

Douglas R. Eborn

Texas A&M University - Commerce
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Commerce, Texas 75429
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EDUCATION

Postdoctoral Research Physiologist – USDA, ARS, U.S. Meat Animal Research Center

Research Areas: *Estrous Synchronization in Beef Cattle; Effect of Blood Chimerism on Reproductive Tract Development in Freemartins; Incidence of DNA Exchange between Dam and Fetus in Cattle* – Dr. Sherrill Echternkamp

Postdoctoral Research Assistant (USDA-NRI grant) – Dept of Animal Sciences and Industry, Kansas State University

Research Project: *Regulation of the Nanog Gene in the Pig* – Dr. David Grieger and Dr. Duane Davis

PhD – Dept of Animal Sciences and Industry, Kansas State University

Emphasis: Reproductive Physiology

Graduation: May 2008

Dissertation: *Cloning and Expression of Pluripotent Factors around the Time of Gastrulation in the Porcine Conceptus; Timed Insemination of Beef Heifers using the 7-11 Synch Protocol.*

M.S. – Dept of Animal Sciences and Industry, Kansas State University

Emphasis: Animal Breeding and Genetics

Graduation: December 2006

Thesis: *Genetic Relationships of Body Condition Score with Carcass Traits in Limousin Cattle*

B.S. – Biology, Utah State University

Minor: Animal Science

Graduation: December 1999

FUNDING

2008-2010 **United States Department of Agriculture NRI Competitive Grant.** Cloning and Characterization of the 5' and 3' Ends of the Porcine Nanog Gene. Douglas Eborn PD. \$125,000.

CURRENT RESEARCH PROJECTS AND INTERESTS

- Establishment and performance of Eastern Gama grass on black land soils
- Effects of weaning strategies and mineral supplementation of beef calf performance
- Deworming strategies and efficacy in beef cattle
- Survey of management practices of beef producers who participate in the NETBIO preconditioned beef calf program
- Estrous Synchronization and Artificial Insemination of Beef Cattle
- Development of Beef Heifers

PROFESSIONAL PRESENTATIONS & PUBLICATIONS

Peer Reviewed Accepted

Eborn D.R., R.A. Cushman, and S.E. Echternkamp. 2013. Effect of postweaning diet on ovarian development and fertility in replacement beef heifers. J. Anim. Sci. 91(9):4168-4179.

- Eborn D.R. and D.M Grieger. 2013. Timed insemination of beef heifers using the 7-11 Synch protocol. J. Anim. Sci. 91:666-672.
- Sullivan R.R., B.R. Faris, D Eborn, D.M. Grieger, A.G. Cino-Ozuna and T.G. Rozell. 2013. Follicular expression of follicle stimulating hormone receptor variants in the ewe. Reproductive Biology and Endocrinology. 11:113 (<http://www.rbej.com/content/11/1/113>)
- Echternkamp S. E., P. Y. Aad, D. R. Eborn, and L. J. Spicer. 2012. Increased abundance of aromatase and follicle stimulating hormone receptor mRNA and decreased insulin-like growth factor-2 receptor mRNA in small ovarian follicles of cattle selected for twin births. J. Anim Sci. 90:2193-2200.
- Dobbins C.A., D.R. Eborn, D.E. Tenhouse, R.M. Breiner, S.K. Johnson, T.T. Marston, and J.S. Stevenson. 2009. Insemination timing affects pregnancy rates in beef cows treated with CO-Synch protocol including an intravaginal progesterone insert. Theriogenology. 72(7):1009-1016.
- Stevenson J.S., M.A. Portaluppi, D.E. Tenhouse, A. Lloyd, D.R. Eborn, S. Kacuba, and J.M. DeJarnette. 2007. Interventions after artificial insemination: conception rates, pregnancy survival, and ovarian responses to gonadotropin-releasing hormone, human chorionic gonadotropin, and progesterone. Journal of Dairy Science. 90(1):331-340.

