

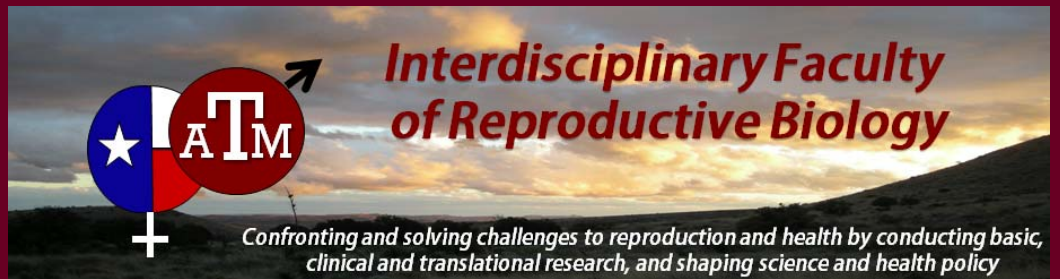
## IFRB 2013

### POINTS OF INTEREST:

- The IFRB was organized in 1992 and is one of the largest Reproductive Biology Programs in the US
- Membership includes 43 faculty from 5 departments, 3 colleges, 4 TAMUS components and 2 state agencies
- IFRB sponsored activities: 19th Annual R.O. Berry Lecture, 22 year old IFRB Repro Forum Seminar Series, 19th Texas Forum on Reproductive Sciences, Annual IFRB Retreat

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2013, ISSUE 2

FALL, 2013

## New IFRB Faculty Spotlight



Many fertility-related loci have been identified by genetic studies involving knockout, transgenic, and mutagenic studies in mice. The characterization of numerical imbalances in the genome and that result in disorders of sexual development and infertility has advanced our understanding of genes required for normal development and function of the reproductive tract. These regions can be caused by non-allelic homologous recombination between segments of low-copy repeats during meiosis. The resulting numerical imbalances or Copy Number Variations (CNVs) can result in changes in segments of the genome that disrupt genes or gene regulatory sequences. Subsequent changes in gene expression are observed in dosage sensitive genes. Based on current measures of heritability, often CNVs and associated phenotypes are caused by de novo imbalances. The "missing heritability" is debatable but predictions based on parental genotypes often have no predictive value for offspring genotypes.

Fertility characteristics traditionally show low heritability; it is a multi-factorial, complex trait influenced by multiple genes or gene interactions, endocrine, and



environmental factors in isolation or in combination. This makes fertility-related selection practices impractical in livestock species. Furthermore, selection for various genotypes beneficial for production traits has resulted in simultaneous selection against advantageous fertility-related genotypes.

**Dr. Shaye K. Lewis**, recently hired as a Research Scientist in the Cooperative Agriculture Research and International Goat Research Centers at Prairie View A&M University, is the newest member of the Interdisciplinary Faculty of Reproductive Biology. Dr. Lewis received

his Ph.D. in Physiology of Reproduction in the laboratories of **Drs. Fuller Bazer** and **Thomas Spencer** where he characterized the genomic structure and functional activities of the promoters of implantation related genes. Upon completion of his Ph.D., Dr. Lewis joined the laboratory of Dolores Lamb at Baylor College of Medicine as a NIDDK Fellow in the Department of Urology. His work at BCM focused on the identification of chromosomal structural variations resulting in copy number gains and losses in patients diagnosed with combined hypospadias and cryptorchidism. He showed that these subtle chromosome aberrations affect dosage sensitive genes

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## Reproductive Biology & One Health



**The One Health concept is a worldwide strategy for expanding interdisciplinary collaborations and communications in all aspects of health care for humans, animals and the environment.** Because reproductive biology is at the epicenter of the life sciences, the field has long played an important role in contributing to the goal of providing optimal health for people, animals and the environment.

Reproduction is essential for the health and well-being of human, livestock, companion animal, and wildlife

populations. The vision of the IFRB is to have Reproductive Biologists address challenges to reproduction and health by conducting basic, clinical and translational research and by shaping science and health policy using an integrated multidisciplinary research team approach. This approach will allow the transfer of knowledge from the laboratory to the classroom, clinic (human and veterinary), field (animal agriculture and wildlife management), community (information, policy, education), and environment. In this way, Texas A&M University will be a

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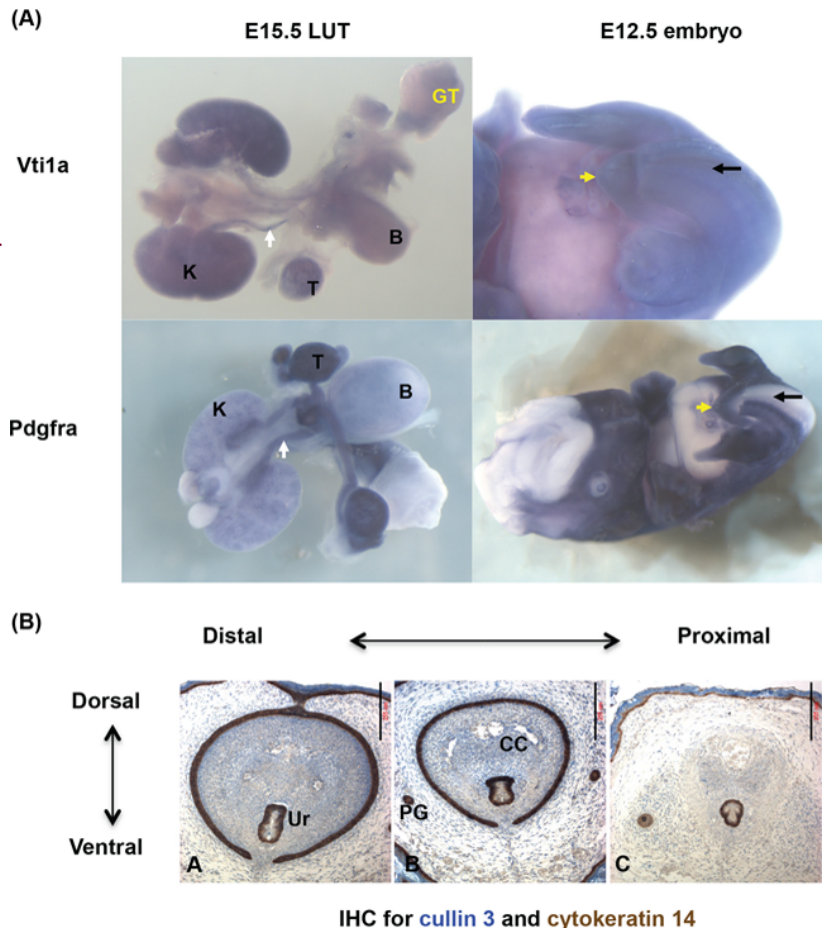
## New IFRB



**Figure 1 (Below)**  
 Schematic of aCGH data showing chromosomal imbalances in patients with congenital GU defects. Chromosomal imbalances affecting 16p11.2, a region associated with Autism Spectrum Disorder. They all showed abnormal urethral development, testicular descent and cleft palate. There are about 27 genes located in this region. The dotted lines indicate minimal affected regions and associated genes.

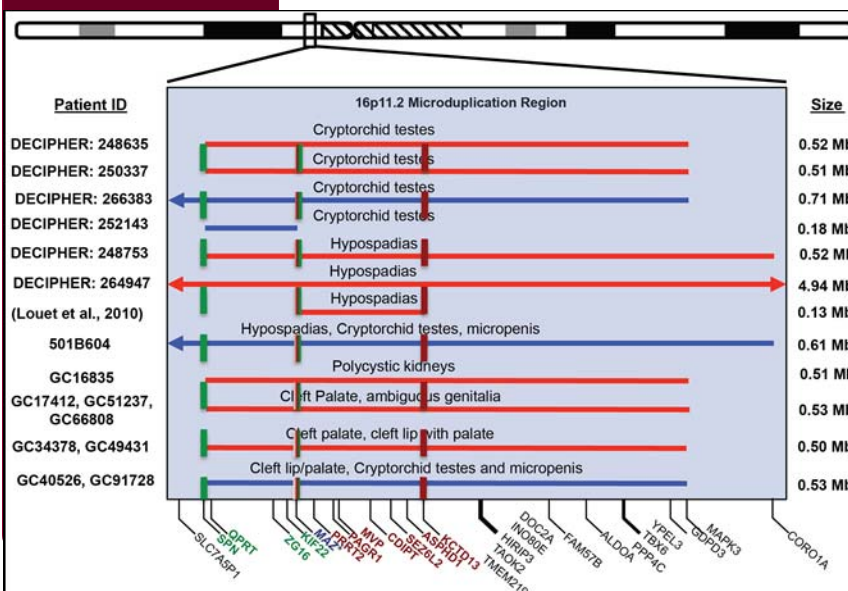
in regions that are critical for genitourinary (GU) tract development. Sex-matched genomic DNA (gDNA) from men of proven fertility and normal development served as a control. Genomic hybridization from control gDNA was compared to gDNA from subjects with diseases of the GU tract including hypospadias and cryptorchidism by aCGH using 720K NimbleGen arrays (Roche). Subjects with diseases of the GU tract displayed distinct genomic regions affected by submicroscopic chromosome duplications or deletions not detected in normal pregnancy proven fertile controls, or in the Database of Genomic Variants (<http://projects.tcag.ca/variation/>). These submicroscopic imbalances affected genes involved in intracellular protein turnover in the ubiquitin proteasome system (UPS).

