



ANIMAL AND POULTRY SCIENCE GUIDE FOR APPLICANTS

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INTRODUCTION

We are pleased that you have expressed an interest in our program. Please read this information carefully in order to prevent unnecessary delays and misunderstandings about the application process. Our department has between 100 and 120 graduate students at any one time compared to a campus-wide population of almost 2,000 graduate students. In our department there are slightly more MSc than PhD students. These students represent about 30 different countries.

REQUIRED DOCUMENTS FOR APPLICATION

1. On-line Application Form only - please remember to print off a hard copy to attach to your application package that is being sent to our Department. The on-line application website is as follows: <http://www.uoguelph.ca/graduatestudies>
2. **85.00 (Cdn) fee**, also paid on-line only. Do not send any money to the Dept. of Animal & Poultry Science - all payments are made on-line. They give you several options of paying.
3. Letter of Personal Interests, indicating the specific area of research that you would like to pursue and the name of the professor that you would like to work with.
4. **Two on-line letters of reference** (special forms) from qualified researchers or teachers who know your abilities and can assess your potential for graduate studies.
5. **Transcripts** (in English), showing your courses and grades. These must be certified official documents from your university. **Photocopies are not acceptable.** All completed degrees must show the date the degree was conferred.
6. **Proof of English language proficiency.** If you are not a Canadian Citizen, you must provide with your grad application package one of the following official
7. English Testing Scores. We accept scores from TOEFL, IELTS (British Council), MELAB and CAEL. The minimum acceptable scores are 600 for paper based TOEFL, 250 for computer based TOEFL, 6.5 for the British Council (IELTS), 85 for the Michigan English Language Assessment Battery (MELAB), and 60 for the Carlton Academic English Language Assessment (CAEL) and Internet-based Toefl overall score must be 89, with no individual component less than 21..

Your application is “not” considered complete until all of these documents have been received.

Your Statement of Interest should state a specific species and discipline in order for us to direct your application to the most appropriate potential advisor for your program. You may even indicate in the letter which faculty members you would like to have look at your application. To find out about faculty and their research programs go to <http://www.aps.uoguelph.ca/> or see below under faculty.

The **Application Form** must be completely filled in. Clearly indicate the semester you wish to begin your studies and whether you want to pursue an MSc by Course work, MSc by thesis, or PhD.

SUBMISSION DEADLINES

Applications may be submitted at any time of the year. Semesters begin here in **January, May, and September**. **International students should apply at least 6-8 months before the required semester of entry**, to give you sufficient time to obtain a visa as well as sufficient time to receive your English proficiency test from **TOEFL, IELTS, MELAB OR CAEL**. It takes *a month or two* before the University receives your official English tests from the above listed Testing Places.

GENERAL ADMISSION REQUIREMENTS

Your completed application is made known to faculty in the department, particularly to those referred to in your Letter of Personal Interests. If a faculty member is willing to be your program advisor (which depends on space, funding, and time commitments), then a Recommendation for Admission form is prepared by the department and submitted to Graduate Program Services. The application package is reviewed by their office to ensure all documents are present and that the previous grades of the applicant are at an acceptable level. If the application materials are acceptable, then the Office of Graduate Studies will send the Letter of Acceptance and other information to you.

RESEARCH PROGRAMS

There are three types of programs in the Department of Animal & Poultry Science. They are the MSc by Coursework, MSc by Thesis, and PhD. The same requirements for admittance apply to each program. Students in any of these programs must establish an Advisory Committee as soon as possible. In the first meeting, the prescribed coursework should be spelled out and submitted to the Department. The committee includes the Advisor and at least one (M.Sc.) or two (Ph.D.) additional faculty members with relevant discipline experience. Students must attain grades of 70% or better in all prescribed courses (as set out by their Advisory Committee), and an average of 70% or better in all other courses in order to remain in the program. Only one senior level undergraduate course is allowed in the prescribed course plan.

MSc by Coursework

This program was originally intended for students interested in Animal Nutrition and Metabolism or Animal Breeding and Genetics who did not plan to continue to a PhD program, but more towards a mid-level career in the animal industries or government. However, some students who

have completed a MSc by Coursework have decided to follow this with a PhD program. The MSc by Coursework was designed to be completed in a short period of time (minimum of 3 semesters). Fields of study include Animal Breeding and Genetics, Animal Nutrition, and Animal Behaviour and Welfare.

The requirements are:

1. Minimum of 4.0 credits comprised of:

- Six (0.5 credit) graduate level courses, with a focus on either Animal Breeding and Genetics, Animal Nutrition and Animal Behaviour and Welfare
- One mandatory (0.0 credit) Seminar Course - ANSC*6600
- One mandatory (1.0 credit) Major Paper - ANSC*6900

The Major Paper will be a detailed, critical review of an area of study and should include an analysis and interpretation of relevant data. Acquisition of the data may require a brief laboratory-based research project, or the student may be presented with previously obtained information. The Major Paper is evaluated by the Advisory Committee, and the student must present their work to the Department in the Seminar course.

At the beginning of the program, the student and student's advisory committee will design the course-work program according to the program guidelines and the aspirations and background of the student. Students will normally choose a minimum of 4 courses in the area of specialization, one of which will be ANSC*6900 Major Paper in Animal and Poultry Science, and a minimum of two courses outside the area of specialization. These latter courses can be offered by departments other than Animal & Poultry Science.

Stipends will rarely be paid to students in the M.Sc. by Coursework and Major Paper program - in this program, the graduate student will seldom conduct a substantial amount of original research that might benefit a faculty member's funded research projects, and the faculty member cannot justify the payment of a stipend.

MSc by Thesis

Students will most likely be working on a research topic related to their Advisor's research program and are expected to produce a thesis that must be defended in front of an examining committee. This program could take at least six semesters (two years) to complete.

The requirements are:

- Minimum of 1.5 credits in graduate level courses.
- One required course is ANSC*6600 Seminar (0.0 credit).
- Preparation of a thesis project proposal.
- Completion of research, writing a thesis and defending it.

PhD Program

Students admitted to a PhD program are expected to be independent, productive, and original thinkers. The PhD program is a research oriented program to develop a student's ability to formulate hypotheses, and design and execute experiments to reach a definitive conclusion.

Usually students have already completed an MSc degree before beginning a PhD program. However, students in an MSc program who show superior scholarly aptitude and performance may transfer to a PhD program in their 3rd or 4th semesters on the recommendation of their advisory committee. In rare cases, students may be admitted directly into a PhD program if they have shown outstanding research potential.

The requirements are:

- One required course is ANSC*6600 Seminar (0.0 credit).
- Satisfactory completion of a Qualifying Examination.
- Preparation of a Thesis project proposal.
- Completion of the research, writing a thesis and defending it.

The Qualifying Examination usually consists of 5 examiners covering one major area and two minor areas chosen by the student and the Advisory Committee. This exam must be completed by the end of the student's fifth semester.

