

Dr. Noah B. Litherland

Dairy Extension Specialist and Livestock Nutritionist
Oklahoma State University Department of Animal Sciences
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Current Position

September 2006-Present
Assistant professor
Dairy extension specialist and livestock nutritionist
Appointment: 70% extension/30% teaching
Dairy judging team coach
Dairy challenge coach
Dairy science club advisor
Faculty chair of dairy cattle center
Undergraduate faculty advisor

Education

University of Illinois at Urbana-Champaign
College of Agriculture, Consumer, and Environmental Sciences
Doctorate of Philosophy in Animal Sciences
Graduated August, 2006

University of Illinois at Urbana-Champaign
College of Agriculture, Consumer, and Environmental Sciences
Masters of Science in Animal Sciences
Graduated August 2004

University of Illinois at Urbana-Champaign
College of Agriculture, Consumer, and Environmental Sciences
Bachelor of Science in Animal Sciences
Graduated May 1999

Personal

Born: March 17, 1977 Bloomington, Illinois
Married: Melissa Litherland, M.S.
Children: Nina and Elana Litherland

Professional Activities

Southern Great Plains dairy teaching consortium curriculum chair
Dairy Max scientific advisory board
2007 American dairy science association awards committee
Journal of Dairy Science manuscript reviewer

Teaching Experience

Spring 2007 and 2008

Lead Instructor

Animal Science 4543

Oklahoma State University Stillwater

Dairy Cattle Production Science. Current concepts and production principles of the dairy cattle industry including practical experience in evaluating the adequacy of dairy herd management practices and making recommendations for change or improvement. Emphasis on dairy cattle nutrition, management, health, well-being, reproduction, production efficiency, and economic return.

Spring 2007 (Student Survey Response Summary, 14 students)

Instructor preparation and organization

Very high (64.3%) High (35.7%) Average (0%) Low (0%) Very low (0%)

Teaching effort

Very high (71.4%) High (28.6%) Average (0%) Low (0%) Very low (0%)

Presentation of material

Very high (64.3%) High (35.7%) Average (0%) Low (0%) Very low (0%)

Knowledge of subject

Very high (78.6%) High (21.4%) Average (0%) Low (0%) Very low (0%)

Explanation of subject matter

Very high (57.1%) High (42.9%) Average (0%) Low (0%) Very low (0%)

Attitude

Very high (78.6%) High (21.4%) Average (0%) Low (0%) Very low (0%)

Overall

Very high (64.3%) High (35.7%) Average (0%) Low (0%) Very low (0%)

Fall 2006 and 2007

Lead Instructor

Animal Science 3210

Oklahoma State University Stillwater

Advanced Dairy Cattle Evaluation. Advanced instruction in evaluation and description of dairy cattle. Designed to prepare students for intercollegiate dairy judging. In 2007 the OSU dairy judging team competed at the North American International Livestock Expo in Louisville, KY and the Fort Worth Livestock Show in Fort Worth, Texas.

Fall 2007 (Student Survey Response Summary, 4 students)

Instructor preparation and organization

Very high (50%) High (25%) Average (25%) Low (0%) Very low (0%)

Teaching effort

Very high (50%) High (50%) Average (0%) Low (0%) Very low (0%)

Presentation of material

Very high (50%) High (50%) Average (0%) Low (0%) Very low (0%)

Knowledge of subject

Very high (75%) High (25%) Average (0%) Low (0%) Very low (0%)

Explanation of subject matter

Very high (75%) High (25%) Average (0%) Low (0%) Very low (0%)

Attitude

Very high (75%) High (25%) Average (0%) Low (0%) Very low (0%)

Overall

Very high (100%) High (0%) Average (0%) Low (0%) Very low (0%)

Fall 2005 University of Illinois Urbana-Champaign
Lead Instructor
Animal Sciences 420.

Advanced Ruminant Nutrition. Physiology and microbiology of digestion in the ruminant, and biochemical pathways of utilization of the absorbed nutrients.

Fall 1999-Fall 2004 University of Illinois Urbana-Champaign
Teaching Assistant
Animal Sciences 100.

Introduction to Animal Science. Survey of beef and dairy cattle, companion animals, horses, poultry, sheep, and swine. Includes the importance of product technology and the basic principles of nutrition, genetics, physiology, and behavior as they apply to breeding, selection, feeding, and management.

Spring 2003 University of Illinois Urbana-Champaign
Teaching Assistant
Animal Sciences 150.

