

IFRB 2015

POINTS OF IN-TEREST:

- The IFRB was organized in 1990 and is one of the largest Reproductive Biology Programs in the US
- Membership includes 44 faculty from 5 departments, 5 colleges, 4 TAMUS components and 2 state agencies
- IFRB sponsored activities: IFRB Repro Forum Seminar Series (25 years) Annual R.O. Berry Lecture (20 years), Texas Forum on Reproductive Sciences (21 years), Annual IFRB Retreat (7 years)

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2015, ISSUE I

clinical and translational research, and shaping science and health policy

New IFRB Faculty Spotlight



SPRING, 2015

Dr. Jay Ramadoss, is the newest member of the Interdisciplinary Faculty of Reproductive Biology. Dr. Ramadoss joined the Department of Veterinary Physiology and Pharmacology in April, 2015

Dr. Ramadoss strives to develop ways to improve the lives of pregnant women and their unborn children. He is committed to promote collaborative interactions with clinician scientists and veterinarians, build strategic multiinvestigator projects, and enhance physiology training programs of undergrad/grad, and professional students.

He was trained in integrative physiology and mechanisms underlying alcohol-induced fetal neuroanatomical deficits by Drs. **Tim Cudd, Wei-jung Chen**, and **James West** at Texas A&M University. For this work, he was awarded the fetal alcohol



spectrum disorders study group Merit Award and Outstanding Graduate Student Award by the College of Veterinary Medicine.

During his postdoctoral period, he received additional training in perinatal biology working with Dr. Ronald Magness, Department of Obstetrics & Gynecology, the University of Wisconsin, Madison. During this time, he was selected for numerous junior investigator research awards including the Perinatal Research Society NICHD Young Investigator Award, Research Society on Alcoholism Enoch Gordis Award, Aspen Perinatal Biology New Investigator Award, Society for Gynecological Investigation Pfizer President's Presenter's Award etc.

Prior to joining Texas A&M, Dr.

Ramadoss was a tenure-track assistant professor for three and one half years in the Department of Obstetrics and Gynecology at the University of Texas Medical Branch at Galveston. Dr. Ramadoss serves on study sections at NIH. (continued on page 2)

IFRB Trainee Xiaoqiu (Churchill) Wang Receives 10th Annual Alltech Young Scientist Award



Xiaoqiu (Churchill) Wang, IFRB trainee working with Drs. Fuller W. Bazer and Guoyao Wu, Co-Chairs was the graduate winner in the 10th annual Alltech Young Scientist (AYS) program, the largest global contest of its kind that rewards scientific genius and experimental application in agriscience.

Rafal Bialek, a student at Adam Mickiewicz University in Poznań, Poland, won the undergraduate division. Nearly 9,000 students from 62 countries had registered for the AYS this year. Competitors were challenged to submit research studies that demonstrate a keen awareness of science and its applications for improving the future of the world, specifically through agriculture.

Dr. Aoife Lyons, director of educational initiatives at Alltech, and Dr. Inge Russell, director of the AYS program, presented the awards in the famed Rupp Arena during the Alltech REBELation, an international conference exploring innovation, inspiration and world-changing ideas. "Worldwide recognition of my current research keeps me inspired," (continued on page 9)

New IFRB Faculty (cont'd from page 1)

He has also received recognition by the Society for Gynecological Investigation for research mentoring. His research training has been funded by NIH beginning with a K99 award on fetal alcohol spectrum disorders to support the initial phase of a Career/Research transition award with mentored postdoctoral support followed by a R00, R01 support on the etiology and the diagnosis of the teratogenic effects of alcohol binging. Currently, there are no approved pharmacologic drugs specifically for treating prenatal alcohol-induced deficits; and his lab investigates treatment strategies based on the multimechanistic actions of alcohol and its heterogeneous outcomes.

