

**ANIMAL SCIENCES 2013 ANNUAL REPORT**  
**Prepared July 2014**

**A. DEPARTMENTAL GOALS FOR 2013**

**General Goals**

- Hold the first-ever NDSU Animal Sciences Alumni Reunion.
- Hold a departmental retreat which focuses on planning for the future.
- Form an alumni advisory board to assist with fundraising to support the judging teams.

**Teaching Goals**

- Prepare for and navigate the Veterinary Technology Program's accreditation review.
- Develop a plan for effectively staffing ANSC 150 and ANSC 189.

**Research Goals**

- Implement a plan for improving the sustainability of the AIM Laboratory.
- Continue to seek improvement in the internal grant submission and approval process.

**Extension Goals**

- Develop a needs assessment for county Extension staff related to livestock programming.
- Develop additional programming materials county staff can use for educational programs.

**B. EXECUTIVE SUMMARY OF ACCOMPLISHMENTS IN ACHIEVING THE GOALS AND PRIORITIES FOR 2013**

**General Goals**

- The first-ever Animal Sciences Alumni Reunion was held in Medora in August. Over 100 people attended. A silent auction and a golf outing were fundraisers for the department's general scholarship fund. A total of \$1,700 was raised.
- A departmental retreat was scheduled for May 19, 2014, with Teresa Lewis speaking on "The Seven Mindsets."
- The goal of forming an alumni advisory board to assist with fundraising for support of the NDSU judging teams is currently in process.
- An alumni job opportunity listserv was developed to keep departmental graduates informed of current job openings.
- Greg Lardy served as president of the American Society of Animal Science. Joel Caton serves as division editor for the Journal of Animal Science. Joel Caton won the 2013 Gary L. Cromwell Award for Minerals Nutrition from ASAS. Larry Reynolds won the 2013 Animal Growth and Development Award. Kim Vonnahme was named the 2013 Young Scientist Award Winner from the Western Section of ASAS.

**Teaching Goals**

- The Veterinary Technology Program underwent an accreditation review from the American Veterinary Medical Association (AVMA) in October.
- The new department-specific AGRI 189 course was taught by Dr. Lauren Hanna.

**Research Goals**

- Funding for a full-time AIM Laboratory director position was obtained. Dr. Pawel Borowicz was hired for that position. We are in the process of implementing a plan to improve the sustainability of the AIM Laboratory. The purchase of a GE Typhoon FLA 9500 Biomolecular Imager has significantly expanded departmental capabilities in proteome analysis.

- The grant development coordinator sends out weekly notices to keep faculty informed about upcoming grant deadlines. We continue to seek ways to improve the internal grant submission and approval process.
- The department received \$54,000 in funding for GRAs as part of the SBARE initiative process. An application process and matching fund requirement (half of funding comes from the department and half from the PI) were implemented. Seven GRAs are funded.

**Extension/Outreach Goals**

- Extension faculty conducted a needs assessment for county Extension staff to determine what additional training is needed.
- Additional programming materials were developed which county Extension staff can use for educational programs (<http://www.ag.ndsu.edu/programplanning/program-teams/livestock-management>).
- Moos, Ewes & More had record attendance of over 1,600.
- The first-ever Lamb and Wool Expo was held in Jamestown. Over 100 sheep producers from several states attended. The Expo was developed as a partnership between the NDSU Extension Service and the North Dakota Lamb and Wool Producers Association.
- Livestock Judging Camp was part of expanded youth Extension offerings. Twenty-three youth attended the three-day camp.
- A Poultry Career Networking Session was held in conjunction with the NDSU Ag Career Fair. The department teamed with poultry industry representatives to develop the session which was attended by 110 students.
- Dr. Carl Dahlen initiated an integrated Extension and research project to conduct on-ranch research with beef cattle producers and conduct Extension programming related to improving adoption of artificial insemination programs.

**C. DEPARTMENT GOALS FOR 2014**

**General Departmental Goal**

- Hold an annual professional development training or faculty/staff retreat.

**Teaching Goals**

- Pursue avenues for additional teaching resources (faculty members and operating budget) to deal with increased enrollment.
- Review and refine the curriculum in the Veterinary Technology Program.

**Research Goals**

- Hire an epigenetics faculty member.
- Seek additional resources to properly staff the AIM Laboratory.

**Extension/Outreach Goals**

- Hire new environmental stewardship specialist.
- Hold the 2<sup>nd</sup> annual Alumni Reunion.

Peer Reviewed Publications (published or accepted)	73
National or International Invited Presentations	39
Juried presentations/performances/exhibitions	0
Research Grants and Contracts (number that are active)	93 (includes 17 Hatch)
Cumulative Amount (total value of active grants and contracts)	\$12,024,136

## 2013 Animal Sciences Appendix

### I. Listing of Active Grants and Contracts

#### Active (Continuing) Research Projects (N = 36, \$11,284,319)

Ascoli, M. and L.P. Reynolds. Frontiers in Reproduction. NIH T15 HD042116. 6/15/10-4/30/15. \$1,153,000.

Berg, E.L. Jeremiah Program and equine guided coaching. NDSU President's Community Project Award. 5/21/12-6/30/13. \$10,000.

Berg, EP. Comparison of red meat versus high carbohydrate diet as a means of preventing tissue-specific down-regulation of insulin receptors. SBARE-ARF. 7/1/11-6/30/14. \$6,806.

Berg, E.P. and P.T. Berg. Establish a short course to train students in basic meat animal harvest and processing. NDSU Development Foundation Ozbun Economic Development Award. 5/9/11, 10 years. \$20,000.

Caton, J. Countering nutritional induced intrauterine growth restriction with VEGF gene therapy: Impacts on fetal developmental outcomes. USDA-AFRI. 5/1/12-4/30/15. \$150,000.

Dahlen, C.R. and J.C. Hadrich. The 2012 ND Beef Industry Survey: Today, tomorrow, and into the Future. ND Corn Council. 2012-2014. \$20,000.

Dahlen, C.R. and J.C. Hadrich. The 2012 ND Beef Industry Survey: Today, tomorrow, and into the Future. ND Soybean Growers Association. 2012-2014. \$3,500.

C.R. Dahlen and B.W. Neville. Impact of pre-breeding vaccination with modified-live or inactivated viral vaccines on subsequent reproductive indices and abortions. PI. Zoetis, Inc. 4/1/13-4/30/16, \$32,000.

Dahlen, C.R. and C.L. Stoltenow. The NDSU PREGCard Project. Zoetis, Inc. 1 year. \$5,000.

Grazul-Bilska, A.T. Acquisition of molecular biology equipment. The NDSU Development Foundation. 4/1/12-3/31/13. \$4,800.

Grazul-Bilska, A.T. Fetal Adaptation to Maternal and Placental Dysfunction; Aspen/Snowmass Perinatal Biology Symposium 2013 (conference grant). USDA, CSREES/ AFRI. No 2013-00836. 2013. \$15,000.

Grazul-Bilska, A.T. and D.A. Redmer. Role of nitric oxide (NO) system in ovarian function. USDA, CSREES/ NRI. Grant No 2011-67016-30174. 2012-2015. \$306,625 direct cost, (\$393,108 total cost).

Hammer, C.J. The effects of maternal under and over nutrition on maternal and neonatal IgG. Gordon A. Larson Agricultural Research Fund. NDSU Development Foundation. 2013. \$1,950.

Hammer, C.J. and S. Rahman. Evaluation of a novel flax horse bedding product. SVM INTL FlaxStalk. 8/1/12-7/31/13. \$7,696.

Maddock, R.J., et al. Renewal on the Standing Rock Reservation: Land, cattle, beef, and people. USDA-AFRI. 2/15/11-2/14/16. \$4,987,395. Maddock's part for 2013 - \$162,637.

Maddock Carlin, K. Gordon A. Larson Agricultural research Fund, NDSU Development Foundation. 4/1/12-3/31/13. \$2,870.

Maddock Carlin K. Evaluation of the influence of metabolizable protein supplementation in late pregnancy on offspring muscle development utilizing a proteomic approach. SBARE-ARF. February 2012-August 2013. \$11,635.