World Animal Resources. Examination of the world's animals, domesticated and wild, and their uses in various climatic, economic, and cultural contexts. Exploration of their contemporary management and their future prospects. Provides background for international experiences and fulfills composition II general education requirements.

Fall 1999 and Fall 2000 University of Illinois Urbana-Champaign
Teaching Assistant

Agriculture, Consumer, and Environmental Sciences (ACES) 100.

Contemporary issues in ACES. Study of contemporary issues in the human, food and natural resources systems, and an overview of the role of the College of Agriculture Consumer and Environmental Sciences and the University of Illinois in these systems.

Guest Lecture Opportunities

Fall 2007

Guest Lecturer (Three lectures and four labs)

Animal Science 3653

Oklahoma State University Stillwater

Applied Nutrition, Dairy Section. Introduced students to applied dairy cattle nutrition including ration balancing, evaluation of particle size, phases of production, and changes in nutrient requirements with stage of production, use of byproducts, and feed additives.

Fall 2007

Guest Lecturer (Four labs)

Veterinary Medicine 7152

Oklahoma State University Stillwater

Zootechnology Laboratory. Introduced first year veterinary students to practical aspects of dairy cattle production. Students were introduced to the impact of nutrition on health, metabolic disorders, and productivity.

Fall 2006 and 2007

Guest Lecturer (Dairy Lab)

Animal Science 5753

Oklahoma State University Stillwater

Animal Nutrition Techniques. Introduced graduate students to techniques used in dairy cattle nutrition research including trial development, design and sampling techniques including: liver biopsies, determining nutrient digestibility using external markers, and blood sampling.

Television Interviews

History Channel Modern Marvels Program. Milk First aired January 7, 2008.

Served as technical expert on breeds of dairy cows, production of milk, and current trend in the dairy industry.

Channel 9 Oklahoma City interview regarding the use of rBST in dairy cattle and the safety of milk. First aired November 2007. Responded to public concerns regarding the use of rBST and the effects on cows, consumers, the environment, and product labeling.

Publications

Peer Reviewed Articles

Loor, J. J., H. M. Dann, N. A. Janovick Guretzky, R. E. Everts, R. Oliveira, C. A. Green, N. B. Litherland, S. L. Rodriguez-Zas, H. A. Lewin, and J. K. Drackley. 2006. Plane of nutrition pre-partum alters hepatic gene expression and function in dairy cows as assessed by longitudinal transcript profiling. *Physiol Genomics*. 27:29-41.

Dann, H. M., N. B. Litherland, J. P. Underwood, M. Bionaz, A. D'Angelo, J. W. McFadden, and J. K. Drackley. 2006. Diets during the far-off and close-up dry periods affect periparturient metabolism and lactation in multiparous cows. *J. Dairy Sci.* 89:3563-3577.

Litherland, N. B., S. Thire, A. D. Beaulieu, C. K. Reynolds, J. A. Benson, and J. K. Drackley. 2005. Dry matter intake is decreased more by abomasal infusion of unsaturated free fatty acids than by unsaturated triglycerides. *J. Dairy Sci.* 88:632-643.

Drackley, J. K., H. M. Dann, G. N. Douglas, N. A. Janovick-Guretzky, N. B. Litherland, J. P. Underwood, and J. J. Loo. 2005. Physiological and pathological adaptations in dairy cows that may increase susceptibility to periparturient diseases and disorders. *Ital. J. Anim. Sci.* Vol 4, 323-344.

Conference Presentations

Litherland, N. B. 2006. Adequacy of processing adjustment factors (PAF's) and intake discounts for dairy cows. Invited Presentation. Oklahoma cattle grain processing symposium. Conference Proceedings (In press).

Litherland, N. B., D. B. Carlson, R. L. Wallace, and J. K. Drackley. 2006. Effects of PPAR- α agonists on in vitro liver fatty acid metabolism in Holstein calves. *J. Dairy Sci.* 89. (Suppl.): 265.

Litherland, N. B., H. M. Dann, and J. K. Drackley. 2006. Parturition intake alters gluconeogenic capacity in liver slices from periparturient dairy cows. *J. Dairy Sci.* 89. (Suppl. 1): 265.

Litherland, N. B., A. D. Beaulieu, and J. K. Drackley. 2004. Effects of esterification, degree of saturation, and amount of fatty acids infused into the rumen or abomasum on nutrient and fatty acid digestibilities in lactating dairy cows. Abstract presented at the Midwestern Section ASAS and Midwest Branch ADSA 2004 Meeting, Des Moines, IA (Abstr. # 305):74.