One such candidate region is 16p11.2 (**Figure 1**). The approximately 600 KB duplication affects 27 known genes and is associated with Autism Spectrum Disorder. None of the indicated patients presented with Autism Spectrum Disorder Syndrome but rather with congenital GU tract defects. A candidate gene in this region is potassium channel tetramerisation domain containing 13 (KCTD13), a substrate recognition domain



**IHC for cullin 3 and cytokeratin 14**

**Figure 2. Expression of novel genes important for the development of the GU tract.** Genes involved in protein turnover are expressed in the GU tract during development in mice. (A) Whole mount ISH for *Vti1a* and *Pdgfra* in mouse E15.5 lower urinary tract (LUT) or E12.5 whole embryo. Expression was detected in the Kidneys (K), Testes (T), Bladder (B), and Ureters (white arrow), tail (black arrow). Yellow arrow is genital tubercle (GT). (B) Serial sections of mouse E17.5 GT. Cullin 3 Protein (blue) is abundant throughout the GT in the epithelial and stromal compartments including the preputial glands (PG) and urethra (Ur).







# IFRB Faculty Spotlight: Dr. Katrin Hinrichs

**Dr. Katrin Hinrichs, DVM, PhD**, is a Professor in the Department of Veterinary Physiology and Pharmacology and holds the Pasty Link Chair in Mare Reproductive Studies at TAMU. The focus of her research is oocyte maturation, fertilization and early embryo development in the horse. Her laboratory has pioneered assisted reproductive techniques in the horse, achieving the birth of the first foal from an in vitro-produced embryo in North America and the birth of the first cloned horse foal in North America.

Dr. Hinrichs became interested in research while performing a Residency in Large Animal Reproduction at the University of Pennsylvania's School of Veterinary Medicine where she also completed a PhD studying early embryonic development in the horse, focusing on the hormonal requirements for pregnancy in ovariectomized mares and the effects of the synchronous and asynchronous uterine environment on embryo development and uterine protein profiles. Dr. Hinrichs then took a faculty position at Tufts University, where she concentrated on the biology of the horse oocyte. Her group found that horse oocytes could mature after transfer to the follicles of live mares and produce embryos. She subsequently determined the relationships among follicle atresia, germinal vesicle chromatin configuration, and meiotic competence oocytes, which unlocked the door to establishing methods for effective oocyte in vitro maturation.

In 1998, Dr. Hinrichs joined the faculty at the TAMU College of Veterinary Medicine. Here, along with colleague Dr. Young-Ho Choi, she pioneered efficient methods for equine intracytoplasmic sperm injection (ICSI), and, subsequently, for in vitro culture of fertilized equine oocytes to the blastocyst stage. Dr. Hinrichs' research has had an immense impact on understanding of factors affecting oocyte maturation, fertilization, and early embryo development in the horse, including the findings that: 1) equine embryos require high glucose levels for development to the blastocyst stage; thus establishing the first protocol for in vitro equine embryo culture that resulted in efficient blastocyst development; 2) that in vitro matured oocytes have normal fertilization rates in vitro, indicating that the failure of equine IVF is not due to zona hardening; 3) that oocyte origin (degree of follicle atresia), duration of ovary transport and duration of oocyte maturation interact to affect developmental competence of horse oocytes; 4) that the equine embryo fails to

differentiate (regulate expression of POU5F1) appropriately in vitro, but that this is corrected after transfer to the uterus; 5) that injection of murine PLC $\zeta$  cRNA induces Ca<sup>2+</sup> oscillations, activation, and embryo development in equine oocytes; 6) that the equine embryonic capsule may be breached and expanded blastocysts biopsied without a detrimental effect on viability; and 7) that equine expanded blastocysts may be collapsed for effective vitrification.

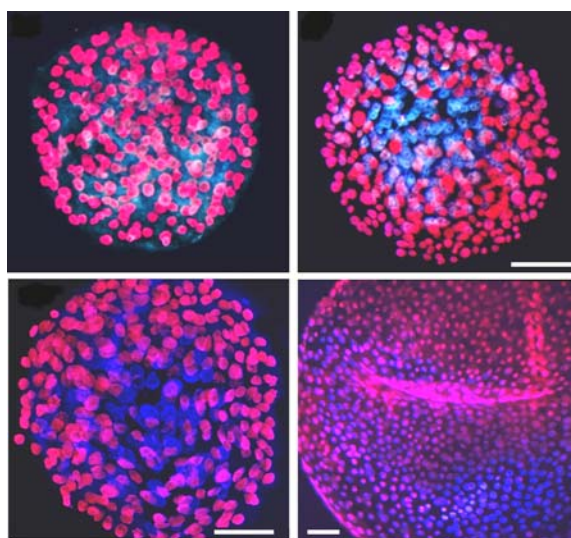
Once the ICSI procedure was repeatedly efficient, her group started performing research aimed at translating the procedure for use in the clinics. Her laboratory determined that equine sperm could undergo two freeze/thaw cycles without effect on capability to produce embryos after ICSI, identified methods for holding of oocytes to schedule maturation and subsequent manipulation, and evaluated methods for transport of ovaries. To this end, they also evaluated methods for collection of oocytes from live mares, determining that transvaginal aspiration of immature follicles was repeatable and produced adequate numbers of oocytes for potential embryo production without being detrimental to



*The Equine Embryo Laboratory: (Top row) Dr. Beatriz Macías García, Shela Spacek, Drs. Isabel Catalina Velez and Lauro Gonzalez Fernández. Bottom row: Drs. Young Ho Choi and Shavahn Loux, Linda Love, and Dr. Katrin Hinrichs*

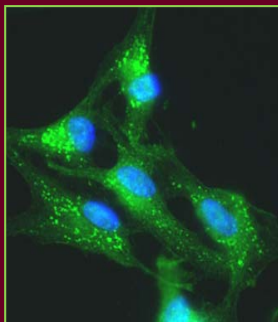
mare health. Based on these research results, Dr. Hinrichs' laboratory started a clinical program in equine ICSI at Texas A&M University, offering embryo production both post-mortem, from valuable mares that suffer untimely death, and, in conjunction with the Section of Theriogenology in the Large Animal Veterinary Teaching Hospital, after oocyte collection from live mares. In the 2013 breeding season, the equine ICSI program at TAMU performed 144 aspirations on client mares, collecting 1,100 oocytes and producing 162 blastocysts that were transferred to recipient mares or vitrified for later transfer.