FINANCIAL ASSISTANCE

Students are responsible for paying their fees and tuition, the levels of which differ between international students and Canadian citizens or permanent residents. The Canadian Government will not allow international students to enter Canada unless they can provide proof of adequate financial support. International students may pay for their program with their own funds (at least Canadian \$25,000 of private funds should be available to you each year), or with funds from an external funding agency, such as CIDA, Commonwealth, World Bank, IDRC, etc. External funding should be approved before your application is submitted. Lastly, your advisor may be able to fund your program.

Advisors may accept a student and provide funding to help students meet these payments. Levels of support from Advisors vary from nothing to the maximum allowed by the Natural Sciences and Engineering Research Council of Canada (NSERC). At the moment this amount is \$17,500 per year. Your letter of admission should state clearly whether you are or are not being funded by your advisor, and the amount. Please consider this before you accept the offer of admission.

Students who are married may be particularly stressed financially. For international students, the spouse must obtain a work visa from Canadian Immigration authorities in order to work in Canada. The Canadian environment could be substantially different from that in other countries, and often spouses and children have difficulty in adjusting to Canadian living. Homesickness is a very common problem and stress factor for international students.

Scholarships

Some students will be recommended for a one-time scholarship of \$2000 for their first semester. No application is necessary. Based on the previous academic performance of the applicant, the Graduate Coordinator may nominate the student for this scholarship. There are a limited number of these scholarships allocated to our Department each year.

After students are admitted and have started the first semester of their program in Guelph, they may apply for College scholarships. There are about 15 scholarships ranging in amounts from \$400 to \$5000. Some are for specific areas of research, such as poultry nutrition, pork production, etc. Students must apply for these scholarships by June 1 of each year. Competition for these

scholarships is high, so good academic performance is a key component.

In October of each year competitions are held for Ontario-wide and Canada-wide scholarships, which range in value from \$10,000 or more per year. About two or three students from our Department have been successful in obtaining these scholarships per year.

Graduate Teaching Assistantships

Students may apply for a Graduate Teaching Assistantship (GTA). Individuals must assist in organizing, presenting, and/or evaluating an undergraduate course. This involves either 5 or 10 hours of work per week during the semester in which the course is offered. A GTA for 5 hours a week is worth about \$2500 for one semester. Being appointed as a GTA is not automatic. A committee matches the applicants to the courses, and every effort is made to give qualified graduate students an opportunity to gain teaching experience.

Work-study Programs

For students unable to obtain a scholarship or an assistantship, sometimes it is possible to arrange a work-study agreement whereby students with demonstrated financial need may assist in a research program by cleaning equipment, taking care of animals, performing data analyses, etc., for a certain number of hours per week and for a limited length of time. The availability of these projects is unpredictable.

LINKS TO OTHER SOURCES OF INFORMATION:

Our courses <http://www.aps.uoguelph.ca/gradcourse.htm>

Graduate Program Services <http://www.uoguelph.ca/GraduateStudies/>

Off-Campus Housing <http://www.housing.uoguelph.ca/ocho/listings>

Family Housing famhous@uoguelph.ca

GRADUATE FACULTY INTERESTS

James L. Atkinson - BSc U.M.I.S.T., MSc London, PhD Guelph, Associate Professor.

Evaluation of feedstuffs for poultry and swine. Protein and amino acid nutrition of salmonid fish. Feeding and nutrition of pets, wildlife and zoo species.

Nyachoti, C.M., J.L. Atkinson and S. Leeson. 1996. Response of broiler chicks fed a high-tannin sorghum diet. *J. Appl. Poultry Res.* 5:239-245.

Gurure, R.M., R.D. Moccia and J.L. Atkinson, 1996. Apparent digestibility and amino acid availability of six feed ingredients by Arctic Char. *Bull. Aquacul. Assoc. Canada* 96-1:32-34.

Hawtin, C., C. Filice and J.L. Atkinson. 1995. Evaluating a submersible diet for ducks and other species. *Proc. 1st Ann. Conf. Nutrition Advisory Group, Am. Zoo & Aquarium Assoc., Toronto, Ont., pp.2.*

Grégoy Y. Bédécarrats – DEUG (biology), DEA Rennes I, Ph.D. McGill, Assistant Professor

My research focuses on elucidating the molecular mechanisms involved in the neuroendocrine control of reproduction in poultry, and the bidirectional interaction between neuroendocrine and immune systems. The objectives are to characterise the effects of GnRH on LH and FSH synthesis and release, and identify the factors and mechanisms controlling the development and regression of reproductive organs in chickens and turkeys. These findings will in turn permit to better control and advance sexual maturity in males, and sustain high rate of egg laying while delaying the occurrence of photorefractoriness in the hen. In addition, the study of the effects of PRL on development, reproduction, and immune system will help elucidate the mechanisms responsible for the tissue specific action of PRL. The results will allow the development of new strategies to eradicate the expression of incubation behaviour in turkey hens, without affecting health and growth.

Bédécarrats GY, Shimizu M and Guémené D (2006). Gonadotropin releasing hormones and their receptors in avian species (review article). Accepted for publication in *The Journal of Poultry Science*.

Bédécarrats GY and Leeson S (2006). Dietary lutein influences immune response in laying hens. Accepted for publication in *The Journal of Applied Poultry Research*.

Bedecarrats GY, and Kaiser UB. Differential regulation of gonadotropin subunit gene promoter activity by pulsatile GnRH in perfused L_T2 cells: role of GnRH receptor concentration. *Endocrinology* 2003; 144:1802-1811.

Bedecarrats GY, Linher K and Kaiser UB. Two common naturally occurring mutations in the human gonadotropin-releasing hormone (GnRH) receptor have differential effects on gonadotropin gene expression and on GnRH-mediated signal transduction. *Journal of Clinical Endocrinology and Metabolism* 2003; 88: 834-43.

Bedecarrats G, Guemene D, Morvan C, Kuhnlein U and Zadworny D. Quantitation of prolactin mRNA, pituitary content and plasma levels of prolactin and detection of immunoreactive isoforms of prolactin in pituitaries from turkey embryos during ontogeny. *Biology of Reproduction* 1999; 61: 757-763.

Bedecarrats G, Guemene D, Morvan C, Crisostomo-Pinto S, Kuhnlein U and Zadworny D. *In vitro* release of isoforms of prolactin from pituitary glands of turkey hens at different physiological stages. *General and Comparative Endocrinology* 1999; 113: 105-111.

Bedecarrats G, Guemene D, Kuhnlein U and Zadworny D. Changes in levels of immunoreactive prolactin isoforms during a reproductive cycle in turkey hens. *General and Comparative Endocrinology* 1999; 113: 96-104.

Mary M. Buhr - BSc, MSc, PhD Waterloo, Professor.