Scientific Meeting Abstracts and Posters

- Kacou, Y., J.A. Lopez, D. Eborn, D. Djidonou. "The Implementation of a Financial Software into an Educational Farm." Poster presented at the Southern Agricultural Economics Association (SAEA) Annual Meeting in Oklahoma City, Oklahoma, February 5-7, 2023.
- Owen M.P., C.O. Lemley, K. Yankey, C. Bily, D. Eborn, J. Mumm, C. Hart, K.J. McCarty, and W. Epperson. 2022. PSXIII-6 Effects of Melatonin on Physiologic Responses and Behavior in Dairy Steers Following LPS-Induced Inflammation. J. Anim. Sci. 100 (Suppl.3):206.
- Drake, D.R., P.J. Swinson, D.R. Eborn, and C.A. Jones. 2021. Evaluating Eastern Gamagrass Establishment in the Texas Blackland Prairie. [Poster]. ASA, CSSA, SSSA International Annual Meeting, Salt Lake City, UT. <https://scisoc.confex.com/scisoc/2021am/meetingapp.cgi/Paper/136619>
- Hendricks, M., D.R. Eborn, K.R. Kipp, C.M. Willis, and M.P. Owen. 2020. Performance Effects on Weaned Calves using 3 Weaning Strategies and Nutritional Supplementation. J. Anim. Sci. 98 (Suppl.2):45-46.
- Hisaw Z.A., C.M. Willis, K.R. Kipp, D.R. Eborn, and M.P. Owen. 2020. Effects of supplementing heifers with dietary quercetin during late-gestation. J. Anim. Sci. 98 (Suppl.2):43.
- Kipp K.R., D.R. Eborn, and M.P. Owen. 2020. Mineral Supplementation Effects in Stocker Cattle Performance Grazed on Wheat Seeded Native Pastures. J. Anim. Sci. 98 (Suppl.2):47-48.
- Parker L.R., S.E. Echternkamp, and D.R. Eborn. 2017. Comparison of post-weaning weights and carcass traits between freemartin and twin-heifer calves. J. Anim. Sci. 95 (Suppl.1):15.
- Echternkamp S.E., D.R. Eborn, and R.A. Cushman. 2014. Maternal dietary effects on embryonic ovarian development in cattle. J. Anim Sci. 92 (Suppl.2):678.
- Eborn D.R., T.G. McDanel, R.M. Thallman and S.E. Echternkamp. 2012. Fetal to maternal transplacental DNA transfer in female beef cattle. J. Anim Sci. 90 (Suppl.3):323.
- Echternkamp S.E., D.R. Eborn, and R.A. Cushman. 2012. Reduced fertility in female progeny from beef heifers on dietary restriction during development. J. Anim Sci. 90 (Suppl.3):472.
- Cushman R.A., J.R. Miles, L.A. Rempel, C.A. Lents, A.K. McNeel, D.R. Eborn, S.E. Echternkamp, K.A. Leymaster, and J.L. Vallet. 2012. Litter size influences lamb weight and ovarian reserve, but not reproductive tract development or expression of genes involved in early follicular development. *Accepted*. SSR 45th Annual Meeting State College, Pennsylvania.
- Eborn D.R., E.E. Blair, and D.M Grieger. 2011. Heifer response to GnRH in a 7-day CIDR synchronization protocol. Proceedings, Western Section American Society of Animal Science. 62:292-294.

