Mammalian development consists of a series of carefully orchestrated changes in gene expression that occur as stem or progenitor cells differentiate to form the tissues and organs making up the growing fetus. These dynamic changes in gene expression arise from cell specific alterations in the way in which the DNA encoding each gene becomes packaged within the nucleus. The mechanisms that control this gene packaging are heritable through cell division, and are referred to as epigenetic as they represent a level of regulation that is above or “epi” to genetics.

Dr. Michael Golding’s research focuses on determining the nature of the biochemical marks and mechanisms that direct the ordered process of epigenetic modification during embryonic development and how environmental factors influence these processes. As a model, his lab examines the impact of environmental and nutritional factors on the transcriptional control of endogenous retroviral elements within mammalian genomes and how the epigenetic control of these parasitic nucleic acids relate to the control of other developmentally critical transcriptional networks during development. Using a stem cell model system his group focuses on discovering the nature of the molecular signature that a cell uses to discern “self” from “non-self” (viral) and what biochemical factors and mechanisms are recruited to silence the latter. Interestingly different tolerances and mechanisms for transcriptional silencing appear to exist between embryonic, extraembryonic and placental tissues. It has long been known that cells that give rise to the embryo silence retroviruses given the necessity of preventing insertional mutagenesis that could arise from retroviral reactivation. Surprisingly, cells that give rise to the placenta do not appear to silence retroviruses whereas cells of the extraembryonic endoderm.

* Trainee Travel Supported by the IFRB with funds provided by the Texas A&M University Division of Research and Graduate Studies and Deans of the Colleges of Agriculture and Life Sciences and Veterinary Medicine & Bomedical Sciences: During the past year 18 trainees received financial support to attend national meetings and present their work. These include Justyna Fliant (Spencer) to attend a Reproductive Tract Biology Gordon Conference; JeHoon Lee, Sam Stephen (Arosh), Piotr Dorniak, Megan Minton (Spencer), Rodolfo Cardoso, Jennifer Thorson (Williams), James Frank (Johnson) to attend the 43rd SSR Meeting, Greg Burns (Long), Mike Peoples (Westhusin) to attend the 36th International Embryo Transfer Society Meeting Carol Dworaczek, (Voglesang), Shavahn Loux, Catalina Velez,(Hinrichs) to attend the 26th International Equine Reproduction Symposium, Lisbeth Ramirez-Carvajal (Long), to attend the 29th American Society for Virology Annual Meeting, Thomas Miller (MacKenzie) to attend the Society for Integrative and Comparative Biology Annual Meeting, and Andrea Loyd, Shane Morgan (Randel) to attend the American Society for Animal Science Annual meeting.
that give rise to the yolk sac and amnion exhibit extremely aggressive retroviral extinction. Thus, with the very first differentiation event of mammalian development three different tolerances for retroviral activity and potentially three unique regulatory mechanisms exist. Using these models for early development, Dr. Golding and his team are trying to understand how environmental toxins and poor nutrition can alter the developmental program of the fetus and result in adult diseases like cancer, diabetes and obesity.

Dr. Golding’s recent 2010 paper in Cell Stem Cell entitled “Multiple epigenetic modifiers induce aggressive viral extinction in extraembryonic endoderm stem cells,” that was highlighted on the Journal cover, described the capacity of the three stem cell lineages of the mouse preimplantation embryo to epigenetically silence retroviral transcription. Using an RNA interference-based screen, Dr. Golding and his colleagues identified a number of enzyme factors that mediate integrated and endogenous retroviral silencing, including an Argonaute family member, suggesting that small noncoding RNAs may play a role in guiding this epigenetic process.