My lab is involved in all aspects of sperm physiology as it relates to artificial insemination (AI). We work primarily with sperm from bulls and boars, but are also currently working with rooster and stallion sperm, and have dabbled in mice and human sperm. Our major thrust is to improve the fertility of sperm used for artificial insemination, working both at the practical level in the AI industry (proper semen collection procedures, commercial lab procedures and semen dilution rates), and at the fundamental research level. The research approach has been to determine what membrane molecules and membrane functions are damaged by processing, and then to devise methods to minimize or prevent this damage. I collaborate widely on a national and international scale, and welcome all inquiries about any aspect of artificial insemination.

Bradford, L.L. and M.M. Buhr. 2003. Function of cryopreserved horse semen is improved by optimized thawing rates. *J. Equine Vet. Sci.* (In press).

Bongalhardo, D.C., N. Somnapan-Kakuda and M.M. Buhr. 2002. Isolation and unique composition of purified head plasma membrane from rooster sperm. *J Poultry Sci.* 81:1877-1883.

Buhr, M.M. 2002. One approach to reducing plagiarism. *The Successful Professor*.4:8-10.

Anzar, M., L. He, M.M. Buhr, T. Kroetsch and K.P. Pauls. 2002. Sperm apoptosis in fresh and cryopreserved bull semen detected by flow cytometry and its relationship with fertility. *Biol. Reprod.* 66:354-360.

Dominique P. Bureau - B.Sc.A., M.Sc. Laval, Ph.D. Guelph, Assistant Professor

Research program focuses on nutrient (amino acids, lipids, carbohydrates, phosphorus) and energy metabolism of fish, diet formulation, ingredient quality, and the development of nutrient-flow, feed requirement and waste output estimation models for aquaculture operations.

Bureau, D.P., Kaushik, S.J. and Cho, C.Y. 2002. Bioenergetics. pp. 1-53. In : Halver, J.E. and R.W. Hardy (Eds.) *Fish Nutrition*, III Edition, Academic Press, San Diego, California, USA.

Cho, C.Y. and Bureau, D.P. 2001. A review of diet formulation strategies and feeding systems to reduce excretory and feed wastes in aquaculture. *Aquaculture Research* 32 : 349-360.

Bureau, D.P., S. Gunther and C.Y. Cho. 2002. Chemical composition and preliminary theoretical estimates of waste outputs of rainbow trout reared on commercial cage culture operations in Ontario. *North American Journal of Aquaculture* (in press).

Philbrick, D.J., D.P. Bureau, F.W. Collins and B.J. Holub. 2002. Evidence that Soyasaponin Bb Retards Disease Progression in a murine Model of Polycystic Kidney Disease. *Kidney International* (in press).

Azevedo, P.A., D.P. Bureau, S. Leeson, C.Y. Cho. 2002. Growth and efficiency of feed usage by Atlantic salmon (*Salmo salar*) fed diets with different dietary protein: energy ratios at two feeding levels. *Fisheries Sciences* 68: 878-888.

John P. Cant - BSc, (AGR.) Nova Scotia, MSc, PhD Univ. of California, Associate Professor.

Currently developing a mathematical model of post-absorptive metabolism in dairy cows that explains the manufacture of organic milk components, i.e. protein, fat and lactose. Experimental approaches include close arterial infusion of substrates to the mammary glands, glucose and amino acid transport studies in isolated mammary cells, postprandial infusions of selected nutrients, and measuring milk composition responses to dietary manipulations. Students will have the opportunity to develop new and innovative ways to describe biological systems with math. The ultimate goal of this research is to improve descriptions of whole farms, complete with soils, plants, animals, etc., so that sustainable systems of food production may be engineered.

Wright, T.C., J.P. Cant and B.W. McBride. 2002. Inhibition of fatty acid synthesis in bovine mammary homogenate by palmitic acid is not a detergent effect. *J. Dairy Sci.* 85(3):642-647.

Cant, J.P., D.R. Trout, F. Qiao, and N.G. Purdie. 2002. Milk synthetic response of the bovine mammary gland to an increase in the local concentration of arterial glucose. *J. Dairy Sci.* 85(3):494-503.

Cherepanov, G.G., A. Danfaer, and J.P. Cant. 2000. Simulation analysis of substrate utilization in the mammary gland of lactating cows. *J. Dairy Res.* 67(2):171-188.

Cant, J.P., F. Qiao, and C.A. Toerien. 1999. Regulation of mammary metabolism. in: G.E. Lobley, A. White and J.C. MacRae, eds. *Protein Metabolism and Nutrition*. Wageningen Pers, Wageningen, The Netherlands. pp. 203-219.

Kees (C.F.M.) de Lange - BSc, (AGR.) PhD Edinburgh, Professor.

Research is focused on nutrient metabolism and utilization in the growing pig, including pig feed ingredient evaluation, minimizing the environmental impact of pork production, characterizing effects of nutrition on gut health and pork meat quality, and mathematical modeling of financial and environmental impact of alternative management strategies of growing-finishing pigs. The overall aim is to support growth of sustainable pork production systems. **Birkett, S.H. and C.F.M. de Lange. 2001.** A computational framework for a nutrient flow representation of energy utilization by growing monogastric animals. *Brit. J. Nutrition.* 86: 661-674.

De Lange, C.F.M. A.M. Gillis, and G. Simpson. 2001. The effect of threonine intake and body weight on the efficiency of using threonine for body protein deposition in gilts between 45 and 75 kg body weight. *J. Anim. Sci.* 79: 3087-3095.

Nyachoti, C.M., E. McNeilage-Van de Wiele, C.M. C.F.M. de Lange and V.M. Gabert. 2002. Evaluation of the homoarginine technique for measuring true ileal amino acid digestibilities in pigs fed barley-canola meal based diets. *J. Anim. Sci.* 80: 440-448. **Möhn, S., R. Ball, M.F. Fuller, A.M. Gillis and C.F.M. de Lange. 2003.** Influence of lysine intake and body weight on lysine oxidation in growing pigs at a high level of energy intake as determined with L-[1-14C]-lysine. *J. Nutr.* In press.

Trevor DeVries - B.Sc. (Agr), Ph.D. British Columbia, Assistant Professor

My research program is focused on understanding the links between dairy cattle behaviour, nutrition and welfare. I have an applied research focus dedicated to improving the feeding management and environment for all age classes of dairy cattle. My fundamental research involves exploring the learning and development of behaviour in dairy cattle. Current projects are focused on diet selection (sorting) behaviour, particularly in growing heifers, and how this behaviour is influenced by diet, management, and housing systems.

DeVries, T. J., K. A. Beauchemin, and M. A. G. von Keyserlingk. 2007. Dietary forage concentration affects the feed sorting behavior of lactating dairy cows. *J. Dairy Sci.* in press.

Huzzey, J. M., T. J. DeVries, P. Valois, and M. A. G. von Keyserlingk. 2006. Stocking density and feed barrier design affect the feeding and social behavior of dairy cattle. *J. Dairy Sci.* 89:126-133.