Litherland, N. B., H. M. Dann, A. S. Hansen, and J. K. Drackley. 2003. Parturition nutrient intake alters metabolism by liver slices from periparturient cows. *J. Dairy Sci.* 86. (Suppl. 1): 105-106.

Litherland, N. B., A. D. Beaulieu, and J. K. Drackley. 2002. Effects of esterification, degree of saturation, and amount of fatty acids infused into the rumen or abomasum in lactating dairy cows. 2002. *J. Dairy Sci.* 80 (Suppl. 1):142.

J. K. Drackley, S. Thire, N. B. Litherland, and A. D. Beaulieu. Dry matter intake is decreased more by abomasal infusion of unsaturated free fatty acids than by unsaturated triglycerides. 2000. *J. Dairy Sci* 78 (Suppl. 1):286.

Co-Authored Abstracts

D. B. Carlson, N. B. Litherland, J. C. Woodsworth, J. K. Drackley. 2006. Distribution of supplemental L-Carnitine among tissues and fluids of periparturient dairy cows. *J. Dairy Sci.* 89. (Suppl. 1): 66.

Janovick Guretzky, N. A., N. B. Litherland, K. M. Moyes, and J. K. Drackley, 2006. Prepartum energy intake affects health and lactational performance in primiparous and multiparous Holstein cows. *J. Dairy Sci.* 89. (Suppl. 1): 26.

D. B. Carlson, N. B. Litherland, J. W. McFadden, A. D'Angelo, J. C. Woodworth, and J. K. Drackley. 2005. Dietary L-carnitine alters hepatic fatty acid metabolism and decreases liver lipid in periparturient Holstein cows. *J. Dairy Sci.* 88 (Suppl. 1): 220.

D. B. Carlson, N. B. Litherland, J. W. McFadden, J. C. Woodworth, and J. K. Drackley. 2005. Influences of dietary L-carnitine on production and metabolism during the periparturient period in Holstein cows. *J. Dairy Sci.* 88 (Suppl. 1): 221.

D. B. Carlson, H. M. Dann, N. B. Litherland, J. C. Woodworth, and J. K. Drackley. 2004. Abomasal infusion of L-carnitine alters hepatic fatty acid metabolism and decreases liver lipid in lactating Holstein cows. *J. Dairy Sci* 87 (Suppl. 1): 309.

D. B. Carlson, H. M. Dann, N. B. Litherland, J. C. Woodworth, and J. K. Drackley. 2004. Abomasal infusion of L-carnitine affects metabolic and production responses to feed restriction in lactating Holstein cows. *J. Dairy Sci* 87 (Suppl. 1): 309.

Dann, H. M., N. B. Litherland, J. P. Underwood, M Bionaz, and J. K. Drackley. 2003. Prepartum dry matter intake, serum nonesterified fatty acids, liver lipid and glycogen content, body weight, and body condition score for cows fed different diets during the dry period. *J. Dairy Sci.* 86 (Suppl. 1):105.

Dann, H. M., N. B. Litherland, J. P. Underwood, M. Bionaz, and J. K. Drackley. 2003. Prepartum nutrient intake has minimal effects on postpartum dry matter intake, serum nonesterified fatty acids, liver lipid and glycogen contents, and milk yield. *J. Dairy Sci*, 86. (Suppl. 1): 106.

Andersen, J. B., A. S. Hansen, N. B. Litherland, L. R. Norup, M. O. Nielsen, J. D. Drackley, and K. L. Ingvarsten. 2001. Effects of polyunsaturated omega-3 fatty acids on short term regulation of hepatic fat metabolism in liver tissue from dairy cows. 11th ICPD, Frederiksberg, Denmark, 179.

Invited Publications in Conference Proceedings

Drackley, J. K., H. M. Dann, N. B. Litherland J. P. Underwood. 2003. Physiological adaptations in dairy cows during the transition period. Pages 1-16 in Proc. California Anim. Nutr. Conf., Fresno, CA. California Grain and Feed Assoc., Sacramento, CA.