“...daily treatment of pregnant sheep with Sildenafil citrate (Viagra) increases the delivery of nutrients to the fetus resulting in increased fetal growth. “
- Satterfield et al. (2010) J Nutr

Dr. M. Carey Satterfield’s lab is focused on the long-term consequences of maternal nutrition on fetal and postnatal growth and development using sheep as his primary animal model. A growing body of scientific evidence indicates that both maternal malnutrition and obesity during pregnancy increase the risk for development of disease in the adult offspring. These diseases include a predisposition to develop obesity, type-II diabetes, hypertension, and many others. In collaboration with others, Dr. Satterfield’s laboratory strives to not only understand the cellular and molecular mechanisms result in adult onset disease but also to develop strategies to intervene during gestation to prevent these consequences. For example, Dr. Satterfield and colleagues recent paper in the Journal of Nutrition entitled “Sildenafil citrate treatment enhances amino acid availability in the conceptus and fetal growth in an ovine model of intrauterine growth restriction” described the ability of daily treatment of pregnant sheep with Sildenafil citrate (Viagra) to increase the delivery of nutrients to the fetus resulting in increased fetal growth. The prevention of fetal growth restriction will likely result in reduced perinatal and adult morbidity.

In addition, Dr. Satterfield studies the role of nutraceuticals in fetal brown adipose tissue development and the ability of offspring to regulate their core body temperature during periods of cold stress. Maintenance of core body temperature is one of the first and most critical physiological processes that mammalian neonates must initiate to survive. In sheep, 40% of non-predator related perinatal losses are attributed to failed or insufficient initiation of this process. Ongoing studies in Dr. Satterfield’s laboratory are investigating the ability of maternal arginine administration during late gestation, which increases development of key thermogenic tissues in the fetus, to improve postnatal response to cold.

IFRB Highlights 2010 (cont’d from page 1)

* Faculty Recruiting: A new IFRB Faculty Member was recruited by The Department of Veterinary Integrative Biosciences. Dr. Quinglei Li received post-doctoral training from Dr. Martin Matzuk’s laboratory at Baylor College of Medicine. Dr. Li’s work is focused on understanding mechanisms of oocyte maturation, ovulation, implantation and pregnancy maintenance. Growth differentiation factor 9 (GDF9) and bone morphogenetic protein 15 (BMP15) are two of the most important oocyte-derived factors that are critical to fertility in multiple mammalian species.

Dr. Li has recently produced and purified bioactive recombinant proteins of these oocyte-derived factors and will examine individual and synergistic effects of these proteins on oocyte maturation, fertilization, and embryo developmental potential along with signal transduction pathways involved. He will also study the role and regulation of several candidate receptors that might be key components of TGFβ1 signaling machinery in multiple reproductive processes including fertilization and pregnancy maintenance. Dr. Li will join the department and the IFRB in January, 2011.

*Activities: For the past 18 years, the IFRB has contributed to the teaching, research, service and outreach activities of the TAMU System. Our interdisciplinary research includes a rich mixture of curiosity-driven basic, clinical and translational research that involves extensive participation of trainees. Milestones in 2010 include:
- 18th year of Fall and Spring Reproductive Biology Forum Seminar series.
- 16th Annual Raymond O. Berry Lecture Series.
- 16th Annual Texas Forum for Reproductive Sciences.
- 4th Annual IFRB Retreat
Trainee Spotlight

Kim Paczolt is a graduate student in the Department of Biology working with Dr. Adam Jones. The focus of her dissertation research is postcopulatory sexual selection and sexual conflict in the evolution of syngnathid reproduction. Syngnathids include sea horses, pipefish, and sea dragons, fish species distinguished by exhibiting male male pregnancy. They therefore serve as excellent models in which to test hypotheses about sexual selection and evolution. Some of her doctoral work was published in the March 18 edition of the journal *Nature* (see "Hot Papers" section) which examines offspring survivorship in pipefish. Kim is in her 5th year of study in Biology. She did her undergraduate work at the University of Illinois at Urbana-Champaign, where she worked in the lab of Carla Caceres and studied the ecology and evolution of Daphnia species in freshwater lakes. She expects to finish her Ph.D. work in the spring of 2011.

Justyna Filant and Piotr Dorniak are new trainees who joined the laboratory of Dr. Thomas Spencer in 2009. They both completed M.S. degrees from the University of Warmia and Mazury in Poland in cooperation with the Polish Academy of Sciences under the direction of Dr. Adam Zieck, an internationally known reproductive biologist. Justyna’s research is focused on hormonal, cellular and molecular mechanisms regulating uterine morphogenesis. Piotr’s research evaluates the role of 15-hydroxyprostaglandin dehydrogenase – the main enzyme of prostaglandin catabolism in porcine endometrium during the maternal recognition of pregnancy period. He is investigating how prostaglandins regulate endometrial functions important for conceptus survival, growth and development in sheep.