Concurrently, Dr. Hinrichs' group has continued to explore standard IVF in the horse, focusing on reasons for its failure in relation to sperm capacitation. They collaborated with scientists at Cornell University, to determine that after induction of tyrosine phosphorylation (PY) in sperm, treatment to stimulate hyperactivated motility increased rates of equine IVF. They also reached the novel finding that PY of equine sperm was modulated by medium pH independently of presence of calcium, bicarbonate or albumin in the capacitation medium, and that, at low pH, both calcium and albumin inhibit PY. Additionally, in contrast to findings in other species, albumin did not remove cholesterol from the equine sperm plasma (continued on page 5)



*In vitro-produced (top) and in vivo-produced (bottom) equine embryos stained to show trophoblast (red) and inner cell network (blue).*

## IFRB Trainee News



**Immunofluorescence localization of the  $\alpha$  integrin subunit in endothelial precursor cells (EPCs). In his thesis, Ted Wing demonstrated EPCs use  $\alpha$ v-containing integrin receptors to bind osteopontin, and this interaction significantly increases the number of EPCs that incorporate into vascular structures in vitro.**

**\*Ted Wing** recently completed the requirements for a M.S. degree in Biomedical Sciences working in the labs of **Drs. Greg Johnson, Kayla Bayless and Robert Burghardt**. Ted's graduate work focused on the contribution of integrins and osteopontin on endothelial cell incorporation into developing vasculature and the expression and regulation of genes for glucose and arginine transporters in pig uteri, conceptuses and placentae that increase during pregnancy. He was a recipient of one of the Society for the Study of Reproduction's major trainee award, a 2013 Animal Research in Reproduction Fellowships from the USDA. He was also a finalist in the Trainee Research Platform Competition.



**\*Shavahn Loux** recently completed requirements for the Ph.D. degree in Biomedical Sciences working with Dr. Katrin Hinrichs. She defended her dissertation, "Hyperactivated Motility of Stallion Spermatozoa," in September, 2013. One of the papers from this work, entitled "CatSper and the relationship of hyperactivated motility to intracellular calcium and pH kinetics in equine sperm," was published on line in *Biology of Reproduction* on Sept. 18. Shavahn also attended the Gordon Research Conference on Fertilization and Activation of Development, July 13-10, 2013, where she presented a poster entitled, "The effect of calcium, pH and motility factors on the axoneme of demembrated stallion spermatozoa." (continued on page 10)



## Dr. Wu Organizes ICAAP, Publishes New Book

The 13th International Congress on Amino Acids, Peptides and Proteins (ICAPP), a traditionally European scientific meeting, was held for the first time in North America on Oct. 5-7, 2013 in Galveston, Texas.

Scientific topics discussed include biochemistry, biomedicine, chemistry, food science, immunology, nutrition, physiology, pharmacology, reproduction, and toxicology of amino acids, peptides, and proteins, as well as genetics and bioinformatics related to their synthesis, catabolism, and utilization in humans and other animal species. Submitted abstracts spanned a wide range of research involving animals (e.g., fish, mice, rats, pigs and sheep), humans, microorganisms, plants, and cell culture models.

**Dr. Guoyao Wu**, University Distinguished Professor in the Department of Animal Science, served as the current president of ICAPP and was instrumental in bringing the conference and more than 200 international scientists to the United States. "More than 135 papers from 32 countries and regions were presented at the 13th ICAPP. It was our goal that the forum provide an invaluable opportunity for both scientists and graduate students to learn about exciting research conducted outside of their own laboratories, foster new research collaborations, develop long-lasting friendships, and freely exchange scientific ideas in a relaxing setting," Wu said. **Dr. Fuller Bazer**, University Distinguished Professor, delivered one of the keynote addresses entitled "Amino acids, peptides and proteins as histotroph in embryo development: discoveries and important roles in reproductive health." Additionally, 12 faculty including **Drs. Kevin Burgess, Raymond Carroll, Greg Johnson, Cynthia Meininger, Carey Satter-**

**field, Stephen Smith, Carmen Tekwe, and Shannon Washburn** and IFRB graduate students from the multiple academic units of Texas A&M University presented their current research.

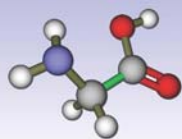
**Dr. Wu's new book, *Amino Acids Biochemistry and Nutrition*, was published in**

**April**. The book spans a broad range of fields including biochemistry, metabolism, physiology, immunology, reproduction, pathology, and cell biology. Comprehensive coverage of technical advancements, from analysis of amino acids by high-performance liquid chromatography and mass spectrometry to molecular cloning of transporters for amino acids and small peptides are included. The text begins with the discoveries and basic concepts of amino acids, peptides, and proteins, and then moves to protein digestion and absorption of peptides and amino acids. Additional chapters cover cell-, tissue-, and species-specific synthesis and catabolism of amino acids and related nitrogenous substances, as well as the use of isotopes to study amino acid metabolism in cells and the body. The book also details protein synthesis and degradation, regulation of amino acid metabolism, physiological functions of amino acids, and inborn errors of amino acid metabolism.



### AMINO ACIDS

Biochemistry and Nutrition



GUOYAO WU



**Amino Acids: Biochemistry and Nutrition by Dr. Guoyao Wu was published April 24, 2013. The hardback format has 503 pages**



# IFRB Seminar Series, Fall 2013

The IFRB Seminar Series, Reproductive Biology Forum, has been held weekly during the Fall and Spring Semesters since 1990. The 2013 IFRB Seminar Series, coordinated by **Dr. Qinglei Li**, continues to provide an excellent combination of seminars from internationally recognized reproductive biologists from outside and inside the university along with advanced IFRB trainees:

September 6 **Dr. Marcel Amstalden**, Chair IFRB, IFRB General Business Meeting.

September 13 **Shavahn Loux**, Ph.D. Candidate, Veterinary Physiology & Pharmacology, TAMU, "Hyperactivated motility of stallion spermatozoa: the relationship of calcium and pH." Hosted by **Dr. Katrin Hinrichs**.

September 20 **Dr. Marcel Amstalden**, Animal Science, TAMU, "Neuroendocrine pathways controlling the onset of puberty in ruminants," Hosted by **Dr. Qinglei Li**.

September 27 **Dr. Milo Wiltbank**, Department of Dairy Science, University of Wisconsin, "Regression of the corpus luteum: molecular mechanisms and practical implications." Hosted by **Dr. Fuller Bazer**.

October 4 **Dr. Katrin Hinrichs**, Veterinary Physiology & Pharmacology, TAMU, "Clinical application of assisted reproduction in the horse," Hosted by **Dr. Qinglei Li**.

October 11 **Reproductive Biology Retreat** (Coordinator: **Dr. Qinglei Li**) Minisymposium speakers: **Dr. Beiyang Zhou**, Veterinary Physiology & Pharmacology, "Macrophage polarization and insulin

resistance."

**Dr. Rajesh C. Miranda**, Neuroscience and Experimental Therapeutics, Texas A&M Health Science Center, "microRNAs, fetal brain development and teratology."

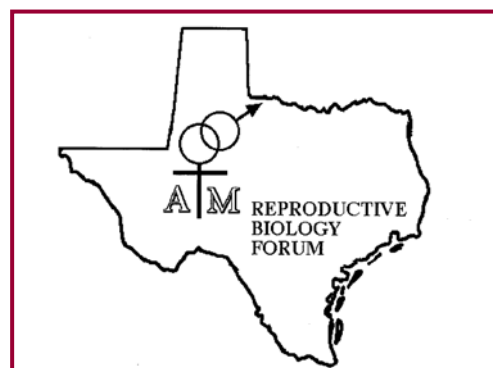
**Xiaoqiu Wang**, M.S., Animal Science, TAMU, "Arginine and secreted phosphoprotein 1 (SPPI) act synergistically to stimulate MTORC1/ MTORC2 cell signaling and cytoskeletal organization for proliferation, migration and adhesion of ovine trophectoderm cells." **Rodolfo C. Cardoso**, D.V.M., M.S., Animal Science, TAMU, "Nutritional and metabolic programming of the onset of puberty in beef heifers." **Will Frank**, M.S., Veterinary Integrative Biosciences, TAMU, "Loss of integrin subunit  $\beta 3$  during the peri-implantation period leads to fetal growth retardation in the sheep."

**Dr. R.O. Berry Memorial Lecture** (Coordinator: **Dr. Fuller Bazer**).

**Dr. Duane C. Kraemer**, Veterinary Physiology & Pharmacology, "Memories of Dr. Raymond O. Berry."

**Thaddeus G. "Ted" Golos**, Ph.D., Professor, Departments of Comparative Biosciences and Obstetrics and Gynecology, and Co-chair, Regenerative and Reproductive Medicine Working Group, Medical and Veterinary Medicine Schools, University of Wisconsin, "The primate maternal-fetal interface: placental interactions with the maternal immune system for programming successful pregnancy outcome."

October 18 **Dr. Bruce Christensen**, University of California-Davis, "Reproductive



challenges in wild canid captive breeding programs," Hosted by **Dr. Katrin Hinrichs**.