Newman, D.J. and J. Magolski. Novel feeding strategy to improve feed efficiency and decrease cost of production for market swine. Northern Canola Growers Association. 4/15/12-4/14/13. \$7,250.

Newman, D.J., R.K. Miller, S. Moeller, C. Raines, C.C. Carr, and B. Delmore. National Pork Board retail benchmarking study. National Pork Board. November 1, 2011. 2.5 years. \$299,404. Newman portion \$179,883.

O'Rourke, K., L. Reynolds, and C. Sun. Undernutrition in pregnancy and developmental programming of vascular function. NIH R03 grant. 9/1/09-8/31/13. \$100,000.

Park, C.S. Canola oil and breast cancer risks, synergistic effect with lipotropic nutrients. Northern Canola Growers Association. 6/1/12-5/31/13. \$44,490.

Park, C.S. Lipotropes and mammary epigenetic imprint in offspring mammary carcinogenesis. NIH-NCI. 8/1/12-7/31/14. \$285,065.

Redden, R. and C. Schauer. Periconceptual supplementation to improve lamb production. ND SBARE-ARF. 3/1/12-6/30/13. \$11,044.

Reynolds, L. Centennial Endowment Fund Application. NDSU Development Fund. 4/1/12-3/31/13. \$1,791.

Reynolds, L.P. and A.J. Conley. Role of placental, fetal adrenal and fetal neural steroids in parturition and extra-uterine survival. USDA-NIFA-AFRI #2013-00797. 9/1/13-8/31/15. \$150,000.

Sibi, S. and L.P. Reynolds. New strategies for targeting proteases in disease. NIH P30 GM 103332. 1/1/13-12/31/17. \$7,500,000.

Smith, D. and D.J. Newman. Depletion of penicillin G residues in sows after intramuscular injection. National Pork Board. December 15, 2011. 2 years. \$133,614. Newman portion \$69,200.

Stoltenow, C.L. M. Bauer, and C. Dahlen. Concurrent application of Nuplura, BRD Shield or One Shot to spring born beef calves in north central United States. Pfizer Animal Health, 6/1/12-12/31/13. \$20,000.

Swanson, K. and M. Bauer. Influence of time of feed consumption on feed efficiency in backgrounding calves. SBARE-ARF. 3/1/12-6/30/13. \$9,287.

Swanson, K., M. Bauer, et al. Influence of feed processing and distiller's grains inclusion on finishing performance. North Dakota Corn Council. 7/1/12-6/30/13. \$29,584.

Swanson, K., M. Bauer, L. Prezotto, T. Gilbery, and A. Islas. The effect of changing time of feed consumption and limit-feeding on growing calf performance. SBARE. 2012-2013. \$1,287.

Swanson, K. B. McBride, C. Fitzsimmons, and S. Miller. Influence of nutrition and RFI on cow energetic efficiency and fetal development. Beef Cattle Research Council and Ontario Cattlemen's Association. 2010-2013. \$387,840.

Vonnahme, K. Evaluating the impact of lactation and arginine supply on placental vascularization in dairy cattle. Evoniuk Industries AG. 4/15/12-4/15/13. \$24,900.

Vonnahme, K.A., K. Swanson, and S. O'Rourke. Early nutritional impacts on uteroplacental blood flow and vascular reactivity in pregnant cows. USDA-AFRI. 2010-2013. 9/1/09-8/31/13. \$350,000.

Wagner, S.A. The effect of banamine on standing and lying behavior after hoof trimming. Merck Animal Health. 7/18/12-12/31/13. \$27,000.

Wagner, S.A. and C.J. Hammer. The effects of maternal nutrition during gestation on objective behavioral measures of lamb vitality. SBARE-ARF. 1 year. \$4,896.

### **Active (New) Research Projects (N = 40, \$739,817)**

Bauer M.L., K. Swanson, and K. Vonnahme. Increased use of corn stalks in gestational diets through strategic supplementation of distiller's grains. North Dakota Corn Council. July 1, 2013. 1 year. \$52,310.

Berg, E.L. PATH Intl. Conference and Annual Meeting travel grant. NDSU Provost's travel and research grant. July 2, 2013. \$300.

Berg, E.L. Mentor travel grant at the Equine Science Society national meeting. NDSU Advance FORWARD. February 10, 2013. \$1,500.

Berg, E.L., C.J. Hammer, S. Wagner, S. Ostby, and T. Sonsthagen. Interdisciplinary instructional development grant for equine science, animal science and vet tech. NDSU Office of the Provost. January 13, 2013, 6 months. \$2,065.

Berg, E.P. Evaluation of glycated hemoglobin as a metabolic marker for marbling in commercial feeder cattle. SBARE-ARF. 1/1/13, 18 months. \$7,256.

Berg, EP. Comparison of red meat versus high carbohydrate diet as a means of preventing tissue-specific down-regulation of insulin receptors. National Pork Board 10/1/13-9/30/14. \$9,853.

Berg, E.P. Comparison of red meat versus high carbohydrate diet as a means of preventing tissue-specific down-regulation of insulin receptors. North Dakota Beef Commission 2/1/13-8/1/14. \$6,806.

Berg, E.P. Evaluation of glycated hemoglobin as a metabolic marker for marbling in commercial feeder cattle. SBARE-ARF. 1/13/13-6/30/14, \$7,256.

Dahlen, C.R. Evaluating the sustainability of beef cattle breeding systems. PI. Sustainable Agriculture Research and Education Grant Program, USDA NIFA. 1/1/13-12/31/15, \$199,995.

Dahlen, C.R. and J.C. Hadrich. The 2012 North Dakota Beef Industry Survey; Yesterday, Today, and into the Future. ND Beef Commission. 5/1/13-4/30/15, \$10,000.

Dahlen, C.R. and B.W. Neville. Impact of pre-breeding vaccination with modified-live or inactivated viral vaccines on subsequent reproductive indices and abortions. Zoetis, Inc. July 1, 2013, 2 years. \$32,000.

Dyer, N. Epidemiology and laboratory capacity. Center for Disease Control and North Dakota Department of Health. April 2013-March 31, 2014. \$23,923.

Dyer, N. Swine surveillance. National Animal Health Laboratory Network. April 1, 2013-March 31, 2014. \$3,850.

Dyer, N. Member lab cooperative agreement. National Animal Health Laboratory Network. 1 year. \$50,875.

Gonzalez, J.M., K. Maddock Carlin, J. Drouillard, and K. Phelps. Effect of implant strategy and supplementation of ractopamine hydrochloride on activity of the calpain system and collagen content of fresh and cooked meat and their relationship to beef tenderness. National Cattlemen's Beef Association. May 1, 2013, 1 year. \$64,327.

Grazul-Bilska, A. Fetal adaptation to maternal and placental dysfunction; Aspen/Snowmass Perinatal Biology Symposium 2013. USDA, CSREES/AFRI. 8/1/13-12/31/13. \$15,000.

Grazul-Bilska A.T. and D.A. Redmer. Acquisition of equipment for the shared reproductive physiology laboratory spaces. USDA, CSREES/ AFRI. 2013, 1 year. Total cost \$41,500.

Hammer, C.J. The effects of maternal under and over nutrition on maternal and neonatal IgG. Gordon A. Larson Agricultural Research Fund, NDSU Development Foundation. 5/1/13-11/30/14. \$1,950.

Maddock Carlin, K. and R. Maddock. Influence of rate of temperature and pH decline on intramuscular beef tenderness variation in muscles in the round. SBARE. January 1, 2013, 18 months. \$7,945.

Maddock Carlin, K. and K. Swanson. Strengthening research infrastructure through improving analytical capability for differential protein expression in agricultural sciences. USDA AFRI Foundational Grants Program – Equipment. 8/1/13-7/31/14. \$50,000.

Newman, D.J. Research support agreement: Acquisition of goods and services I. USDA ARS. 5/1/13-7/31/13. \$19,202.

Newman, D.J. Research support agreement II: Acquisition of goods and services. USDA-ARS. 7/1/13-6/30/14. \$21,753.