Dr. Bryan White is a Canadian post-doctoral research associate in the Department of Veterinary Integrative Biosciences. Bryan and his wife Sarah moved to Texas earlier this year, when he started work on a USDA-funded project awarded to Drs. Kayla J. Bayless and Greg A. Johnson focused on the regulation of angiogenesis in the sheep uterus and placenta by sphingosine-1-phosphate during pregnancy. He completed his undergraduate and graduate studies in St. John’s, Newfoundland, Canada at Memorial University of Newfoundland. After completing an undergraduate degree in Biochemistry, he began graduate work in the lab of Dr. Daniel MacPhee in the Faculty of Medicine. His Ph.D. research focused on mid-late pregnancy and labor in a rat model, and he investigated the regulation of small Heat Shock Protein 27 and its role in uterine contraction during this period.

16th Annual Raymond O. Berry Lecture

Dr. Raymond O. Berry, a member of the faculty of the Agricultural and Mechanical College of Texas from 1931 to 1960 contributed significantly to establishment of the discipline of Reproductive Immunology through his pioneering studies involving embryo transfer to evaluate genetic factors affecting reproduction. (The 58th Legislature of Texas, on August 23, 1963, changed the name of the Agricultural and Mechanical College of Texas to Texas A&M University). For his outstanding contributions, Texas A&M University recognizes the work of this distinguished scientist through the Raymond O. Berry Memorial Lecture which was established in 1994 by Dr. Fuller W. Bazer.

Over the past 16 years, Dr. Berry’s daughters, Dorothy McLemore and Margaret Thompson and their family members have attended the Lecture as guests. This year, Dorothy and her husband, Dr. Joe McLemore joined the IFRB for the Lecture, Social and Dinner that followed.

Dr. Duane C. Kraemer, Professor of Veterinary Physiology & Pharmacology and IFRB member worked with Dr. Berry during his early years as a graduate student. Dr. Kraemer led off the Lecture by providing an entertaining presentation that included memories of Dr. Berry.

Dr. Donald J. Dudley, Professor and Vice Chair for Research, Department of Ob/Gyn, UT Health Science Center at San Antonio presented the Raymond O. Berry Lecture entitled, “The Relevance of Reproductive Immunology.”

Dr. Dudley, who is a Fellow in the American College of Ob/Gyn and a member of multiple societies that focus on maternal-fetal medicine, was selected by a vote of the entire IFRB following an open nomination process. Dr. Dudley has served on key national committees that focus of perinatal medicine and children’s health and received numerous awards from his research. His lecture, entitled “The Relevance of Reproductive Immunology,” covered a variety of topics including regulation of lymphokine production by murine decidual lymphocytes, the role of interleukin 6 in preterm labor, immunology of preeclampsia, and cytokine networks at the maternal-fetal interface.

“Dr. Berry’s pioneering studies contributed basic knowledge about maternal immune recognition of the fetal placental unit.”

