic effects of piperonyl butoxide on permethrin resistant and susceptible horn flies (Diptera: Muscidae) exposed to lambda-cyhalothrin. Livestock Workers Conference 2018.

S Nafziger, MA Abedal-Majed, S Tenley, **AF Summers**, M Hart, J Bergman, S Kurz, J Wood, RA Cushman, AS Cupp. Attainment and Maintenance of Pubertal Cyclicity May Predict High A4 cows with Reduced Fertility. SSR 2018

RA Cushman, SC Tenley, R Spuri Gomes, SL Rosasco, EJ Northrop, JJJ Rich, AK McNeel, **AF Summers**, JR Miles, CC Chase Jr, CA Lents, GA Perry, JR Wood, AS Cupp. Maternal age influences folliculogenesis and gene networks in the ovaries of beef heifers. SSR 2018.

KA Bochantin, **AF Summers**, WE Pohlmeier, KM Sargent, SG Kurz, SM Romereim, O Daudu, RM McFee, RA Cushman, JS Davis, AS Cupp, JR Wood. Microarray Analysis Predicts that Differentially Expressed Genes in Theca Cells from Cows with High Intrafollicular Androstenedione is Regulated by ESR1 and VEGFA Signaling and Increased mRNA Stability. SSR 2018

CJ Kassetas, JK Beard, SL Rosasco, EJ Scholljegerdes, **AF Summers**. Comparison of two estrous synchronization protocols utilized with natural service in young beef cows on reproductive performance and profitability. Western Section ASAS 2017.

S Nafziger, MA Abedal-Majed, S Tenley, **A Summers**, M Hart, G Harsh, J Bergman, S Kurz, J Wood, R Cushman, AS Cupp. Endocrine profiles during attainment of puberty may predict reproductive longevity in heifers. SSR 2017.

SM Romereim, **AF Summers**, BE Pohlmeier, RM McFee, R Spuri-Gomes, SG Kurz, JS Davis, JR Wood, AS Cupp. A High-Androgen Microenvironment Inhibits Granulosa Cell Proliferation and May Alter Cell Identity. SSR 2017.

AL Patterson, JK Beard, MC Herrington, SL Rosasco, EM Soares, EJ Northrop, EL Larimore, JJ Rich, OL Amundson, AK McNeel, CC Chase, GA Perry, **AF Summers**, RA Cushman. Investigation of ovarian reserve parameters in *Bos indicus* cows. Midwest Section ASAS 2017.

R Spuri Gomes, SC Tenley, S Romeriem, MA Abedal-Majed, **AF Summers**, S Kurz, J Bergman, RM McFee, JC Gomes Neto, RA Cushman, JS Davis, JR Wood, AS Cupp. Cows with follicular fluid androgen excess exhibit anovulation and have altered circulating sex hormone binding globulin, gonadotropin secretion and plasma and follicular fluid composition. Midwest Section ASAS 2017.

AF Summers, MA Ward, SL Rosasco, JK Beard, S Soto-Navarro, and DM Hallford. Effects of predation on cortisol and progesterone levels in gestating ewes. ADSA-ASAS Joint Annual Meeting 2016.

SM Romereim, **AF Summers**, WE Pohlmeier, RM McFee, R Spuri-Gomes, SG Kurz, AK McNeel, RA Cushman, JS Davis, JR Wood, AS Cupp. Granulosa cell cycle regulation and steroidogenesis in a high androstenedione follicular environment. SSR 2015.

S Romereim, **A Summers**, B Pohlmeier, R McFee, R Spuri-Gomes, S Kurz, T McNeel, B Cushman, J Davis, J Wood, A Cupp. Differential Regulation of cell cycle and immune response networks in bovine granulosa cells with excess intrafollicular androstenedione. Gil Greenwald Symposium 2014.

AF Summers, WE Pohlmeier, KM Sargent, SG Kurz, RM McFee, AK McNeel, RA Cushman, JR Wood, AS Cupp. Granulosa cell expression profiling in cows with divergent follicular fluid concentrations of androgens. SSR 2014.

KM Sargent, NX Lu, WE Pohlmeier, ML Bremer **AF Summers**, AS Cupp. Transient treatment of VEGFA isoforms *in vivo* affects testis composition and mRNA abundance of genes that regulate self-renewal of undifferentiated spermatogonia and survival in perinatal rat testes. SSR 2014.