Articles in Press

Step, D. L., N. B. Litherland, L. O. Burciaga-Robles, M. A. Breshears, C R. Krehbiel, A. W. Confer, R. W. Fulton, G. L. Morgan, R. M. Thornsberry, and S. M. Fassig. Clinical observations, biochemical analysis, and postmortem and histopathological findings in young dairy calves fed zeolite clinoptilolite binder combined with milk replacer. 2008 American Journal of Veterinary Research. (In press)

Extension Publications

Loor, J. J., H. M. Dann, N. A. Janovick Guretzky, R. E. Everts, R. Oliveira, C. A. Green, N. B. Litherland, S. L. Rodriguez-Zas, H. A. Lewin, and J. K. Drackley. 2006. Liver gene expression during the transition period is altered by level of energy intake during the dry period. Illinois Dairy Report, pages 21-23.

Carlson, D. B., J. W. McFadden, N. B. Litherland, and J. K. Drackley. 2006. Dietary L-carnitine prevents fat accumulation in the liver of transition dairy cows. Illinois Dairy Report, pages 35-37.

Litherland, N. B., H. M. Dann, and J. K. Drackley. 2005. Prepartum nutrient intake alters metabolism of palmitate by liver slices from peripartal dairy cows. Illinois Dairy Report, pages 66-68.

Dann, H. M., N. B. Litherland, J. P. Underwood, and J. K. Drackley. 2005. Nutrition during the far-off and close-up dry periods. Illinois Dairy Report, pages 71-73.

Extension Presentations

Litherland, N. B. January ,2008. Techniques for making quality silage for beef and dairy cattle. Presented at Oklahoma Cooperative Extension Service Conference. Stillwater, OK.

Litherland, N. B. November, 2007. Strategies to control stable flies and house flies on dairy farms. Animal Science Industry Symposium. Manhattan, KS

Litherland, N. B. November, 2007. Understanding the impact of forage quality and forage processing on feed costs. Presented at Dairy Herd Improvement Association Annual Meeting. Pryor, Stillwell, and Chickasha OK.

Litherland, N. B. November , 2007. Corn Processing; getting your dollars worth. Presented at Dairy Herd Improvement Association Annual Meeting. Pryor, Stillwell, and Chickasha OK.

Litherland, N. B. 2007. Feeding management: What's going on out at the feedbunk? Presented at Dairy Herd Improvement Association Annual Meeting. Pryor, Stillwell, and Chickasha OK.

Litherland, N. B. November, 2007. Alternative energy and fiber sources: What other non-traditional feedstuffs are out there? Presented at Dairy Herd Improvement Association Annual Meeting. Pryor, Stillwell, and Chickasha, OK.

Litherland, N.B. November, 2007. Exploring dry period feeding strategies to optimize transition cow health. Presented at Texas Animal Nutrition Council Meeting. Canyon, TX.

Litherland, N. B. February, 2007. Dairy efficiency: Managing during challenging times. Oklahoma Dairy Days Management Conference. Chickasha and Pryor, OK

Litherland, N. B. February, 2007. Dairy Nutrition Update. Oklahoma Dairy Days Management Conference.

Litherland, N. B. December, 2006. Making Quality Silage. Oklahoma Beef Producers Meeting. Ottawa County Extension.

Current Research Projects

Effect of site of infusion of direct fed microbials on production and nutrient digestibility in lactating dairy cows. Status: In progress (Internally funded) (Kyle Thompson, M. S. Candidate)

The use of a rumen temperature sensing bolus to correlate core body temperature change with normal lifecycle events in dairy cattle Status: In progress (Amy Czaja, B. S. Candidate)

Effects of direct fed microbial feeding on performance of dairy calves fed for either 21 or 42 days. Status: Pending funding (\$10,100.00) (Kristy Rutz , B. S. Candidate)

Effects of yeast product, direct fed microbials or a combination on performance of dairy calves. Status: Pending funding (\$15,579.51) (Amy Czaja. B. S. Candidate)

Fat from distillers grains; effects on intake, digestion, and milk composition in lactating cattle. Status: Pending funding (\$24,653.40)

Winter wheat pasture compared with conventional winter dry lot rearing on growth and development, economic efficiency, and subsequent milk production in Holstein dairy heifers. Status: Pending funding. (\$36,959.20)

External Funding

\$12,032.00 Zeocorp: Clinical observations, biochemical analysis, and postmortem and histopathological findings in young dairy calves fed zeolite clinoptilolite binder combined with milk replacer.

Internal Funding

\$170,000.00 Oklahoma State University facility renovation and revitalization of the OSU dairy cattle center. Funds for purchasing of Insentec feeders for monitoring individual feed intake.