-Fuller W. Bazer
NEW GRANTS:
* Marcel Amstalden, NIH, NICHD, R03: Neuroendocrine Ontogeny of Accelerated Puberty,” 7/1/10 to 5/31/12, $146,500.
* Fuller W. Bazer, PI; Co-PIs, Guoyao Wu, Greg A. Johnson, USDA CSREES AFRI 2010-03220, “Arginine and Secreted Phosphoprotein Mediate mTOR Cell Signaling for Conceptus Development and Survival,” 12/1/10-11/30/14, $500,000.
* Peter J. Hansen, PI; Co-PIs, Todd Bilyby (Texas A&M University), Alan D Ealy (University of Florida), Albert De Vries (University of Florida), Charles R. Staples (University of Florida), Geoffrey E Dahl (University of Florida), Jerome Block (University of Florida), John Fernandez van Cleve (University of Puerto Rico), John B Cole (USDA AIPL), Jose Eduardo Santos (University of Florida), Robert J. Collier (University of Arizona), USDA-NIFA award #2010-5122-20623, Improving fertility during heat stress in lactating dairy cows. Total $1,000,000: Sub-award to Texas AgriLife Extension $243,998.
* Adam Jones and Kimbery Paczolt, Co-PIs, NSF, Dissertation Research: “Sex-specific Effects on Postcopulatory Sexual Selection and Sexual Conflict in a Sex-role Reversed Pipefish,” 7/1/10-6/30/11, $15,000.
* D. Forbes, PI, Thomas Welsh, Ron Randel, Gordon Carstens, F.M. Rouquette, Co-PIs, USDA, “Beef Improvement Research, 4/1/10 to 3/30/11, $349,000.
* Gary L. Williams, PI, Marcel Amstalden, Co-PI, Link Endowment Equine Research, “RF-related Peptide-3 (RFRP-3) as a Regulator of Reproduction in the Mare,” 9/1/10 to 8/30/12, $60,000.
* Shannon E. Wilson, NIH, K08, “Mechanisms and Nutritional Intervention for Fetal Alcohol Spectrum Disorders,” 3/20/2010 to 2/28/13, $90,000/year. (Timothy Cudd, Guoyao Wu, Mentors)
* Guoyao Wu, American Heart Association, “Leucine and Vascular Insulin Resistance in Diet-induced Obese Rats,” 7/1/10 to 6/30/12, $140,000.
- National Science Foundation of China, “Regulation of N-acetylglutamate Synthase Gene Expression in the Pig Small Intestine,” 1/1/10 to 12/30/11, $30,000.
- Indonesia Government, Foreign Research Cooperation and International Publication Program “Improving nutrient quality of carrot and fruit juice waste mixture for poultry diet,” 7/1/10 to 6/30/12, $30,000 (PI: Dr. Yose Rizal, University of Andalas, Indonesia; Co-PI: G. Wu).
PATENTS AWARDED:
INVITED LECTURES:
* Fuller W. Bazer, June 6, 2010, “Interferon Tau, Secreted Phosphoprotein 1 (Spp1) And Nutrients Affect Conceptus Development Via The Mammalian Target Of Rapamycin (mTOR) Pathway.” Germ Cell, Stem Cell and Reproductive Biology Symposium, Hyatt Hotel, Jeju Island, South Korea.
* Katrin Hinrichs, July 26, 2010, “Use of intracytoplasmic sperm injection and in vitro culture to the blastocyst stage for clinical production of foals post mortem.” 10th International Symposium on Equine Reproduction, Lexington, KY.
**IFRB Seminar Series, Fall 2010**

The IFRB Seminar Series (Reproductive Biology Forum) has been held weekly during the Fall and Spring Semesters since 1990. The 2010 Fall IFRB Seminar Series, coordinated by Dr. Marcel Amstalden, continues to provide an excellent combination of seminars from internationally recognized reproductive biologists from outside and inside the university along with advanced IFRB trainees:

Sep. 10 Kim Paczolt, Ph.D. student (Dr. Adam Jones), TAMU, Biology Dept. Title: Post-copulatory sexual selection in the evolution of male pregnancy Thomas Miller, Ph.D. student (Dr. Duncan MacKenzie), TAMU, Biology Dept. Title: Glycoprotein hormone specificity of the goldfish thyrotropin receptor Host: Dr. Duncan MacKenzie

Sep. 17 IFRB General Business Meeting – Dr. Greg Johnson, Past-Chair; Dr. Robert Burghardt, Chair IFRB

Sep. 24 Reproductive Biology Retreat (Coordinator: Dr. Marcel Amstalden) R.O. Berry Memorial Lecture (Coordinator: Dr. Fuller Bazer) Lecturer: Dr. Donald Dudley, UT Health Science Center at San Antonio. Title: The Relevance of Reproductive Immunology Host: Dr. Fuller Bazer

Oct. 8 Dr. Jeffrey Vallet, USDA-ARS Meat Animal Research Center, Clay Center Title: “Factors Affecting the Number of Piglets Weaned.” Host: Dr. Fuller Bazer