DeVries, T. J., M. A. G. von Keyserlingk, and K. A. Beauchemin. 2005. Frequency of feed delivery affects the behavior of lactating dairy cows. *J. Dairy Sci.* 88:3553-3562.

DeVries, T. J., M. A. G. von Keyserlingk, and D. M. Weary. 2004. Effect of feeding space on the inter-cow distance, aggression, and feeding behavior of free-stall housed lactating dairy cows. *J. Dairy Sci.* 87:1432-1438.

DeVries, T. J., M. A. G. von Keyserlingk, D. M. Weary, and K. A. Beauchemin. 2003. Measuring the feeding behavior of lactating dairy cows in early to peak lactation. *J. Dairy Sci.* 86:3354-3361.

Ming Z. Fan BSc Xinjiang, MSc Harbin, PhD Alberta -- Associate Professor.

Overall research objectives are to: **1)** understand factors influencing digestive and post-absorptive utilization and metabolism of dietary nutrients in pigs; **2)** develop strategies for improving efficiency of nutrient utilization and for reducing detrimental impacts of animal production on the environment.

Shen, Y., M. Z. Fan, A. Ajakaiye and T. Archbold. 2002. True phosphorus digestibility and the endogenous phosphorus loss associated with corn for growing-finishing pigs are determined with the regression analysis technique. *The Journal of Nutrition* 132: 1199-1206.

Fan, M.Z., O. Adeola, E.K. Asem, and D. King. 2002. Postnatal ontogeny of kinetics of porcine jejunal brush border membrane-bound alkaline phosphatase, aminopeptidase N, and sucrase activities in pigs. *Comparative Biochemistry and Physiology A. Molecular and Integrated Physiology* 132: 599-607.

Golovan, S., R.D. Meidinger, A. Ajakaiye, M. Cottrill, M.Z. Weiderkehr, C. Plante, J. Pollard, M.Z. Fan, A. Hayes, A.C. Jesper Laursen, J.P. Hjorth, R.R. Hacker, D. Barney, J.P. Phillips and C. Forsberg 2001. Enhanced phosphorus digestion and reduced pollution potential by pigs with salivary phytase. *Nature – Biotechnology* 19: 741-745.

Burrin, D.G., B. Stoll, M.Z. Fan, M.A. Dudley, S. M. Donovan and P.J. Reeds. 2001. Oral IGF-I increases the efficiency of lactase processing in association with a suppression of intestinal proteolysis in neonatal pigs. *The Journal of Nutrition* 131: 2388-2396.

James France - BSc Wales, MSc, PhD, DSc Hull, FIMA, CMath, CSci, Professor and Senior Canada

Research Chair, Director of the Centre for Nutrition Modelling Biomathematics of digestion and metabolism. Modelling nutrient flows in ruminants and monogastrics. Development of feed evaluation systems and

mitigation strategies for environmental pollution.

Thornley, J.H.M. & France, J. (2006) *Mathematical Models in Agriculture. Quantitative Methods for the Plant, Animal and Ecological Sciences.* CABI Publishing, Wallingford, UK, 900 pp.

Bannink, A., Kogut, J., Dijkstra, J., France, J., Kebreab, E., Van Vuuren, A.M. & Tamminga, S. (2006) Estimation of the stoichiometry of volatile fatty acid production in the rumen of lactating cows. *Journal of Theoretical Biology* 238:36-51.

France, J., Lopez, S., Kebreab, E., Bannink, A., Dhanoa, M.S. & Dijkstra, J. (2005) A general compartmental model for interpreting gas production profiles. *Animal Feed Science and Technology* 123-124:473-485.

Lopez, S., Prieto, M., Dijkstra, J., Dhanoa, M.S. & France, J. (2004) Statistical evaluation of mathematical models for microbial growth. *International Journal of Food Microbiology* 96:289-300.

Niel Karrow B BSc Guelph, MSc, PhD Waterloo, Assistant Professor.

Research interests include immunomodulation and comparative immunology of livestock species. Past research has focused on studying immune response genes in cattle that may be associated with susceptibility/resistance to disease, and pharmacological and pollutant-induced immunomodulation in fish, rodents, swine, and cattle. I will be developing a research program in animal health, specifically focusing on immunoregulation mediated through the hypothalamic-pituitary adrenal, gonadal, and thyroid axes. Research will utilize tissue culture, host-resistance models, immune function assays, and molecular techniques such as gene and protein expression profiling to study HP-immune interaction.

A. Hernandez, N.A. Karrow, B.N. Wilkie, and B.A. Mallard, 2002. Evaluation of DTH and antibody to OVA as a means to identify high (H) and low (L) immune responsiveness in cattle: Microarray analysis of gene expression associated with H and L immune response phenotypes. 16th Spring Meeting of the Canadian Society for Immunology, Collingwood, Ontario April 5-8.

Karrow, N.A., Guo, T.L., Leffel, E.K., Zhang, L.X., McCay, J.A., Germolec, D.R., and White, K.L. Jr. An in-depth evaluation of sodium metasilicate hypersensitivity using BALB/c mice. (*American Journal of Contact Dermatitis*-In Press).

Karrow, N.A., McCay, J.A., Johnson, G.W., Brown, R.D., Musgrove, D.L., Germolec, D.R., Luebke, R. and White, K.L. Jr., 2001. Evaluation of the immunomodulatory effects of the disinfection by-product, sodium chlorite, in female B6C3F1 mice: A drinking water study. *Drug and Chemical Toxicology* 24,3,239-258.

Karrow, N.A., Boermans, H.J., Bols, N.C., Dixon, D.G., Solomon, K.R., and Whyte, J.J., 2001. The effect of creosote exposure time on rainbow trout pronephros phagocyte activity and the percentage of lymphoid B-cells. *Journal of Toxicology and Environmental Health, Part A* 63, 363-381.

Karrow, N.A., McCay, J.A., Brown, R.D., Musgrove, D.L., Pettit, D.A., Germolec, D.R., Munson, A.E., and White, K.L., Jr. 2000. Thalidomide stimulates splenic IgM antibody response and cytotoxic T lymphocyte activity, and alters leukocyte sub-populations in female B6C3F1 mice. *Toxicology and Applied Pharmacology* 165, 237-244.

Steve Leeson - DPT (Hons), MPhil, Ph.D. Nottingham, Professor

Poultry nutrition studies center on work with broilers, growing pullets and laying hens. For meat birds the most recent emphasis has been on energy metabolism and control over growth pattern as they influence metabolic disorders and carcass composition. Studies with laying hens involves nutritional and environmental factors that influence maturity. There is also an interest in manipulating the diet of both meat birds and laying hens so as to change the nutrient profile of meat and eggs related to optimizing human nutrition. Nutraceuticals of interest are omega-3, DHA and lutein.