Departmental Committees

September 2007-present Animal science banquet planning committee
September 2007-present Seminar planning committee
September 2006-present Faculty chair of OSU dairy cattle center
September 2006-present OSU dairy cattle center renovation project
September 2006-present Teaching committee
September 2006-present Extension committee
September 2006-present Diversity committee
September 2006-present Undergraduate student recruitment
September 2006-present Quadrathlon (dairy section)

State and Regional Committees

January 2008-present Western dairy management conference planning committee
September 2006-present Oklahoma Holstein association board member
September 2006-present Southern national Holstein show and sale planning committee
September 2006-present Sooner state dairy show planning committee
September 2006-present Tulsa state fair open and junior dairy show superintendent
September 2006-present Southern Great Plains dairy teaching consortium (Curriculum co-chair)
September 2006-present Texas animal nutrition council member
September 2006-present Mid-south ruminant nutrition conference planning committee
September 2006-present Dairy Max scientific advisory committee
September 2006-present Southwest dairy museum scientific advisor

Dairy Judging Team Coach

2007 and 2008 North American International Livestock Exposition Louisville, KY
5th High Team Holstein
Fort Worth Stock Show Fort Worth, TX
Solicited \$1550.00 from various donors to sponsor dairy judging team travel
Judging jackets donated by Southwest Dairy Farmers

Dairy Challenge Team Coach

2007 Regional Competition Baton Rouge, LA
One platinum and three gold award winners

Conferences Organized

- June 2007 Dairy Heifer School, Albuquerque, NM
Attended by sixteen agricultural youth ages 10-17. Topics included; heifer nutrition, heifer management, fitting show heifers, showmanship, judging dairy cattle, quiz bowl, show ring ethics, newborn calf management, pedigree evaluation, parts of the cow, disease risk at the fair, and animal behavior. Students were invited to bring their own heifers for fitting and showmanship practice.
- February 2007 Oklahoma Dairy Days Conference (A focus on efficiency)
Statewide meeting was held in two locations in Oklahoma included four speakers and a trade show.
Topics included;
Litherland, N. B. Dairy efficiency; Managing during challenging times.
Hansen, L. Genetic improvement of fertility of dairy cows might be easier than you think
Pruitt, M. Johne's disease implication and prevention
Peel, D. Dairy economics and feed markets
Pruitt, M. Animal identification
- February 2008 Oklahoma Dairy Days Conference (Opportunities for success)
Statewide meeting planned for three locations in Oklahoma including five speakers and a trade show.
Planned topics include;
Litherland, N. B. Dry period feeding strategies for a smoother transition period
Kensinger, R. Manipulating the length of the dry period
Talley, J. Controlling flies on your dairy
Peel, D. Dairy economics and feed markets
Redfearn, D. Strategies for producing quality forage in the Southwest

Ph.D. and M.S. Research Programs

My graduate work at the University of Illinois offered many challenges that have given me the opportunity to grow both as a person and as a scientist. My time as a graduate assistant resulted in fine-tuning skills including planning and executing research trials, problem solving, organization, time use, personnel management, and achieving goals. Initial work for my Ph.D. began in the fall of 2001.

The ultimate goal of my Ph.D. research was to determine potential preventative and treatment measures against bovine ketosis and fatty liver. The transition period, from 3 weeks before to 3 weeks after parturition, is characterized by a high frequency of metabolic disorders and infectious diseases in dairy cows.

Changes occurring around the time of calving, such as increasing fetal demands during the last weeks of gestation, initiation of lactation, reduction of feed intake, and changes in environment and social stresses increase the potential for disease. Health disorders that frequently occur during this time include retained fetal membranes, ketosis, fatty liver (hepatic lipidosis), displaced abomasum, metritis, and milk fever (hypocalcemia). Conditions associated with the transition period lead to or are a result of negative energy balance. Negative energy balance occurs when energy outputs, such as energetic requirements for lactation and maintenance, are greater than energy inputs. Cows compensate for this deficit in energy intake by mobilizing body lipid reserves from adipose tissue in the form of non-esterified fatty acids (NEFA). Blood concentrations of NEFA rise dramatically at calving as cows mobilize body fat stores to meet the sudden demands of lactation. Mobilization of these stores offers a source of energy to maintain milk production until feed intake increases and positive energy balance is once again achieved.

Mobilization of large amounts of adipose NEFA can, however, result in excess production of ketone bodies by the liver and result in hepatic lipidosis or fatty liver.