Oct. 15 Dr. Akio Miyamoto, Professor & VP (International Activity) Reproduction Science Group, Obihiro, Japan. Title: Regulation of the corpus luteum development and regression in the cow: the possible specific roles of vascular (angiogenic factors and luteal blood flow) and immune (Neutrophils) systems. Host: Dr. Fuller Bazer

Oct. 22 Dr. Jon Oatley, Penn State University. Title: Of Mice and Bulls: Study of Male Germiline Stem Biology in Biomedical Sciences and Animal Agriculture Host: Drs. Greg Johnson and Bob Burghardt

Oct. 29 Justyna Filant, Ph.D. student (Dr. Tom Spencer), TAMU. Title: Mechanisms Regulating Endometrial Gland Development in the Mouse Piotr Dorniak, Ph.D. student (Dr. Tom Spencer), TAMU. Title: Prostaglandins Regulate Conceptus Elongation and Mediate Effects of Interferon Tau on the Endometrium Host: Dr. Thomas Spencer

Nov. 05 Dr. Frank (Skip) Bartol, Auburn University. Title: Lactocrine Signaling and Neonatal Reproductive Tract Development Host: Dr. Fuller Bazer

Nov. 11 Special Seminar: Dr. Mark Miranda, National Program Leader for the Animal Nutrition, Growth and Reproduction, Agriculture and Food Research Initiative, USDA National Institute of Food and Agriculture. Title: “Reorganization of the USDA National Institute of Food and Agriculture (NIFA): What it means for AFRI and other funding programs at NIFA.” Host: Dr. Robert Burghardt

Nov. 12 Dr. Gail Cornwall, Texas Tech University Health Science Center, Lubbock. Title: “The Cystatin CRES: Amyloidogenic Properties and Reproductive Function” Host: Dr. Fuller Bazer

Nov. 19 Dr. Gil Rosenthal, Department of Biology TAMU. Title: “Sexual Communication and Natural Hybridization in Swordtail Fish.” Host: Dr. Marcel Amstalden

Nov. 26 No Forum - Thanksgiving

Dec. 03 Dr. Joe Arosh, Department of Veterinary Integrative Biosciences Title: “Molecular Control of Prostaglandin F2a Transport in Ruminant Reproduction.”

**IFRB Hot Papers 2010**


(continued, page 9)
Theriogenology News

Texas A&M University has a world-class team of equine Theriogenologists, including 5 faculty who are board certified by the American College of Theriogenologists (ACT): Drs. Terry Blanchard, Steve Brinsko, Katrin Hinrichs, Charles Love and Dickson Varner.

The equine Theriogenology faculty focus on translational research in the areas of stallion fertility/infertility and equine assisted reproductive technologies. In addition, TAMU boasts ACT diplomates specializing in epidemiology (Dr. James Thompson) and small ruminant reproduction (Dr. Juan Romano). The clinical theriogenologists have joined forces with basic scientists at TAMU and other universities to address issues that impact the horse breeding industry.

Highlights:
Dr. Steve Brinsko was elected to a four-year term on the ACT Executive Committee, including current service as president-elect.

Recent innovations from members of this group include:
- Novel analytical approaches to study subfertility in stallions (see Das et al., 2010 in "Hot Papers" section);
- Establishment of methods for equine embryo biopsy for preimplantation genetic diagnosis (see Choi et al., 2010 in Hot Papers section);
- Development of a centrifugation technique to enhance semen quality, a process that is now being applied to several commercial stallions.

The TFRS is a unique regional organization that resulted from the vision of distinguished reproductive biologists working at multiple institutions in central Texas. In 1994, Drs. Fuller Bazer (Texas A&M) Barbara Sanborn & George Stancel (University of Texas Health Sciences Center Houston), JoAnne Richards and Stan Glasser, (Baylor College of Medicine), Dan Carson (MD Anderson Cancer Center Houston), Robert Garfield (University of Texas Medical Branch-Galveston) organized reproductive biologists from their institutions that resulted in inter-institutional collaborations and the development an annual regional meeting that continues to expand as the TFRS. Additional participating institutions include faculty (and organizers) from the University of Texas at San Antonio (Dr. John McCarrey), the University of Texas Southwestern Medical Center at Dallas (Dr. Mala Mahendroo), the Texas Tech University Health Sciences Center (multiple investigators), Rice University (Dr. Daniel Carson), Texas A&M University – Kingsville (Drs. Michelle Garcia and Randy Stanko), and the Institute for Biosciences and Technology, Texas A&M System Health Sciences Center (Dr. Stephen Safe).
Reproductive biology research is conducted at multiple off-campus locations by IFRB members including 3 of the 14 Texas AgriLife Research and Extension Centers.