Newman, D.J. NDSU BBQ Boot Camp. North Dakota Beef Commission. April 1, 2013, 1 year. \$10,000.

Newman, D.J. NDSU BBQ Boot Camp. North Dakota Turkey Federation. May 1, 2013, 1 year. \$2,500.

Newman, D.J. NDSU BBQ Boot Camp. Northern Canola Growers. June 1, 2013, 1 year. \$2,000.

Newman, D.J. and C.R. Dahlen. Global Food Production Systems Study Abroad Program. North Dakota Corn Council. 7/1/13-6/30/15. \$20,000.

Park, C.S. Canola oil, mammary growth and offspring health: synergistic effect with methyl nutrients. Northern Canola Growers Association. July 1, 2013, 1 year. \$45,000.

Redden, R., C. Schauer, and I. Cannayan. Image processing based wool testing system. American Wool Council. 2/1/13-9/30/14. \$22,000.

Redmer, D.A. and A.T. Grazul-Bilska. Acquisition of equipment for the shared reproductive physiology laboratory spaces. September 1, 2013-August 31, 2014. \$41,500 (\$21,641 + \$21,641 match).

Reynolds, L.P. and A.J. Conley. Role of placental, fetal adrenal and fetal neural steroids in parturition and extra-uterine survival. NIFA-AFRI Animal Reproduction. 9/1/13-8/31/15. \$131,399.

Schmidt, R. and R. Redden. 2013. New method to eliminate ovine progressive pneumonia in sheep flocks in North Dakota. NC-SARE. March 1, 2013, 1 year. \$18,250.

Smith, D.J., W.L. Shelver, L. Tell and J. W Schroeder. Plasma kinetics and tissue residues after label and extra label administration of flunixin meglumine to cull dairy cows with and without endotoxemia. USDA/ARS. September 2013-September 2015, 2 years. \$42,308.

Stokka, G.L. Characterization of colostrum in first calf beef heifers, absorption of IgGs by neonatal calves and impact on health and productivity. Zoetis. \$5,000.

Stokka, G. L. Pederson, C. Dahlen, and C. Stoltenow. Utilizing temperature data loggers to monitor deviations in delivered and stored animal health vaccine shipments. National Cattlemen's Beef Association. 5/1/13-9/30/13. \$10,000.

Stokka, G.L., C. Stoltenow, and B. Neville. Use of Bovi-Shield GOLD One Shot or Inforce 3, Bovi-Shield GOLD BVD and One Shot® at branding followed by Bovi-Shield GOLD-One Shot at weaning to spring born beef calves. Zoetis. 5/1/13-3/31/14. \$27,000.

Swanson, K., G. Lardy, M. Bauer, and G. Stokka. Supplementation of microbial inoculants on feed intake and feeding behavior in feedlot adaptation and finishing diets for natural and conventional feeding programs. Priority IAC, Inc. 2013-2014, 1 year. \$77,143.

Vonnahme, K.A. Impact of maternal nutrient restriction and realimentation on placental growth and vascularity parameters. Agricultural Products Utilization Commission. 4/1/13-3/31/14. \$33,800.

Vonnahme, K.A. Travel fund request to participate in Perinatal Conference. NDSU Trustees. \$1,000.

Wagner, S.A. Behavioral methods to evaluate the analgesic effects of non-steroidal anti-inflammatory drug therapy in lame dairy cows, Phase 1: Stability of lameness measures dairy cows over one week. Zoetis. 2013. \$13,750.

Wagner, S.A. Travel support for veterinary technology program students to attend the annual meeting of the American Association of Bovine Practitioners. NDSU Development Foundation Trustees Fund. 2013. \$1,000.

### **Hatch Projects Active in 2013 (N = 17)**

Berg, E.P. Impact of stress factors on performance, health, and well-being of farm animals (W1173). NIFA. 10/1/11-9/30/16.

Caton, J.S. Improving ruminant use of forages in sustainable production systems for the western U.S. NIFA. 10/1/12-9/30/14.

Caton, J.S. Nitrogen cycling, loading, and use efficiency in forage-based livestock production systems (formerly NCT-196 and NC-189). NIFA. 10/1/10-9/30/14.



Dahlen, C.R. Improving beef cattle reproduction and nutritional management. (ND01745). NIFA. 10/1/12-9/30/13.

Dahlen, C.R. Methods to increase reproductive efficiency in cattle (NC1201).

Grazul-Bilska, A.T. Enhancement of reproductive parameters in domestic livestock. NIFA. 10/1/07-9/30/13.

Maddock, R. Factors that can add value to beef in a worldwide marketplace. NIFA. 7/1/12-6/30/16.

Maddock Carlin, K. Factors influencing muscle ultrastructure and subsequent impacts on muscle growth and meat quality. NIFA. 10/1/13-9/30/18.

Newman, D.J. Swine production management to enhance animal welfare and value of U.S. pork. 10/1/10-9/30/16.

Park, C. Role of dietary methyl nutrients in epigenetic control of lactation. 10/1/10-9/30/13.

Redden, R.R. Increasing efficiency of sheep production. NIFA 10/1/2011-9/30/14.

Redmer, D.A. Regulation of vascular growth and function in reproductive tissues of livestock. NIFA. 10/1/12-9/30/17.

Schroeder, J.W. Metabolic relationships in supply of nutrients for lactating cows. NIFA. 10/1/07-9/30/13.

Swanson, K. Factors influencing efficiency of nutrient use in ruminants. NIFA. 10/1/12-9/30/13.

Vonnahme, K. Early nutritional impacts of uteroplacental blood flow and vascular reactivity in pregnant cows. NIFA. 9/1/09-8/31/13.

Vonnahme, K. Reproductive performance in domestic ruminants. NIFA. 10/1/12-9/30/16.

Wagner, S.A. Improvement of animal welfare through the assessment and treatment of pain in livestock. NIFA. 10/1/12-9/30/17.

### **Other Funding (N = 7)**

Dahlen, C.R. Fate of net wrap ingested by cattle- in situ, in vivo. PI. Startup funds and in kind Donations.

Klein, S.I. and C.R. Dahlen. Alternate day feeding metabolism study. PI. Startup funds and In-Kind Donations.

Neville, B.W. and C.R. Dahlen. Impacts of implant strategy on growth performance and carcass characteristics of steers with varying genetic potential for growth and quality grade. PI. Internal Funds.

Redden, R. and G. Stokka. Effects of vaccination for hisophilus in feedlot lambs. Pfizer Animal Health. 1 year. \$2,900 in kind veterinary products.

Steichen, P.L., B.W. Neville, C.S. Schauer, and C.R. Dahlen. Artificial insemination vs. natural service in commercial beef herds. PI. Startup funds, AES assistantship, and In-Kind Donations.

Swanson, K., M. Bauer, T. Gilbery, and A. Islas. The effect of forage source in finishing diets on growth performance and feeding behavior. 2013. Funded with \$500 start-up funds.

Swanson, K., G. Lardy, M. Bauer, and G.L. Stokka. Supplementation of microbial inoculants on feed intake and feeding behavior in feedlot adaptation and finishing diets for natural and conventional feeding programs. \$2,500 in kind veterinary products. 2012-2013.

## **II. Publications and Presentations**

### **Refereed Journal Articles Published (N = 59, invited = 2)**

Abo-Ismael, M.K., M.J. Kelly, E.J. Squires, K.C. Swanson, and S.P. Miller. 2013. Identification of single nucleotide polymorphisms in genes involved in digestive and metabolic processes associated with feed efficiency and performance traits in beef cattle. *J. Anim. Sci.* 91:2512-2529.

Awda, B.J., S.P. Miller, Y.R. Montanholi, G. Vander Voort, T. Caldwell, M.M. Buhr, and K.C. Swanson. 2013. The relationship between feed efficiency traits and fertility in young beef bulls. *Can. J. Anim. Sci.* 93:185-192.

Campbell, C.P., J. Haley, K.C. Swanson, and I.B. Mandell. 2013. Packing plant differences in meat quality for grain-fed veal. *Can. J. Anim. Sci.* 93:205-215.