Dr. Ramadoss' lab's long term goals are to investigate the role of maternalfetal interaction in the etiology of fetal alcohol spectrum disorders and thus develop targeted treatment strategies, to develop state of the art non-invasive biomarkers for prenatal alcohol exposure, and to investigate fetal alcohol programing of adult-onset disease states. His research spans a wide spectrum of physiologic systems including the reproductive, endocrine, cardiovas- A cular, respiratory, metabolic, and renal system as they relate to alcoholmediated fetal growth and neuroanatomic developmental deficits (Figure I). In the area of screening and diagnosis.

Dr. Ramadoss has utilized many advances in the field of quantitative mass spectrometry (Figure 2) to detect extremely subtle protein posttranslational alterations including characterization of N-oligosaccharides, their exact composition, sequences, and abundances in relation to gestational alcohol exposure. His ongoing research also explores in utero alcohol -mediated adult onset disease states including diabetes, hypertension, and behavioral alterations. His overall goal is to discover means to enhance intrauterine environment that may have lifelong health benefits for the offspring.



Figure 1. Gestational alcohol exposure alters multiple maternal and fetal organ system function including the maternal-fetal interface (also see Am J Physiol Heart Circ Physiol. 2012 Aug 15; 303(4): H414–H421).



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Figure 2: Representative two-dimensional (2-D) differential in gel electrophoresis (DIGE) images of paired control and alcohol uterine endothelial samples depicting a rich array of fluorescent spots. Equal amounts of Cy2 (standard with equally mixed samples), Cy3 (control), and Cy5 (alcohol)-labeled samples were mixed and then separated on analytical 2-D DIGE. A and B: black and white images depict fluorescent signals derived from the red and green channels. C: green spots on the 2-D gel depict maternal uterine endothelial proteins that were downregulated by alcohol, whereas red spots were proteins that were upregulated and yellow spots were unaltered by binge alcohol exposure. (J Proteomics 74: 2986 - 2994, 2011).

INTERDISCIPLINARY FACULTY OF REPRODUCTIVE BIOLOGY



IFRB Faculty Spotlight

Dr. Joe Arosh is an Associate Professor in the Department of Veterinary Integrative Biosciences and an active member of the IFRB since 2005. The specific research-goal in his laboratory is to understand the endocrine, autocrine and paracrine actions of prostaglandins (PGs) in the physiology and pathology of the uterus and the ovary in order to identify new therapeutics for gynecological diseases and novel strategies to improve animal and human health.

Dr. Arosh obtained his bachelor's degree in Veterinary Medicine from Madras Veterinary College, Tamil Nadu Veterinary and Animal Sciences University, Madras, India in 1995. He obtained his master's degree in Veterinary Obstetrics and Gynecology (Theriogenology) from the same institute in 1997. During his master's pro-

gram, he studied the effects of prostaglandin F2a (PGF2a) and progestagens synchronization regimens on superovulatory response, oocyte quality, and embryo quality in cows. During 1997-2000, he worked as a Research Associate in Embryo Biotechnology Laboratory at the same institute. In 2002, he joined Dr. Michel Fortier' lab for his PhD program in Physiology & Endocrinology at the Faculty of Medicine, Laval University, Quebec, Canada where he studied molecular and cellular aspects of PGF2a and PGE2 biosynthesis, transport and signaling in the endometrium and corpus luteum of cows.. One of the important findings reported in PNAS was that identification of a role for prostaglandin transporter protein in ruminant reproductive system.

In December 2004, Dr. Arosh was recruited to Texas A&M as an Assistant Professor. His research goals are addressed in two focus areas: (i) Understand the physiological roles of PGF2a and PGE2 in luteolysis and the maternal-fetal dialogue required for the establishment of pregnancy in ruminants. Understanding of the molecular and cellular mechanisms of these processes is necessary to identify strategies to ameliorate infertility/subfertility in ruminants. (ii) Understand the molecular and cellular aspects of proinvasive, prosurvival, proinflammatory, and pronociceptive actions of PGE2 in the pathogenesis of endometriosis with the aim of identifying PGE2 receptors EP2 and EP4 as a nonsteroidal target for the treatment of endometriosis in childbearing age women.

