TEXAS A&M UNIVERSITY

IFRB 2012

Interdisciplinary Faculty of Reproductive Biology

Confronting and solving challenges to reproduction and health by conducting basic, clinical and translational research, and shaping science and health policy

2012, ISSUE 1 SPRING, 2012

POINTS OF INTEREST:

- The IFRB was organized in 1992 and is one of the largest Reproductive Biology Programs in the US
- Membership includes 44 faculty from 5 departments, 3 colleges , 4 TAMUS components and 2 state agencies
- IFRB sponsored activities: IFRB Repro Forum Seminar Series (19 years) Annual R.O. Berry Lecture (18 years), Texas Forum on Reproductive Sciences (18 years), Annual IFRB Retreat

INSIDE

New IFRB Faculty Spotlight

In domestic animals and humans, optimal fetal growth is predicated by sufficient nutrient delivery across the placenta. Insufficient delivery of nutrients to the developing conceptus results in intrauterine growth restriction (IUGR), a significant social and economic problem of global importance. Maternal undernutrition is often overlooked as a cause of IUGR, although in developing countries, maternal malnutrition is a significant problem. In developed countries, greater than 50% of pregnancies are associated with some form of "morning sickness" characterized by nausea, inappetence, and, at times, vomiting. Of note, 1% of those pregnancies are associated with extreme vomiting and weight loss. In addition, to increased risk of perinatal morbidity and mortality associated with nutrient restriction, IUGR is also associated with increased disease risk later in life, collectively referred to as developmental origins of adult disease. It is clear that insufficient fetal growth increases neonatal morbidity and mortality in both livestock species and humans. The additional long-term health consequences in these offspring associated with a suboptimal uterine environment is of emerging importance. Although the potential impact of maternal environment on pregnancy outcome, including fetal weight, has been described in various species, the underlying mechanisms controlling placental adaptation for increased nutrient transport, which are crucial for regulating fetal growth, are not clearly understood.

Dr. Kathrin Dunlap is a Research Assistant Professor in the Department of Animal Science whose research interests are focused on discovery of the

(Continued, Page 2)

Global Issues: Developmental Origins of Health and Disease

File:Fetus leonardo.jpg

Almost 60 years ago, Watson and Crick published the proposed double-helix structure of DNA in Nature. Five decades later the Human Genome Project successfully sequenced the complete human genome, a feat 13-years in the making. This project was as much about developing and harnessing the power of new technologies as it was about unlocking the actual genetic code. In fact, in the 9 years since its publication the genomes of at least 19 other mammalian species have been sequenced and published. In addition to genome sequencing, scientists continued to build upon the foundation provided by Watson and Crick, to further characterize the surrounding structure of the DNA sequence itself. This new investigation developed into the field of science termed "epigenetics." At this point you might be thinking "I thought this was the Interdisciplinary Faculty of Reproductive Biology not the Interdisciplinary Faculty of Genetics?" but just stay with me. As with most things in science, answering one question leads to the development of many new questions. In reality, they often aren't new questions but rather refinements of the originals; reshaped by recently generated knowledge and asked using more sophisticated technologies.

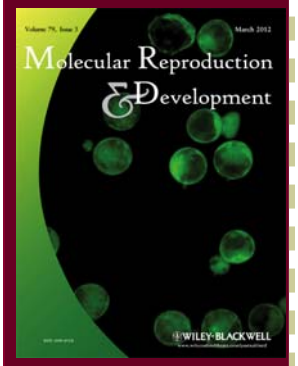
(Continued, Page 9)

New IFRB Faculty (cont'd from page 1)

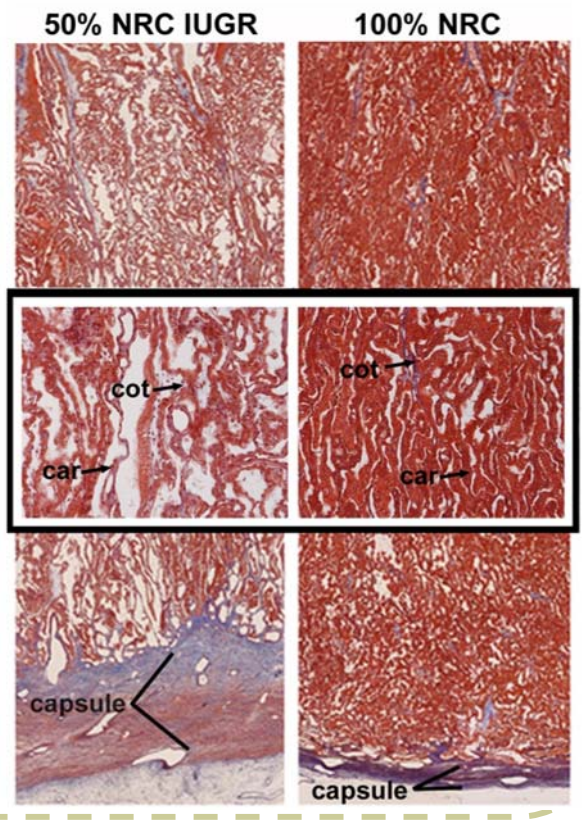
physiological pathways mediating fetal-placental adaptation to maternal environmental constraints. Dr. Dunlap has a long-standing interest in the study of placental biology. As a Ph.D. student in the laboratories of Drs. Fuller Bazer and Thomas Spencer she was the first to utilize Morpholino Antisense Oligonucleotide technology for the study of conceptus development in domestic animals. Her findings regarding the role of the endogenous Jaagsiekte Sheep retrovirus (enJSRV) on formation of binucleate cells within the sheep placenta were published in the Proceedings of the National Academy of Sciences 103:14390 (2006). Upon completion of her Ph.D. program she pursued postdoctoral studies with Drs. Greg Johnson (Department of Veterinary Integrative Biosciences) and Kayla Bayless (Department of Molecular and Cellular Medicine) in the area of placental angiogenesis. Dr. Dunlap's research in this area was supported by a post-doctoral fellowship awarded by the USDA National Research Initiative Competitive Grants Program. The resulting research on the lysosphingolipid, sphingosine-1-phospate, in the sheep placentome was also recognized by the Society for the Study of Reproduction in 2009 with a Trainee Research Award at the 42nd Annual Meeting.

Upon completion of her post-doctoral studies she served as an Associate Research Scientist within the Laboratory for Uterine Biology and Pregnancy from 2009-2011 before being named to her current position. Since joining the Department of Animal Science, Dr. Dunlap has continued to pursue studies in placental biology using complementary in vivo and in vitro model systems, and is working to develop biomarkers of fetal health, independent of birth weight, by capitalizing on a natural population variance in an experimentally controlled, non-inbred pregnant sheep model of maternal undernutrition. In this model system two distinct subpopulations have emerged in response to maternal nutrient restriction: those that deliver low birth weight offspring (IUGR) and those that deliver phenotypically normal (non-IUGR) birth weight offspring. Importantly, these varied phenotypes do not exist among inbred rodent strains, making the sheep a valuable model. Additionally, the sheep is an accepted and uniquely well-suited animal model for studies of pregnancy and neonatology. Through her studies Dr. Dunlap aims to elucidate physiological pathways by which the placenta adapts to maternal environmental constraints as well as developing biomarkers suitable for identification of individuals that may be more- or less-susceptible to such constraints. These findings will provide the foundation for development of precise interventions to improve fetal growth and well-being.

As someone who benefitted greatly from the mentoring she received as a trainee, Dr. Dunlap has maintained a strong commitment to teaching in her current appointment. In her current faculty position she teaches ANSC 481: Senior Seminar, and serves as a mentor for undergraduate researchers from both the College of Veterinary Medicine and the Department of Animal Science. Additionally, Dr. Dunlap recently developed a new course, ANSC 289: Basic Animal and Research Experience, in an effort to provide undergraduate students with increased exposure to research opportunities within the Department of Animal Science. This course was enthusiastically received by the students and is the topic of a feature article in an upcoming issue of the Animal Science Monthly Magazine, published by the Texas A&M Department of Animal Science.



Tessane et al. were featured on the cover of Molecular Reproduction and Development, Volume 79, Issue 3, March 2012.
The legend for the cover: HDAd-GFP expression in Doublecortin expressing cells located adjacent to cerebellar Purkinje cells. This work demonstrates the ability of HDAd injected by this route of delivery to transduce neuronal cells. The transduced neuroepithelial cells can be potentially used to secrete therapeutic proteins into the cerebrospinal fluid and provide them via cross-correction to nontransduced cells. Targeting of neuronal cells and long-term transgene expression make this approach attractive for the treatment of several neurologic diseases.