AF Summers, WE Pohlmeier, KM Sargent, SG Kurz, RM McFee, AK McNeel, RA Cushman, JR Wood, AS Cupp. Granulosa cell expression profiling in cows with divergent follicular fluid concentrations of androgens. Molecular Mechanism of Disease retreat 2014.

HR Nielson, JD Harms, **AF Summers**, RA Vraspir, RN Funston. Impact of heifer development system on subsequent ADG and reproduction in two different breeding seasons. ADSA-ASAS Joint Annual Meeting 2014.

HR Nielson, **AF Summers**, RN Funston. A comparison of two implant protocols: Synovex-Choice and Synovex-Plus vs. Synovex-S and Revlor-S on steer feedlot performance and carcass characteristics. ADSA-ASAS Joint Annual Meeting 2014.

AF Summers, WE Pohlmeier, KM Sargent, BD Cole, RJ Vinton, SG Kurz, RM McFee, RA Cushman, AS Cupp, JR Wood. Altered theca gene expression and ovarian follicular development in cows with follicular fluid androgen excess. Gil Greenwald Symposium 2013.

B Cole, R Vinton, WE Pohlmeier, S Kurz, **A Summers**, R McFee, R Cushman, J Wood, AS Cupp. Expression of Vascular Markers in the Bovine Ovarian Cortex and Follicular Stages from Cows with Differing Steroidogenesis. Gil Greenwald Symposium 2013

AF Summers, WE Pohlmeier, KM Sargent, S.G Kurz, RM McFee, RA Cushman, JR Wood, AS Cupp. A bovine model for Polycystic Ovary Syndrome. Molecular Mechanisms of Disease retreat 2013.

AF Summers, TL Meyer, RN Funston. Impact of late-gestation supplementation on ADG, feed intake, calf birth BW, and rebreeding in primiparous heifers. Western Section ASAS 2013.

JD Harms, RN Funston, LA Stalker, **AF Summers**. Impact of maternal nutrition and post-weaning management on steer and heifer progeny in a late spring calving system. Western Section ASAS 2013.

RA Vraspir, **AF Summers**, AJ Roberts, RN Funston. Effect of cyclicity status and number of cycles in beef heifers prior to the breeding season on reproductive performance. Western Section ASAS 2013.

R McFee, S Kurz, **A Summers**, W Pohmeier, J Wood, R Cushman, A Cupp. Granulosa cells activate different signal transduction pathways dependent on follicle health status and ability to convert androstenedione to estrogen resulting in different steroidogenic profiles for beef cattle follicles. SSR 2013.

AF Summers, WE Pohlmeier, KM Sargent, S.G Kurz, RM McFee, RA Cushman, JR Wood, AS Cupp. A bovine model for Polycystic Ovary Syndrome. SSR 2013.

AF Summers, W E Pohlmeier, VM Brauer, KM Sargent, RM McFee, RA Cushman, JR Wood, AS Cupp. Bovine females with thecal cell androgen excess result in altered oocyte maternal effect gene abundance. Midwest ASAS Annual Meeting 2013.

AF Summers, DM Larson, AS Cupp. Increasing preconception RUP supplementation improves mature beef cow return to estrous cyclicity but does not impact milk production or reproductive performance. Midwest ASAS Annual Meeting 2013.

AF Summers, WE Pohlmeier, RM McFee, VM Brauer, S Kurz, RA Cushman, JR Wood, AS Cupp. VEGFA164_B mRNA abundance has a positive relationship to AMH, BCL2 and the ratio of E2:A4 in mural granulosa cells of estrogen active and inactive follicles prior to ovulation. SSR 2012.

AF Summers, TL Meyer, SP Weber, RN Funston. Effect of beef heifer development system on ADG, reproduction, and feed efficiency during first pregnancy. ADSA-AMPA-ASAS-CSAS-WSASAS Joint Annual Meeting 2012.

AF Summers, RA Cushman, AS Cupp. Heifers with low antral follicle counts have low birth weights and produce progeny with low birth weights. ADSA-AMPA-ASAS-CSAS-WSASAS Joint Annual Meeting 2012.

AF Summers, RA Cushman, JE Smith, B Lammers, R McFee, W Pohlmeier, V Brauer, K Sargent, N Lu, AS Cupp, JR Wood. Cows with reduced fertility and granulosa cell efficiency have excess androstenedione in follicular fluid, altered theca gene expression and increased maternal effect gene mRNA levels in cumulus-oocyte complexes. Gil Greenwald Symposium 2011.