As a PI on continuously funded USDA-NIFA grants from 2008-2017, his research on PGE2 and PGF2a in luteolysis and establishment of



pregnancy has resulted in major discoveries including: (i) Prostaglandin transporter (PGT) has been identified as terminal component of luteolytic mechanisms in ruminants (ii) During establishment of pregnancy, interferon tau (IFNT) regulates PGT through novel a JAK-RAS-RAF-ERK I/2 signaling module in the endometrium (Figure-1). (iii) Identified non-canonical pathways for IFNT action in the ruminant endometrial epithelium at the time of maternal recognition of pregnancy. (iv) Luteal PG biosynthesis and signaling are selectively directed to PGE2 at the time of establishment of pregnancy. Ongoing research is directed towards identifying molecular and cellular aspects of luteal PGE2 and PGF2a biosynthesis and signaling in establishment of pregnancy in sheep. Outcomes of this research expect to fill a substantial gap in our knowledge that is re-

quired for developing new strategies to treat infertility and improve reproductive efficiency in ruminants.

Dr. Arosh's other primary research on endometriosis is funded by NIH-NICHD with two R21 grants and R01 (2015-2020) grants. Major contributions include: (i) Establishment of a translational xenograft Rag2g(c) mice model using human endometriotic cell lines derived from red lesional phenotype to study pathogenesis of endometriosis. (ii) Demonstration that selective inhibition of EP2 and EP4 receptors inhibits adhesion, invasion, growth and survival of endometriotic cells by modulating integrins, MMPs and TIMPs, cell cycle, growth and survival, and intrinsic apoptotic pathways in an epithelial-stromal cell specific manner. A patent application (US Provisional Patent #61/165,302) has been filed as a result of his research endeavors. His ongoing research in this line is directed to discover epigenetic actions of PGE2 on DNA methylation and H3 Histone modification in prosurvival genes and proapoptotic miRNAs and LncRNAs in the pathogenesis of endometriosis. These investigations provide new fundamental knowledge to formulate personalized phenotype-based combinatorial nonsteroidal therapy through inhibition of EP2/EP4 and activation of proapoptotic miRNA and LncRNA for endometriosis. In addition, this novel non-hormonal therapy could provide a more effective alternative treatment to existing hormonal therapies for endometriosis. He also has collaborative grants with Dr. Kevin Osteen and Dr. Kaylon Bruner-Tran (Pls), Vanderbilt University, also funded by NIH-NIEHS to investigate interactions between dioxin and PGE2 signaling in the pathogenesis of endometriosis, (continued on page 10)





In situ hybridization of alpha v integrin mRNA in uterine luminal epithelial (LE) and conceptus trophectoderm (Tr) on Day 25 of pregnancy in pigs identifies mechanical signaling at the maternal-conceptus interface. -Will Frank, Ph.D. trainee in Dr. Greg Johnson's lab.



NEW GRANTS:

* **Dr. Joe Arosh,** NIH/NICHD "Role of miR15a and miR34c in PGE2 Signaling in the Pathogenesis of Endometriosis," S.K. Banu, Co-PI, 4/1/2015 to 3/31/2020, \$1,610,780. * **Dr. Qinglei Li,** Department of

Defense, Ovarian Cancer Research Program (OCRP) Pilot Award "A new paradigm for ovarian sex cordstromal tumor development." 04/15/15-04/14/17 \$327,375.