Lipid accumulation in the liver may significantly contribute to other metabolic disorders and subsequently decrease milk production. NEFA are normally metabolized by mitochondrial β -oxidation, but after calving the rate of mobilization can exceed the capacity of the liver to oxidize them, leading to accumulation of NEFA in the blood and fat deposits in the liver. Reduction of NEFA could offer an opportunity for improvement in the health and production of the transition cow. Enhanced oxidative capacity could decrease circulating NEFA and hepatic lipid accumulation. Agonists that activate the nuclear receptor for peroxisome proliferator-activated receptor- α (PPAR- α) in turn lead to increased transcription and translation of enzymes responsible for β -oxidation of NEFA in mitochondria and peroxisomes.

My first project was a cooperative effort with another graduate student examining the effects of diets during the far-off and close-up dry period on periparturient metabolism in 74 multiparous Holstein cows. Objectives of this study were to determine the effects of far-off period diet, close-up period diet, and their interaction on prepartum and postpartum liver metabolism. Our hypothesis was that diet during the far-off dry period is at least as important as diet during the close-up period on periparturient liver metabolism. Cows were fed different diets during the far-off and close-up periods to provide inadequate, adequate, or excessive amounts of energy compared with requirements. Effects of dietary treatment on liver lipid and glucose metabolism were tested in an in vitro system. Results from this study indicated that excessive energy intake during the far-off dry period decreased liver oxidation and increased esterification of fatty acids. Changes observed for in vitro liver metabolism were correlated with in vivo liver triglyceride accumulation postpartum.

My final Ph.D. project investigated the activity of PPAR- α agonists in dairy calves. The objective of this study was to evaluate the effects of two different amounts of a pharmaceutical test compound, clofibric acid, and polyunsaturated fatty acids on liver fatty acid metabolism and induction of PPAR- α responsive genes in liver of dairy cattle, using a calf model. Results then can be applied to the transition cow. Results from this study indicate that calves are weak responders to PPAR- α agonists.

My Masters research program began in the Summer of 1999. My first project examined the effects of chemical differences and amount of abomasal infusion of unsaturated free fatty acids compared with unsaturated triglycerides. Specific objectives of this study were 1) to compare the effects of abomasal infusion of unsaturated free fatty acids with those of unsaturated triglyceride on intake, milk yield, and composition, and plasma metabolites and hormones, and 2) to determine possible mechanisms regulating dry matter intake (DMI). Results from this study showed that both lipid sources decreased intake, and that unsaturated free fatty acids were 2.2 times more potent in decreasing DMI than were triglycerides. Concentration of glucagon-like peptide-1 (7-36) (GLP-1), a potent regulator of feed intake, significantly increased in plasma as feed intake decreased with increasing infusion amount of unsaturated free fatty acid.

These results indicate that unsaturated free fatty acids reaching the duodenum are more potent inhibitors of feed intake than are unsaturated triglyceride, an effect that may be at least partially mediated by GLP-1.

My second Masters project began in the Spring of 2000 and examined the effects of esterification, degree of saturation, and amount of fatty acids infused into the rumen or abomasum in lactating cows. The objective of this experiment was to determine the effect of chemical structure, amount, and site of infusion of long chain fatty acids (LCFA) on dry matter intake (DMI), milk yield and composition, fermentation characteristics, digestibility of nutrients, and metabolite and gut hormone concentrations in blood. Six multiparous Holstein cows with ruminal cannulas were used in a 6×6 Latin square with 21-d periods. Treatments were infusions of 1) Control; 200 g/d of meat solubles + 12 g/d of Tween 80 in 10 L of water; 2) control plus mostly saturated FA abomasally (SFAA); 3) control plus mostly saturated FA ruminally (SFAR); 4) control plus soy FFA abomasally (UFAA); 5) control plus soy TG abomasally (TGA); and 6) control plus soy TG ruminally (TGR). The DMI was decreased more by increasing UFAA than by TGA. Both SFAR and TGR decreased DMI. Plasma concentration of GLP-1 (7-36) were greater for cows infused with UFAA than TGA. Plasma concentration of CCK-8 was greater for cows infused with fat than CONT. Milk production followed a trend similar to DMI. Interactions of site of and site of TG \times level showed that SFAR and TGA decreased milk production at the higher infusion amount. Milk fat yield was decreased by UFAA. Unsaturated FA decreased milk fat yield to a greater extent than did saturated FA. All FA treatments decreased short and medium chain FA in milk, with greatest decreases for UFAA. Both UFAA and TGA increased proportions of C_{18:2} in milk. Milk CLA 9,11 was increased by TGR.