Maternal nutrient status impacts fetal development and alters placentome histoarchitecture. *Placentomes collected from singleton pregnant ewes receiving only 50% of their nutritional requirements (NRC) and giving rise to IUGR fetuses, are markedly less dense than those of ewes which received 100% NRC and produced normal weight lambs. The IUGR associated placentomes have a pronounced lack of caruncular (CAR) crypt development, branching, and associated interdigitation with cotyledonary (COT) villi. Interestingly, the capsule is inversely thickened in the nutrient restricted IUGR pregnancies. Stereological and vascular evaluations will provide valuable information for understanding the impact of placentome structure on placental blood flow, nutrient transport, fetal growth and lamb viability. (K. Dunlap, unpublished results).*

IFRB Faculty Member Spotlight: Dr. Gil Rosenthal

I am an Associate Professor in the Department of Biology as well as the chair of the Interdisciplinary Research Group in Ecology and Evolutionary Biology. I teach BIOL 467 (Integrative Animal Behavior) and, along with Ginger Carney, BIOL 691 (Behavior, Genes, & Evolution). My lab's research program focuses on using natural hybrids between the swordtail fish *Xiphophorus birchmanni* and *X. malinche* to study the mechanisms and evolutionary dynamics of mate choice. My obsession with live bearing fishes dates back to the guppy tank I received for my sixth birthday. I began working on *Xiphophorus* as an undergraduate, developing video stimuli for mate-choice studies with Chris Evans during a summer internship in Peter Marler's lab at UC Davis. Mike Ryan, my PhD advisor at UT - Austin, introduced me both to swordtails' natural habitat in the lovely Huasteca region of central Mexico, and to the study of behavioral mechanisms in an evolutionary context. My main thesis project involved the production of synthetic animations based on population parameters in order to understand the role of mating preferences in maintaining intra- and interspecific variation in male traits. My lab continues to use animations as a powerful tool for behavioral experiments; along with collaborators Wei Yan (VIZA, TAMU) and Jerry Johnson (Brigham Young University), we are funded by NSF to develop ***anyFish*****,** software used by behavioral biologists to develop their own animated stimuli.

While doing field work for my PhD, I stumbled on natural swordtail hybrids near Calnali, Hidalgo, in the foothills of the Sierra Madre Oriental. After a postdoc at UC San Diego and a brief stint as a faculty member in Boston University's now-defunct program at Woods Hole's Marine Biological Laboratory, I returned to Texas to take a faculty position here in the Biology department, and returned to Calnali to establish the Centro de Investigaciones Científicas de las Huastecas "Aguazarca" in partnership with my wife, Rhonda Struminger. My recently graduated PhD student, Dr. Zachary Culumber, is now based in Calnali full-time and is directing research activities there.

Research by my current graduate students focuses on multiple aspects of the biology of traits involved in reproduction. James (Brad) Johnson is investigating performance costs and geographic variation in sexually-dimorphic male ornaments involved in courtship; Nick Ratterman, co-advised with Adam Jones, is doing theoretical and empirical studies of coevolution between male traits and female mating preferences. New students Pablo Delclos and Mattie Squire are working, respectively, on the relationship between ecological community structure and sexual communication, and on the relationship between mating preferences and realized mate choice. Rongfeng (Ray) Cui is using next-generation sequencing techniques both for admixture mapping of genetic loci associated with male traits and female preferences, and to elucidate how early social experience changes expression of odorant receptor genes in the olfactory periphery. Finally, and of particular relevance to the IFRB, Victoria Smith is working on the relationship between female reproductive physiology and mate-choice decisions. Specifically, she is focusing on the role of cortisol in mediating the relationship between external stressors and behavioral preferences.

18th Annual Raymond O. Berry Memorial Lecturer Selected

Dr. Peter Parham, Professor in the Departments of Structural Biology and Microbiology & Immunology at the Stanford University School of Medicine, was selected by a vote of IFRB faculty in December, 2011, to present the 18th Annual Dr. Raymond O. Berry Memorial Lecture which will be held in conjunction with the 6th Annual IFRB Retreat on Friday, October 26, 2012 at The Veranda in Bryan, TX.

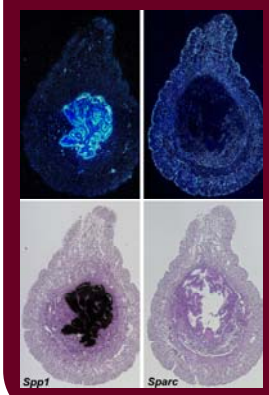
Dr. Parham studied Natural Sciences at Cambridge University, subsequently obtaining his PhD in Biochemistry and Molecular Biology at Harvard University with Professor Jack Strominger. Elected a Junior Fellow of the Society of Fellows at Harvard, he spent a year working with Walter Bodmer in the Department of Genetics at Oxford University, before returning to Harvard to start his independent research program. Dr. Parham joined the Stanford faculty in 1980. Throughout his career Dr. Parham's research has focused on proteins of the human immune system that vary greatly between individuals and populations. These differences, the consequence of natural selection, not only modulate the immune response to infection and cancer, but also influence the success of reproduction and therapeutic transplantation of cells, tissues and organs. He has received scientific awards from the Leukemia Society of America, the American Society of Histocompatibility and Immunogenetics, the European Federation of Immunogenetics and the British Society of Immunology; in 2008 he was elected fellow of the Royal Society. Dr. Parham has served on the Editorial Board of several major immunology Journals and as Editor-in Chief for Immunological Reviews. He is also the author of an introductory text-book 'The Immune System' that is used worldwide in immunology courses for undergraduate and professional students.

The Annual Raymond O. Barry Memorial Lecture series in honor of Dr. Raymond O. Barry, a member of the faculty from 1931 to 1960 who contributed to the establishment of the discipline of Reproductive Immunology through his pioneering studies involving embryo transfer to evaluate genetic factors affecting reproduction. The Lecture was established in 1994 by Dr. Fuller Bazer.

Awards, etc.

Above: Section of a Day 16 fetal mouse paw giving the A&M GIG'EM sign. Shown is mRNA expression of matricellular proteins Spp1 (in fetal skin and cartilage) and Sparc (in fetal connective tissue and cartilage).

Below: mRNA expression of the same matricellular proteins in an inter-implantation site within the uterus of a mouse undergoing implantation that was induced using the "delayed implantation model." Spp1 is expressed by uterine epithelium whereas Sparc is expressed by the uterine stroma, myometrium and broad ligament. Data generated in Dr. Greg Johnson's lab by Dr. David Erikson (now a post-doctoral fellow at the Univ. California, San Francisco Medical School) in collaboration with Dr. Pi-Ling Chang, Univ. Alabama, Birmingham.



NEW GRANTS:

*** Guoyao Wu,** Safety of arginine supplementation to healthy adults", International Council of Amino Acid Science, $250,000, 4/2012 to 3/2014.

INTERNATIONAL ACTIVITIES:

*** Fuller W. Bazer** is completing his third 18 week semester of research and teaching as World Class University (WCU) Professor in Biomodulation, Department of Agricultural Biotechnology, Seoul National University (SNU). The WCU project, a program of the Korean government, was initiated to: enhance national, higher educational and industrial competitiveness in multi-disciplinary fields and transform Korean universities into world-class research institutions. Dr. Bazer established the Laboratory of Reproductive Biology at SNU to study contributions of the avian oviduct to development and growth of the embryo in ovo and effects of select nutrients on the mTOR cell signaling pathway in porcine conceptus trophectoderm. Dr. Bazer conducts research in collaboration with former trainees **Drs. Gwonhwa Song, Jinyoung Kim and Hakhyun Ka.**

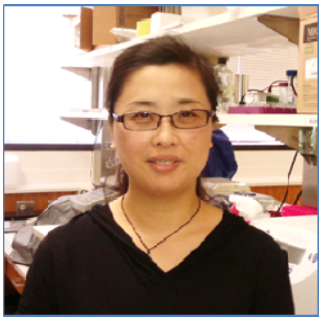
INVITED LECTURES:

*** Sakhila Banu,** "Chromium induces ovarian failure through reactive oxygen species (ROS) and p53-mediated pathways", Prof P. Govindarajulu endowment lecture, Dr. ALM Institute of Basic Medical Sciences, University of Madras, India, January 9, 2012.

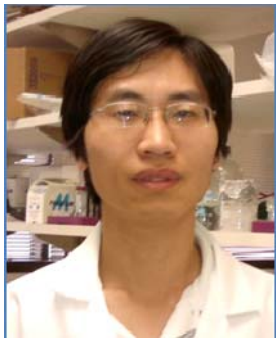
"Use and Misuse of Chromium: *From Ancient History to Modern Civilization"*, Thavathiru Adigalar College of Education, Tamil Nadu Teachers Education University, Kundrakudi campus, Tamil Nadu, India, January 16, 2012.