- Echternkamp S.E., D.R. Eborn, and R.A. Cushman. 2011. Failure of differences in prepubertal dietary intake to affect ovarian development in pubertal beef heifers. *J. Anim. Sci.* 89 (Suppl. 1):93.
- Echternkamp S.E., D.R. Eborn, and L. J. Spicer. 2011. Hedgehog signaling pathway in small bovine ovarian follicles. #673. SSR 44th Annual Meeting Portland Oregon.
- Eborn D.R., D.L. Davis, and D.M. Grieger. 2009. Cloning and expression of pluripotent factors around the time of gastrulation in the porcine conceptus. *Society of Reproduction and Fertility supplement.* 66:211-212. PMID: 19848289.
- Sullivan R., D.R. Eborn, B.R. Faris, D.M. Grieger, and T.G. Rozell. 2009. Expression of Follicle-Stimulating Hormone Receptor Variants During the Estrous Cycle of the Ewe. *Biology of Reproduction.* 81(Supp. 1):346.
- Voge J.L., D.R. Eborn, D.M. Grieger, and D.L. Davis. 2006. Tentative Identification of Nanog Expression in the Pig Conceptus. VIIth International Conference on Pig Reproduction. Rolduc The Netherlands. Pp. 96
- Holiday C.D., A.W. Thompson, D.R. Eborn, and D.M. Grieger. 2003. Pregnancy status of beef heifers immunized against luteinizing hormone and luteinizing hormone-releasing hormone. *J. Anim. Sci.* 81(Supp. 2):93.
- Keenan L.D., D.R. Eborn, D.W. Moser, and T.T. Marston. 2003. Relationships between live animal ultrasound predicted intramuscular fat and shear force in fed cattle. *J. Anim. Sci.* 81(Supp.1):87.
- Eborn D.R. and D.W. Moser. 2003. Genetic relationships of body condition score with carcass traits in Limousin cattle. *J. Anim. Sci.* 81(Supp. 1):87.

Book Chapters

- Owen, Megan, and Douglas R. Eborn. 2022. Chapter 5. Reproduction: Male and Female Livestock Anatomy and Physiology. In: R. Harp, Editor, *Introduction to Animal Science Lab Manual*. Linus Learning Ronkokoma, NY. p. 47-56.
- Harp, Randy, Nick Riecke, Douglas Eborn, Megan Owen, and Dugan Burgess. 2022. Chapter 16. Beef Breeding Cattle. In: R. Harp, Editor, *Introduction to Animal Science Lab Manual*. Linus Learning Ronkokoma, NY. p. 213-226.

Future Manuscripts

Submitted

- Sutton, C.M. and D.R. Eborn. The Effects of Short-Term Separation Leading up to Breeding on Calf Stress. *Texas Journal of Agriculture and Natural Resources.* *Submitted* summer 2023.
- Ketchum, J.N., Lacey K. Quail, Kaitlin M. Epperson, Chloey P. Guy, Jerica J. J. Rich, Saulo Menegatti Zoca, Adalaide C. Kline, Taylor N. Andrews, Julie A. Walker, Pedro Levy Piza Fontes, Sandy K. Johnson, Megan P T. Owen, Douglas Eborn, Kelsey M. Harvey, Adam F. Summers, George A. Perry. Evaluation of two beef cow fixed-time AI protocols that utilize presynchronization. *Journal of Animal Sciences.* *Submitted* summer 2023.

In Progress

- Baldwin C. and D.R. Eborn. Pre-weaning Management Strategies in Swine Production: A Review. (In Progress; March 2024)
- Joie, E. and D.R. Eborn. Commonalities and Differences amongst NETBIO Producers. (In Progress, June 2024)
- Hendricks, M. and D.R. Eborn. Implications of Stress on Beef Calves at Weaning: A Study on Fence-Line Weaning. (future submission; June 2024)

Sutton, C.M. and D.R. Eborn. The effects of presynchronization and calf removal leading up to breeding on multiparous beef cattle. (In Progress)

Kipp, K.R. and D.R. Eborn. Effectiveness of Anthelmintic classes in beef calves and their implications on beef cattle performance. (In Progress)

Kirchhoff R. and D.R. Eborn. Comparison of Equine Behavior Temperaments to Parelli “Horsenality” Categories and Training Effects. (future submission)