**Dr. Gary Williams** is Professor/Research Leader in the Animal Reproduction Laboratory, Texas AgriLife Research Station-Beeville and former Vice-Chair of the IFRB. His research group has 3 major ongoing projects: 1) Nutritional regulation of puberty in the heifer; objectives are to understand how early calfhood nutrition influences neuroendocrine plasticity and gene expression in the timing of pubertal onset; 2) Neuroendocrine control of reproductive seasonality in the mare and development of pharmacological methodologies for accelerating onset of reproductive transition; 3) Optimization of pharmacological methodologies for synchronization of ovulation and fixed-time AI in Bos indicus influenced beef cattle. His program at Beeville is linked tightly with Dr. Marcel Amstalden’s on the TAMU campus. Drs. Williams and Amstalden are Co-PI’s on multiple grants and they co-mentor all of their graduate students. They currently have 3 Ph.D. and 1 M.S. students. Two 2 M.S. students just completed degree requirements. (see page 9).

**Dr. Ron Randel** is Senior AgriLife Faculty Fellow/Regents Fellow and Professor stationed at the AgriLife Research and Extension Center at Overton. He has served as the Physiology of Reproduction Section Leader in the Department of Animal Science. His research group has several ongoing projects: 1) Influence of residual feed intake on correlated production traits with emphasis on reproducing in beef cattle; 2) Influence of temperament on endocrine and immune function and resultant productivity of beef cattle. His program at Overton is linked with Dr. Tom Welsh’s program at TAMU. They are co-PIs on grants and co-mentor students. They are working collaboratively with former student Dr. Jeff Carroll at ARS Lubbock on stress physiology and immunity of beef cattle and with Dr. Rhonda Vann at Mississippi State University on temperament and related production traits of beef cattle. They currently mentor 2 PhD students and 5 MS students.

**Dr. Todd Bilby** is an Associate Professor and extension dairy specialist located at the AgriLife Research and Extension Center in Stephenville. His research program is well funded (see “New Grants”) and involves cattle management, reproduction, nutrition, and heat abatement. Special emphasis is given to designing strategies to maximize profit for dairy producers. This includes refining timed artificial insemination protocols, nutritional and cooling strategies to improve heat loss/abatement, and ways to improve fertility in the dairy cow. Dr. Bilby’s extension duties include leadership and coordination of educational programs in dairy management via applied research, demonstrations and workshops. He provides expertise and training for clientele and organizations across Texas. He develops communication strategies with the Texas dairy industry through associations, boards, cooperatives and individual producers. Dr. Bilby advises 1 TAMU M.S. student, 1 Tarelton State M.S. student and 1 West Texas A&M Ph.D. student (where he is an adjunct professor) and a post-doc from the National Autonomous University, Mexico. Dr. Bilby’s research program is also linked with Dr. Tom Spencer’s on the TAMU campus.
Invited Lectures, continued

- **Greg A. Johnson,** April 22, 2010. "Osteopontin and integrins attach uterus to placenta to stabilize the interface for transfer of nutrients from mother to fetus during pregnancy." Sigma Xi Spring Symposium.

- **Thomas E. Spencer**
  - March 25, 2010, "The role of Wnt signaling in conceptus-endometrial Interactions." 57th Annual Meeting of the Society for Gynecologic Investigation, Orlando, FL.
  - April 7, 2010, "Endogenous retroviruses: from infectious elements to essential genes." Asdell Lecturer, Department of Animal Science, Cornell University.
  - July 1, 2010, "Maternal nutrition and programming of fetal development." Alltech Distinguished Lecturer, University of Kentucky, Lexington, KY.
  - July 31, 2010, "Endogenous retroviruses: from infectious elements to essential genes," "SSR Annual Meeting, Milwaukee, WI.
  - Aug. 2010, "Wnt genes and uterine differentiation." Gordon Research Conference on Reproductive Tract Biology, Andover, NH.
  - Sept. 3-7, 2010, "Endogenous retroviruses of sheep: a model system for understanding physiological adaptation to an evolving ruminant genome," 8th International Ruminant Reproduction Symposium, Anchorage, AK.