*** Sakhila Banu,** Forum on "Women in Education & Research: How do we overcome challenges and struggles?", Thavathiru Adigalar

IFRB Trainee News



*** Haixia Wen, Ph.D.,** is an Associate Professor in the Department of Physiology in Harbin Medical University, China, where her research focused on the effects of Phytoestrogen genistein on the estrogen receptor signaling reproduction and cancer development. Dr. Wen joined the laboratory of **Dr. Qinglei Li** in January 2012 as a Visiting Scholar. Her current research is to understand the TGFβ signaling in the regulation of uterine myometrial development and function.



*** Chao Wang** is a graduate student at the College of Animal Science and Technology, China Agricultural University. He is on a Ph.D. Joint Training program and is under the mentorship of **Dr. Qinglei Li** for one year in Texas A&M University. He joined Dr. Li's laboratory in February, 2012. Mr. Wang is interested in exploring the role of TGFβ signaling in the regulation of oocyte development and function.

*** Rongfeng Cui**, graduate student in the laboratory of **Dr. Gil Rosenthal** was a recipient of an annual Rosemary Grant Graduate Student Research Award competition of the Society for the Study of Evolution. These awards are to assist students in the early stages of their Ph.D (first two years) programs by enabling them to collect preliminary data (to pursue additional sources of support). His main research interests include animal communication, signal-receptor coevolution, prezygotic isolation mechanisms and sympatric speciation. Current projects focus on the effect of early learning in female mate choice in *X. malin*che and characterization of pheromone chemistry and olfactory receptors.

*** James (Will) Frank**, graduate student in the laboratory of **Dr. Greg Johnson**, earned first place honors in the platform competition at the 18th Annual Texas Forum for Reproductive Sciences held on April 12-13, 2012 at Rice University in Houston. Will has also served as the Trainee Member of the IFRB Executive Committee and his two year term ends this year. He has effectively represented the interests of IFRB trainees and has coordinated meetings of trainees with IFRB speakers.

*** Bruna Alves**, D.V.M., a Ph.D. candidate with **Dr. Marcel Amstalden** was awarded a 2012 Tom Slick Fellowship, from the College of Agriculture and Life Sciences. She anticipates completing requirements for the Physiology of Reproduction Ph.D. degree this fall.

(Continued, Page 10)

IFRB Seminar Series, Spring 2012

The IFRB Seminar Series, Reproductive Biology Forum, has been held weekly during the Fall and Spring Semesters since 1990. The 2012 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. Each of the seminars is followed directly by a luncheon involving graduate student and postdoctoral trainee discussions with the seminar speaker:

January 27, **Dr. Robert Burghardt**, Chair IFRB, IFRB General Business Meeting

February 3, **Dr. Bryan White**, VIBS, TAMU College Station. "Modulation of the sphingosine 1-phosphate signaling pathway in pregnant ewes alters placentome architecture and fetal growth." Hosted by **Dr. Greg Johnson**

February 10, **Dr. Clay Lents**, USDA-ARS Meat Animal Research Center. "Neuroendocrine factors impacting gonadotropin secretion and genomic markers associated with puberty in the female pig." Hosted by **Dr. Marcel Amstalden**

February 17, **Dr. Jeanne Garner**, West Indies Marine Animal Research and Conservation Service. "Reproductive endocrinology of nesting leatherback sea turtles in St. Croix, Virgin Islands." Hosted by **Dr. Duncan MacKenzie**

February 24, **Dr. Chung Park**, North Dakota State University. "Maternal methyl diet and epigenetic imprint of mammary carcinogenesis in offspring." Hosted by **Dr. Gary Williams**

March 2, **Dr. Ryan Ashley**, New Mexico State University, Las Cruces. "Membrane Progesterone Receptors and Angiogenic Factors During Early Pregnancy." Hosted by **Dr. Greg Johnson**

March 9, **Dr. Karen J. Berkley**, Florida State University, Tallahassee. "Neural Mechanisms of Endometriosis: Lessons from a Rat Model." Hosted by **Dr. Joe Arosh**

March 16, Spring break – No Forum

March 23, **Dr. Jennifer Hernandez-Gifford**, Oklahoma State University. "Beta-catenin's unappreciated role in follicular steroidogenesis." Hosted by **Dr. Greg Johnson**

March 30, **Dr. Sunny Scobell**, Texas A&M University. "Reproductive endocrinology of male pregnancy and female aggression in a sex-role reversed pipefish. Hosted by **Dr. Duncan McKenzie**

April 13, **Texas Forum of Reproductive Sciences,** Rice University, Houston, TX

April 20, **Dr. Ken Cornetta**, University of Indiana. "Lentiviral Gene Therapy - Engineering a Virus into a Clinical Product." Hosted by **Dr. Mark Westhusin**

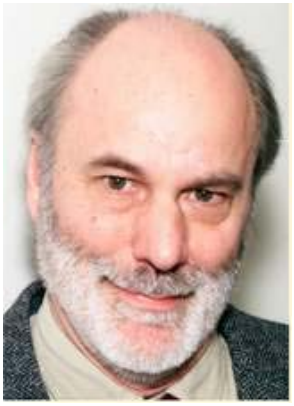
April 27, **Dr. Marty Matzuk**, Baylor College of Medicine, Houston. "Small RNAs and reproductive cancer development." Hosted by **Dr. Qinglei Li**

Eppig Presents Special IFRB Seminar

Dr. John J. Eppig, Professor and Senior Staff Scientist, presented a special seminar at Texas A&M sponsored by the IFRB and the College of Veterinary Medicine & Biomedical Sciences on February 14, 2012. The title of his seminar was, "Oocytes Under Arrest: A Whodunit."

Dr. Eppig is recognized as the world's leading authority on the cellular and molecular basis for mammalian oocyte development. His paradigm changing work has shown how the oocyte orchestrates its own maturation and competence by establishing a feed-back loop with the somatic cells that surround it within the ovarian follicle. He and Dr. Marty Matzuk at Baylor College of Medicine have shown that two oocyte-specific genes, *Gdf9* and *Bmp15* have instructional roles that allow oocytes to outsource many of its metabolic requirements including provision of glycolytic intermediates and cholesterol biosynthesis to the cumulus cells surrounding oocytes. The IFRBs own **Dr. Quinglei Li** was a co-author on three recent papers with Drs. Eppig and Matzuk dealing with the coordination of oocyte and cumulus cell communication. Dr. Matzuk was also scheduled as a regular IFRB Spring Seminar speaker.

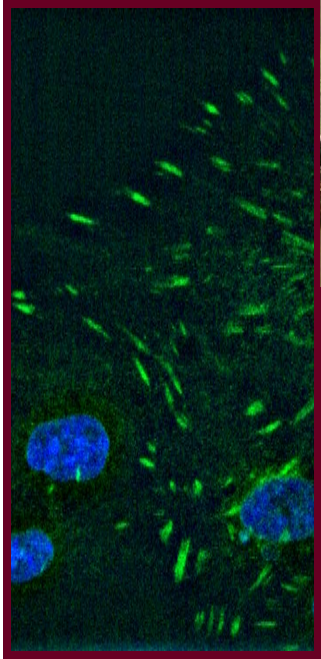
He has been a leader in developing culture systems that support oocyte development from the primordial follicle stage to the mature competent oocyte stage. Many reproductive biologists are aware of the famous mouse "Egbert" who was developed in vitro from the primordial stage, matured *in vitro*, fertilized, and transferred at the two cell stage resulting in the birth of a live mouse in 1996. A number of his scientific contributions have been reported in the lay press such as Discover Magazine and Science News.



Dr. Eppig has held major leadership roles including service on the SSR Board of Directors, the NIH Human Embryo Research Panel, President of the SSR, Co-Editor in Chief of *Biology of Reproduction* from 2004-2009.

His most recent awards include the Pioneer in Reproduction Research Award, Frontiers in Reproduction Program at the Marine Biological Laboratory NICHD, 2008; The Carl G. Hartman award, the highest honor bestowed by the Society for the Study of Reproduction in 2010; and last year he was named a member of the National Academy of Sciences in recognition of his distinguished and continuing achievements in original research, 2011.

Trainee Spotlight



Jennifer Thorson, a doctoral candidate in Physiology of Reproduction, investigates the mechanisms that regulate reproductive seasonality in mares and pharmacological approaches for accelerating reproductive transition and pregnancy in seasonally anovulatory mares. Prior to beginning graduate studies at Texas A&M University in the spring semester of 2009, she received a B.S. in Equine Science and Agricultural Business from Colorado State University and a M.S. in Animal Science (Reproduction) from North Dakota State University.