Intakes of DM, OM, CP, ADF, NDF, and gross energy were decreased more by increasing UFAA than by TGA. Apparent digestibilities of DM, OM, CP, ADF, NDF, and gross energy in the total tract were decreased by UFAA compared with TGA; digestibilities of DM, CP, and energy were decreased more by increasing amount of UFAA infused. Apparent digestibility of total FA was lower for UFAA than for TGA and was greater for SFAR compared with SFAR. post-ruminal infusion of unsaturated FA reduced intake and digestibility of nutrients and FA; saturated FA did not disrupt nutrient digestion. Unsaturated TG and saturated FA depressed DMI to a lesser extent than did UFAA; TGA decreased DMI more than saturated FA infused ruminally or abomasally.

Contract Research Study Experience

Throughout my Ph.D. I volunteered to coordinate and execute two research studies funded by a large pharmaceutical company. Goals of this research were to gain experience in performing FDA caliber research, furthering my understanding of liver metabolism in transition dairy cows, and to procure funding for future experiments. Data produced from these studies are proprietary and thus the company determines publication rights. The first experiment took place in the spring of 2004. Objectives of this research focused on development and optimization of a long term in vitro system using slices of liver to measure changes in rates of liver lipid oxidation, and secondly to determine if liver harvested from calves could be used as an alternative to cows for measuring changes in liver lipid metabolism. The goal of this research was to further develop an in vitro system into a screening tool to rapidly evaluate the effect of pharmaceutical compounds using a minimal amount of liver tissue. Over one thousand incubations were performed in order to test the effectiveness of this system. The outcome of this experiment resulted in optimization of the system to increase the time hepatocytes could be kept viable and helped contribute to the selection of a compound for further evaluation in an animal model.

The second contract research study was conducted in the spring of 2005. Objectives of this research study were to determine the effectiveness of a test compound on liver metabolism, blood metabolites, health, and production parameters in dairy cows during the transition period. Execution of this study required obtaining forty pregnant Holstein cows from a commercial herd sixty days prior to calving and feeding and managing these cows through fifty days of lactation. Blood and liver samples were collected, and measurement of production parameters made to determine the effectiveness of the test compound. I was responsible for all facets of this study including sample analysis and delivery of a final report summarizing findings. I worked in cooperation with an out of state monitor from the company to ensure work associated with this project was accomplished in compliance with strict guidelines for precision required by the FDA.

Personnel Management

I have always felt that dedication to a goal, hard work, clear communication, and adherence to high moral and ethical standards are important attributes of an effective leader. Throughout my graduate experience at the University of Illinois and my time as a faculty member at Oklahoma State University, I have had the opportunity to spearhead nine major research projects. Work performed during these studies was accomplished in part by undergraduate students that I interviewed, hired and trained and graduate students that I have mentored. I have had the pleasure to select and work closely with ten excellent undergraduate hourly workers and two Masters students. Understanding strengths and weaknesses of individuals, staying positive through use of constructive criticism, and communicating expectations are keys to keeping employees productive and motivated. I have always tried to win the respect and admiration of my employees by looking out for their well being, listening to their ideas, and offering positive encouragement and praise upon completion of a job. A good leader must always think of others first. I feel it is helpful to work alongside employees to exhibit the importance of achieving a common goal. The ability to successfully manage and motivate personnel is a powerful tool for success in an academic environment.

International Experience

During the spring of 2000, I was invited to the Danish Institute of Agricultural Science (DIAS) as a visiting research scientist. During my three-month stay at DIAS, I was privileged to work with Drs. Klaus Ingvarsten and Jens Bech Andersen to develop a model to test the in vitro effects of long-chain polyunsaturated fatty acids on lipid metabolism in bovine liver. Our objective was to determine metabolic changes in liver associated with supplementation of transition cows with fish oil. My work in Denmark resulted in an international collaboration with a Danish research scientist who came to the University of Illinois to further apply the in vitro system to measure changes in liver lipid metabolism.