Chapinal, N., C. Fitzpatrick, S. Wagner, and K. Leslie. 2013. Experimentally induced mastitis reduces weight shifting between the rear legs while standing in dairy cows. *J. Dairy Sci.* 96(5):3039-3043.

Cho, K., W.S. Choi, C.L. Crane, and C.S. Park. 2013. Pubertal supplementation of lipotropes in female rats reduced mammary cancer risk by suppressing histone deacetylase 1. *European J. Nutr.* doi: 10.1007/s00394-013-0626-3.

Cho, K., L. Mabasa, M.W. Walters, and C.S. Park. 2013. Lipotropes enhance the anti-proliferative effect of chemotherapeutic drugs in MCF-7 human breast cancer cells. *Oncology Report* 29:2237-2242.

- Conley, A.J., F.Z. Stanczyk, J.H. Morrison, P. Borowicz, K. Benirschke, N.A. Gee, and B.L. Lasley. 2013. Modulation of higher-primate adrenal androgen secretion with estrogen-alone or estrogen-plus-progesterone intervention. *Menopause* 20:322-328.
- Dyer N., K.G. Register, D. Miskimins, and T. Newell. Necrotic pharyngitis associated with *Mycoplasma bovis* infections in American bison (*Bison bison*). *J. Vet Diagn. Invest.* 2013:301-303.
- Gonzalez, J.M., L.E. Camacho, S.M. Ebarb, K.C. Swanson, K.M. Vonnahme, A.M. Stelzleni, and S.E. Johnson. 2013. Realimentation of nutrient restricted pregnant beef cows supports compensatory fetal muscle growth. *J. Anim. Sci.* 91:4797-4806.
- Grant, J.K., P.L. Steichen, C.L. Wright, K.A. Vonnahme, M.L. Bauer, J.S. Jennings, and G.A. Perry. 2013. Influence of nitrogen and sulfur intake on bovine uterine pH throughout the luteal phase. *J. Anim. Sci.* 91:1186-1192.
- Grazul-Bilska, A.T., P.P. Borowicz, L.P. Reynolds, and D.A. Redmer. 2013. Vascular perfusion method to study angiogenesis and expression of regulatory factors in ovaries. *Acta Histochemica* 115:893-898.
- Grazul-Bilska, A.T., M.L. Johnson, P.P. Borowicz, L. Baranko, D.A. Redmer, and L.P. Reynolds. 2013. Placental development during early pregnancy in sheep: Effects of embryo origin on fetal and placental growth, and global methylation. *Theriogenology* 79:94-102.
- Guelker, M.R., A.N. Haneklaus, J.C. Brooks, C.C. Carr, R.J. Delmore Jr., D.B. Griffin, D.S. Hale, K.B. Harris, G.G. Mafi, D.D. Johnson, C.L. Lorenzen, R.J. Maddock, J.N. Martin, R.K. Miller, C.R. Raines, D.L. VanOverbeke, L.L. Vedral, B.E. Wasser, and J.W. Savell. 2013. National Beef Tenderness Survey–2010: Warner-Bratzler shear force values and sensory panel ratings for beef steaks from United States retail and food service establishments. *J. Anim. Sci.* 91:1005-1013.
- Harris, E.K., E.P. Berg, E.L. Berg, and K.A. Vonnahme. 2013. Effect of maternal activity during gestation on maternal behavior, fetal growth, umbilical blood flow and farrowing characteristics in pigs. *J. Anim. Sci.* 91:734-744.
- Holligan, S., J. Wang, J.P. Cant, and K.C. Swanson. 2013. A mass spectrometry-based proteomics approach to detect tissue-wide adaptive changes associated with increased  $\alpha$ -amylase activity in domestic cattle (*Bos taurus*). *Comp. Biochem. Phys. D.* 8:65-71.
- Islas, A., T.C. Gilbery, R.S. Goulart, C.R. Dahlen, M.L. Bauer, and K.C. Swanson. 2014. Influence of supplementation with corn dried distillers grains plus solubles to growing calves fed medium-quality hay on growth performance and feeding behavior. *J. Anim. Sci.* doi:10.2527/jas2013-7067.

Johnson, A.K., L.M. Gesing, M. Ellis, J.J. McGlone, E.P. Berg, S.M. Lonergan, R. Fitzgerald, L.A. Karriker, A. Ramirez, K.J. Stalder, A. Sapkota, R. Kephart, J.T. Selsby, L.J. Sadler, and M.J. Ritter. 2013. The welfare of pigs on farm during the marketing process. *J. Anim. Sci.* 91:2481-2491.

Johnson, G.D., H.B. Goosey, M.G. Rolston, W.L. Miller, D.G. Hokit, R.R. Redden, and R.W. Kott. 2013. Evaluation of mosquito responses to pyrethroid insecticides topically applied to sheep. *J. Amer. Mosq. Con. Assoc.* 29:146-153.

Lekatz, L.A., J.S. Luther, J.S. Caton, and K.A. Vonnahme. 2013. Impacts of maternal nutritional plane on umbilical artery hemodynamics, fetal and placentome growth in sheep. *Anim. Reprod.* 10:99-105.

Lemley, C.O., L.E. Camacho, A.M. Meyer, M. Kapphahn, J.S. Caton, and K.A. Vonnahme. 2013. Dietary melatonin supplementation alters uteroplacental amino acid (AA) flux during intrauterine growth restriction in ewes. *Animal* 7:1500-1507.

Lemley, C.O., L.E. Camacho, and K.A. Vonnahme. 2013. Uterine infusion of melatonin or melatonin receptor antagonist alters ovine fetoplacental hemodynamics during mid-gestation. *Biol. Reprod.* 89(40):1-9.

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Van Emon, M, C. Schauer, A. Meyer, K. Maddock-Carlin, and K. Vonnahme. 2013. Effects of maternal metabolizable protein supplementation during late gestation on wether offspring organ weights. *J. Anim. Sci.* 91(2):129-130.

Waterman, R., J.S. Caton, and C. Loest. 2013. How well does the current metabolizable protein system account for protein supply and demand of beef females within extensive western grazing systems? *J. Anim. Sci.* 91(E2):440.

Wellnitz, K.R., J.D. Magolski, K.R. Maddock-Carlin, V.L. Anderson, and E.P. Berg. 2013. Lactate concentration at exsanguination is related to feedlot heifer temperament but not fresh beef color. *J. Anim. Sci.* 91(2):99.

Yunta, C., B.R. Mordhorst, K.A. Vonnahme, C. Parys, and A. Bach. 2013. The effect of arginine supplementation during pregnancy on uterine blood flow in dairy heifers. *J. Anim. Sci.* 91(2):451.

### **Abstracts Accepted in Refereed Journals (N = 13)**

Alkhuriji, M., P.P. Borowicz, L.L. Baranko, K.R. Wellnitz, and E.P. Berg. Comparison of red meat versus high carbohydrate diet using the gilt biomedical model: Myofiber and adipocyte molecular biology. *J. Anim. Sci.* 92(E2).

Baranko, L.L., K.R. Wellnitz, K.A. Vonnahme, and E.P. Berg. Comparison of red meat versus high carbohydrate diet using the gilt biomedical model: Blood chemistry. *J. Anim. Sci.* 92(E2).

Cho, K.B., L. Mabasa, K.S. Choi, C.L. Crane, W.S. Choi, and C.S. Park. In utero exposure to dietary lipotropes affects DNA methylation and gene expression in mammary glands of offspring. *FASEB J.* 28:937.5

Doscher F.E., C.S. Bass, A.T. Grazul-Bilska, S.L. Kaminski, D.A. Redmer, J.D. Kirsch, and K.C. Swanson. The impact of diet and arginine supplementation on pancreatic mass and digestive enzyme activity in ewes. *J. Anim. Sci.* 92(E2).

Heller Pereira, C., K.R. Wellnitz, L. Prezotto, F.E. Doscher, E.P. Berg, and K.C. Swanson. Comparison of red meat versus high carbohydrate diet using the gilt biomedical model: Liver and muscle energy use. *J. Anim. Sci.* 92(E2).