The first year of Jennifer's doctoral program was spent in the Animal Reproduction Laboratory, Texas AgriLife Research-Beeville, and all of her research has involved the combined resources of the Beeville laboratory and the Department of Animal Science in College Station. Studies completed by Jennifer and colleagues have indicated that the marked decrease in adenohypophyseal synthesis and release of luteinizing hormone (LH), a major cause of seasonal anovulation in the mare, can be overcome by application of a subcutaneous osmotic pump that delivers gonadotropin-releasing hormone (GnRH) continuously for several weeks. This treatment approach, which leads to increased circulating concentrations of LH uniquely in the equine (continuous treatment with GnRH leads to decreased LH in circulation in most mammalian species due to receptor desensitization), was applied successfully to accelerate reproductive transition, induce follicular development, and advance the establishment of pregnancy in approximately 80% of mares by the end of March. Because most seasonally-anovulatory mares resume reproductive cyclicity approximately 3 to 4 months after the winter solstice (April in the northern hemisphere), the continuous administrations of native GnRH is a highly-effective pharmacological tool to mitigate the winter anovulatory season in mares. A patent application by Texas AgriLife Research for the concept and efforts to develop a commercialized delivery modality are currently in progress in Beeville.

Jennifer is also conducting studies to investigate the role of neuropeptides of the arginine-phenylalanine (RF)-amide family in the seasonal reduction of LH secretion in the mare. Ongoing studies have demonstrated that the gene encoding RF-related peptides is expressed in the equine hypothalamus, and that neurons containing RF-related peptides project to brain locations that are compatible for the control of GnRH. Jennifer has also observed that the receptor for RF-related peptides is present in the adenohypophysis of mares, indicating that a direct effect at the level of the adenohypophysis may occur. In seasonal breeding birds and several mammals, at least one functional RF-related peptide (RFRP3) has been shown to modulate the secretion of LH, including direct inhibitory effects at the anterior pituitary. However, those results have been difficult for some investigators to replicate; thus, the true role of RFRP3 and related peptides in mammals is still in question. To date, adenohyphyseal cell culture experiments led by Jennifer, as well as collaborative in vivo studies with her fellow graduate students, have also failed to demonstrate functional RFRP3 effects in the mare. However, some of the mystery associated with the RFRP system may about to be resolved using an antagonist to RFRP3, RF9. The latter has been shown recently to counteract the endogenous inhibitory effects of the RFRP system in sheep, and Jennifer has now demonstrated a similar effect during reproductive transition in anovulatory mares. This approach could eventually contribute to the development of new therapeutic modalities for controlling reproductive seasonality in the mare.

Jennifer will complete her doctoral program by late 2012, with a dissertation entitled "Interactive roles of gonadotropin-releasing hormone and RF-amide related peptide 3 in adenohypophyseal physiology and reproduction in the mare". During her program at Texas A&M University, Jennifer has authored or co-authored 8 abstracts presented at national and international meetings, is a co-author of an in-press review article, and has 2 manuscripts in preparation for submission. **Drs. Gary Williams** and **Marcel Amstalden** serve as co-chairs of her graduate advisory committee.

SSR

Society for the Study of Reproduction

45th SSR Annual Meeting, Penn State University

The 45th Annual Meeting of the Society for the Study of Reproduction will be held in State College, Pennsylvania August 12-15, 2012. The SSR Annual Meeting is typically one of the best attended meetings by members and trainees of the IFRB. **This Spring, 11 trainees who have had first authored abstracts accepted for presentation at the meeting will receive travel support to attend the meeting with funding generously provided by the Texas A&M University Division of Research and Deans of the Colleges of Agriculture and Life Sciences and Veterinary Medicine & Biomedical Sciences.**

A Snapshot of IFRB Research Productivity

The IFRB is recognized as one of the most productive interdisciplinary research and education programs in reproductive biology in the U.S. The following partial "snapshot" of research productivity illustrates the multiple investigator research activities of the IFRB involving extensive participation of trainees during the 4 month period Jan—May, 2012:

Ahn SE, Jeong W, Kim JH, Lim W, Kim J, Bazer FW, Han JY, Song G. (2012) ERBB receptor feedback inhibitor 1: Identification and regulation by estrogen in chickens. Gen Comp Endocrinol 175:194-205.

Allen CC, Alves BRC, Li X, Tedeschi LO, Zhou J, Paschal JA, Riggs PK, Braga-Neto UM, Keisler DH, Williams GL, Amstalden M. (2012) Gene expression in the arcuate nucleus of heifers is affected by controlled intake of high- and low-concentrate diets. J Anim Sci, in press.

Bake S, Tingling JD, Miranda RC. (2012) Ethanol exposure during pregnancy persistently attenuates cranially directed blood flow in the developing fetus: evidence from ultrasound imaging in a murine second trimester equivalent model. Alcohol Clin Exp Res 36:748-758.

Balaraman S, Winzer-Serhan UH, Miranda RC. (2012) Opposing Actions of Ethanol and Nicotine on MicroRNAs are Mediated by Nicotinic Acetylcholine Receptors in Fetal Cerebral Cortical-Derived Neural Progenitor Cells. Alcohol Clin Exp Res Mar 28. [Epub ahead of print].

Balden R, Selvamani A, Sohrabji F. (2012) Vitamin D deficiency exacerbates experimental stroke injury and dysregulates ischemia-induced inflammation in adult rats. Endocrinology 153:2420-2435.

Bazer FW, Kim J, Ka H, Johnson GA, Wu G, Song G. (2012) Select nutrients in the uterine lumen of sheep and pigs affect conceptus development. J Reprod Develop 58:180-188.

Bazer, F., Kraemer, D., McHughen: Welfare, Health, and Biological Efficiency of Animals through Genetics and Biotechnology. In: Animal Welfare in Animal Agriculture, CRC Press, 2012.

Bazer FW, Song G, Kim J, Erikson DW, Johnson GA, Burghardt RC, Gao H, Satterfield MC, Spencer TE, Wu G. (2012)Mechanistic mammalian target of rapamycin (MTOR) cell signaling: Effects of select nutrients and secreted phosphoprotein 1 on development of mammalian conceptuses. Mol Cellular Endocrinol 354:22–33.

Bazer FW, Song G, Thatcher WW. (2012)Roles of conceptus secretory proteins in establishment and maintenance of pregnancy in ruminants. Asian-Aust J Anim Sci 25:1-16.

Blanchard TL, Varner DD, Brinsko SP, Love CC. (2012) Azoospermia in stallions: determining the cause. Compend Contin Edu Vet 34:E1-8.

Blanchard TL, Thompson JA, Love CC, Brinsko SP, Ramsey J, O'Meara A, Varner DD. (2012) Influence of day of postpartum breeding on pregnancy rate, pregnancy loss rate, and foaling rate in Thoroughbred mares. Theriogenology 77:1290-1296.

Bliss SB, Voge JL, Hayden SS, Teague SR, Brinsko SP, Love CC, Blanchard TL, Varner DD. (2012) The impact of cushioned centrifugation protocols on semen quality of stallions. Theriogenology 77:1232-1239.

Chadalapaka G, Jutooru I, Safe S. (2012) Celastrol decreases specificity proteins (Sp) and fibroblast growth factor receptor-3 (FGFR3) in bladder cancer cells. Carcinogenesis 33:886-894.

Connor EE, Baldwin RL 6th, Blanton JR Jr, Johnson SE, Poulos S, Welsh TH Jr. (2012) Growth and Development Symposium: Understanding and mitigating the impacts of inflammation on animal growth and development. J Anim Sci 90:1436-1437.

Doan R, Cohen N, Harrington J, Veazy K, Juras R, Cothran G, McCue ME, Skow L, Dindot SV. (2012) Identification of copy number variants in horses. Genome Res 22:899-907.

Doan R, Cohen ND, Sawyer J, Ghaffari N, Johnson CD, Dindot SV. (2012) Whole-genome sequencing and genetic variant analysis of a Quarter Horse mare. BMC Genomics.13:78.

Dorniak P, Bazer FW, Wu G, Spencer TE. (2012) Conceptus derived prostaglandins regulate endometrial function in sheep. Biol Reprod. April 18. [Epub ahead of print].

Dorniak P, Welsh TH, Bazer FW, Spencer TE. Endometrial HSD11B1 and Cortisol Regeneration in the Ovine Uterus: Effects of pregnancy, interferon tau and prostaglandins. Biol Reprod 2012; 86:1-10.

Edmond AJ, Brinsko SP, Love CC, Blanchard TL, Teague SR, Varner DD.(2012) Effect of centrifugal fractionation protocols on quality and recovery rate of equine sperm. Theriogenology. 77:959-966.