A Summers, RA Cushman, JE Smith, B Lammers, R McFee, W. Pohlmeier, V Brauer, K Sargent, N Lu, AS Cupp, JR Wood. Females with reduced fertility have excess androstenedione in follicular fluid, altered theca gene expression and increased VEGFA 164b, maternal effect, and microRNA processing and mRNA levels in cumulus-oocyte complexes. SSR 2011.

AF Summers, SP Weber, TL Meyer, and RN Funston. Late gestation supplementation impacts primiparous beef heifers and progeny. ADSA-ASAS Joint Annual Meeting 2011.

AF Summers, RA Cushman, SP Weber, ML Spangler, and AS Cupp. Effects of protein supplementation during heifer development on reproductive characteristics and success in beef heifers. ADSA-ASAS Joint Annual Meeting 2011.

SP Weber, **AF Summers**, TL Meyer, and RN Funston. Impact of beef heifer development system on ADG, reproduction, and feed efficiency. ADSA-ASAS Joint Annual Meeting 2011.

AF Summers, KH Ramsay, and RN Funston. Influencing Steer Performance through Maternal Nutrition. ADSA-CSAS-ASAS Joint Annual Meeting 2010.

RN Funston, **AF Summers**, DM Larson, JL Martin, and DC Adams. Winter grazing system and supplementation of beef cows during late gestation influence heifer progeny. ADSA-CSAS-ASAS Joint Annual Meeting 2010.

Departmental and Extension publications: 24

AS Cupp, S Romereim, **AF Summers**, WE Pohlmeier, RM McFee, R Spuri-Gomes, SG Kurz, AK McNeel, RA Cushman, JS Davis, JR Wood. Granulosa Cell Exposure to Excess Androgens Inhibits Their Ability to Proliferate in the Cow Which May Cause or Perpetuate Androgen Excess. Nebraska Beef Report 2016. P. 25-26.

HR Nielson, JD Harms, **AF Summers**, RA Vraspir, RN Funston. Impact of Heifer Development System on Subsequent Gain and Reproduction. Nebraska Beef Report 2015. P. 5-7.

HR Nielson, **AF Summers**, RN Funston. A Comparison of Two Implant Protocols: Synovex-Choice/Synovex-Plus vs. Synovex-S/Revalor-S on Steer Feedlot Performance and Carcass Characteristics. Nebraska Beef Report 2015. P. 96-97.

AF Summers, TL Meyer, MF Kirby, JR Teichert, RN Funston. Impact of Supplemental Protein Source on Pregnant Beef Heifers. Nebraska Beef Report 2014 P. 21-23.

AF Summers, DM Larson, AS Cupp. Preconception Supplement Improves Mature Beef Cow Return to Estrous But Not Progeny Performance. Nebraska Beef Report 2014 P. 19-20.

AF Summers, WE Pohlmeier, VM Brauer, KM Sargent, RM McFee, SG Kurz, RA Cushman, JR Wood, AS Cupp. Androgen Excess in Beef Cows Results in Altered Theca Cell Gene Expression and Fertility. Nebraska Beef Report 2014 P. 11-13.

JD Harms, RN Funston, LA Stalker, JA Musgrave, AF Applegarth, **AF Summers**. Effects of Winter Supplementation on Cow Performance and Post-Weaning Management on Steer and Heifer Progeny in Late Spring Calving Systems. Nebraska Beef Report 2014 P. 24-26.

RA Vraspir, **AF Summers**, AJ Roberts, RN Funston. Effect of Pubertal Status and Number of Estrous Cycles Prior to the Breeding Season on Pregnancy Rate in Beef Heifers. Nebraska Beef Report 2014 P. 5-7.

RA Vraspir, **AF Summers**, D O'Hare, LD Rowden, RN Funston. Comparison of Melengestrol Acetate and Controlled Internal Drug Release Long-Term Progestin-Based Synchronization Protocols on Fixed-Time AI Pregnancy Rate in Beef Heifers. Nebraska Beef Report 2014 P. 8-10.

RM McFee, RA Artac, **AF Summers**, WE Pohlmeier, VM Brauer, SG Kurz, RA Cushman, JR Wood, AS Cupp. Follicular Vascular Endothelial Growth Factor A Expression Before and After the LH Surge. Nebraska Beef Report 2014 P. 14-16.