October 25 **Kylee Veazey**, Veterinary Physiology & Pharmacology, TAMU, "Ethanol-induced epigenetic errors in early developmental programming: Is timing everything?" Hosted by **Dr. Michael Golding**. **Yang Gao**, Veterinary Integrative Biosciences, TAMU, "TGF $\beta$  signaling regulates myometrial development," Hosted by **Dr. Qinglei Li**.

November 1 **Dr. Joe Arosh**, Veterinary Integrative Biosciences, TAMU, "Prostaglandin E2 dysregulates microRNAs through epigenetic pathways cross-talk in endometriosis," Hosted by **Dr. Qinglei Li**.

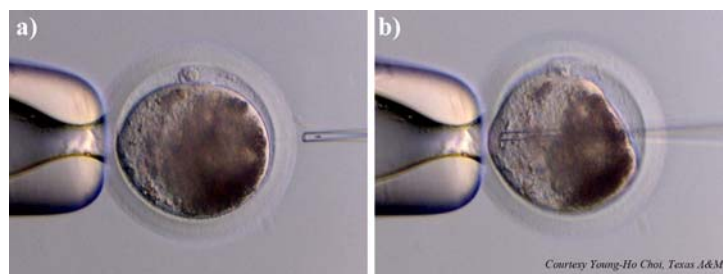
November 8 **Dr. Beiyang Zhou**, Veterinary Physiology & Pharmacology, TAMU, "Non-coding RNA regulation in obesity and insulin resistance," Hosted by **Dr. Qinglei Li**.

November 15 **Dr. Humphrey Yao**, National Institute of Environmental Health Sciences, "How to make a gonad: from cell fate determination to organ formation," Hosted by **Dr. Qinglei Li**.

November 22 **Dr. Dekai Zhang**, Institute of Biosciences and Technology, Texas A&M Health Science Center, "TBA," Hosted by **Dr. Fuller Bazer**.

## Faculty Spotlight, cont'd from page 3

membrane, indicating a difference in the mechanism for cholesterol efflux, a basic tenet of capacitation, in the horse. **Dr. Hinrichs'** work has uncovered novel pathways in sperm capacitation, revealing that the PY induced in the absence of  $\text{Ca}^{2+}$  occurs via the canonical cAMP-PKA pathway; however, PY induced in the presence of calcium but inhibition of calmodulin is not affected by inhibitors of the canonical pathway. This work uncovered a novel tyrosine kinase (PTK2/2B) in sperm that appeared to be downstream of both pathways, and that may be the tyrosine kinase directly responsible for protein tyrosine phosphorylation in sperm capacitation. Since hyperactivation in equine sperm appeared to be under different control from that in other species, her group has gone on to examine mechanisms for induction of this essential component of sperm fertilizing ability, finding that equine sperm possess the  $\text{Ca}^{2+}$  channel, CatSper, that is required for hyperactivated motility in other species, and that increased intracellular pH results in increases in intracellular  $\text{Ca}^{2+}$  and in hyperactivated motility parameters; however, in contrast to findings in other species, the degree of hyperactivated motility appeared to be inversely related to the rise in intracellular  $\text{Ca}^{2+}$ . Direct evaluation of  $\text{Ca}^{2+}$  effects in demembrated equine sperm supported a difference in  $\text{Ca}^{2+}$  response, as hyperactivat-

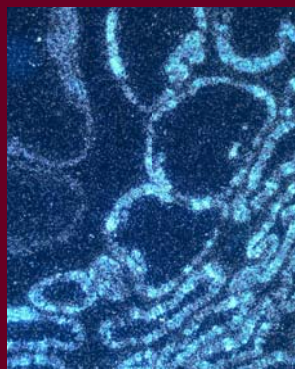


ed motility was not induced by raising bath  $\text{Ca}^{2+}$ , and the sperm arrested at logarithmically lower  $\text{Ca}^{2+}$  concentrations than those effective in other species. Her aim is to continue work on both oocyte and sperm biology to shed light on mechanisms for fertilization in the horse.

**Dr. Hinrichs** has received numerous honors for her work, including an honorary doctorate from the University of Copenhagen, the Theriogenologist of the Year award from the American College of Theriogenologists, the Outstanding Faculty Award from Tufts University, and the SmithKline Beecham Award for Research Excellence. She has served on the International Equine Reproduction Symposium committee, the Domestic Animal Biotechnology committee of the International Embryo Transfer Society, the Biotechnology committee of the Society for Theriogenology, and the Education committee for the SSR.



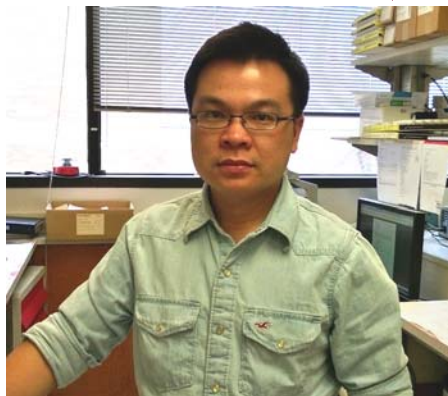
## Trainee Spotlight: Wei (Eddie) Ying



*In situ hybridization of uteroferrin mRNA in Day 141 pig uterus showing abundant expression in uterine glands.*

- Image provided by Dr. Fuller W. Bazer

**Wei (Eddie) Ying**, is a second year Ph.D student in the Department of Animal Science, under the mentorship of **Drs. Fuller W. Bazer** (Department of Animal Science) and **Beiyan Zhou** (Department of Veterinary Physiology and Pharmacology). He received the B.S. degree in Animal Nutrition from China Agricultural University and the M.S. in Animal Nutrition from Kansas State University. At Texas A&M, his research has been focusing on the regulation of obesity-associated inflammation and insulin resistance, nutrient metabolism during pregnancy, and hematopoiesis. His initial research involved an investigation of arginine metabolism in ovine conceptuses and uteri, under supervision of **Drs. Fuller Bazer and Guoyao Wu**. His study revealed that arginine can be metabolized by arginine



decarboxylase to agmatine and agmatine can be converted by agmatinase in an alternative pathway for synthesis of polyamines in the ovine conceptus and uterus. This was the first evidence for this pathway being active in reproductive tissues of a mammal.

As a joint student of Drs. Fuller W. Bazer and Beiyan Zhou, Eddie expanded his research scope to understand the function of other pregnancy

related factors. For example, Eddie found that uteroferrin (UF), a pregnancy related cytokine discovered by Dr. Bazer's lab, can modulate fetal hematopoietic development, specifically, terminal erythropoiesis. His discovery suggests that UF can stimulate red blood cell formation by enhancing the differentiation of erythrocyte progenitors at various stages and the re- (continued on page 8)

## 46th Annual SSR Meeting

The 46th Annual Meeting of the Society for the Study of Reproduction was held at the Palais des congrès de Montréal, Montréal, Québec, Canada, 22-26 July 2013.

The IFRB was again well represented at the meeting with reports involving 16 faculty members and 24 trainees.

Faculty from TAMU contributing to papers presented included **Drs. Marcel Amstalden, Joe A. Arosh, Kayla J. Bayless, Sakhila K. Banu, Fuller W. Bazer, Robert C. Burghardt, W. Les Dees, Kathrin A. Dunlap, Jill Hiney, Greg A. Johnson, Duane C. Kraemer, Qinglei Li, Charles Love, M. Carey Satterfield, Gary L Williams, and Guoyao Wu**.

Trainee participants included **Bruna R.C. Alves, Ahmed T. Albarzanchi, Michelle Bedenbaugh, Chelsie Burroughs, Rodolfo C. Cardoso, Hannah DelCurto, David Erikson, James Frank, Yang Gao, Ashley B. Keith, Michael Kjelland, JeHoon Lee, Songrui Liu, Thamizh K.**

**Nithy, Irene Ruiz-Gonzales, Kirthiram K Sivakumar, Jones A. Stanley, Michael Uzelac, Churchill Wang, Ted Wing, Jean Xu, Eddie Ying and Xiaoling Zhu.**

Current and former IFRB trainees and faculty were recipients of major SSR awards. **Ted Wing** was a recipient of the 2013 Animal Research in Reproduction Fellowships from the USDA. He was also a finalist in the Trainee Research Competition (Platform). Former trainee, now faculty member at Yonsei University, Korea, **Dr. Hakhyun Ka**, was the recipient of the 2013 SSR International Scholar Award which was jointly sponsored by the Korean Society for Animal Reproduction and the SSR. Dr. Ka obtained his Ph.D. under **Dr. Fuller Bazer**. Former IFRB faculty member, **Dr. Tom Spencer**, received the 2013 SSR Research Award that recognizes an active SSR member who has published outstanding research in the past six years. The work recognized by this award was performed while Dr. Spencer was a member of the IFRB faculty at TAMU.