Hisaw, Zach, Megan P.T. Owen, Brooke Clemmons, and Douglas R. Eborn. 2022. Effects of Supplementing Heifers Dietary Quercetin during Late-Gestation on Uterine Artery Blood Flow. (future submission)

Park, Shanon N., Megan P.T. Owen, Tyson W. Wallis, Courtney P. Heaton, Douglas R. Eborn, Kaylee R. Kipp, Haley M. Cole, Nathan H. Wells, and Lindsey M. Victorson. 2022. The Effects of Supplementing Stock-Type Horses with Dietary Antioxidants. (future submission)

Non-refereed Research Reports

Eborn D.R., E.E. Blair, and D.M. Grieger. 2011. Is GnRH necessary at CIDR insertion in a 7-Day CIDR protocol for beef heifers? SRP 1047, Kan. Agri. Exp. Sta. Pp. 32-34.

Eborn D.R., C.R. Spiker, R.R. Sullivan, and D.M. Grieger. 2009. Heifer Synchronization Using 7-11 Synch or 7-11 Synch + CIDR. SRP 1010, Kan. Agri. Exp. Sta. Pp. 31-32.

Dobbins C.A., D.E. Tenhouse, D.R. Eborn, S.K. Johnson, K.R. Harmony, and J.S. Stevenson. 2007. Altered Insemination Timing Improves Pregnancy Rates After a CO-Synch + CIDR Protocol. SRP 978, Kan. Agri. Exp. Sta. Pp. 4-7.

Burns M.G., B.S. Buttrey, D.R. Eborn, J.E. Larson, B.J. Lovaas, G.C. Lamb, K.C. Olson, and J.S. Stevenson. 2007. Evaluation of Human Chorionic Gonadotropin as a Replacement for GnRH in an Ovulation Synchronization Protocol Before Fixed-Time Insemination. SRP 978, Kan. Agri. Exp. Sta. Pp. 8-11.

Eborn D.R. and D.M. Grieger. 2007 GnRH Removal in the 7-11 CO-Synch for Timed Insemination of Beef Heifers. 2007. SRP 978, Kan. Agri. Exp. Sta. Pp. 12-14.

Eborn D.R., G.E. Freneau, and D.M. Grieger. 2006. Comparison of CIDR vs. MGA in a 7-11 Cosynch and Timed Insemination of Beef Heifers. SRP 959, Kan. Agri. Exp. Sta. Pp. 58-59.

Thompson A.W., D.R. Eborn, L.D. Keenan, and D.M. Grieger. 2004. Short-term Progestin Estrus Synchronization with Timed Insemination for Beef Heifers: CIDR vs. MGA. SRP 923, Kan. Agri. Exp. Sta. Pp. 11-12.

Thompson A.W., C.D. Holladay, D.R. Eborn, and D.M. Grieger. 2003. Timed Artificial Insemination in Yearling Beef Heifers: 7-11 Cosynch vs. Cosynch. SRP 908, Kan. Agri. Exp. Sta. Pp. 103-104.

Grieger D.M., C.D. Holladay, and D.R. Eborn. 2002. Timed-insemination of beef heifers using Cosynch with one or two initial injections of GnRH. SRP 890, Kan. Agri. Exp. Sta. Pp. 119-120.

Popular Press Articles

Eborn D.R. and D.W. Moser. 2001. AHA Carcass Merit Project-Interim Report. *Hereford World*. Vol 92, No 4. Pp. 144-145.

Meetings/Conferences/Workshops

Professional

- Applied Reproductive Strategies in Beef Cattle. October 8-9, 2014. Stillwater Oklahoma.
- Southern Section of American Society of Animal Science. February 4-7, 2017. Franklin, Tennessee.

- Southern Section of American Society of Animal Science. January 25-28, 2020. Chattanooga, Tennessee.
- American Society of Animal Science (ASAS-CSAS) Annual Meeting & Trade Show. July 8-11, 2021; Austin, Texas.