Martinez-Cummer, M.A. And S. Leeson. 2005. Design of non-destructive methodologies to assess skeletal integrity in laying hens. *Wld. Poult. Sci. J.* 61: 583-598

Gonzalez-Esquerria, R. And S. Leeson, 2005. Effects of acute vs chronic heat stress on broiler response to dietary protein. *Poult. Sci.* 84:1562-1569.

Leeson, S., H. Namkung, M. Antonigiovanni and E.H. Lee, 2005. Effect of butyric acid on the performance and carcass yield of broiler chickens. *Poult. Sci.* 84:418-422.

Lopez, G. And S. Leeson, 2005. Utilization of metabolizable energy by young broilers and birds of intermediate growth rate. *Poult. Sci.* 84: 1069-1076.

Leeson, S. And L.J. Caston, 2004. Feeding value of dehulled flaxseed. C.J. Anim. Sci. 84:545-547.

Leeson, S. And L. Caston 2004. Enrichment of eggs with lutein. Poult. Sci. 83:1709-1712.

Julang Li - Msc Changchun, PhD Ottawa, Assistant Professor

The research in my laboratory is focused on the following three areas: 1) The regulation of ovarian cells (mainly oocytes and granulosa cells) during follicular development and oocyte maturation; 2) Skin-derived stem cell differentiation and mechanisms involved in the differentiation; 3) Biotechnology for improving disease-resistance in pig production.

Jesse. Craig, Hai. Zhu, Paul.W. Dyce, Lihua Wen and **Julang. Li** (2005) Leptin Enhances Porcine Pre-implantation Embryo Development *in Vitro*. Molecular and Cellular Endocrinology. Molecular and Cellular Endocrinology 229: 141-147

Jesse. Craig, Hai. Zhu, Paul.W. Dyce, Jim. Petrik and **Julang. Li** (2004) Leptin enhances oocyte nuclear and cytoplasmic maturation via the MAP kinase pathway Endocrinology. 145 (11): 5355-5363

Hai. Zhu, Jesse Crig, Paul.W. Dyce, and **Julang. Li** (2004) Porcine skin originated sphere cells are efficient donor for nuclear transfer Biology of Reproduction. 71 (6): page number to be added (now online)

Paul W. Dyce, Hai Zhu, Jesse Craig & **Julang Li** (2004) Stem cells with multilineage potential derived from porcine skin. Biochemical and Biophysical Research Communications 316: 651-657

Hai Zhu, Bhaju Tamot, Margaret Quinton, John Walton, Roger R. Hacker, **Julang Li** (2004) Influence of tissue origins and external microenvironment on porcine fetal fibroblast growth, proliferative life span and genome stability. Cell Proliferation 37:255-266

I.B. Mandell - BS, MS Ohio State, PhD University of Saskatchewan, Assistant Professor.

Research involves postmortem processing of beef and pork to improve meat quality. Areas of interest include applying new technology to identify tough and tender beef, improving utilization of cull cow beef, eliminating use of marbling classification as an indicator of beef quality, and examining the effects of implant management on palatability attributes in beef.

Mandell, I.B., E.A. Gullett, J.G. Buchanan-Smith, and C.P. Campbell, 1997. Effects of diet and slaughter endpoint on carcass composition and beef quality in Charolais cross steers. Can. J. Anim. Sci. 77:404-414.

Mandell, I.B., E.A. Gullett, J.W. Wilton, R.A. Kemp and O.B. Allen, 1997. Effects of gender and breed on carcass traits, chemical composition and palatability attributes in Hereford and Simmental bulls and steers. Livest. Prod. Sci. 49:235-248.

Mandell, I.B., J.G. Buchanan-Smith, B.J. Holub and C.P. Campbell, 1997. Effects of dietary incorporation of fish meal in beef cattle diets on growth performance, carcass traits and altering fatty acid composition in longissimus muscle. J. Anim. Sci. 75:910-919.

Brian W. McBride - BSc, MSc Guelph, PhD Alberta, Professor.

Research is directed towards defining metabolic components of energy expenditures in ruminants namely, the cellular energy costs associated with protein synthesis and Na⁺,K⁺-transport. This work encompasses experimental surgery to isolate biopsy tissue and in vitro techniques to measure rates of protein synthesis and Na⁺,K⁺-fluxes.

Kelly, J.M., and B.W. McBride. 1990. The sodium pump and other mechanisms of thermogenesis in selected tissues. Symposium on "Thermogenesis: mechanisms in large mammals". Proc. Nutrit. Soc. 49:185-202.

Zhao, X., B.W. McBride, I. Politis, H.T. Huynh, R.M. Akers, J.H. Burton and J.D. Turner. 1992. Receptor binding and growth-promoting activity of insulin-like growth factor-I in a bovine mammary epithelial cell line (MAC-T3). J. Endocrin. 134:307-312.

Ian McMillan - BSc, Msc, PhD Toronto, Professor

Research interests are generally in statistical methods for agricultural applications and modeling, and simulation of agricultural systems. Current interests include poultry and fish breeding.

Pante, M.J.R., B. Gjerde, I. McMillan and Ignacy Misztal. 2002. Estimation of additive and dominance genetic variances for body weight at harvest in rainbow trout, *Oncorhynchus mykiss*. *Aquaculture* 204:383-392.

McMillan I. and M. Quinton. 2002. Selection strategies for limiting the increase in Ascites while increasing growth in broilers. *Poultry Sci.* 81:737-744.

Pante, M.J.R., B. Gjerde and I. McMillan. 2001a. The effect of inbreeding on body weight at harvest in rainbow trout, *Oncorhynchus mykiss*. *Aquaculture* 192:201-211.

Pante, M.J.R., B. Gjerde and I. McMillan. 2001b. Inbreeding levels in selected populations of selected trout, *Oncorhynchus mykiss*. *Aquaculture* 192:213-224.

Steve Miller - Bsc, Msc, PhD Guelph, Assistant Professor.

Making beef cattle more profitable through genetic improvement is the main research goal. The primary emphasis is on the improvement of the efficiency of feed utilization and beef quality including tenderness. Approaches include genomics, genetic evaluation and mate selection. Projects range from the detection and validation of genetic markers through to live animal measures using ultrasound, infrared and feed intake recording technologies in a state of the art beef cattle research facility. Unique data resources secured, relating DNA with advanced measurements of feed intake and meat quality are instrumental in further application of genomic selection technologies. The use of large panels of 10 of thousands of SNP in large scale gene marker assisted selection procedures represents the latest frontier in this area.