  - April 329, 2010, "Glutamate content in foods and utilization by the pig small intestine." International Glutamate Technical Committee, Santa Monica, CA.

INTERNATIONAL:

- **Amstalden M, JS Redmond, GM Baez-Sandoval, KM Spel, TE Spencer, CA Lents, GL Williams,** "Kiss1 gene expression in the arcuate nucleus increases during activation of pulsatile release of LH in maturing ewe lambs." International Congress of Neuroendocrinology July 11-15, Rouen, France.

- **Fuller W. Bazer,** WCU Professor in Biomodulation, Department of Agricultural Biotechnology, Seoul National University, 599 Gwanak-ro, Gwanak-gu, Seoul 151-921, Korea.


- **Thomas E. Spencer,** May 8-12, 2010, "Comparative Aspects of Conceptus-Endometrial Interactions and Implantation." Frontiers in Perimplantation Biology Symposia of the First State Key Laboratory of Reproductive Biology, Beijing, China.


AWARDS:

- **Fuller W. Bazer,** Pioneer Award, International Society for Ruminant Reproduction (2010) - Doctor of Science degree by the University of Florida

OTHER ACTIVITIES:

- **Fuller W. Bazer,** - Associate Editor, Journal of Animal Science and Biotechnology (2010 - ).
- **Robert C. Burghardt** - Member, Scientific Advisory Board of TauMedix, 2010 -).
- **Steven Brinsko** is involved in numerous service activities that support the American College of Theriogenologists: Denver, Colorado.

The 4th Annual IFRB Retreat was organized by Dr. Marcel Amsdalden with support from 5 departments in two colleges including the Department of Animal Science, College of Agriculture and Life Sciences and Departments of Veterinary Integrative Biosciences, Veterinary Large Animal Clinical Sciences, Veterinary Physiology & Pharmacology and Veterinary Pathobiology in the College of Veterinary Medicine & Biomedical Sciences. Special thanks goes to Drs. Gary Acuff, John August, Glen Laine, Evelyn Tiffany-Castiglioni, and William Moyer for their sustained support of the trainee-focused activities of the IFRB.

The Retreat was held in conjunction with the 16th Annual Raymond O. Berry Memorial Lecture.

IFRB Chair: Dr. Robert C. Burghardt

We acknowledge and thank donors who have supported the IFRB in the past. We welcome contributions at any level to support the following: graduate fellowships, pilot funds for promising research directions, capital equipment for imaging and biological analysis, and infrastructure upgrades for research laboratories. For more information on how to support the IFRB, contact Dr. Robert Burghardt at: rburghardt@cvm.tamu.edu

Following a short IFRB Business Meeting, Drs. Katrin Hinrichs and Tom Spencer presented Minisymposia in the morning session. After lunch, trainee platform “Data Blitz” highlighting research of Sam Stephen (VIBS), Xilong Li (Animal Science) and veterinary resident, Dr. Shelby Hayden (LACS, Theriogenology) were followed by poster sessions.

IFRB RESEARCH AND TRAINING MISSION:

Reproductive Biology is at the epicenter of the life sciences. Focal areas of research and graduate/postdoctoral training in the IFRB are interdisciplinary and cover both genders, encompass humans, domestic animals, laboratory animals and wildlife, and include: assisted reproductive techniques, biological clocks, cloning, conservation of endangered species, contraception, developmental biology, diseases of the reproductive tract, endocrinology, fertilization, fetal growth retardation, gametogenesis, gender-biased diseases and health issues, immunology, infertility, lactation, pregnancy and pregnancy-related disorders, premature labor, recovery of function, science and health policy, stem cell biology, systems biology and functional genomics, toxicology, and uterine biology. The outcomes of this research are impacting Texas, our nation and the world.

“A matricellular protein medley” - G Johnson, D Erikson, P-L Chang, R Burghardt