Lekatz, L.A. M.L. Van Emon, L.E. Camacho, C.S. Schauer, K.R. Maddock-Carlin, and K.A. Vonnahme. Maternal metabolizable protein restriction during late gestation leads to greater gravid uterine uptake of total serum nitrites in sheep. *J. Anim. Sci.* 92.

Mordhorst, B.R., L.E. Camacho, C.O. Lemley, D.A. Redmer, and K.A. Vonnahme. Influence of early gestational nutrient restriction on vascularity of beef cow placentomes. *J. Anim. Sci.* 92(E2).

Park, C.S. Compensatory nutrition regimen enhances mammary development and lactation potential. *Growth & Nutrition* 2:68.

Peine J.L., K. Wellnitz, G.Q. Jia, A.M. Meyer, L.P. Reynolds, and J.S. Caton. Effects of maternal nutrient restriction and rumen-protected arginine supplementation of ewes on carotid artery hemodynamics during gestation and lamb birth weights. *J Anim. Sci.* 92(1).

Pereira, C.H., C.S Bass, A.T. Grazul-Bilska, S.L. Kaminski, F.E. Doscher, D.A. Redmer, J.D. Kirsch, and K.C. Swanson. Effect of plane of nutrition and arginine supplementation on kidney and liver mass. *J. Anim. Sci.* 92(E2).

Schwartz, C., K.A. Vonnahme, C.S. Schauer, S.M. Lonergan, K.J. Grubbs, W.L. Keller, and K.R. Maddock-Carlin. Effect of maternal metabolizable protein supplementation in isocaloric diets during late pregnancy on muscle fiber type and enzyme expression in ovine fetal skeletal muscle. *Meat Science.* 96(1):492.

Sorensen, K.L, V.L. Anderson, K.R. Maddock-Carlin, C.L. Engel, C.S. Schauer, K.C. Olsen, and R.J. Maddock. Effects of dietary forage concentration in finishing diets on growth and carcass characteristics of beef steers. *J. Anim. Sci.* 92 (Suppl.2):99.

Wellnitz, K.R., J.D. Crosswhite, and E.P. Berg. Comparison of red meat versus high carbohydrate diet using the gilt biomedical model: Liver and muscle energy use. *J. Anim. Sci.* 92: (E2).

#### **Proceedings Papers Published (N = 20)**

Camacho, L.E., C.O. Lemley, J.S. Haring, P.P. Borowicz, D.M. Hallford, K.C. Swanson, and K.A. Vonnahme. 2013. Maternal nutrient restriction followed by realimentation during early to mid-gestation on mammary gland development in beef cows. *Proc. West. Sect. Soc. Anim. Sci.* 64:76-79.

Crane, A.R., R.R. Redden, M.L. Van Emon, T.L. Neville, L.P. Reynolds, J.S. Caton, and C.S. Schauer. 2013. Impacts of supplemental arginine on reproductive performance in sheep. *Proc. West. Sect. Soc. Anim. Sci.* 64:154-156.

Dahlen, C.R., G.P. Lardy, and J.C. Hadrich. 2013. North Dakota Beef Industry Survey: Today, tomorrow, and into the future. Northern States Beef Conference. Watertown, SD. Pg. 7-16.

Dahlen, C.R. 2013. Control of estrus with natural service. *Applied Reproductive Strategies in Beef Cattle.* Staunton, VA. Pg. 133-143.

Doscher, F.E., E.A. Nere, R.D. Yunosova, L.E. Camacho, C.O. Lemley, L.D. Prezotto, K.A. Vonnahme, J.S. Caton, and K.C. Swanson. 2013. Effects of realimentation after nutrient restriction during early to mid-gestation on pancreatic digestive enzymes in beef cattle. In: J.W. Oltjen, E. Kebreab, and H. Lapierre (Eds.) *Energy and protein metabolism and nutrition in sustainable animal production.* Proc. of the 4<sup>th</sup> International Symp. Energy and Protein Metabolism and Nutr. EAAP publication No. 134. Wageningen Academic Publishers. The Netherlands. Pg. 285-286.

- Johnson, G.D., H.B. Goosey, M.G. Rolston, W.L. Miller, D.G. Hokit, R.R. Redden, and R.W. Kott. 2013. Evaluation of mosquito responses to topically applied pyrethroid insecticides to sheep. *Proc. West. Sect. Amer. Soc. Anim. Sci.* 64: 224-226.
- Peine, J.L., G.Q. Jia, M.L. Van Emon, T.L. Neville, J.D. Kirsch, C.J. Hammer, S.T. O'Rourke, L.P. Reynolds, and J.S. Caton. Effects of maternal nutrition and rumen-protected arginine supplementation on ewe and postnatal lamb performance. *Proc. West. Sec. Amer. Soc. Anim. Sci.* 2013. 64:80-83.
- Prezotto, L.D., L.E. Camacho, C.O. Lemley, F.E. Doscher, J.S. Caton, K.A. Vonnahme, and K.C. Swanson. 2013. Effects of nutrient restriction in beef cows during early and midgestation on maternal and fetal liver and small intestinal mass and in vitro oxygen consumption. In: J. W. Oltjen, E. Kebreab, and H. Lapierre (Eds.) *Energy and protein metabolism and nutrition in sustainable animal production*. Proc. 4<sup>th</sup> International Symp. Energy and Protein Metabolism and Nutr. EAAP publication No. 134. Wageningen Academic Publishers. The Netherlands. pp 463-464.
- Redden, R.R., L.M.M. Surber and R.W. Kott. 2013. Effects of ewe efficiency classification and method of diet processing on subsequent forage based growth test. *Proc. West. Sect. Amer. Soc. Anim. Sci.* 64: 279-282.
- Schroeder, J.W. 2013. Improving profitability through feed efficiency by reducing feed bunk losses. *Pro. Lechero International Symposium, Expo Leche, San Marcos.*
- Shelver, W.L., S.J. Lupton, D.J. Newman, S. Larsen, and D.J. Smith. Evaluation of penicillin G residues by kidney inhibition swab tests in sow body fluids and tissues following intramuscular injection. *Proc. SafePork 2013*. Portland, Maine.
- Smith, D.J., W.L. Shelver, S.J. Lupton, D.J. Newman, and S. Larsen. Depletion of penicillin G residues in sows after intramuscular injection. *Proc. SafePork 2013*. Portland, Maine.
- Stokka, G.L., R. Maddock, C. Dahlen, T. Petry, and C. Stoltenow. Preg checking, why should we recommend it? *Proc. 46<sup>th</sup> Annual Conference of the AABP* 46:34-35.
- Stokka, G.L., Vaccine interference: Fact or fiction. *Proc. Summer Conference of the Academy of Veterinary Consultants*, Pg. 109-118.
- Vonnahme, K.A., J.S. Caton, K.R. Maddock Carlin, and C.S. Schauer. 2013. Maternal environment impacts fetal and offspring outcomes in sheep. *Proc. West. Sec. Amer. Soc. Anim. Sci.* 64:24-26.
- Wagner, S.A. Auxiliaries: Leverage yourself with bovine practice. Fall Continuing Education Meeting, Ontario Association of Bovine Practitioners. Guelph, Ontario, Canada. November 20-21, 2013, Pg. 1-4.

Wagner, S.A. Technical skills in bovine practice. Fall Continuing Education Meeting, Ontario Association of Bovine Practitioners. Guelph, Ontario, Canada. November 20-21, 2013, Pg. 26-36.

Wagner, S.A. Optimizing veterinary auxiliary roles in bovine practice. Fall Continuing Education Meeting, Ontario Association of Bovine Practitioners. Guelph, Ontario, Canada. November 20-21, 2013, Pg. 45-47.

Wagner, S.A. Teaching pharmacology to veterinary technicians. Proc. 23<sup>rd</sup> Biennial Symp. Amer. Veterinary Tech. Educators, Denver, CO. July 2013.