* Dr. Jayanth Ramadoss, NIH/ NIAA "Alcohol and Maternal Uterine Vascular Adaptations in Pregnancy, 4/1/2015 to 3/31/2020, \$1,636,875. * Dr. Weston Porter, NIH/NIEHS, "Circadian Regulation of BaP Metabolism," 5/1/15 to 3/31/20, \$1,739,169. * Dr. Brandie Taylor received two new grants as PI: HRSA Grant T76MC28441, "Maternal and Child Health Public Health Program," 06/2015-05/2020. The second was a Discovery Foundation grant, "The role of early pregnancy serum markers of cellular damage, innate immune signaling and angiogenesis in preeclampsia subtypes," 07/2015-06/2018. *** Drs. Guoyao Wu (PI), Fuller Bazer** and **Greg Johnson, (Co-I),** USDA/AFRI, "Regulation of water and ion transport by arginine in porcine conceptuses." 04/01/2015 -12/31/2018, \$492,970,

AWARDS, Honors

* Fuller W. Bazer was named one of the top 20 professors in Animal Sciences by Vet Tech Colleges based on influences in molding programs at both Texas and

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the University of Florida and for many awards for his reproduction research from organizations like the ASAS, American Association for the Advancement of Science (AAAS), and the Society for Reproduction and Fertility (SRF).

Dr. Bazer also served on the Program Committee for the 2015 meeting of the Society for the Study of Reproduction and organized a Focus Session on Uterine Receptivity to Implantation and Placentation with 10 speakers.

* **Dr. Qinglei Li** served as an Ad hoc reviewer for NIH Study Section -Cellular, Molecular and Integrative Reproduction (CMIR) and as an ad hoc reviewer for Department of Defense Ovarian Cancer Research Program

(continued on page 10)



D20P PAG E-c

Above: Immunofluorescence staining for pregnancy associated protein (PAG; green, stains binucleate cells, BNCs). Ecadherin (E-cad; red, stains mononuclear trophoblast and LE) at implantation sites of sheep on Day 20 of pregnancy. <u>Below</u>: Double Immunofluorescence for $\beta 1$ integrin (green, stains syncytial trophoblasts) and E-cadherin (E-cad, red, stains mononuclear trophoblasts) in caruncular endometrium; Day 35 of pregnancy. -Dr. Heewon Seo, Postdoctoral fellow in Dr. Greg Johnson's lab.



Frank defended his doctoral dissertation entitled, "Characterization of Integrins and Osteopontin at the Uterine-Placental Interface During Pregnancy in Pigs and Sheep" under the direction of Dr. Greg Johnson. Will's doctoral studies were

* James "Will"

supported by a National Institute of Food and Agriculture (NIFA) Fellowship, USDA . He graduated, May, 2015.



* Yang Gao received the following awards: The Center for Translational Environmental Health Research Rededication & Toxicology Forum Poster Award (2nd place), Interdisciplinary Faculty of Toxicology, A College of Veterinary Medicine & Bio-

medical Sciences (CVM) 2015 High Impact Achievement Award for First Author Publication, and the 2015 CVM-Graduate Student Association Travel award to attend the Society for the Study of Repro duction annual meeting in Puerto Rico.

<u>IFRB Trainee News</u>

* Shawna Peer defended her M.S. thesis entitled "Characterization of GSTA3 gene products in multiple species and demonstration of their conservation in divergent species" under the direction of Dr. Nancy H. Ing. Her work contributes to further understanding of understand of the mechanisms of action of the GSTA3 enzyme in the testosterone biosynthesis pathway.



* Wei "Eddie" Ying, defended his doctoral dissertation, "Regulation of Obesity-Induced Adipose Tissue Inflammation and Insulin Resistance Through Modulation of Immune Cell Function." under the direction of Drs. Fuller W. Bazer, Chair and Beiyan Zhou, Co-Chair of Graduate Advisory Committee. Eddie graduated, May, 2015.



* Heewon Seo, postdoctoral fellow, working with Dr. Greg Johnson was awarded a CVM-Postdoc Research Trainee grant \$10,000) for his proposal, "Endometrial Response to Mechanical Forces for Development of Uterine-Placental Folds in Pigs".



IFRB Seminar Series, Spring 2015

The IFRB Seminar Series, Reproductive Biology Forum, has been held weekly during the Fall and Spring Semesters since 1990. The Spring 2015 IFRB Seminar Series, coordinated by Dr. Qinglei Li, continued to provide an excellent combination of seminars from internationally recognized reproductive biologists from outside and inside the university along with advanced IFRB trainees. Seminars are immediately followed by a luncheon involving graduate student and postdoctoral trainee discussions with the seminar speaker.