Recipients of the Larry Ewing Memorial Trainee Travel Fund Awards (LEMTTF), administered by the Trainee Affairs Committee were **Michelle Bedenbaugh, Chelise A. Burroughs, Rodolfo Cardoso, Hannah M. DelCurto, Ashley Keith, Yang Gao, Irene Ruiz-Gonzalez, Xiaoqi Wang, Theodore Wing, Jing Xu, Wei Ying, and Xiaolong Zhu.**

Additional travel awards to attend the SSR meeting were provided by the IFRB with funding 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. Trainees supported included **Michelle Bedenbaugh, Chelise A. Burroughs, Rodolfo Cardoso, Hannah M. DelCurto, Ashley Keith, Yang Gao, Irene Ruiz-Gonzalez, Xiaoqi Wang, Theodore Wing, Jing Xu, Wei Ying**. Two other trainees received travel awards to attend the American Dairy Science Association (ADSA) American Society of Animal Science (ASAS) Science 2013 Joint Annual Meeting in Indianapolis, IN, July 8 - 12, 2013, including **Brittni Littlejohn, Meghan Roberts and Sarah Schmidt**.

SSR 



Society for the Study of Reproduction

# A Snapshot of IFRB Research, Fall 2013

**The IFRB is recognized as one of the most productive interdisciplinary research and education programs in reproductive biology in the U.S. The following “snapshot” of research productivity illustrates the multiple investigator research activities of the IFRB involving extensive participation of trainees during the 5 month period June 1 to November 1, 2013:**

- Alvarez-Gallardo H, Kjelland ME, Moreno JF, Welsh TH Jr, Randel RD, Lammoglia MA, Pérez-Martínez M, Lara-Sagahón AV, Esperón-Sumano AE, Romo S (2013) Gamete therapeutics: recombinant protein adsorption by sperm for increasing fertility via artificial insemination. *PLoS One* 8(6):e65083.
- Andey T, Patel A, Jackson T, Safe S, Singh M (2013) 1,1-Bis (3'-indolyl)-1-(p-substitutedphenyl)methane compounds inhibit lung cancer cell and tumor growth in a metastasis model. *Eur J Pharm Sci* 50(2):227-241.
- Bae SM, Lim W, Jeong W, Lee JY, Kim J, Han JY, Bazer FW, Song G (2013) Hormonal regulation of beta-catenin during development of the avian oviduct and its expression in epithelial cell-derived ovarian carcinogenesis. *Mol Cell Endocrinol* 382(1):46-54.
- Bae SM, Lim W, Jeong W, Lee JY, Kim J, Bazer FW, Song G (2013) Sex-specific expression of CTNBN1 in the gonadal morphogenesis of the chicken. *Reprod Biol Endocrinol*. 2013 Sep 11;11(1):89. [Epub ahead of print]
- Banu SK (2013) Heavy Metals in the Ovary. In: Ovarian Toxicology, Second Edition, P.B. Hoyer, Ed, CRC Press, Taylor & Francis Group pp 193-299.
- Bazer FW (2013) Pregnancy recognition signaling mechanisms in ruminants and pigs. *J Anim Sci Biotechnol* 4:23. doi:10.1186/2049-1891-4-23.
- Boakye CH, Doddapaneni R, Shah PP, Patel AR, Godugu C, Safe S, Katiyar SK, Singh M (2013) Chemoprevention of skin cancer with 1,1-Bis (3'-Indolyl)-1-(aromatic) methane analog through induction of the orphan nuclear receptor, NR4A2 (Nurr1). *PLoS One* 8(8):e69519.
- Bousquet M, Zhuang G, Meng C, Ying W, Cheruku PS, Shie AT, Wang S, Ge G, Wong P, Wang G, Safe S, Zhou B (2013) miR-150 blocks MLL-AF9-associated leukemia through oncogene repression. *Mol Cancer Res* 11(8):912-922.
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- Browning ZS, Wilkes AA, Mackenzie DS, Patterson RM, Lenox MW (2013). Using PET/CT imaging to characterize 18 F-fluorodeoxyglucose utilization in fish. *J Fish Dis* 36(11):911-919. doi:10.1111/jfd.12081.
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## Eddie Ying, Trainee Spotlight cont'd. from page 6

sults are under the revision for publication. Eddie found that another ruminant pregnancy secreted factor, interferon tau (IFNT), exerts profound regulatory effects to mitigate obesity-associated systemic inflammation and insulin resistance. Using a diet induced obesity mouse model, he demonstrated that IFNT is a potent regulator favoring anti-inflammatory activation of adipose tissue macrophages, thus can significantly ameliorate obesity associated syndromes, including adipose tissue inflammation and insulin resistance. The results have been presented at the 2013 Annual Conference of American Diabetes Association and is currently in the final stage of submission. His oral presentation on this research has won him a Career Award at the 5th Chinese American Diabetes Association Conference early this year.

Given the shared interests on obesity associated syndromes from Drs. Bazer and Zhou's lab, Eddie decided to investigate immune cell functions in the obesity context, specifically non-coding RNAs regulated cell responses. Eddie found that a microRNA, miR-150, can regulate obesity associated insulin resistance by modulating immune cell interaction in the adipose tissue niche. In addition, de-

rived from previous discovery of Zhou's lab that microRNAs are new regulators of obesity associated phenotypes, Eddie intends to further understand the crosstalk between microRNAs, specifically miR-223, with known key regulator of macrophage--PPAR $\gamma$ . His research on this project is awarded a Pre-doctoral Award (\$50,000 for two years) from American Heart Association.

Since joining Texas A&M university, Eddie has published three articles (one first-author and two co-author peer-reviewed research articles). Three additional manuscripts where Eddie serves as the first author are at the final stage of submission or revision. In addition, he also has five first-authored abstracts presented in national conferences and he received the second place honors at the 2013 Texas A&M Student Research Week (SRW). Eddie appreciates the advice and guidance from all members of his graduate supervisory committee members including **Drs. Fuller W. Bazer, Beiyan Zhou, Guoyao Wu, Stephen Safe, Robert Chapkin, and Kathrin Dunlap**, as well as the grant support from the United States Department of Agriculture's National Institute for Food and Agriculture and American Heart Association.

## Reproductive Biology and One Health cont'd.

leader in identifying and addressing issues in reproduction and health facing society today, thus impacting Texas, our nation and the world.

Many of the most important challenges facing society today involve issues with reproduction and health. For example, in the U.S. there are approximately 6.7 million women of reproductive age with impaired fertility (defined as the failure to conceive after a year or more of trying). This has driven the development of assisted reproductive technologies including advances in embryo selection techniques with the goal of providing safer pregnancies and healthier babies. A contrasting challenge is posed by the population of the earth which reached 7 billion people in 2011. Two years later, the population is estimated at 7.2 billion and United Nations demographers predict that the population will reach 9.6 billion by 2050. A surging population is the major driver of increased food demand. To meet rising food demand, revolutionary improvements in plant and animal agriculture are needed. This is driving research in domestic farm species to increase reproductive efficiency considering the fact that high embryonic mortality occurs in an estimated that 20-40% of conceptuses in many farm animal species. Many of the most important challenges facing society today involve issues with reproduction and health including successful outcomes of pregnancy in humans and food animal agriculture, impacts of nutrition and wide ranging environment exposures on chronic diseases in adults, contraception, assisted reproductive technologies, and many others. Because reproduction and related health concerns touch some of the most vital and contentious issues affecting us as a nation, understanding these issues, informing the public about them, and designing and framing reproductive policies and procedures that are environmentally relevant and acceptable to the majority of the population is a challenge that requires equal, transdisciplinary collaborations between physicians, osteopaths, veterinarians, dentists, nurses and other professionals in health and environmental sciences.