Industry and Producer Conferences/Workshops

- Texas and Southwestern Cattle Raisers Association ranch gathering. July 24, 2018. Paris Texas.
- Texas and Southwestern Cattle Raisers Association ranch gathering. November 1, 2020. Mount Pleasant, Texas.

GRADUATE AND UNDERGRADUATE THESIS COMMITTEES

Graduate – Major Advisor

- Courtney Baldwin. 2022. A Survey of Texas Pork Producers Current Pre-weaning Management Strategies.
- Payton Swinson. 2021. Establishment of Eastern GamaGrass into a Cool Season Grazing System in Texas Blackland Prairie Soils.
- Kaylee R. Kipp. 2020. Effectiveness of Anthelmintic Classes in Beef Calves and Their Implications on Beef Cattle Performance.
- Genevieve M. D'Souza. 2018. Effect of Yeast Supplementation on the Performance of High Risk Beef Cattle.
- Kristi L. Geckler. 2018. Equine Physiologic Responses to Training Methods in Cutting Horses.
- Lauren C. Parker. 2018. Effectiveness of Different Anthelmintic Classes on the Texas A&M University-Commerce Goat Herd.
- Courtney M. Sutton. 2015. The Hormonal Response of Presynchronization with GnRH and/or Calf Removal Leading up to Breeding. Evaluation of Stress on Calves during Separation.

Undergraduate – Honor's Thesis Advisor

- Emily Joie. 2023 Commonalities and Differences amongst NETBIO Producers.
- Meagan E. Hendricks. May 2020. Implications of Stress on Beef Calves at Weaning: A study on Fence-Line Weaning.
- Breanthony Baker. 2018. Comparative Economic Analysis of Beef Calf Preconditioning Programs.
- Rebecca R. Kirchoff. 2018. Comparison of Equine Behavior Temperaments to Parelli "Horsenality" Categories and Training Effects.
- Ashlyn M. Thomas. 2018. Testing the Reliability of the Use of the Draminski for Estrus Detection in Heifers.
- Hanna S. Wilson. 2017. Effects of equine appeasing pheromone on heart rate and heart rate variability during temporary separation of equine preferred partners.

Master's or Honor's Committee Member

Name	Degree	Major Professor	Date
1. Yves-Bernard Kacou	M.S.	Jose Lopez	2022

2. Thomas Aquino	M.S.	Brooke Clemmons	2022
3. Codi Bily	M.S.	Megan Owen	2022
4. Shanon Park	M.S.	Megan Owen	2021
5. Brad Voss	M.S.	Curtis Jones	2020
6. Zachary Hisaw	M.S.	Megan Owen	2019
7. Taiwo Bankole	M.S.	Jose Lopez	2016
8. Brooke Harris	M.S.	Petra Collyer	2016
9. Cortney Stewart	Honor's	Petra Collyer	2015
10. Brandy Spoor	Honor's	Petra Collyer	2015

TEACHING EXPERIENCE

Assistant Professor – Texas A&M University - Commerce 2014 to Present

23 Different Courses Taught

Introduction to Animal Science Laboratory (ANS 1119)

Spring 2016, 2022, 2025

Introduction to Animal Science (ANS 1319)

Fall 2016; Spring 2016, 2017

Animal Nutrition (ANS 308)

Fall 2015, 2018, 2019

Animal Breeding (ANS 309)

Fall 2020-2025

Animal Genetics (ANS 310)

Spring 2020-2025

Genetics of Livestock Improvement (ANS 310)

Spring 2014-2019

Reproductive Physiology of Domestic Animals (ANS 311)

Fall 2014-2018, 2022-2023

Artificial Breeding of Domestic Animals (ANS 312)

Spring 2015, 2017, 2020, 2022, 2024

Dairying (ANS 313)

Summer 2014, 2016, 2018-2025

Livestock Management Techniques (ANS 317)