Foster EB, Fisher G, Sartin JL, Elsasser TH, Wu G, Cowan W, Pascoe DD. (2012) Acute regulation of IGF-I by alterations in post-exercise macronutrients. Amino Acids 42:1405-16.

Gao K, Jiang Z, Lin Y, Zheng C, Zhou G, Chen F, Yang L, Wu G. (2012) Dietary L-arginine supplementation enhances placental growth and reproductive performance in sows. Amino Acids 42:2207-14.

Gao H, Sathishkumar KR, Yallampalli U, Balakrishnan M, Li X, Wu G, Yallampalli C. Maternal protein restriction regulates IGF2 system in placental labyrinth. (2012) Front Biosci E4:1434-1450.

Gardiner L, Akintola A, Chen G, Catania JM, Vaidya V, Burghardt RC, Bonventre JV, Trzeciakowski J, Parrish AR.(2012) Structural equation modeling highlights the potential of Kim-1 as a biomarker for chronic kidney disease. Am J Nephrol 35:152-163.

Gold JR, Cohen ND, Welsh TH Jr. (2012) Association of adrenocorticotrophin and cortisol concentrations with peripheral blood leukocyte cytokine gene expression in septic and nonseptic neonatal foals. J Vet Intern Med 26:654-661.

He QH, Ren PP, Kong XF, Wu YN, Wu G, Li P, Hao FH, Tang HR, Yin YL (2012) Comparison of serum metabolite compositions between obese and lean growing pigs using an NMR-based metabonomic approach. J Nutr Biochem 23:133-139.

Jeong W, Lim W, Kim J, Ahn SE, Lee HC, Jeong JW, Han JY, Song G, Bazer FW. (2012) Cell-specific and temporal aspects of gene expression in the chicken oviduct at different stages of the laying cycle. Biol Reprod Mar 14. [Epub ahead of print]

Jeong W, Kim HS, Kim YB, Kim MA, Lim W, Kim J, Jang HJ, Suh DH, Kim K, Chung HH, Bazer FW, Song YS, Han JY, Song G. (2012) Paradoxical Expression of AHCYL1 Affecting Ovarian Carcinogenesis between Chickens and Women. J Exp Biol Med, in press.

Kane CJ, Smith SM, Miranda RC, Kable J. (2012) Proceedings of the 2010 annual meeting of the Fetal Alcohol Spectrum Disorders Study Group. Alcohol 46:107-114.

Kang LS, Nurkiewicz TR, Wu G, Boegehold MA. (2012) Changes in eNOS phosphorylation contribute to increased arteriolar NO release during juvenile growth. Am J Physiol Heart Circ Physiol 302:H560-6.

Kaur G, Long CR, Dufour JM. (2012) Genetically engineered immune privileged Sertoli cells: A new road to cell based gene therapy. Spermatogenesis 2:23-31.

Kim K, Chadalapaka G, Lee SO, Yamada D, Sastre-Garau X, Defossez PA, Park YY, Lee JS, Safe S. (2012) Identification of oncogenic microRNA-17-92/ZBTB4/specificity protein axis in breast cancer. Oncogene 31:1034-1044.

Kim K, Jutooru I, Chadalapaka G, Johnson G, Frank J, Burghardt R, Kim S, Safe S. (2012) HOTAIR is a negative prognostic factor and exhibits pro-oncogenic activity in pancreatic cancer. Oncogene. May 21.[Epub ahead of print]

(Continued, Page 8)

Snapshot (cont'd from page 7)

Kim M, Seo H, Choi Y, Shim J, Bazer FW, Ka H. (2012) Swine leukocyte antigen-DQ expression and its regulation by interferon-gamma at the maternal-fetal interface in pigs. Biol Reprod 86: 1-11.

Kim J, Song G, Wu G, Bazer FW. (2012) Functional roles of fructose. Proc Nat Acad Sci USA May 23. [Epub ahead of print]

Klassen JA, Mathewson HA, Rosenthal GG, Morrison ML. (2012) Canopy characteristics affect reproductive success of golden-cheeked warblers. Wildlife Society Bulletin. 36:54-60.

Kong X, Tan B, Yin Y, Gao H, Li X, Jaeger LA, Bazer FW, Wu G. (2012) L-Arginine stimulates the mTOR signaling pathway and protein synthesis in porcine trophectoderm cells. J Nutr Biochem Nov 30. [Epub ahead of print]

Kwak HI, Kang H, Dave JM, Mendoza EA, Su SC, Maxwell SA, Bayless KJ. (2012) Calpain-mediated vimentin cleavage occurs upstream of MT1-MMP membrane translocation to facilitate endothelial sprout initiation. Angiogenesis 15:287-303.

Lee J, Banu SK, Nithy TK, Stanley JA, Arosh JA. (2012) Early pregnancy induced expression of prostaglandin E2 receptors EP2 and EP4 in the ovine endometrium and regulated by interferon tau through multiple cell signaling pathways. Mol Cell Endocrinol 348:211-223.

Lee JY, Jeong W, Lim W, Kim J, Bazer FW, Han JY, Song G. (2012) Chicken pleiotrophin gene: identification and regulation of tissue specific expression by estrogen in the oviduct and distinct expression pattern in the glandular epithelia of ovarian carcinomas. PLoS One 7(4): e34215.

Lei J, Feng D, Zhang Y, Zhao FQ, Wu Z, Gabriel AS, Fujishima Y, Wu H. (2012) Nutritional and regulatory role of branched-chain amino acids in lactation. Front Biosci 17:2725-39.

Lewis DK, Thomas KT, Selvamani A, Sohrabji F. (2012) Age-related severity of focal ischemia in female rats is associated with impaired astrocyte function. Neurobiol Aging 33(6):1123.e1-16.

Li X, Lee SO, Safe S. (2012) Structure-dependent activation of NR4A2 (Nurr1) by 1,1-bis(3'-indolyl)-1-(aromatic)methane analogs in pancreatic cancer cells. Biochem 83:1445-1455.

Li Z, Chadalapaka G, Ramesh A, Khoshbouei H, Maguire M, Safe S, Rhoades RE, Clark R, Jules G, McCallister M, Aschner M, Hood DB. (2012) PAH particles perturb prenatal processes and phenotypes: protection from deficits in object discrimination afforded by dampening of brain oxidoreductase following in utero exposure to inhaled benzo(a)pyrene. Toxicol Sci 125:233-247.

Lim W, Ahn SE, Jeong W, Kim JH, Kim J, Lim CH, Bazer FW, Han JY, Song G. (2012Tissue Specific Expression and Estrogen Regulation of SERPINB3 in the Chicken Oviduct. Gen Comp Endocrinol 175:65-73.

Lim W, Kim JH, Ahn SE, Jeong W, Kim J, Bazer FW, Han JY, Song G. (2012) Avian SERPINB11 gene: A marker for ovarian endometrioid cancer in chickens. Exp Biol Med (Maywood) 237:150-159.

Lim W, Jeong W, Kim JH, Shin J, Kim J, Bazer FW, Han JY, Song G. (2012) Differential expression of secreted phosphoprotein 1 in response to estradiol-17beta and in ovarian tumors in chickens. Biochem Biophys Res Commun May 12 [Epub ahead of print]

Liu XD, Wu X, Yin YL, Liu YQ, Geng MM, Yang HS, Blachier F, Wu GY (2012) Effects of dietary L-arginine or N-carbamylglutamate supplementation during late gestation of sows on the miR-15b/16, miR-221/222, VEGFA and eNOS expression in umbilical vein. Amino Acids 42:2111-9.

Liu X, Jutooru I, Lei P, Kim K, Lee SO, Brents LK, Prather PL, Safe SH.(2012) Betulinic Acid targets YY1 and ErbB2 through cannabinoid receptor-dependent disruption of microRNA-27a:ZBTB10 in breast cancer. Mol Cancer Ther May 2. [Epub ahead of print]

Love CC, Blanchard TL, Varner DD, Brinsko SP, Voge J, Bliss S, Sudderth K, Teague S, Lacaze K. (2012) Effect of daily semen centrifugation and resuspension on the longevity of equine sperm quality following cooled storage. Theriogenology.77:1911-1917

McCracken JA, Custer EE, Schreiber DT, Tsang PC, Keator CS, Arosh JA. (2012) A new in vivo model for luteolysis using systemic pulsatile infusions of PGF(2a). Prostaglandins Other Lipid Mediat 97:90-96.

Mendonca LGD, Dewey ST, Lopes Jr G, Rivera FA, Guagnini F, Fetrow J, Bilby TR, Chebel RC. (2012) Effect of resynchronization strategies for lactating Holstein cows on pattern of reinsemination, fertility, and economic outcome. Theriogenology 77:1151-1158.