Miller, S.P., B.J. Hayes and M.E. Goddard. 2006. Positioning single nucleotide polymorphisms on an existing bovine map using a genetic algorithm and estimates of linkage disequilibrium. *Proc. 8th World Congr. Genet. Appl. Livest. Prod.* (Submitted)

Bergen, R., S.P. Miller, J.W. Wilton and I.B. Mandell. 2006. Genetic correlations between live yearling bull and steer carcass traits adjusted to different slaughter endpoints. 2. Carcass fat partitioning. *J. Anim. Sci.* 84:558-566

Schenkel, F.S., S.P. Miller, Z. Jiang, I.B. Mandell, X. Ye, H. Li and J.W. Wilton. 2006. Association of a single nucleotide polymorphism in the calpastatin gene with carcass and meat quality traits in beef cattle. *J. Anim. Sci.* 84:291-299.

Schenkel, F.S., S.P. Miller, X. Ye, S.S. Moore, J.D. Nkrumah, C. Li, J. Yu, I.B. Mandell, J.W. Wilton and J.L. Williams. 2005. Association of single nucleotide polymorphisms in the leptin gene with carcass and meat quality traits in beef cattle. *J. Anim. Sci.* 83:2009-2020

Roso, V.M., F.S. Schenkel, S.P. Miller and J.W. Wilton. 2005. Additive, dominance, and epistatic loss effects on pre-weaning weight gain in crossing of different *Bos taurus* breeds. *J. Anim. Sci.* 83:1780-1787

Schenkel, F.S., S.P. Miller and J.W. Wilton. 2004. Genetic parameters and breed differences for feed efficiency, growth and body composition traits of young beef bulls. *Can. J. Anim. Sci.* 84:177-185

Richard D. Moccia - BSc, MSc Guelph, Professor.

Students have an opportunity to be part of an interdisciplinary aquaculture research team, or, to pursue a course-work based, non-thesis degree within the M.Sc.-Aquaculture program. Research studies currently involve the testing and development of improved feeds for farmed salmonids, establishing physiological and behavioural measures of the welfare status of captive fish, development of predictive models for the monitoring of environmental impacts of aquaculture, and collaborative work in novel food products from fish. Studies are also ongoing examining the toxicology of Botulinum Type-E neurotoxin in fish. Professor Moccia is also the Director of the Alma Aquaculture Research Station, Co-ordinator of the Aquaculture Centre, Director of the Animal Research Program, OMAFRA-UG Agreement, and Interdepartmental Chair of the M.Sc.-Aquaculture Program.

Personal Website: <http://www.aps.uoguelph.ca/~rmoccia/>

Aquaculture Centre Website: <http://www.aps.uoguelph.ca/~aquacentre/>

- Yue, S., I.J.H. Duncan and R.D. Moccia.** 2006. Do Differences In Conspecific Body Size Induce Social Stress In Domestic Rainbow Trout ? *Environmental Biology of Fishes* (Accepted Jan-06).
- Yule, A.M., J.W. Austin, I.K. Barker, B. Cadieux, and R.D. Moccia.** 2005. Persistence Of *Clostridium Botulinum* Neurotoxin Type E In Tissues From Selected Fresh Water Fish Species. Implications to Public Health. *Journal of Food Protection* 69(4): xx-xxx.
- Burke, M.G., M. Kirk, N. MacBeth, D. Bevan and R.D. Moccia.** 2005. The Influence of Photoperiod and Ration Delivery on Mortality and Growth of Juvenile Arctic Charr, *Salvelinus alpinus* (L.). *North American Journal of Aquaculture* 67: 344-350.
- Chandross, K.P., S.J. Cooke, R.S. McKinley and R.D. Moccia.** 2005. Use of electromyogram telemetry to assess the behavioural and energetic responses of rainbow trout, *Oncorhynchus mykiss* (Walbaum) to transportation stress. *Aquaculture Research* 36: 1226-1238.
- Gunther, S. J., R.D. Moccia., and D.P. Bureau.** 2005. Growth and whole body composition of lake trout (*Salvelinus namaycush*), brook trout (*Salvelinus fontinalis*) and their hybrid, F1 splake (*Salvelinus namaycush* X *Salvelinus fontinalis*), from first-feeding to 16 weeks post first-feeding. *Aquaculture* 249: 195-204.
- Cameron, C., R.D. Moccia and J.F Leatherland.** 2005. Growth hormone secretion from the Arctic charr (*Salvelinus alpinus*) pituitary gland *in vitro*: Effects of somatostatin-14, insulin-like growth factor-I, and nutritional status. *General and Comparative Endocrinology*. 141:93-100.
- Chandross, K.P., S. Yue, and R.D. Moccia.** 2004. An Evaluation of Current Perspectives on Consciousness and Pain in Fishes. *Journal of Fish and Fisheries*. 5: 281-295.

Vern R. Osborne - BSc (Agr) , Msc, PhD Guelph, Assistant Professor

Research interests include evaluating potable water as a vector to deliver nutrients in combination with other feed ingredients at various physiological stages of development for dairy, swine and equine species.

Osborne, V.R., K.E. Leslie and B.W. McBride. 2002. Effect of Supplementing Glucose in Drinking Water on the Energy and Nitrogen Status of the Transition Dairy Cow. *Can. J. Animal Science* (In press).

Osborne, V.R., R.R. Hacker and B.W. McBride. 2002. Effects of Heating drinking water on the production responses of lactating Holstein and Jersey cows. *Can. J. Animal Science* (In press).

Osborne, V. R. B. W. McBride, and R. R. Hacker. 2002. The effects of additional lighting and glucose supplemented drinking water on the performance of dairy calves. *ADSA/ASAS/CSAS*, Quebec City.

Osborne, V. R. , B. W. Mc Bride, R. R. Hacker, S. Radhakrishnan, A. R. Hill, and J. K. Kramer. 2002. The effects of supplementing fish oil into the drinking water of dairy cows on lactation performance and milk fatty acids. *ADSA/ASAS/CSAS*, Quebec City.

Cottee, G., V. R. Osborne, I. Kyriazakis, T. M. Widowski, and B. W. McBride. 2002. The effects of sub-acute rumen acidosis on sodium bicarbonate supplemented water intake for lactating dairy cows. *ADSA/ASAS/CSAS*, Quebec City.

Andy Robinson BSc(Agr), MSc Guelph, PhD Cornell – Assistant Professor

Research interests focus on livestock genetic improvement, specializing in swine including but not necessarily limited to the following areas. 1) genetic evaluation and improvement through statistical modeling, 2) detection of Quantitative Trait Loci for traits of economic importance, 3) combining molecular and statistical genetic information and 4) the application of information systems and bio-informatics to livestock improvement. Current project areas include marker / QTL associations for carcass quality and reproductive traits of pigs, relationships between sow productivity and piglet survival traits, models for evaluation of repeated measures for traits like growth, fatness, feed intake and efficiency in swine, marker / QTL associations for dairy cattle production and conformation traits and exploring alternatives for dairy cattle evaluation using simulated dairy cattle populations.

J.A.B. Robinson and V.M. Quinton. 2002. Genetic parameters of early neo-natal piglet survival and number of piglets born. Proceedings of the 7th World Congress on Genetics Applied to Livestock Production, Montpellier, France.