Members of the Texas A&M University Interdisciplinary Faculty of Reproductive Biology are contributing to the One Health Initiative in many ways as illustrated in the faculty and trainee spotlight articles in this newsletter. Other examples include research being carried out by members of the Uterine Biology and Pregnancy Re-

search Team which performs basic research using domestic farm species and some laboratory animals to investigate the cellular, biochemical and molecular mechanisms of embryonic development, implantation, and placental development to reduce early embryonic loss and improve reproductive efficiency for animal agriculture. However, these basic studies have enormous translational potential to human reproduction, development of healthy offspring along with unexpected applications. One example is the ruminant pregnancy recognition signal, interferon tau (IFNT), discovered by Dr. Bazer's laboratory that is being studied for its beneficial antiviral effects without the toxicity of other interferons as well as its considerable potential for treatment of autoimmune and immunologically mediated disorders, including Multiple Sclerosis.

As noted in the Trainee Snapshot in this IFRB Newsletter issue, studies carried out by Eddie Ying in the Bazer and Zhou laboratories have identified the novel application potential for this novel interferon to mitigate obesity-associated systemic inflammation and insulin resistance. Another example from the current Newsletter is from the work of graduate student Ted Wing working with Drs. Johnson, Bayless and Burghardt who has provided new insights on the differentiation of porcine endothelial precursor (EPC) cells. These bone marrow-derived monocyte precursors found in circulating, that home to sites of neoangiogenesis and differentiate into endothelial cells to support vascular growth. EPC proliferation and number are reduced in preeclampsia and gestational diabetes, serious medical conditions that compromise fetal development. Further understanding of the regulation of these cells could facilitate improvements in placental blood flow to support intrauterine growth restriction (IUGR) in crowded porcine pregnancies and improved outcomes in human pregnancies compromised by preeclampsia and diabetes. There are many other examples research being carried out by members of the IFRB that are contributing to the goal of providing optimal health for people, animals and the environment. Examples of these research programs that support the One Health Initiative will be highlighted in future IFRB Newsletters.



# 19th Annual Dr. Raymond O. Berry Memorial Lecture

**The Nineteenth Annual Dr. Raymond O. Berry Memorial Lecture was held at the Veranda, Bryan, TX on October 21, 2013.** The Annual Raymond O. Berry Lecture series is held in honor of Dr. Raymond O. Berry, a member of the faculty of the Agricultural and Mechanical College of Texas from 1931 to 1960 who contributed significantly to establishment of the discipline of Reproductive Immunology through his pioneering studies involving embryo transfer to evaluate genetic factors affecting reproduction.

Dr. Berry made many contributions to the fields of Reproductive Biology and Genetics. Pioneering work of Dr. Berry and his colleagues involved embryo transfer to study sheep/goat hybrids. Dr. Berry and colleagues made the first successful intra-species transfer of a goat embryo in 1932 and a successful intra-species sheep embryo transfer in 1933. Until that time, embryo transfer had been limited to rats and rabbits. Dr. Berry's research produced

sin-Madison Medical School, was selected by a vote of IFRB faculty to present the **Annual Berry Memorial Lecture** which was entitled, "The primate maternal-fetal interface: placental interactions with the maternal immune system for programming successful pregnancy outcome."

Dr. Golos received the B.S. in Biology from Marquette University, and the M.S. and Ph.D. from the University of Illinois in Physiology and Biophysics. He then moved to the University of Pennsylvania, Department of Obstetrics and Gynecology as a USPHS Postdoctoral Fellow in the Division of Reproductive Biology in the laboratory of Dr. Jerome F. Strauss III. He accepted an academic position at the University of Wisconsin-Madison, Wisconsin National Primate Research Center in 1987 and has since risen through the academic ranks to Professor in the University of Wisconsin-Madison Medical School, Department of Obstetrics and Gynecology and in the School of Veterinary Medicine, Department of Comparative Biosciences. He is also the co-chair of the Regenerative and Reproductive Medicine Working Group at the Primate Center.



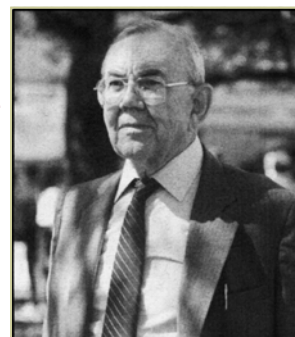
*From left to right: Dr. Joe McLemore, Obstetrician / Gynecologist in Houston, Texas, Mrs. Dorothy McLemore, daughter of Dr. Berry; Dr. Duane C. Kraemer, Professor Emeritus Department of Veterinary Physiology and Pharmacology, and colleague of Dr. Berry when he was a member of the faculty of Texas A&M University. Dr. Ted Golos, the 19th Lecturer in the Series, Dr. Fuller W. Bazer, Regents Fellow, Distinguished Professor, O.D. Butler Chair, Department of Animal Science and Organizer of the Annual Raymond O. Berry Memorial Lecture; Dr. Marcel Amstalden, Chair, IFRB; Dr. Qinglei Li, Organizer of the IFRB Retreat, held in conjunction with the Lecture.*

pregnancies from interspecies transfer of embryos between sheep and goats, but none was carried to term. Through these results, he was perhaps the first to demonstrate that the uterus is not an immunologically privileged site. Pregnancy failure does result because the uterus of the goat rejects fetal-placental tissues of sheep and vice versa. Since that time scientists have determined that the trophoblast (placenta) associated with an embryo must be immunologically compatible with the mother. Therefore, a goat embryo will develop to term in a ewe if the early embryo is manipulated to insure that it has sheep trophoblast (placenta) and sheep/goat chimeras will develop successfully to term so long as the trophoblast (placenta) is immunologically compatible with the recipient female. 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 19 years, Dr. Berry's daughters, Dorothy McLemore and Margaret Thompson and 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, Emeritus 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. Thaddeus G. "Ted" Golos, Professor in the Department of Obstetrics and Gynecology, University of Wisconsin-**

Madison, was recipient of an NIH Predoctoral National Research Service Award in Reproductive Biology as well as Cellular and Molecular Biology at the University of Illinois, an NIH Individual Postdoctoral National Research Service Award at the University of Pennsylvania, a NIH FIRST Award while at the University of Wisconsin, and he has been named as a NICHD Lecturer by the Perinatal Research Society and NIH Lecturer by the International Federation of Placenta Associations. Since 1994, Dr. Golos has served on many review panels for the NIH, particularly NICHD and NCRR, including as a full member of the Biochemical Endocrinology Study Section from 1997-2001, as a member of more than 20 Special Review Panels, including for U54 Collaborative Research Centers in Reproduction, R20 Stem Cell Development Centers, NCRR R24 Review Panels, and as an ad hoc review for the Pregnancy and Neonatology and Reproductive Biology Study Sections. He has mentored 10 postdoctoral fellows, served on graduate committees for 22 graduate students and mentored 36 undergraduate students in research projects. Accordingly, he is a member of graduate training programs in Endocrinology and Reproductive Physiology,

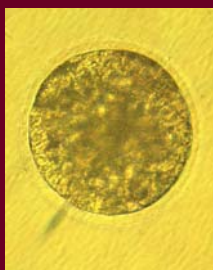
(Continued on page 14)



*"Dr. Berry's pioneering studies contributed basic knowledge about maternal immune recognition of the fetal placental unit."*

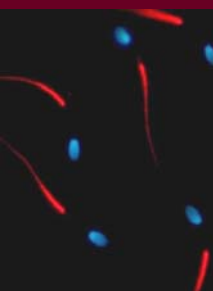
-Fuller W. Bazer

## Trainee News, cont'd from page 4



*In vitro-produced equine blastocyst produced by intracytoplasmic sperm injection (ICSI)*

- Image provided by Drs Young-Ho Choi and Katrin Hinrichs



*Immunolocalization of CATSPER1, a pH-gated calcium channel, in the principal piece of equine sperm.*

*This channel plays a role in hyperactivated motility in other species, however, in work from Dr. Hinrichs' lab Loux et al (Biol Reprod, 2013) report that the relationship of hyperactivated motility to calcium influx in equine sperm is weak.*

**\*Onkwar Sawant** recently completed doctoral degree requirements in Biomedical Sciences working with **Drs. Timothy Cudd and Shannon Washburn**. The title of his dissertation is "Effects of Maternal L-glutamine Supplementation on the Fetus to Mitigate Teratogenic Effects of Alcohol." Three manuscripts from his work have been published in 2013 including a senior authored paper in the Sept., 2013 issue of Alcohol Clin Exper Res entitled "The role of acidemia in maternal binge alcohol-induced alterations in fetal bone functional properties," was coauthored with Drs. J Ramadoss, HA Hogan, and SE Washburn.