Fall 2014-2022; Spring 2014-2022

Sheep and Goat Management (ANS 411)

Summer 2015-2016

Beef Cattle Management (ANS 412)

Fall 2015, 2017-2021, 2023-2024

Swine Management (ANS 413)

Summer 2015, 2017-2020

Diseases and Parasites of Livestock (ANS 419)

Summer 2017, 2025

Advanced Reproductive Physiology (ANS 511)

Fall 2014, 2016, 2018; Spring 2022; Summer 2024

Endocrinology (ANS 512)

Spring 2017

Advanced Animal Nutrition (ANS 515)

Spring 2016

Animal Breeding (ANS 522)

Fall 2019

Advanced Dairying (ANS 597)

Summer 2014, 2018-2019, 2022, 2023-2024

Advance Animal Genetics (ANS 597)

Summer 2021

Seminar (AG 400)

Fall 2021

Internship (AG 405)

Summer 2019

Scientific Methodology in Agricultural Research (AG 532)

Spring 2015

Graduate Teaching Assistant – Kansas State University

2000 to 2008

ASI Problem/Calving (ASI 666)

Spring 2005-2007

- Managed course schedule related to “hands-on” experience at animal units
- Lectured yearly on calving genetics

ASI Problem/Applied Animal Technology (ASI 666), 15 students

Spring 2005-2007

- Set up and assisted with setup of labs
- DNA isolation, primer design, PCR
- Sperm labeling
- Cell transformations and transfections

Bovine reproductive technologies (ASI 512), 24 students

Fall 2001, 2004-2007

- Assisted with weekly labs in: rectal palpation, embryo transfer, ultrasound of pregnancy
- Taught classes in absence of professor when needed on reproductive physiology

The Horse as a Window to the World (ASI 330), 30 students Spring 2007

- Graded weekly assignments, quizzes, exams, and papers
- Managed and interacted with students on an online discussion board

Animal Breeding Principles (ASI 510), 40 students Fall 2000, Spring 2004

- Graded weekly assignments and taught lectures on beef cattle crossbreeding

Farm Animal Reproduction (ASI 400), 80 students Fall 2002

- Graded assignments and 4 major exams; assisted with weekly lab sessions

Genetics (ASI 500), 40 students Spring 2001

- Graded weekly assignments and quizzes

ACADEMIC, PROFESSIONAL, AND COMMUNITY POSITIONS/SEVICE

Texas A&M University-Commerce

University

IACUC Committee – Texas A&M University-Commerce

- Vice Chair Feb. 2022 - 2024
- Member Sept. 2016 – Present

Academic Integrity Taskforce – Texas A&M University-Commerce October 2014 – May 2015

- Committee member; assist with proposing new university guideline and standards for academic integrity and updating policies
- Academic Integrity in the Classroom/Online – subcommittee member

College of Agricultural Sciences and Natural Resources

CASNR Executive Council – Member January 2015 - Present

Animal Science IE Program - *Coordinator* August 2016 - Present

Faculty Curriculum Committee – *Member* August 2016 - Present

Graduate Admissions and Guidelines - *Member* August 2015 - Present

CDE Dairy Evaluation Contest: *Co-Coordinator* April 2014 - Present

School of Agriculture Graduate Coordinator March 2014 – August 2016

Agricultural Sciences Strategic Planning Committee - *Member* April 2014 – August 2014

Agricultural Sciences Interim Farm Manager May 2014 – August 2014

Faculty/Staff Search Committees

1. Assistant Professor of Agronomy (Member) (Spring 2014)
2. Farm Manager (Chair) (Fall 2015)
3. Director for School of Agriculture (member) (Spring 2015)
4. Director for School of Agriculture (member) (Spring 2016)
5. Assistant Professor of Animal Science (Chair) (Spring 2016)
6. Assistant Professor of Animal Science (member)(Fall 2017)
7. Assistant Farm Manager/ Equine Supervisor (Chair)(Spring 2017)
8. Director of Veterinary Nursing (member)(Spring 2018)