Dairy Cattle Judging Experience

January 2008	Fort Worth Stock Show junior judging contest reasons evaluator
September 2007	New Mexico State Fair open and junior dairy judge
September 2007	Arkansas North East district show open and junior dairy judge

Extension Work at the University of Illinois

- Performed twenty liver biopsies on two separate occasions, collected blood, and performed ration consultation on a 400-cow dairy in northern Illinois to diagnose nutrition-related health disorders in transition dairy cows (2005)
- Taught liver biopsy technique training session at Ohio State University (2005)
- Jonathan Baldwin Turner scholarship committee, College of ACES (2005)
- Cow leader and evaluated reasons for 4-H and FFA judging contests (1999-2005)

- Accompanied Dr. Mike Hutjens on numerous consulting visits to dairies in Illinois and Indiana (1999-2005)
- Tour guide for University of Illinois farms for visiting faculty and researchers, FFA, 4-H, and international students (1999-2005)
- Attended dairy focus group meetings to discuss producer challenges (2005)
- Official judge for county 4-H youth and FFA dairy cattle and goat shows throughout central Illinois (1999-2005)
 - Counties include: Champaign, Coles, Dekalb, Douglas, Henry, Iroquois, Livingston, Logan, Ogle, and Sangamon.
- American Dairy Goat Association Regional speaker (Fatty liver in dairy goats) (2002)
- Quiz bowl monitor for regional 4-H youth contests (2002)
- Assistant superintendent for state 4-H dairy show (2002)
- Academic Quadrathlon dairy booth organizer (2000-2003)
- Headed College of ACES Open House cannulated cow exhibit and milk-a-cow booth (2002)

Conferences and Meetings Attended

2007	Western dairy management conference
2007	Mid-South Ruminant Nutrition Conference
2000-2006	Illinois Dairy Days Annual Meeting
2003-2005	Midwest ASAS/ADSA Meeting
2003	Molecular Biology Workshop, University of Illinois Week-long intensive laboratory workshop on methodology and technique
1999-2007	ASAS/ADSA Annual Meeting
1999-2005	Four State Applied Nutrition and Management Conference

Extension Program Interests

- Develop a strong dairy nutrition extension program to offer support to dairy producers
- Develop nutrition and management conferences to improve efficiency and sustainability of the dairy industry
- Act as an advisor and problem solver for individual producers to maximize cow productivity, profitability, and health
- Coordinate local and state producer meetings
 - Convey new scientific findings to producers
 - Address producer question and concerns
 - Assist producers in meeting regulatory guidelines
- Provide on farm consulting and problem solving
- Organize regional and state youth and collegiate contests and activities
- Serve as an ambassador for visiting students and scholars
- Coordinate and design on-line courses for students and producers off-campus to enhance the effectiveness of education through out-reach programs

Research Interests

- Determine nutrition and management strategies that optimize health and productivity in transition dairy cows.
- Implementation of genomics technology to precisely identify changes in the biology of dairy cows and associate disease states with negative energy balance.
- Exploration of neural and hormonal mechanisms that regulate feed intake in ruminants.
- Optimization of feeding efficiency through improvements in nutrient utilization by meeting dietary needs more accurately based on stage of lactation and level of production.
- Exploration of the use of peroxisomal proliferator activated receptors (PPAR) α and γ to enhance lipid oxidation in the liver and reduction of lipid mobilization in adipose tissue.

Personal Goals

- To continue to develop into a productive contributor to the animal science field.
- To serve as a valuable resource to dairy producers, animal science students, fellow faculty members, and colleagues on a local, state, national, and international level.
- To develop a graduate student program that yields well trained young men and women that will be tomorrow's agricultural leaders.
- To serve with fellow colleagues at the department, college, and university level to enhance learning experiences for undergraduate students.
- To be an active member of my community.
- To provide a safe and caring environment for my family.

Technical skills

- Liver, muscle, and adipose biopsy
- Tail and jugular blood collection
- Gas and thin layer chromatography
- Blood metabolite assays: glucose, NEFA, insulin, total protein, urea nitrogen
- Liver composition assays: total lipid, triglyceride, and glycogen
- Rumen and abomasal infusion
- Nutrient digestibility using external marker
- Feed composition assays: acid detergent fiber/neutral detergent fiber, kjeldahl, bomb calorimetry, ash, and dry matter
- Volatile fatty acid profiling
- In vitro measurement of liver lipid and glucose metabolism
- Real time PCR
- Radioisotopes marker methods in biological tissues
- Blood fatty acid composition analysis
- Experienced in SAS programming, Excel, Word, Publisher and Sigma Plot
- Ration formulation using NRC, 2001, Spartan, and CPM Model