**\*Irene Ruiz-Gonzalez, DVM, PhD**, recently completed post-doctoral studies and left the Laboratory of Uterine Biology and Pregnancy last August after being recruited by IVIOMICS, a Spanish company that provides advanced services in human reproductive genetics worldwide. Irene is currently in training within the Department of Pre-implantational Genetic Diagnosis and Molecular Cytogenetics with the objective of being appointed Lab Manager of the next international location where the company plans to open, after the successful inauguration of Miami and India labs.



**\*William Cromwell** is a new graduate student working in the Laboratory of **Dr. Mark Westhusin** who is the recipient of a CVM Merit Scholar Fellowship. His research is focused on the use of the mammary glands in goats for rapid production large amounts of proteins. One application is for the rapid production of vaccines when time is a critical factor in halting the spread of pathogens.



**\*Sicilia T. Grady, DVM, MS**, is a new PhD candidate in the laboratory of **Dr. Katrin Hinrichs**. After completing high school in Mexico she obtained her B.S. degree from the University of California-Davis and her Master's Degree from Texas A&M University. She attended veterinary school at Colorado State University, and after a one-year internship in private practice she is back at TAMU. Dr. Grady is currently focusing on oocyte recovery and therapies to improve fertility in mares.



**\*Yang Gao** received a CVM Outstanding Student Scholarship. Yang works in the laboratory of **Dr. Qinglei Li**.



**\*Paola S. Tinetti Pinto, DVM, MS**, recently joined the laboratory of **Dr. Katrin Hinrichs**. She earned her Veterinary Medicine degree at Universidad de El Salvador, and her MS degree in Veterinary Sciences at the Universidad Complutense de Madrid, Madrid, Spain. Prior to joining Dr. Hinrichs' lab, she spent 5 years in wild animal species conservation and completed her MS working with primordial follicles in coculture with stromal cells to study preantral folliculogenesis in lambs. In Dr. Hinrichs lab she will be working with pluripotent stem cell production to generate an alternative method to facilitate endangered wild equine species preservation.



**\*Curtis Korthanke** recently joined the laboratory of **Dr. Gary Williams** to start the M.S. program in Physiology of Reproduction. He earned a B.S. in Animal Science in August, 2013 and worked as student worker with **Dr. Steven Brinko**, Professor of Theriogenology in the CVM. He will investigate the role of the RF-amide related peptides in seasonal reproduction in the mare.



**\*Marcella D'Oliveira**, a doctoral student at the Federal University of Mato Grosso do Sul, Brazil, under the supervision of Dr. Gumercindo Franco, joined the laboratory of **Dr. Marcel Amstalden** for a one-year research fellowship funded by CAPES (Coordenação de Aperfeiçoamento de Pessoal de Nível Superior), Brazil. Marcella has a B.S. and M.S. in Animal Science from the Federal University of Mato Grosso do Sul, and will be investigating the role of neurokinin B in the maturation of the reproductive neuroendocrine system of ewe lambs.



**\*Dakshnapriya Balasubramanian** joined **Dr. Joe Arosh's** lab in May, 2013. Her research is focused on the epigenetic regulation of small noncoding RNAs (microRNAs) and long noncoding RNAs (LncRNAs) in the pathogenesis of endometriosis. She received her undergraduate degree in Industrial Biotechnology Anna University, India and an MS at Georgetown University in May, 2012. She also received a TAMU Walter W. Lechner Estate Lechner Scholarship in 2013.



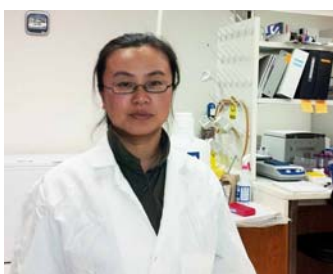


# Visiting International Scholars

**\*LiYin Du**, Professor at College of Animal Science and Technology, Inner Mongolia University for Nationalities. He is a visiting scholar funded by China Scholarship Council in the laboratory of **Dr. Fuller Bazer** for 12 months. He joined the lab in March, 2013. His research mainly focuses on Effects of Interferon tau on browning of white adipose cells in rat.



**\*Dr. Shu Li** is a visiting scholar in **Dr. Qinglei Li's** lab. Shu is a professor at the department of Veterinary Physiology, Northeast Agricultural University (NAU), China. She is collaborating with Dr. Li to study the function of transforming growth factor  $\beta$  signaling in female reproduction.



**\*Dr. Yong Feng Sun**, Associate Professor, College of Animal Science and Technology, Jilin Agricultural University. He is visiting scholar funded by China Scholarship Council in the laboratory of **Dr. Bazer** for 12 months beginning July, 2013. His research focuses on expression of arginine decarboxylase and agmatinase in pig conceptus and endometrium during early pregnancy and the roles of interferons delta (IFND) and gamma (IFNG) in early pregnancy of pigs.



**\*Dr. Elisha Gootwine**, Volcani Research Institute, Rehovot, who had previously spent a year on sabbatical in the laboratory returned for the summer to work with Drs. Bazer, Dunlap and Satterfield on a research proposal for submission to the Binational Agricultural Research & Development (BARD) program.



## Save the Dates

**The 20th Annual Meeting of the Texas Forum for Reproductive Sciences** will be held at the UTSA Downtown Campus in San Antonio on April 17-18, 2014.

**The 2014 Gordon Research Conference on Mammalian Reproduction**, "Translating Basic Science into Clinical Applications," will be held August 10-15, 2014, Colby-Sawyer College, New London, NH, Chairs: John R. McCarrey & Francesco J. DeMayo.

**The 2014 Society for the Study of Reproduction's 47th Annual Meeting**, "Fertility: A Global Challenge," will be held July 19-23, 2014 at the DeVos Place, Grand Rapids, Michigan.

## 7th Annual IFRB Retreat, 2013

**The 7th Annual IFRB Retreat** was held on October 11, 2013 in conjunction with the 19th Annual Dr. Raymond O. Berry Memorial Lecture. Over 65 IFRB faculty and trainees from the Colleges of Veterinary Medicine & Biomedical Sciences and Agriculture and Life Sciences, College of Medicine, and Prairie View A&M plus guests participated in the Retreat which was held at the Veranda in Bryan, TX. The organizer of the retreat was **Dr. Qinglei Li**, Assistant Professor, Veterinary Integrative Biosciences.

Highlights of the Retreat included Minisymposia presentations by IFRB Faculty and Trainee members: **Dr. Beiyan Zhou**, "Macrophage polarization and insulin resistance." **Dr. Rajesh C. Miranda**, "microRNAs, fetal brain development and teratology." **Xiaoqiu Wang**, "Arginine and secreted phosphoprotein 1 (SPPI) act synergistically to stimulate MTORC1/ MTORC2 cell signaling and cytoskeletal organization for proliferation, migration and adhesion of ovine trophectoderm cells." **Dr. Rodolfo C. Cardoso**, "Nutritional and metabolic programming of the onset of puberty in beef heifers." **Will Frank**, "Loss of integrin subunit  $\beta 3$  during

the peri-implantation period leads to fetal growth retardation in the sheep."

There were also 20 posters were presented by trainees during the retreat. For the fourth year in a row, **Dr. Davey Griffin** and members of the Texas A&M Department of **Animal Science Meats Judging team** provided an excellent prime rib dinner.

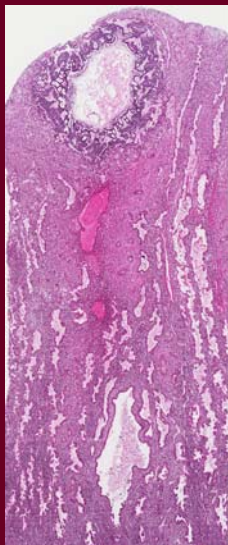
**Support for the 6th Annual IFRB Retreat and Dr. Raymond O. Berry Memorial**

**Lecture** was provided by **Dr. Evelyn Tiffany-Castiglioni**, Department of Veterinary Integrative Biosciences, **Dr. H. Russell Cross**, Department of Animal Science, **Drs. Mark Hussey and Alan Sams**, College of Agriculture and Life Sciences, **Dr. John Stallone**, Department of Veterinary Physiology and Pharmacology, **Dr. Paul Ogden**, College of Medicine, and **Dr. Fuller Bazer**, through his Distinguished Professor account.