J.S. Melville, A.M. Verrinder Gibbins, J.A.B. Robinson, J.P. Gibson, A.L. Archibald, C.S. Haley and Z.H. Jiang. 2002. A Meishan positive QTL for prolificacy traits found at the *NC0A1* locus on SSC 3. 2002. Proceedings of the 7th World Congress on Genetics Applied to Livestock Production, Montpellier, France.

Z.H. Jiang, J.A.B. Robinson, A.M. Verrinder Gibbins, J.P. Gibson, A.L. Archibald and C.S. Haley. 2002. Mapping of QTLs for prolificacy traits on SSC8 using a candidate gene approach. Proceedings of the 7th World Congress on Genetics Applied to Livestock Production, Montpellier, France.

X. Ye, J.A.B. Robinson, Z.H. Jiang, A.M. Verrinder Gibbins and J.P. Gibson. 2002. Polymorphisms of histone deacetylase 1 and 3 genes and fatty acid binding protein 3 and 4 genes and their associations with economic traits in swine. Proceedings of the 7th World Congress on Genetics Applied to Livestock Production, Montpellier, France.

J.P. Gibson, Z.H. Jiang, J.A.B. Robinson, A.L. Archibald and C.S. Haley. 2002. No Detectable Association of the ESR PVUII Mutation with Sow Productivity in a Meishan x Large White F2 Population. *Animal Genetics* 33: 448-450.

J.J. Tosh, J.A.B. Robinson, G.B. Jansen and C.Y. Lin. 2001. Effect of reducing the frequency of milk recording on accuracy of genetic evaluation using a random regression model. *J. Dairy Sci.* 84: (Suppl.1) 342 .

Larry R. Schaeffer - BS Purdue, MS, PhD Cornell, Professor.

Main interests are in statistical methodology for use in genetic analyses of livestock. Areas of application include international evaluation of dairy and beef bulls, random regression, test day models, reducing rates of inbreeding, estimation of variance components, random number generators, computing algorithms for genetic evaluation, and accounting for selection bias.

Jamrozik, J., L.R. Schaeffer, K.A. Weigel. 2002. Genetic evaluation of bulls and cows with single and multiple country test day models. *J. Dairy Sci.* 85:1617-1622.

Schaeffer, L.R. 2003. Application of random regression models in animal breeding. *Livest. Prod. Sci.* (Accepted).

Flavio S. Schenkel BBA, BSc, and MSc Brazil, PhD Guelph – Assistant Professor.

Research interests encompass basic and applied areas of genetic improvement of livestock species. Past research has dealt with development and implementation of genetic evaluation programs at producer and national levels for a broad range of traits and species. More recently, research focused on: application of new developments in statistical modeling to improve genetic evaluation of longitudinal traits, including growth, feed intake and feed efficiency; genetic evaluation of crossbred animals; and evaluation of association of SNPs in candidate genes with fat deposition and meat tenderness in beef cattle. Current research includes the use genomic information to enhance genetic evaluation of dairy cattle, using dense SNP maps. Other current research areas involve preservation of genetic variability and diversity in Canadian farm animals, identification of genetic polymorphisms associated with susceptibility or resistance to bovine mastitis and Johne's disease, and the use of modified Givens rotations as a direct method to solve and update solutions of systems with sequential accumulation of data.

Leyva, F. Schenkel, B. S. Sharma G. B. Jansen and N.A. Karrow. 2007. Single nucleotide polymorphisms discovery in the MCP-1, IL-8, CXCR2, and CCR2 genes in Canadian Holstein bulls. *Animal Genetics* (in press).

Sharma, B.S., I. Leyva, F. Schenkel, and N.A. Karrow. 2006. Association of toll-like receptor 4 polymorphisms with somatic cell score and lactation persistency in Holstein

bull. Journal of Dairy Science, 89: 3626-3635.

Schenkel, F.S., Miller, S.P., Jiang, Z.H., Mandell, I.B., Ye, X., Li, H., and Wilton, J. W. 2006. Association of a single nucleotide polymorphism in the calpastatin gene (CAST) with carcass and meat quality traits in beef cattle. Journal of Animal Science, 84: 291-299.

Schenkel, F.S.; Miller, S.P., Ye, X., Moore, S.S., Nkrumah, J.D., Li, C., Yu, J., Mandell, I.B., Wilton, J.W., and Williams, J.L. 2005. Association of single nucleotide polymorphisms in the leptin gene with carcass and meat quality traits in beef cattle. Journal of Animal Science, 83: 2009-2020.

Roso, V.M., Schenkel, F.S., Miller, S.P., and Wilton, J.W. 2005. Additive, dominance, and epistatic loss effects on preweaning weight gain of crossbred beef cattle from different *Bos taurus* breeds. Journal of Animal Science, 83: 1780-1787.

Roso, V.M., Schenkel, F.S., Miller, S.P., and Schaeffer, L.R. 2005. Estimation of genetic effects in the presence of multicollinearity in multibreed beef cattle evaluation. Journal of Animal Science, 83: 1788-1800.

Schenkel, F.S., Miller, S.P., and Wilton, J.W. 2004. Herd of origin effect on weight gain of station-tested beef bulls. Livestock Production Science, 86:93-103.

Schenkel, F.S., Miller, S.P., and Wilton, J.W. 2004. Genetic parameters and breed differences for feed efficiency, growth, and body composition traits of young beef bulls. Canadian Journal of Animal Science, 84:177-185.

Schenkel, F.S., Devitt, C. J. B., Wilton, J. W., Miller, S. P., Jamrozik, J. 2004. Random regression analyses of feed intake of individually tested beef steers. Livestock Production Science, 88:129-142.

Trevor K. Smith - BSc British Columbia, MSc Manitoba, PhD Cornell, Professor.

The focus of our research program is feed and food toxicology. The adverse effects of feed-borne *Fusarium* mycotoxins on performance and metabolism of pigs, poultry, horses, companion animals and dairy cows is being examined including effects on immune status, reproduction, behavior and brain neurochemistry. Development of analytical methodology for detection of mycotoxins in feedstuffs and foods is also undertaken as is development of mycotoxin adsorbents to prevent intestinal absorption of mycotoxins.

Chowdhury, S.R. and Smith, T.K. 2005. Effects of feeding grains naturally contaminated with *Fusarium* mycotoxins on hepatic fractional protein synthesis rates of laying hens and the efficacy of a polymeric glucomannan mycotoxin adsorbent. Poul. Sci. 84: 1671-1674.

Chowdhury, S.R., Smith, T.K., Boermans, H.J. and Woodward, B. 2005. Effects of feed-borne *Fusarium* mycotoxins on hematology and immunology of laying hens. Poul. Sci. 84: 1841-1850.