- AF Summers**, TL Meyer, SP Weber, RN Funston. Effect of Beef Heifer Development System on ADG, Reproduction and Feed Efficiency During First Pregnancy. Nebraska Beef Report 2013 P.5-7.
- AF Summers**, TL Meyer, JA Musgrave, SP Weber, RN Funston. Effect of Development System on Heifer Performance and Primiparous Heifer Grazing Behavior. Nebraska Beef Report 2013 P.8-10.
- AF Summers**, RA Cushman, AS Cupp. Heifers with Low Antral Follicle Counts have Low Birth Weights and Produce Progeny with Low Birth Weights. Nebraska Beef Report 2013 P. 11-12.
- JD Harms, **AF Summers**, JA Musgrave, RN Funston. Effect of Two Estrus Synchronization Protocols on Reproductive Performance of May Calving Cows. Nebraska Beef Report 2013 P. 13-14.
- AF Summers**, SP Weber, TL Meyer, RN Funston. Late Gestation Supplementation Impacts Primiparous Heifers and Progeny. Nebraska Beef Report 2012. P. 22-23.
- AF Summers**, RA Cushman, SP Weber, KV Moline, JW Bergman, ML Spangler, AS Cupp. Nutritional Regime and Antral Follicle Count Impact Reproductive Characteristics in Heifers. Nebraska Beef Report 2012. P 24-25.
- N Lu, J Smith, V Brauer, **A Summers**, W Pohlmeier, K Beavers, R McFee, K Sargent, J Kerl, RA Cushman, AS Cupp, JR Wood. Oocyte mRNA and Follicle Androgen Levels are Associated with Fertility. Nebraska Beef Report 2012. P. 28-29.
- SP Weber, **AF Summers**, TL Meyer, RN Funston. Effect of Post-Weaning Heifer Development System on Average Daily Gain, Reproduction, and Adaptation to Corn Residue During First Pregnancy. Nebraska Beef Report 2012. P.37-38.
- SP Weber, **AF Summers**, TL Meyer, RN Funston. Impact of Post-Weaning Beef Heifer Development System on Average Daily Gain, Reproduction, and Feed Efficiency. Nebraska Beef Report 2012. P. 39-40.
- AF Summers**, KH Ramasy, J Teichert, TL Meyer, RN Funston. Influencing Steer Performance Through Maternal Nutrition. Nebraska Beef Report 2011. P. 8-10.
- RN Funston, JL Martin, **AF Summers**, DC Adams, J Musgrave, TL Meyer, DM Larson. Winter Grazing System and Supplementation of Beef Cows During Late Gestation Influence Heifer Progeny. Nebraska Beef Report 2011. P. 5-7.
- AS Cupp, JR Wood, RA McFee, R Slattery, KA Beavers, W Pohlmeier, K Sargent, NX Lu, J Smith, J Kerl, V Brauer, **A Summers**, SP Weber, RA Cushman. Granulosa Cell Gene Expression is Altered in Follicles from Cows with Differing Reproductive Longevity. Nebraska Beef Report 2011. P. 13-15.
- AF Summers**, RD Wiedmeier, M Stuart, and L Hall. 2009. Effects of Creep Supplementation While Grazing Improved Irrigated Pastures. Utah State University Extension publication. AG/Beef/2009-01.
- RD Wiedmeier, **AF Summers**, D ZoBell, and D Feuz. 2008. Some Items to Consider Before You Change The Calving Season of Your Beef Cow Herd. Utah State University Extension publication. AG/Beef/2008-01.