# IRFB Faculty Activities, Awards, etc.

Below: Human implantation site, day 12-15 postovulation.



On Oct 12-13, 2013 the Equine Reproduction group, (Drs. Terry Blanchard, Stephen Brinsko, Katrin Hinrichs, Charles Love, and Dickson Varner), presented a short course to over 100 producers who have donated to the Legends Premier Stallion Service Auction, that funds research in equine reproduction at the CVM. Topics included techniques for semen processing, evaluation of stallion breeding records, management of the pregnant and foaling mare, and clinical application of ICSI, with demonstrations given the following day.

## NEW GRANTS:

\***Dr. Joe Arosh** recently received notice of a new USDA AFRI grant entitled, "The Role of Intraluteal Prostaglandins in Luteolysis and Luteal Protection in Sheep."

\***Dr. Beiyang Zhou** recently received a \$1.54 million grant from the National Institutes of Health-National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK)-part of the to study the role of micro-RNA in diabetes.

\***Drs. Gary Williams and Marcel Amstalden** recently received a new USDA AFRI grant entitled, "Prenatal Control of Nutritionally-Accelerated Puberty in Heifers."

## AWARDS & HONORS:

\***Dr. Kayla J. Balyess** began service as a chartered member of the National Institutes of Health, Atherosclerosis, Inflammation, and Cardiovascular Sciences (AICS) Study Section on July 1, 2013. The term will run through June 30, 2019.

\***Dr. Katrin Hinrichs** and PhD students **Shavahn Loux** and **Leticia Vivani** attended the Gordon Conference on Fertilization and Activation of Development in Holderness, NH, 15-18. Shavahn presented a poster, "The Effect of Calcium, pH and Motility Factors on the Axoneme of Demembrated Stallion Spermatozoa" and Leticia presented a poster, "The Effect of Zinc on Stallion Sperm Motility"

\***Dr. Greg A. Johnson** received an Association of Former Students, College Level Distinguished Achievement Award for Teaching.

\***Dr. Qinglei Li**, has been invited to serve on the Board of Reviewing Editors of *Biology of Reproduction*.

\***Dr. Gary R. Newton**, IFRB member and Research Leader, Cooperative Agricultural Research Center, Prairie View A&M University received a \$5000 scholarship to participate in a USDA sponsored LEAD21 program. The LEAD21 program provides leadership and professional development training for faculty and professionals within the land-grant system. Dr. Newton will participate in three, 5-day sessions in Minneapolis, Kansas City and Wash-

ington, D.C. in June and September, 2013 and February, 2014.

\***Dr. Shannon Washburn** received an Association of Former Students, College Level Distinguished Achievement Award for Teaching.

## INTERNATIONAL ACTIVITIES:

\***Dr. Kayla J. Balyess** was invited to speak at the International Union of Physiological Sciences (IUPS Conference) in Birmingham (U.K.) from July 21-26, 2013 and presented a talk entitled, "The intermediate filament cytoskeleton plays a key role in endothelial sprout initiation."

\***Dr. Fuller W. Bazer** was invited to present lectures at the following international meetings: - 9th International Conference on Pig Reproduction titled "Roles of selected nutrients on development of the conceptus during pregnancy," Olsztyn, Poland, June 9-12, 2013.

- Keynote Lecture for International Congress on Amino Acids, Peptides and Proteins entitled "Amino acids, peptides and proteins as histotroph affecting embryonic development: Discoveries and roles in reproductive health," Galveston, TX, Oct. 5, 2013. - "Pregnancy Recognition in Ruminants and Pigs," World Congress on Animal Production 2013, Beijing, Peoples Republic of China and served as Chair of Session on Physiology on October 18, 2013.

\***Dr. Greg Johnson** traveled to Fitzwilliam College, Cambridge, England, July 7, 2013 to attend an Editorial Board Meeting, for the Journal, *Reproduction*.

## INVITED LECTURES

\***Dr. Marcel Amstalden** an invited speaker for the Reproduction Symposium: External Influences on Reproductive Neuroendocrinology. ADSA/ASAS Joint annual meeting, Indianapolis; July, 2013. The title of his lecture was "Neuroendocrine programming of accelerated puberty in heifers."

- Invited speaker for the Symposium on Neuroendocrine Influences on Reproduction. Society for the Study of Reproduction Annual Meeting, Montreal, Canada; July, 2013, "Neuroendocrine pathways controlling the onset of puberty in ruminants."

-Invited speaker, Beef Cattle Short Course, TAMU, August, 2013, "Role of the brain in timing the onset of puberty in beef heifers."

\***Dr. Fuller W. Bazer** was the invited speaker for the Trainee Forum, Society for the Study of Reproduction, on Transitioning into an Independent Career, Montreal, Quebec, Canada, July 27, 2013.

- "Arginine And Secreted Phosphoprotein 1 Mediate mTOR Cell Signaling for Conceptus Development and Survival," Agriculture and Food Research Initiative Annual Project Director Meeting, Montreal, Quebec, Canada, July 28, 2013.

- Niswender Lecture, "Interferon Tau: Effects on the Uterine Environment for Conceptus Development," Colorado State University, October 28, 2013.

\***Dr. Greg Johnson** was invited again to serve as a faculty member in the 2013, Frontiers in Reproduction course at the Marine Biological Laboratories, Woods Hole, MA, 28 April - 8 June, 2013. He and Dr. Tom Spencer presented sections on Implantation, Development of Reproductive Tract and Transgenesis, and Placental Structure.

Dr. Johnson was also invited to participate in the Reproductive Biology Fall 2013 Seminar Series, at the University of Missouri, October, 23, 2013. His talk was entitled, "Osteopontin and its integrin receptors physically and functionally modify the uterus and placenta to support pregnancy."

\***Dr. Shannon Washburn** was an invited speaker at the 13th Annual International Congress on Amino Acids, Peptides and Proteins, October 5-7, 2013, "Maternal glutamine supplementation mitigates negative fetal developmental effects from prenatal alcohol exposure."

Dr. Washburn was also the TAMU Delegate, St. George University Clinical Meeting, Granada, West Indies.

\***Dr. Gary Williams** was an invited speaker at the Beef Cattle Short Course, TAMU, August, 2013 and presented two talks, "Bee synch for successful fixed-time AI of Brahman-influenced cattle," and "Nutritional strategies to time puberty in replacement heifers."



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(continued on page14)

juvenile development. To achieve these objectives, his aims are to: 1) define genotypes of fertility-related loci in bucks based on observed fertility phenotypes, 2) Characterize the genes involved in the normal developmental program of the male reproductive tract in goats during fetal to juvenile development and including seasonal changes influenc-

ing testes function. The increased use of massively parallel sequencing technologies and the increase in sequence and array data from multiple livestock species facilitates the use of a functional genomics approach understand developmental factors influencing semen quality of unknown etiology.

## R.O. Berry Lecture, cont'd from page 9

Gamete and Embryo Biology, Cellular and Molecular Biology, Environmental Toxicology, Hematology Training Program, Stem Cell Training Program, Medical Scholars Training Program, Comparative Biomedical Sciences Training Program, and Cellular and Molecular Pathology Training Program.

In service to his professional societies, Dr. Golos is a member of the Executive Committee of the American Society for Reproductive Immunology and he has served as a member of the editorial boards for *Journal of Molecular Endocrinology*, *Placenta*, and the *American Journal of Reproductive Immunology*. He has been funded continuously by grants from the NIH since 1989, and his current research is funded by NIH grants to study Primate Placental Immunogenetics, Transgenic Marmosets for Translational Research, and by the University of Wisconsin Medical School to study Decidual Listeriosis and pregnancy loss. From his research, Dr. Golos has published 96 refereed journal articles and 12 book chapters, and presented many invited seminars and lecture at prestigious meetings at the national and international levels. Dr. Golos research currently focuses on maternal-fetal immune interactions, primate transgenesis, and placental infection, inflammation and pregnancy loss.

## Research Snapshot, cont'd from page 13

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### 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.**