Raymond, S.L., Smith, T.K. and Swamy, H.V.L.N. 2005. Effects of feeding a blend of grains naturally contaminated with *Fusarium* mycotoxins on feed intake, metabolism, and indices of athletic performance of exercised horses. J. Anim. Sci. 83: 1267-1273.

Swamy, H.V.L.N., Smith, T.K. and MacDonald, E.J. 2004. Effects of feeding blends of grains naturally contaminated with *Fusarium* mycotoxins on brain regional neurochemistry of starter pigs and broiler chickens. J. Anim. Sci. 82: 2131-2139.

E. James Squires - BSc, MSc, PhD Memorial, Professor

Research interests involve the application of methods in biochemistry and molecular biology to improve health and productivity of swine and poultry. In swine, the metabolism of the 16-androstene steroids and skatole (the two major components of boar taint) are being studied in order to develop genetic markers for low boar taint pigs. In poultry, the etiology of metabolic diseases, such as fatty liver hemorrhagic syndrome in laying hens, and cardiovascular problems such as ascites and sudden death syndrome in broilers and round heart disease in turkeys is being studied.

Thomson, A.E., Squires, E.J. and Gentry, P.A. 2002. Assessment of factor V, VII and X activity, the key coagulant proteins of the tissue factor pathway in poultry plasma. *Br. Poult. Sci.* 43:313-321.

Sinclair, P.A., Squires, E.J. and J.I. Raeside. 2001*. Early postnatal plasma concentrations of testicular hormones, pubertal development and carcass leanness as potential indicators of boar taint in market weight intact male pigs. *J. Anim. Sci.* 79:1868-1876.

Diaz, G.J. and E.J. Squires, 2000.* Metabolism of 3-Methylindole by Porcine Liver Microsomes: Responsible Cytochrome P450 Enzymes. *Toxicological Sciences* 55:284-292.

Kendall C. Swanson – BS, MS North Dakota State University, PhD University of Kentucky, Assistant Professor

My program of teaching and research in Ruminant Nutritional Physiology focuses on improving the efficiency of feed utilization and reducing the environmental impact of beef cattle production systems, better defining the nutrient requirements of gut tissues and the whole animal, and determining if expression of biologically important proteins can be altered through dietary manipulation and if altered expression influences production efficiency. This work encompasses a broad range of techniques including molecular biology, stable isotope kinetics, nutrient balance, and animal growth experiments.

Swanson, K. C., J. C. Matthews, C. A. Woods, and D. L. Harmon. 2003. Influence of substrate and/or neurohormonal mimic on in vitro pancreatic enzyme release from calves post-rationally infused with partially hydrolyzed starch and/or casein. *J. Anim. Sci.* 81:1323-1331.

Swanson, K. C. and D. L. Harmon. 2002. Dietary influences on pancreatic α -amylase expression and secretion in ruminants. In: R. Zabielski, V. Lesniewska, P. C. Gregory, and B. Westrom (Eds.) *Biology of the Intestine in Growing Animals.* Elsevier, Boston. pp. 515-537.

Swanson, K. C., J. C. Matthews, C. A. Woods, and D. L. Harmon. 2002. Postruminal administration of partially hydrolyzed starch and casein influences pancreatic α -amylase expression in calves. *J. Nutr.* 132:376-381.

Swanson, K. C., C. J. Richards, and D. L. Harmon. 2002. Influence of abomasal infusion of glucose or partially hydrolyzed starch on pancreatic exocrine secretion in beef steers. *J. Anim. Sci.* 80:1112-1116.

Swanson, K. C., D. A. Redmer, L. P. Reynolds, and J. S. Caton. 1999. Ruminally undegraded intake protein (UIP) in sheep fed low quality forage: Weights, growth, cell proliferation, and morphology of visceral organs. *J. Anim. Sci.* 77:238-243.

J.S. Walton - BSc, PhD Reading, Professor

Research emphasis is on the endocrine control of metabolic and reproductive function in cattle and sheep.

Reproductive studies concentrate upon follicular dynamics and programmed breeding, and the interactions between the conceptus and dam during early pregnancy. Antibodies that mimic the action of somatotrophin are the focus of the metabolic studies.

Otieno, C.J., C.M. Wood, S.K. Tallam, A.M. Verrinder Gibbins and J.S. Walton. (2002). Expression of luteinizing hormone genes in bovine conceptuses. *Reproduction* 123:155-162.

Tallam, S.K., T.L. Kerbler, K.E. Leslie, K. Bateman, W.H. Johnson and J.W. Walton. (2001). Reproductive performance of postpartum dairy cows under a highly intervenient breeding program involving times insemination and combinations of GnRH, prostaglandin F₂" and human chorionic gonadotropin. *Theriogenology* 56: 91-104.

Yavas, Y. and J.S. Walton. (2000). Postpartum acyclicity in suckled beef cows: A review. *Theriogenology* 54:25-55.

Tallam, S.K., J.S. Walton and W.H. Johnson. (1999.) Effects of oxytocin on cloprostenol-induced luteolysis, follicular growth, ovulation and corpus luteum formation in heifers. *Theriogenology* 53: 963-979.

T. M. Widowski – B.S., M.S., Ph.D. Illinois, Associate Professor

My research focuses on how various housing and management practices affect the behavioural biology and welfare of farm animals, with an emphasis on pigs. Fundamental research explores underlying developmental and physiological mechanisms of behaviour, while more applied projects address practical approaches to solving behaviour problems and improving welfare on farms. Current research projects include investigations of the causation of behaviour problems in newly weaned piglets and in growing pigs, managing the behaviour of gestating sows in alternative housing systems and the role of pig temperament in pre-slaughter handling, stress and meat quality.

Séguin, M.J., R.M. Friendship, R.N. Kirkwood, A.J. Zanella, T.M. Widowski, 2006. Effects of boar presence on agonistic behavior, shoulder scratches and stress response of bred sows at mixing. *Journal of Animal Science*, 84 (in press).

Torrey, S., T.M. Widowski, 2006. Is belly nosing redirected suckling behaviour? *Applied Animal Behaviour Science* (in press)

Séguin, M.J., D. Barney, T.M. Widowski, 2006. Assessment of a group-housing system for gestating sows: Effects of space allowance and pen size on the incidence of superficial skin lesions, changes in body condition, and farrowing performance. *Journal of Swine Health and Production* 14:89-96.

Widowski, T.M., J.M. Gardner, Y. Yan, 2005. The effect of accommodating sucking and massage on the behaviour of artificially-reared piglets. *Laboratory Animals* 39:240-250

Torrey, S. T.M Widowski, 2004. Effect of drinker type and sound stimuli on early-weaned piglet performance and behavior. *Journal of Animal Science* 82: 2105-2114

Jankevicius, M.L., T.M. Widowski, 2003. Exogenous adrenocorticotrophic hormone does not elicit a salt appetite in growing pigs. *Physiology and Behavior*, 78:277-284.