9. Farm Foreman II (member)(Fall 2018)
10. Farm Manager (Fall 2019)
11. Assistant Professor of Animal Science (Chair)(Spring 2019)
12. Assistant Professor of Animal Science (Member)(Spring 2020)
13. Instructor of Animal Science & Judging Team Coordinator (Member)(Spring 2021)
14. Instructor of Animal Science (Member)(Summer 2022)
15. Assistant Professor of Agricultural Education (Chair) (Summer 2024)

Advisor – TAMU-C Livestock Show Team (2014-2015)(2020-Present)

- East Texas State Fair (September 2021)
- Texas A&M University – Commerce AG Day (October 9th, 2021)
- Hereford Heritage Showcase (December 2021)
- Ft. Worth Stock Show and Rodeo (January 25-30, 2023)
- NSR Southwest Type Conference (March 1-4, 2023)

Advisor – Pre-Vet Society (2016-2020)

Popular Press

- Maupin Katie. 2022. Collegiate Cross. *Hereford World*. Vol 112 (9); 38-39
 - Article about the beef breeding program at the TAMU-C

Other Service or Community Engagement

- Riley's Round Up for M.S. Fundraiser: Denison Tx. (Volunteer)(Dec. 6, 2014)
- Help a Child Benefit Livestock Show Fundraiser; Sulphur Springs Tx. (Volunteer) (October 16, 2021)
- Metch Memorial Scholarship Livestock Show; Canton Tx. (Volunteer) (March 19, 2022)
- Academic Director for North Improvement Beef Association (NETBIO); Sulphur Springs TX (2015-Present)
- Invited Speaker – Commerce Rotary Club; Commerce, Tx. August 16, 2023.
- McCleery and Friends Pig Sale volunteer; Poolville Tx. September 2, 2023
- Bear Creek Cattle Raiser's Round Up. Leonard, Tx. September 2021, 2022, 2023.
- Member of the Texas and Southwestern Cattle Raisers Association (2021-2023)
- Santa Gertrudis Annual Meeting; San Marcos Tx. May 2, 2025

AWARDS AND RECOGNITION

- Augustine "Chuck" Arize Junior Faculty Award (2019)
 - Given by TAMU-C for teaching, research, and departmental service.

GRADUATE CURRICULUM

- Asi 801 Hormonal Control of Reproduction and Lactation (3 credits)
- Asi 710 Physiology of Reproduction in Farm Animals (3 credits)
- Asi 802 Gametes, Fertilization, and Pregnancy in Farm Animals (3 credits)
- Asi 825 Stress Physiology of Livestock (3 credits)
- Asi 902 Topics: Biotechnology in Stem Cells (1 credit)

- Stat 703 Statistical Methods for Natural Scientists (3 credits)
- Stat 704 Analysis of Variance (2 credits)
- Stat 705 Regression and Correlation Analysis (2 credits)
- Stat 720 Design of Experiments (3 credits)
- Stat 870 Analysis of Messy Data (3 credits)
- Bioch 755/765 Biochemistry (6 credits)
- Asi 661 Applied Animal Breeding (3 credits)
- Asi 749 Advanced Animal Breeding (3 credits)
- Agron 830 Quantitative Genetics / Plant Breeding (3 Credits)
- Asi 680 Ruminant Nutrition (2 credits)
- Asi 683 Grazing Livestock Nutrition (1 credit)
- Asi 684 Nutrition of Feedlot Cattle (1 credit)
- Agron 501 Range Management (3 credits)

FIELD AND LABORATORY TECHNIQUES

- Artificial Insemination
- Ultrasonography
 - Ovarian Scanning
 - Pregnancy Determination
 - Fetal Sexing
- Real-time PCR
- Northern and Western Blots
- Gene Cloning and Sequencing
- Gene Reporter Assays
- Stem Cell Culture