Wood, K.M., C.J. Fitzsimmons, S.P. Miller, B.W. McBride, and K.C. Swanson. 2013. The effect of pregnancy on weight change, visceral organ mass and circulating serum metabolites in mature beef cows. J. W. Oltjen, E. Kebreab, and H. Lapierre (Eds.) Energy and protein metabolism and nutrition in sustainable animal production. 4<sup>th</sup> International Symp. Energy and Protein Metabolism and Nutr. EAAP publication No. 134. Wageningen Academic Publishers. The Netherlands. pp 465-466.

#### **Abstracts Published in Meeting Proceedings (N = 22)**

Bass C.S., A.T. Grazul-Bilska, S.L. Kaminski, L.S. Carlson, and D.A. Redmer. 2013. Diet and in vivo arginine (Arg)-treatment affect luteal growth and vascularization in non-pregnant ewes. Biol. Reprod. 2013 Ann. Mtg. Abstract 534.

Bass, C.S., D.A. Redmer, S.L. Kaminski, D.H. Keisler, P.P. Borowicz, S.T. Dorsam, J.S. Haring and A.T. Grazul-Bilska. Diet, but not arginine (Arg) treatment, affects leptin, insulin and progesterone (P4) serum concentrations in non-pregnant ewes. Perinatal Biology Symposium, Snowmass/Aspen, CO. August 24-27, 2013.

Camacho L.E., C.O. Lemley, J.S. Haring, P.P. Borowicz, D.M. Hallford, K.C. Swanson, and K.A. Vonnahme. 2013. Maternal nutrient restriction followed by realimentation during early to mid-gestation on mammary gland development in beef cows. Proc. Western Section Amer. Soc. Anim. Sci. 64.

Grazul-Bilska A.T. Role of nitric oxide system in ovarian function. 2013. Anim. Reprod. USDA Projects Director Meeting. Pg. 8.

Grazul-Bilska A.T., M.L. Johnson, P.P. Borowicz, C. Bass, S. Kaminski, T. Cymbaluk, S. Dorsam, L.P. Reynolds, and D.A. Redmer. 2013. In vivo L-arginine and sildenafil citrate treatment: Effects on luteal function in non-pregnant sheep. Ann. Mtg. Soc. Study of Reprod. Montreal, CA, Pg. 110.

Igathinathane, C., R. Redden, and C. Schauer. 2013. Application of image processing for development of economical wool fiber thickness measurement for grading. ASABE Ann. Meeting. Control ID 1600767.



Kaminski, S., A. Grazul-Bilska, E Berg, and K. Vonnahme. 2013. Impact of maternal exercise on ovarian development in the pig. ASAS/ADSA Midwestern Sect. Ann. Meeting, Des Moines, IA. Abstract 0030.

Kaminski S.L., D.A. Redmer, C.S. Bass, S. Norberg, K.A. Vonnahme, A.T. Grazul-Bilska. 2013. Progesterone (P4) secretion is affected by plane of nutrition but not arginine (Arg) treatment during the estrous cycle in sheep. Biol. Reprod. 2013 Ann. Mtg. Pg. 21, Abstract 49.

Klinkner, B.T., D.S. Buchanan, C.C. Carr, R.B.A. Dahlen, R.J. Delmore, K. Grimshaw, W.R. Henning, R.K. Miller, S.J. Moeller, H.N. Zerby, and D.J. Newman. 2013. Pork Quality: 2012 National Retail Benchmarking Study. 2013 ASAS Midwest Meetings, Des Moines, IA.

Montanholi, Y., K. Colliver, M. Lim, B. Smith, A. Fontoura, F. Schenkel, K. Swanson, and S. Miller. 2013. Assessments of fluctuations in heat, CO<sub>2</sub>, CH<sub>4</sub> and infrared imaging in beef heifers with known feed efficiency. Proc. of the XI World Congress on Anim. Production, Beijing, China.

Paradis, F., J. Grant, K. Wood, K. Swanson, I. Mandell, S. Miller, B. McBride, and C. Fitzsimmons. 2013. Impact of maternal nutrition during gestation on fetal longissimus dorsi muscle transcriptome in beef cattle. Proc. Can. Soc. Anim. Sci. Ann. Mtg. Pg. 34.

Quinn K.E., L.P. Reynolds, P.P. Borowicz, A.T. Grazul-Bilska, S.T. Dorsam, and R.L. Ashley. CXCL12 expression increases in sheep uterine and fetal tissues during early gestation. 46<sup>th</sup> Ann. Mtg. Soc. for the Study of Reproduction. Montreal, Canada.

Reyaz, A., M.S. Sane, F. Yao, L.E. Camacho, C.O. Lemley, K.C. Swanson, S.T. O'Rourke, and K.A. Vonnahme. 2013. Nutrient restriction during early and mid-gestation followed by realimentation alters cotyledonary arterial vasoreactivity in response to bradykinin in beef cows. Proc. Soc. Study of Reproduction 46<sup>th</sup> Annual Meeting. Pg. 241.

Reynolds, L.P., J.S. Caton, P.P. Borowicz, K.A. Vonnahme, C.O. Lemley, and A.J. Conley. 2013. Maternal melatonin treatment alters expression of fetal hypothalamic 5 alpha reductase type. Aspen/Snowmass Perinatal Biology Symposium: "Fetal Adaptations to Maternal and Placental Dysfunction" Pediatric Research, 74:479-483.

Reynolds L.P., Haring JS, Borowicz PP, Grazul-Bilska AT. Expression of genes associated with embryonic diapause in ovine placental tissues during early pregnancy: Effects of assisted reproductive technologies (ART). 46th Ann. Mtg. Soc. for the Study of Reprod. Montreal, CA, July 2013.

Riley, D.G., T.H. Welsh, C.A. Gill, L.L. Hulsman (Hanna), A.D. Herring, P.K. Riggs, J.E. Sawyer, and J.O. Sanders. 2013. Association of newborn calf cannon bone length with preselected SNP chosen based on proximity to genes with suspected influence. American Society of Animal Science Southern Section Annual Meeting and Conference, Orlando, FL, USA. Accessed Feb. 12, 2013. Pg. 9.

Schneider M.J., S.J. Lupton, D.J. Smith, and D.J. Newman. Distribution of penicillin G residues among sow muscles. 2013 PITTCON Conference & Expo., Philadelphia, PA.

Shelver, W.L., S.J. Lupton, D.J. Newman, S. Larsen, and D.J. Smith. 2013. Evaluation of penicillin G residues by kidney inhibition swab tests in sow body fluids and tissues following intramuscular injection. SafePork 2013, Portland, Maine. Pg. 35-38.

Smith, D.J., W.L. Shelver, S.J. Lupton, D.J. Newman, and S. and Larsen. 2013. Depletion of penicillin G residues in sows after intramuscular injection. Allen D. Lemman Swine Conference. Minneapolis, MN. Pg. 39-41.

Smith, D.J., W.L. Shelver, S.J. Lupton, D.J. Newman, and S. Larsen, S. 2013. Depletion of penicillin G residues in sows after intramuscular injection. SafePork 2013. Portland, ME.

Sorensen, K.L. V.L. Anderson, K.R. Maddock Carlin, C.L. Engel, C.S. Schauer, K.C. Olson, R.J. Maddock. 2013. Effects of dietary forage concentration in finishing diets on growth and carcass characteristics of beef steers. Proc. Midwest Animal Science Meetings.

Wood, K.M., C.J. Fitzsimmons, S.P. Miller, B.W. McBride, and K.C. Swanson. 2013. The effect of pregnancy on proteins relating to energy metabolism in mature beef cows. Can. Soc. Anim. Sci. Annual Meeting. Pg. 46-47.

#### **Abstracts Accepted in Meeting Proceedings (N = 13)**

Black, D.N., M.R. Schook, J.C. Hadrich, G.P. Lardy, and C.R. Dahlen. The North Dakota Beef Industry Survey I. Demographics, challenges, and opportunities. Proc. Amer. Soc. Anim. Sci. 2014 Midwest Section meeting. #2938.