Proceedings: 18

- SL Rosasco, LH Schmitz, SH Cox, RC Dunlap, DM Hallford, **AF Summers**, EJ Scholljegerdes. 2018. Effects of growth-promoting implants administered during the suckling phase on growth, conception rates, and longevity in replacement beef heifers grazing native range. *Proc. West. Sec. Am. Soc. Anim. Sci. In Press*.
- BH Aloqaily, EM Ferranti, **AF Summers**, CA Gifford, JA Hernandez Gifford. 2018. Intra-ovarian WNT3A modulates estrogen mediated reproductive events and estrus behavior in cattle. *Proc. West. Sec. Am. Soc. Anim. Sci. In Press*.
- SL Rosasco, EJ Scholljegerdes, SH Cox, RC Dunlap, DM Hallford, and **AF Summers**. 2017. Influence of increased nutrient intake pre- and post-breeding on performance and reproductive efficiency of beef heifers. *Proc. West. Sec. Am. Soc. Anim. Sci. 68: 162-166*. doi: 10.2527/asasws.2017.0065
- JK Beard, GA Silver, EJ Scholljegerdes, and AF Summers. 2017. The effect of precipitation received during gestation on progeny performance in *Bos indicus*-influenced beef cattle. *Proc. West. Sec. Am. Soc. Anim. Sci. 67: 180-183*. doi: 10.2527/asasws.2017.0064
- KE Smith, SL Rosasco, JK Beard, ER Oosthuisen, B Meyerhoff, EJ Scholljegerdes, AF Summers, SL Ivey. 2017. Changes of season impacts ruminal fermentation and microbiome in heifers grazing native range. *Proc. West. Sec. Am. Soc. Anim. Sci. 67:153-156*. doi: 10.2527/asasws.2017.0060
- SL Rosasco, JK Beard, MC Herrington, DM Hallford, **AF Summers**. 2016. Effect of prostaglandin administration after ram exposure on ewe reproductive efficiency. *Proc. West. Sec. Am. Soc. Anim. Sci.67:142-145*.
- L.R. Owensby, CB Gardner, RD Dunlap, CA Löest, SL Ivey, SH Cox, **AF Summers**, EJ Scholljegerdes. 2016. Effects of rumen protected arginine supplementation to cows during early or late gestation on progeny glucose tolerance. *Proc. West. Sec. Am. Soc. Anim. Sci.67:194-197*.
- AF Summers** and RN Funston. 2015. Fetal Programming: Implications for Beef Cattle Production. Proc. Applied Reproductive Strategies in Beef Cattle. Applied Reproductive Strategies in Beef Cattle, Davis, CA.
- AF Summers**, TL Meyer, RN Funston. 2013. Impact of late-gestation supplementation on ADG, feed intake, calf birth BW, and rebreeding in primiparous heifers. *Proc. West. Sec. Am. Soc. Anim. Sci. 64:234-238*.
- JD Harms, RN Funston, LA Stalker, **AF Summers**. 2013. Impact of maternal nutrition and post-weaning management on steer and heifer progeny in a late spring calving system. *Proc. West. Sec. Am. Soc. Anim. Sci. 64:93-95*.
- RA Vraspir, **AF Summers**, AJ Roberts, RN Funston. 2013. Effect of cyclicity status and number of cycles in beef heifers prior to the breeding season on reproductive performance. *Proc. West. Sec. Am. Soc. Anim. Sci. 64:116-120*.
- AF Summers** and RN Funston. 2012. Fetal Programming: Implications for Beef Cattle Production. Proc. Applied Reproductive Strategies in Beef Cattle. Applied Reproductive Strategies in Beef Cattle, Souix Falls, SD.

AF Summers, TL Meyer, SP Weber, RN Funston. 2012. Effect of beef heifer development system on ADG, reproduction, and feed efficiency during first pregnancy. *Proc. West. Sec. Am. Soc. Anim. Sci.* 63:244-247.

AF Summers, RA Cushman, AS Cupp. 2012. Heifers with low antral follicle counts have low birth weights and produce progeny with low birth weights. *Proc. West. Sec. Am. Soc. Anim. Sci.* 63:217-220.

AF Summers and RN Funston. 2011. Fetal Programming: Implications for Beef Cattle Production. Proc. Applied Reproductive Strategies in Beef Cattle. Applied Reproductive Strategies in Beef Cattle, Boise, ID.

AF Summers and RN Funston. 2011. Fetal Programming: Implications for Beef Cattle Production. Proc. Applied Reproductive Strategies in Beef Cattle. Applied Reproductive Strategies in Beef Cattle, Joplin, MO.

RN Funston, JL Martin, **AF Summers**, DC Adams, DM Larson. 2010. Winter grazing and supplement of beef cows during late gestation influence heifer progeny. *Proc. West. Sec. Am. Soc. Anim. Sci.* 61:197-200.

AF Summers, KH Ramsay, RN Funston. 2010. Influencing steer performance through maternal nutrition. *Proc. West. Sec. Am. Soc. Anim. Sci.* 61:201-204.

Community Service:

4-H leader, 2018- present

Boy Scouts of America- Merit Badge Counselor Animal Science, Dog Care, Mammal Study and Veterinary Medicine

Southern New Mexico State Fair- Scholarship committee 2014- present

Southern New Mexico State Fair- Sheep and Goat Showmanship Judge 2015