Mertens-Talcott SU, Noratto GD, Li X, Angel-Morales G, Bertoldi MC, Safe S. (2012) Betulinic acid decreases ER-negative breast cancer cell growth in vitro and in vivo: Role of Sp transcription factors and microRNA-27a:ZBTB10. Mol Carcinog Mar 7.[Epub ahead of print]

Miller T, Jaques JS, Szkudlinski MW, MacKenzie, DS. (2012). Thyrotropic activity of recombinant human glycoprotein hormone analogs and pituitary mammalian gonadotropins in goldfish (*Carassius auratus*): insights into the evolution of thyrotropin receptor specificity. Gen Compar Endocrinology 177:70-75.

Miranda RC.(2012) MicroRNAs and fetal brain development: implications for ethanol teratology during the second trimester period of neurogenesis. Front Genet 3:77. Epub May 16.

Montano GA, Kraemer DC, Love CC, Robeck TR, O'Brien JK. (2012) Evaluation of motility, membrane status and DNA integrity of frozen-thawed bottlenose dolphin (Tursiops truncatus) spermatozoa after sex-sorting and recryopreservation. Reproduction 143:799-813.

Norman TE, Chaffin MK, Bisset WT, Thompson JA. (2012) Association of clinical signs with endoscopic findings in horses with nasopharyngeal cicatrix syndrome: 118 cases (2003-2008). J Amet Med Assoc 240:734-739.

Padua MB, Lynch VJ, Alvarez NV, Garthwaite MA, Golos TG, Bazer FW, Kalkunte S, Sharma A, Wagner GP, Hansen PJ. (2012) ACP5 (Uteroferrin): Phylogeny of an ancient and conserved gene expressed in the endometrium of mammals. Biol Reprod 86:1-8.

Park YY, Kim K, Kim SB, Hennessy BT, Kim SM, Park ES, Lim JY, Li J, Lu Y, Gonzalez-Angulo AM, Jeong W, Mills GB, Safe S, Lee JS. (2012) Reconstruction of nuclear receptor network reveals that NR2E3 is a novel upstream regulator of ESR1 in breast cancer. EMBO Mol Med. 4:52-67.

Patel AR, Spencer SD, Chougule MB, Safe S, Singh M. (2012) Pharmacokinetic evaluation and in vitro-in vivo correlation (IVIVC) of novel methylene-substituted 3,3' diindolylmethane (DIM). Eur J Pharm Sci 46:8-16.

Ren W, Yin Y, Liu G, Yu X, Li Y, Yang G, Li T, Wu G. (2012) Effect of dietary arginine supplementation on reproductive performance of mice with porcine circovirus type 2 infection. Amino Acids 42:2089-94.

Safe SH, Prather PL, Brents LK, Chadalapaka G, Jutooru I. (2012) Unifying mechanisms of action of the anticancer activities of triterpenoids and synthetic analogs. Anticancer Agents Med Chem May 2. [Epub ahead of print]

Sankpal UT, Abdelrahim M, Connelly SF, Lee CM, Madero-Visbal R, Colon J, Smith J, Safe S, Maliakal P, Basha R. (2012) Small molecule tolfenamic acid inhibits PC-3 cell proliferation and invasion in vitro, and tumor growth in orthotopic mouse model for prostate cancer. Prostate Apr 2. [Epub ahead of print]

(Continued, Page 12)

Developmental Origins (cont'd from page 1)

With the genetic revolution in full swing scientists began to reevaluate the manner by which gene expression is regulated, and why changes in expression of relatively few genes result in so many different phenotypes. Concurrently, a number of epidemiological studies were identifying interesting associations between unfavorable environments during pregnancy and increased susceptibility of offspring to disease much later in life. These two freight trains of inquiry have collided and in the aftermath lies a burgeoning field of study "fetal programming" that not only helps to explain questions posed by geneticists regarding phenotype penetrance, but has also increased awareness of the sensitivity of the reproductive process to perturbation and the power that we, as reproductive biologists, have to improve the health and well-being of all forms of animal life.

Fetal programming is likely rooted in evolutionary biology arising from the need for the fetus to develop in a manner that would make it most suitable for the world it will be born into. As example, poor nutrition during pregnancy would cue the fetus to establish an efficient metabolic rate, and thus once born the offspring would preferentially put on fat during periods of nutritional excess as insurance against future nutritional hardship. A poor intrauterine and even early postnatal environment has also been shown to have potentially adverse behavioral and social consequences including anxiety and inability to cope with stress. Although many early studies have highlighted the link between nutrition and fetal programming a multitude of other environmental cues impact fetal development, including stress, drugs and alcohol, smoking, environmental pollution, teenage pregnancy, and assisted reproductive technologies such as cloning.

Nutrition: Worldwide, 1.5 billion people are overweight and 500 million are classified as obese. Conversely, 925 million people in the world were undernourished in 2010. Parental over- or under-nutrition increases the incidence of obesity, type-II diabetes, and hypertension in offspring. For those of you thinking the potential severity of these numbers are inflated because only women can get pregnant I've got news for you, the old adage "it takes two to tango" still rings true. Recent studies in rodents have found that paternal obesity diminishes reproductive health of two subsequent generations as well as programs beta-cell dysfunction in female offspring.

Substance Abuse: A recent federal report published by the United Stated government found that 320,000 babies were born having been exposed to alcohol and illicit drugs *in utero*, annually. It was also noted that a far larger number were exposed to sedatives and nicotine *in utero*. Not only can these offspring suffer from birth defects, but also mental retardation, learning disorders, anxiety, hyperactivity, and poor impulse control.

Stress: The 21st century woman has increasingly become a critical and even primary contributor to the financial resources of a family. The increased responsibility coupled with the physical and emotional demands of pregnancy make it unsurprising that many women perceive an increased stress load during this critical period of fetal development. In addition to an increased risk for preterm birth, maternal stress during pregnancy has also been linked to attention deficit and compulsive fear in offspring. Importantly, because development and programming of the brain is still occurring during early childhood life, the postnatal environment may also play a key role in patterning offspring behavior. Studies in rats have indicated that the degree to which the mother cares for her offspring has a significant impact on mothering behavior of her female offspring themselves and that these behaviors are epigenetically programmed resulting in altered gene expression in the brain.

Assisted Reproductive Technologies (ART): The development of ART has without question enhanced the life of many families that otherwise would not have been able to have children. These technological breakthroughs however are likely not without consequence. Certainly studies in livestock species related to cloning have found that inappropriate embryo culture conditions result in altered epigenetic states and can give rise to large offspring syndrome. Through diligent research many of these problems have been alleviated due to improved culture conditions, however given the relative infancy of the field of fetal programming and the often long delay between insult and disease penetrance it will be important for researchers to carefully monitor offspring to continue to improve these technologies. In humans, the first "test-tube baby" was Louise Brown born in 1978 in Great Britain. At the ripe old age of 34 the book is still unwritten regarding any long-term consequences of her "unique" entry to the world. Since 1978, more than 3 million IVF babies have been born worldwide.

Without question these recent discoveries have cemented the role of the reproductive biologist as the central guide in the never-ending quest to improve the lives of humans and animals alike. Our knowledge provides the earliest opportunities to promote lifelong health and well-being, while also developing intervention strategies that may be used to ameliorate problems when necessary. Wellness, however, can only be achieved with continued multidisciplinary approaches employed by reproductive biologists, nutritionists, geneticists, toxicologists, psychologists, engineers, and physicians. It is truly an exciting time to be a reproductive biologist!

- Commentary by Dr. Carey Satterfield, Assistant Professor, Department of Animal Science, Interdisciplinary Faculty of Reproductive Biology

IFRB Hot Papers, Spring 2012

Oncogene

Molecular Reproduction & Development

PNAS

Genome Research

Doan R, Cohen N, Harrington J, Veazy K, Juras R, Cothran G, McCue ME, Skow L, Dindot SV. (2012) Identification of copy number variants in horses. Genome Res 22:899-907.

Kim K, Jutooru I, Chadalapaka G, Johnson G, Frank J, Burghardt R, Kim S, Safe S. (2012) HOTAIR is a negative prognostic factor and exhibits pro-oncogenic activity in pancreatic cancer. Oncogene. May 21.[Epub ahead of print]

Kim J, Song G, Wu G, Bazer FW. (2012) Functional roles of fructose. Proc Nat Acad Sci USA May 23. [Epub ahead of print].

Su SC, Bayless KJ. (2012) Utilizing sphingosine-1-phosphate to stimulate sprouting angiogenesis. Methods Mol Biol 874:201-213.

Tessanne K, Golding MC, Long CR, Peoples MD, Hannon G, Westhusin ME. (2012) Production of transgenic calves expressing an shRNA targeting myostatin. Mol Reprod Dev 79:175-185.