Camacho, L.E., C.O. Lemley, J. Haring, K.C. Swanson, and K.A. Vonnahme. Effects of nutrient restriction on maternal jugular serum, umbilical cord serum, and amniotic fluid metabolite concentrations in beef cows. Proc. Midwest Sect. Am. Soc. Anim. Soc. Ann. Meeting.

Carlson, Z.E., T.C. Gilbery, A. Islas, M.L. Bauer, and K.C. Swanson. Influence of forage source on growth performance and feeding behavior in finishing steers. Proc. Midwest Sect. Amer. Soc. Anim. Soc. Ann. Meeting.

Caton J.S., A.M. Meyer, R.D. Yunusova, P.P. Borowicz, L.P. Reynolds, D.A. Redmer, C.J. Hammer, and K.A. Vonnahme. Effects of maternal selenium supply and nutritional plane on offspring intestinal biology. Proc. of the 15<sup>th</sup> International Symposium on Trace Elements in Man and Animals (TEMA), Orlando, FL, June 2014.

Dahlen, C.R., S.I. Klein, G.C. Lamb, V.R.G. Mercadante, and P.L. Steichen. Physiological response of beef heifers after receiving a reused CIDR processed with different heat-treating methods. Amer. Soc. Anim. Sci. 2014 Midwest Section meeting. #2933.

Doscher, F.E., C. Bass, A. Grazul-Bilska, S. Kaminski, D.A. Redmer, J. Kirsch, and K.C. Swanson. Impact of arginine supplementation on pancreatic mass and digestive enzyme activity in non-pregnant ewes. Proc. Midwest Sect. Amer. Soc. Anim. Soc. Ann. Meeting.

Gaspers, J.J., G.L. Stokka, and B.W. Neville. Birth weight and calving ease effects on passive transfer of immunoglobulins in neonatal beef calves. Proc. Amer. Soc. Anim. Sci. 2014 Ann. Meeting.

Hart, C.G., L.J. Grossner, L.E. Camacho, K.C. Swanson, K.A. Vonnahme, and C.O. Lemley. Hepatic peroxisome proliferator activated receptor alpha (PPAR $\alpha$ ) is increased during mid- to late gestation in beef cows. Proc. Midwest Sect. Am. Soc. Anim. Soc. Ann. Meeting.

Pereira, C.H., C.S. Bass, A.T. Grazul-Bilska, S.L. Kaminski, F.E. Doscher, D.A. Redmer, J.D. Kirsch, and K.C. Swanson. Effect of plane of nutrition and arginine supplementation on kidney and liver mass. Proc. Midwest Sect. Amer. Soc. Anim. Soc. Ann. Meeting.

Pereira, C.H., H.O. Patino, K.C. Swanson, F.A. L. Gonzalez, D.M.Z. Vargas, D.M. Panazzolo, L. Lunardini, and J.U. Tarouco. Growth performance, carcass characteristics and serum cholesterol and progesterone concentrations of heifers fed different energy sources on pasture. Proc. Midwest Sect. Amer. Soc. Anim. Soc. Ann. Meeting.

Pereira, C.H., K. Wellnitz, L. Prezzoto, F. Doscher, E.P. Berg, and K.C. Swanson. Comparison of red meat versus high carbohydrate diet using the gilt biomedical model: liver and muscle energy use. Proc. Midwest Sect. Amer. Soc. Anim. Soc. Ann. Meeting.

Prezotto, L., T.C. Gilbery, A. Islas, M.L. Bauer, and K.C. Swanson. Influence of feed restriction and feeding time to growing calves on growth performance and feeding behavior. Proc. Midwest Sect. Amer. Soc. Anim. Soc. Ann. Meeting.

Schook, M.R., D.N. Black, J.C. Hadrich, G.P. Lardy, and C.R. Dahlen. The North Dakota Beef Industry Survey II. Comparing herd management and production practices among producers planning to exit the industry and producers planning to remain in production. Amer. Soc. of Anim. Sci. 2014 Midwest Sect. Meeting. #2957.

### **National or International Invited Presentations (N = 39)**

Berg, E.L. Intake assessment strategies for participation in therapeutic horsemanship programs. PATH Intl. Region 6 Conference. St. Cloud, MN. March 2013.

Caton, J.S. Maternal plane of nutrition: Impact on the offspring. XVII Curso “Novos Enfoques na Produção e Reprodução de Bovinos.” Brazil. March 14-15, 2013.

Caton, J.S. Emerging concepts of epigenetics: Background, significance, and potential relevance in livestock production. XVII Curso “Novos Enfoques na Produção e Reprodução de Bovinos” Brazil. March 14-15, 2013.

Caton, J.S. Maternal environment impacts fetal and offspring outcomes in sheep. West. Sec. Amer. Soc. Anim. Sci. Bozeman, MT. June 2013.

Caton, J.S. How well does the current metabolizable protein system account for protein supply and demand of beef females within extensive western grazing systems? ASAS and JAM Summer Symposium, Indianapolis, IN. July 2013.

Caton, J.S. Maternal nutrition and offspring development. CA ARPAS Continuing Education Conference: A Year in the Life: Growth & Development, Harris Ranch, Orange County, CA. October 24-25, 2013.

Caton, J.S. Biofortification of maternal diets with selenium: Postnatal growth outcomes. 3<sup>rd</sup> International Conference on Selenium in the Environment and Human Health, Hefei, China. November 10-14, 2013.

Dahlen, C.R. North Dakota and the future of food production. Chinese Agriculture University, Department of Economics. Beijing, China. May 16, 2013.

Dahlen, C.R. North Dakota and the future of food production. Chinese Agriculture University, Department of Animal Science. Beijing, China. May 16, 2013.

Dahlen, C.R. Overview of the U.S. beef industry. Northwest Agriculture and Forestry University. Yangling, Shaanxi, China. May 22, 2013.

Dahlen, C.R. NDSU and North Dakota agriculture. Nanjing Agricultural University, Nanjing, China. May 24, 2013.

Dahlen, C.R. Reproductive management for your bottom line: A North Dakota perspective. 9<sup>th</sup> Annual Cattleman's Workshop: Opportunities for the Northwest Cow/Calf Producer in a Changing World. LeGrand, OR. January 19, 2013.

Dahlen, C.R. Control of estrus with natural service. Applied Reproductive Strategies in Beef Cattle. Staunton, VA, October 15, 2013.

Dahlen, C.R. North Dakota Beef industry survey: Today, tomorrow, and into the future. Northern States Beef Conference. Watertown, SD. January 16, 2013.

Grazul-Bilska, A.T. Role of diet in regulation of ovarian function: Effects on gametogenic (oocyte quality) and endocrine (hormone secretion) functions. Institute of Animal Reproduction and Food Research of Polish Academy of Sciences. Olsztyn, Poland. May 21, 2013.

Grazul-Bilska, A.T. Placental development during early pregnancy: tissue growth, angiogenesis and epigenetics. Warmia and Mazuria. Olsztyn, Poland. May 17, 2013.

Grazul-Bilska, A.T. Role of diet in regulation of ovarian function: Effects on gametogenic and endocrine functions. Warsaw University of Life Sciences, Division of Histology and Embryology, Department of Morphological Sciences, Faculty of Veterinary Medicine. Warsaw, Poland. May 15, 2013.

Lardy, G.P. Research needs in the cow-calf industry. Corrientes, Argentina. October 2013.

Lardy, G.P. The interaction between cow nutrition and neonatal calf health. Banff, Alberta, Canada. June 2013.

Maddock, R.J. Renewal on the Standing Rock Reservation. Project Directors Meetings. Washington, DC. April 2013.

Newman, D.J. A fresh look at pork value cuts. Protein Innovation Summit 2013. Chicago, IL. April 2013.

Newman, D.J. Domestic pork marketing update. National Pork Industry Forum. Orlando, FL. March 2013.

Newman, D.J. North Dakota Agriculture: The future of food production, NDSU Animal Sciences. Chinese Agriculture University, Agriculture Economics School. Beijing, China: May 16, 2013.

Newman, D.J. North Dakota agriculture specifics, NDSU Animal Sciences, Global Swine Production. Chinese Agriculture University, Animal Sciences Department. Beijing, China. May 16, 2013.

Newman, D.J. Overview of global meat production, North Dakota agriculture, and the U.S. swine industry. Northwest Agriculture and Forestry University. Yangling, Shaanxi, China. May 22, 2013.

Newman, D.J. Pork quality research at NDSU and global pork quality parameters. Nanjing Agriculture University, Center for Meat Quality Improvement. Nanjing, China. May 2013.

Newman, D.J. What is pork quality? World Pork Expo 2013. National Pork Board Retail Advisory Committee Meeting. June 6, 2013.

Park, C.S. In utero exposure to dietary lipotropes suppresses chemically-induced mammary carcinogenesis. The Global Breast Cancer Conference. Seoul, Korea. October 2013.

Reynolds, L.P.  $5\alpha$ -reduced steroids in parturition and extra-uterine survival. No Name Society. Ghost Ranch Conference Center, Albuquerque, NM. October 2013.

Schroeder, J.W. Improving profitability through feed efficiency by reducing feed bunk losses. Expo Leche 2013. Aguascalientes, Mexico. April 23-25, 2013. Pg. 86-98.

Sonsthagen, T. How to build alternative models. American Veterinary Technician Educators Symposium. Denver, CO. July 2013.

Swanson, K.C. Nutritional impacts of feed efficiency in beef cattle. University of Saskatchewan, Department of Animal and Poultry Science seminar. Saskatoon, Saskatchewan, Canada. May 7, 2013.

Vonnahme, K.A. Effects of supranutritional selenium on growth and vascularity of nutrient transferring tissues in livestock. 10<sup>th</sup> International Symposium on Selenium in Biology and Medicine 2013. Berlin, Germany. September 14-18, 2013.

Vonnahme, K.A. Fetal programming. 2013 Liquid Feed Symposium. St. Louis, MO. September 11, 2013.

Vonnahme, K.A. Maternal environment impacts fetal and offspring outcomes in sheep. WERA-39-Western Section Amer. Soc. Anim. Sci. Sheep Symposium. Montana State University. Bozeman, MT. June 19, 2013.

Vonnahme, K.A. Developmental programming in livestock: Why maternal nutrition impacts more than just the dam. Montana Nutrition Conference and Livestock Forum. Bozeman, MT. April 9, 2013.

Wagner, S.A. Improving practice scope and income using veterinary auxiliaries: Leverage yourself within bovine practice. Technical Skills in Bovine Practice, Fall Continuing Education Meeting, Ontario Association of Bovine Practitioners. Guelph, Ontario, Canada, November 21, 2013.

Wagner, S.A. Farm Pharm: Top tips. 46<sup>th</sup> Annual Meeting of the American Association of Bovine Practitioners. Milwaukee, Wisconsin. September 19, 2013.

Wagner, S.A. Teaching pharmacology to veterinary technicians. Association of Veterinary Technician Educators, 23<sup>rd</sup> Biennial Symposium. Denver, CO. July 2013.

### **Books Published (N = 1)**

Sonsthagen, T. Veterinary Instruments and Equipment – A Pocket Guide.” 3<sup>rd</sup> edition. Elsevier, 784 pages. **Invited.**

### **Book Chapters Published (N = 1)**

Wagner, S.A. and R.J. Erskine. Antimicrobial Therapy of Mastitis in Veterinary Medicine, 5<sup>th</sup> edition, John Prescott et al., Editors, Blackwell Publishing Professional, Ames, Iowa. **Invited.**

### **Research Reports (N = 6)**

Dahlen, C.R., J.C. Hadrich, and G.P. Lardy. 2013. The 2012 North Dakota Beef Industry Survey: Yesterday, today and into the future. North Dakota Beef Report: 59-69.

Grazul-Bilska, A.T., P.P. Borowicz, D.A. Redmer and L.P. Reynolds. 2013. Placental development during early pregnancy in sheep: Effects of assisted reproductive technology on fetal and placental growth. Western Dakota Sheep and Beef Day: 53.

Prezotto, L.D., T.C. Gilbery, M.L. Bauer, A. Islas, and K.C. Swanson. 2013. Influence of restriction and feeding time to growing calves on growth performance and feeding behavior. ND Beef Report: 39-41.

Steichen, P.L., S.I. Klein, Q.P. Larson, K.M. Bischoff, V.R.G. Mercadante, G.C. Lamb, C.S. Schauer, B.W. Neville, and C.R. Dahlen. 2013. Effects of natural service and artificial insemination breeding systems on calving characteristics and weaning weights. ND Beef Report: 6-8.

Steichen, P.L., M.R. Schook, C.S. Schauer, B.W. Neville, and C.R. Dahlen. 2013. Effects of artificial insemination and natural service breeding systems on steer progeny backgrounding performance. ND Beef Report: 45-47.

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### **Popular Press Articles (N = 33)**

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Berg, E.L. The horse and human connection. Valley Equestrian. September 2013.

Dahlen, C. Smooth transitions. Midwest Forage Association. February 2013.

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Swanson, T.J. Equestrian team. FM Extra. April 2013.

Vonnahme, K.A. Going “behind the scenes” with the ASAS Board. Taking Stock. August 22, 2013.

### **Reviewed Extension Publications (N = 25)**

Dalen, C.R. AS-1632. Methods of pregnancy detection in beef cattle.

Lardy, G. AS-647R. Feeding value of sprouted grains.

Lardy, G. AS-1151R. Systems for backgrounding beef cattle.

Lardy, G. AS-1158R. Feeding management for backgrounders.

Lardy, G. AS-1161R. Cattleman’s guide to feedlot terminology.

Lardy, G. AS-1162R. A cow-calf producer’s guide to custom feeding.

Lardy, G. AS-1238R. Feeding corn to beef cattle.

Lardy, G. AS-1272R. Handling liquid feed commodities.

Redden, R. AS-1317R. Abortions in sheep.

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Schroeder, J.W. AS-1250R. Quality forage: Forage nutrition for ruminants.

Schroeder, J.W. AS-1251R. Quality forage: Interpreting composition and determining market value.

Schroeder, J.W. AS-1252R. Quality forage: Haylage and other fermented forages.

Schroeder, J.W. AS-1253R. Quality forage: Corn silage management.

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Schroeder, J.W. AS-1256R. Quality forage: Stressed-damaged crops.

Stoltenow, C., Dyer, N., and Stokka, G.L. V-1211R. Campylobacteriosis.

Stoltenow, C., Dyer, N., and Stokka, G.L. V-1212R. Cryptosporidiosis.

Stoltenow, C., Dyer, N., and Stokka, G.L. V-1213R. Giardiasis.

Stoltenow, C., Dyer, N., and Stokka, G.L. V-1220R. Rabies.

Stoltenow, C., Dyer, N., and Stokka, G.L. V-1221R. Toxoplasmosis.

Stoltenow, C., Dyer, N., and Stokka, G.L. V-1235R. West Nile Fever.

Stoltenow, C., Dyer, N., and Stokka, G.L. V-1315R. Leptospirosis.

Stoltenow, C., Schroder, J.W., and G. Lardy. AS-1209R. Johne's Disease in beef and dairy herds.

### **Videos** (N = 2)

Reynolds, L.R. What the University Distinguished Professors Do. These three videos can be accessed at [Distinguished Professors - JoAnn Miller - YouTube](#); [Distinguished Professors - Kalpana Katti - YouTube](#); [Distinguished Professors - Larry Reynolds - YouTube](#).

Sonsthagen, T. Veterinary Technology Program. YouTube video. Teresa wrote and directed the video, Alisha Nord, Public Information Officer, North Dakota Agricultural Experiment Station shot the film. <http://www.youtube.com/watch?v=JPDsTO5iiS0>.

### **Webinars** (N = 3)

Redden, R.R. NDSU winter sheep webinar.

Redden, R.R. NDSU spring sheep webinar.

Redden, R.R. National webinar on the National Sheep Improvement Program. **Invited.**

### **Software** (N = 1)

Hanna, L.R. Statistical software package Map2NCBI. Available at: <http://cran.us.r-project.org/>.

**Apps (N = 0)**

None.