Willis PM, Rosenthal GG, Ryan MJ. (2012) An indirect cue of predation risk counteracts female preference for conspecifics in a naturally hybridizing fish Xiphophorus birchmanni. PLoS One. 2012;7

Trainee News (cont'd from page 4)

Ted Wing, DVM, received a CVM Predoctoral Research Award 2012, for a proposal entitled, "Elucidation of Intercellular Signals That Allow Endothelial Progenitor Cells (EPCs) to Incorporate Into Established Vasculature," **Drs. Greg Johnson, Kayla Bayless and Robert Burghardt** serve as mentors,

*** Onkar Sawant** received a CVM-Predoctoral Research Award, 2010, for a proposal entitled "Role of the mTOR Signaling Pathway in the Neurodevelopmental Defects Caused by the Teratogenic Effect of Alcohol." **Drs. Shannon Washburn** and **Timothy Cudd** serve as mentors,

*** Beatriz Macías García, DVM, Ph.D.,** is a postdoctoral fellow in the laboratory of **Dr. Katrin Hinrichs** funded by an Estancia Breve grant from the Spanish Ministery of Eductaion, Science and Innovation. She was recently awarded an CVM Postdoctoral Research Award for a proposal entitled "Role of Protein Kinase A and Calcium-Calmodulin Signaling in the Regulation of Hyperactivated Motility of Equine Sperm. Results obtained have resulted in an abstract to the European Society for Domestic Animal Reproduction meeting in Dublin, Aug 29 - Sept 1, 2012 entitled, "Calmodulin, Calmodulin Kinase II and Extracellular Calcium are Implicated in the Control of Hyperactivated Motility in Stallion Sperm." She has also been invited to the C.E.S School of Veterinary and Zootechnics in Medellin (Colombia) for a talk, entitled "Assessing Semen Quality: Use of Advanced Techniques."

*** Kirthiram K Sivakumar** is a doctoral student who joined **Dr. Sakhila Banu's** laboratory in January, 2012. He is studying the effects of hexavalent chromium (CrVI) on female reproduction and fetal development. Kirthiram completed his M.S. in Biotechnology at TAMU in 2009 and continued as a Research Associate in the Food Safety and Environmental Microbiology lab at TAMU from 2009 to 2011, under the supervision of Dr. Suresh Pillai. He received his Bachelor degree in Industrial Biotechnology from Anna University, India.

Congratulations to IFRB Graduates:

*** Ligia Prezotto** earned a Physiology of Reproduction M.S. degree under the direction of **Drs. Gary Williams and Marcel Amstalden**. Her thesis title was, "Role of an Equine Homologue of Gonadotropin-Inhibiting Hormone in Controlling Secretion of Luteinizing Hormone in the Mare." She graduated in May, 2012 and is currently enrolled in a doctoral program at North Dakota State University where she will study nutritional physiology of ruminants.

Jeanne Garner, received a Ph.D. in Wildlife and Fisheries sciences under the direction of **Drs. Duncan MacKenzie and Delbert Gatlin.** Jeanne has been the Principal Investigator and Project Coordinator for the Leatherback Turtle Project at Sandy Point since 2002 and specializes in nutritional biology of marine animals. The title of her dissertation was "Reproductive Endocrinology of Nesting Leatherback Sea Turtles in St. Croix, US Virgin Islands."

Kevin O. Curley, Jr., received his Ph.D. degree in May, 2012, Physiology of Reproduction, under the direction of **Drs. Ronald D. Randel and Thomas H. Welsh, Jr.** The title of his dissertation was "Evaluation of a Bovine Temperament Model for Endophenotypes Associated with Hypothalamic-Pituitary-Adrenal Axis Dysfunction." Dr. Curley is a Lecturer in VIBS.

Azure N. Facucette, received her Ph.D. degree in May 2012, Physiology of Reproduction, under the direction of **Drs. David W. Forrest and Nancy H. Ing.** The title of her dissertation was "Changes in Gene Expression of Goat Developing Testes and Sperm during Breeding and Non-Breeding Seasons."

Ashley E. Navarrette completed a Physiology of Reproduction M.S. degree under the direction of **Dr. Todd R. Bilby**. The title of her thesis was "Genomic Differences Between High Fertile and Sub-fertile Holstein Dairy Heifers." She is currently working on a graduate program in the Department of Veterinary Physiology & Pharmacology.

Kelley C. Chiles completed a M.S. degree, Physiology of Reproduction under the direction of **Dr. David Forrest**. The title of her thesis was "Response to Incorporation of Supplemental Gonadotropins for Donor and Recipient Protocols in Commercial Bovine Embryo Transfer."

Brook Lyn Bradbury completed a M.S. degree, Physiology of Reproduction under the direction of **Drs. Ronald D. Randel and Thomas H. Welsh, Jr.** The title of her thesis was "Reproductive Performance in Domestic Ruminants."

*** Michelle Bedenbaugh**, an undergraduate student in ANSC completed the University Undergraduate Research Fellows program at TAMU and graduated with *Summa Cum Laude* recognition (GPR 4.0) in May 2012. Michelle will begin the M.S. in Physiology of Reproduction program in the Fall semester 2012.

Awards, etc. (cont'd from page 4)

College of Education, Tamil Nadu Teachers Education University, Tamil Nadu, India, January 16, 2012.
Chromium Toxicity and its role in cancer", PG and Research Department of Biotechnology and Bioinformatics lecture series, Holy Cross College, Bharathidhasan University, Trichy, India. January 18, 2012.
Dr. Banu, also received the Prof. P. Govindarajulu Endowment Award from the Society of Reproductive Biology and Comparative Endocrinology (SRBCE), India.
* **Fuller W. Bazer,** "Select Nutrients in the Uterine Lumen Affect Conceptus Development Via MTOR Cell Signaling," Yonsei University, Seoul, Republic of South Korea, April 4, 2012.
"Advance Education and Research In Animal Biotechnology" Department of Agricultural Biotechnology, Seoul National University, Seoul, South Korea, April 19, 2012,
"Inteferons in Pregnancy and Beyond," Department of Biomedical Science, Cha University, Seoul, South Korea, April 24, 2012.
* **Todd R. Bilby**, "Strategies to Improve Reproduction in Summer," National Webinar for eXtension, March 5, 2012.
* **Robert Burghardt**, "Integrating Advances in Optical Microscopy for Interdisciplinary Research and Education," University Lecture Series, North Dakota State University, April 26, 2012.
"Eavesdropping on Animal Cells and Tissues at the Micrometer to Nanometer Scale," Department of Animal Science, Center for Nutrition and Pregnancy and the Advanced Imaging and Microscopy Laboratory, North Dakota State University, April 27, 2012.
* **Greg Johnson,** Frontiers in Reproduction Molecular and Cellular Concepts and Applications, Marine Biological Laboratory, April 29-June 9. Lectures on Comparative Placentation.
* **Guoyao Wu,** "Arginine nutrition in mammalian reproductive function," State Key Animal Nutrition Laboratory Conference, Beijing, China, January 5-7, 2012.
"Synthesis and catabolism of amino acids in the lactating mammary gland," European Pediatric and Enteral Nutrition Conference, Stockholm, Sweden, April 26-28, 2012.

AWARDS

* **Kayla J. Bayless**, received The *Journal of Biological Chemistry* Herbert Tabor Young Investigator Award, which was presented at the Gordon Conference on Matrix Metalloproteinases. **Dr. Bayless** also received a College of Medicine, Junior Investigator Excellence in Research Award.

* **Greg Johnson,** Texas A&M Chapter, Gamma Sigma Delta, The Honor Society of Agriculture, Award of Merit, Teaching. 2012.

* **Shannon Washburn,** received the 2012, Texas Veterinary Medical Association Outstanding Research Scientist Award.

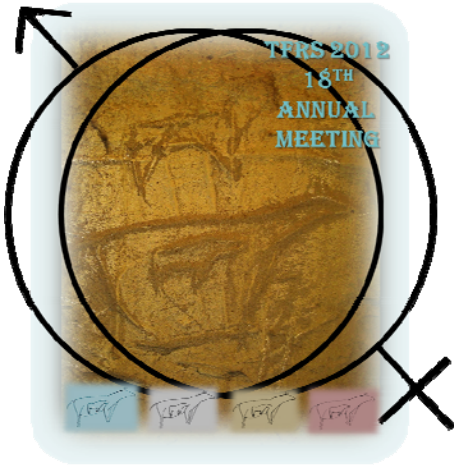
* **Guoyao Wu,** will become a University Distinguished Professor, effective Sept. 1, 2012 in recognition of his work that has caused a substantial intellectual leap forward in his discipline. Additional information will appear in the Fall, 2012 IFRB Newsletter.

18th Annual Texas Forum for Reproductive Sciences

The 18th Annual Texas Forum for Female Reproduction was held on April 12-13, 2012 at Rice University in Houston, TX in the new BioScience Research Collaborative Building. Over 120 participants from all major Texas universities registered for the meeting. Keynote lectures were presented by Drs. Dan Carson, Rice University ("MUC1 and Other Mucins: implantation, inflammation and therapeutic targeting") and John McCarrey, University of Texas – San Antonio ("Epimutations - Where do they come from and where to they go?"). The annual meeting serves as a venue for the exchange or research ideas and discoveries in the spectrum of reproductive sciences. Platform and poster sessions focus almost exclusively on trainee presentations.

Texas A&M University was well represented at the meeting. Two current and three former trainees presented platform session talks. Current trainees included **James (Will) Frank** ("A role for osetopontin and integrins in nutrient transport by placentae") and **Ahmed M. Taiyeb Ridha** ("Synchronization of oocyte meiotic maturation in superovulated mice improves in vitro fertilization rates"). Former trainees participating in the platform session included **Drs. Jay Ramadoss, Shay K. Lewis, and C. Allison Stewart**.

Trainees presenting posters included **JeHoon Lee** ("Selective inhibition of prostaglandin E2 receptors EP2 and EP4 inhibits adhesion of human endometriotic epithelial and stromal cells through integrin-mediated mechanisms"), **Theodore Wing** (Expression and regulation of genes for glucose and arginine transporters in pig uteri, conceptuses and placentae"), **Wei Ying** ("Regulation of expression and consequences of silencing translation of toll-like receptors 7 and 8 mRNAs in the ovine uterus"), **Greg Burns** ("Bovine embryo type, grade, and recipient synchrony, but not corpus luteum quality, influence pregnancy rates in commercial embryo transfer"), **Dr. YoungHo Choi** ("Application of preimplantation genetic diagnosis in the horse"), **Xiaoqui Wang** ("Effects of in vivo knockdown of translation of arginine-associated gene transcripts in conceptus trophectoderm an growth, development , and gene expression by ovine conceptuses"), and **Dr. Bryan White** ("Antagonism of the S1P signaling pathway affects placental and fetal development").



*-The logo for the 18th Annual TFRS Meeting was designed by **Dr. Greg A. Johnson**.*

Congratulations to **James (Will) Frank** who took first place honors in the platform competition and to former trainee **Dr. Shaye Lewis** who earned second place honors.

IFRB Productivity (cont'd from page 8)

Satterfield MC, Dunlap KA, Keisler DH, Bazer FW, Wu G. (2012) Arginine nutrition and fetal brown adipose tissue development in nutrient-restricted sheep. Amino Acids Dec 1 [Epub ahead of print]

Satterfield MC, Dunlap KA, Keisler DH, Bazer FW, Wu G. (2012) Arginine nutrition and fetal brown adipose tissue development in diet-induced obese sheep. Amino Acids. 2012 Feb 12. [Epub ahead of print]

Schulz VJ, Smit JJ, Huijgen V, Bol-Schoenmakers M, van Roest M, Kruijssen LJ, Fiechter D, Hassing I, Bleumink R, Safe S, van Duursen MB, van den Berg M, Pieters RH. (2012) Non-dioxin-like AhR ligands in a mouse peanut allergy model. Toxicol Sci Apr 6. [Epub ahead of print]

Selvamani A, Sathyan P, Miranda RC, Sohrabji F. (2012) An antagomir to microRNA Let7f promotes neuroprotection in an ischemic stroke model. PLoS One 7(2):e32662.

Spencer TE, Dunlap KA, Filant J. (2012) Comparative developmental biology of the uterus: insights into mechanisms and developmental disruption. Mol Cell Endocrinol 354:34-53.

Stanley JA, Aruldhas MM, Chandrasekaran M, Neelamohan R, Suthagar E, Annapoorna K, Sharmila S, Jayakumar J, Jayaraman G, Srinivasan N, Banu SK. (2012) Androgen receptor expression in human thyroid cancer tissues: a potential mechanism underlying the gender bias in the incidence of thyroid cancers. J Steroid Biochem Mol Biol 130:105-124.

Su SC, Bayless KJ. (2012) Utilizing sphingosine-1-phosphate to stimulate sprouting angiogenesis. Methods Mol Biol 874:201-213.

Tan B, Li X, Yin Y, Wu Z, Liu C, Tekwe CD, Wu G (2012) Regulatory roles for L-arginine in reducing white adipose tissue. Front Biosci 17:2237-2246.

Tessanne K, Golding MC, Long CR, Peoples MD, Hannon G, Westhusin ME. (2012) Production of transgenic calves expressing an shRNA targeting myostatin. Mol Reprod Dev 79:176-185.

Velez IC, Pack JD, Porter MB, Sharp DC, Amstalden M, Williams GL. (2012) Secretion of luteinizing hormone into pituitary venous effluent of the follicular and luteal phase mare: novel acceleration of episodic release during constant infusion of gonadotropin-releasing hormone. Dom Anim Endocrinol 42:121-128.

Verzijden MN, Culumber ZW, Rosenthal GG. (2012) Opposite effects of learning cause asymmetric mate preferences in hybridizing species. Behav Ecol, in press.

Wang J, Wu Z, Li D, Li N, Dindot S, Satterfield MC, Bazer FW, Wu G. (2012) Nutrition, epigenetics, and metabolic syndrome. Antioxidants and Redox Signal 17:282-301.

Wang X, Yang F, Liu C, Zhou H, Wu G, Qiao S, Li D, Wang J. (2012) Dietary supplementation with the probiotic Lactobacillus fermentum I5007 and the antibiotic aureomycin differentially affects the small intestinal proteomes of weanling piglets. J Nutr 142:7-13.

Wei J, Carroll RJ, Harden KK, Wu G. (2012) Comparisons of treatment means when factors do not interact in two-factorial studies. Amino Acids 42:2031-2035.

Weems YS, Bridges PJ, Jeoung M, Arreguin-Arevalo JA, Nett TM, Vann RC, Ford SP, Lewis AW, Neuendorff DA, Welsh TH Jr, Randel RD, Weems CW. (2012) In vivo intra-luteal implants of prostaglandin (PG) E1 or E2 (PGE1, PGE2) prevent luteolysis in cows. II: mRNA for PGF2a, EP1, EP2, EP3 (A-D), EP3A, EP3B, EP3C, EP3D, and EP4 prostanoid receptors in luteal tissue. Prostaglandins Other Lipid Mediat 97:60-65.

Williams GL, Thorson JF, Prezotto LD, Velez IC, Cardoso RC, Amstalden M. (2012) Reproductive seasonality in the mare: neuroendocrine basis and pharmacological control. Dom Anim Endo http://dx.doi.org/10.1016/j.domaniend.2012.04.001

Willis PM, Rosenthal GG, Ryan MJ. (2012) An indirect cue of predation risk counteracts female preference for conspecifics in a naturally hybridizing fish Xiphophorus birchmanni. PLoS One. 2012;7 (4):e34802.

Wilson H, Chadalapaka G, Jutooru I, Sheppard S, Pfent C, Safe S. (2012) Effect of Tolfenamic acid on canine cancer cell proliferation, specificity protein (Sp) transcription factors, and sp-regulated proteins in canine osteosarcoma, mammary carcinoma, and melanoma cells. J Vet Intern Med Apr 27.[Epub ahead of print]

Yao K, Yin Y, Li X, Xi P, Wang J, Lei J, Hou Y, Wu G. (2012) Alpha-ketoglutarate inhibits glutamine degradation and enhances protein synthesis in intestinal porcine epithelial cells. Amino Acids 42:2491-500.

Zhang S, Kim K, Jin UH, Pfent C, Cao H, Amendt B, Liu X, Wilson-Robles H, Safe S. (2012) Aryl hydrocarbon receptor agonists induce microRNA-335 expression and inhibit lung metastasis of estrogen receptor negative breast cancer cells. Mol Cancer Ther 11:108-118.

Zhuang G, Meng C, Guo X, Cheruku PS, Shi L, Xu H, Li H, Wang G, Evans AR, Safe S, Wu C, Zhou B..(2012) A Novel Regulator of Macrophage Activation: miR-223 in obesity associated adipose tissue inflammation. Circulation May 11. [Epub ahead of print]

Interdisciplinary Faculty of Reproductive Biology at Texas A&M University

Mail Stop 2471

College Station, TX 77843-2471

Phone: 979-845-5929

Fax: 979-862-2662

Email: ifrb@tamu.edu

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.