February 6, Dr. Andrea Braundmeier, Southern Illinois University School of

Medicine, "Using the Microbiome to Understand the Pathophysiology of Endometriosis." Hosted by Dr. Annie E. Newell-Fugate

February 13, Cheng An Chang, Ph.D. Candidate, Texas A&M University, Sexdifference in adipose tissue macrophage activation in obesity" and Alexander Tseng, Ph.D. Candidate, Texas A&M University, "MicroRNAs Dictate Adipose Tissue Stem Cell Behavior in an Obese Context." Hosted by Dr. Beiyan Zhou

sity of Texas Health Science Center San Antonio. "Mitochondrial Dysfunction in the Placenta with Preeclampsia and Obesity - role of miR-210." Hosted by Dr. Qinglei Li

February 27, Dr. Monique Rijnkels, Texas A&M University, "What the Genome and Epigenome Can Tell Us About Mammary Gland Development and Function." Hosted by **Dr. Weston Porter**

March 6. Dr. Warren Nothnick. University of Kansas Medical Center "miR451 and the MIF Pathway in Endometriosis Pathogenesis." Hosted by Dr. Joe Arosh

March 13, Dr. Elizabeth McGee, University of Vermont, "Is TGF β a friend or a foe to the developing follicle?" Hosted by Dr. Qinglei Li

March 20, Spring Break – No Forum March 27, Dr. Stephen Safe, Texas A&M University, "Rhabdomyosarcoma: a childhood cancer- development of mechanismbased therapeutic approaches." Hosted by **Dr.**

Qinglei Li

April 3, Reading Day, no forum April 9-10, Texas Forum for Reproductive Sciences, 21st Annual Meeting, February 20, Dr. Leslie Myatt, Univer- MD Anderson Onstead Auditorium,

International Scholars



Houston, TX.

Plenary Lectures: Dr. Marie-Claude Hofmann, U.T. MD Anderson, "Regulation of male germ line stem cell homeostasis." Dr. Qinglei Li, Texas A&M University – "TGF-beta signaling in uterine development and function"

April 17, Dr. Ramkumar Menon, Department of Obstetrics and Gynecology, Division of Maternal-Fetal Medicine & Perinatal Research, The University of Texas Medical Branch at Galveston, "Oxidative stress induced fetal cell senescence: A signal for parturition." Hosted by Dr. Brandie Taylor

April 24, Dr. Annie E. Newell-Fugate, Texas A&M University, "Obesity, hyperinsulinemia, and hyperandrogenemia: a ménage à trois." Hosted by Dr. Qinglei Li

* Yasser Lenis Sanin is a PhD student in a Veterinary Science program at Antioquia University in Medellin-Colombia under mentorship of Drs. Fuller W. Bazer from Texas A&M University and Juan Maldonado from Antioquia University. Yasser Lenis received his degree in Veterinary Medicine in 2006 and specialized in cow reproduction and human physiology. In 2009 he received his M.S. degree in Animal Science from Antioquia University and is working at Texas A&M University as a Research Scholar for two years. The goal of this research is to



reduce embryonic mortality that is a major impediment to reproductive performance in all mammalian species. His work focuses on the impact of knockdown of expression of the major proteins in the pathways required for arginine, agmatine and polyamines to affect growth and development of ovine conceptuses during the peri-implantation period of pregnancy using the ewes as the animal model. The results of this project are expected to enhance understanding of the biological pathways critical for conceptus development during the preimplantation period of pregnancy and suggest strategies to reduce the embryonic losses in all mammals.

* Dr. Orlando Valenzuela recently joined the laboratory of **Dr. Katrin** Hinrichs as a postdoctoral research associate. Dr. Valenzuela received his D.V.M degree from the School of Veterinary Medicine at Universidad de Concepción in 2002 and a M.S. degree in animal reproduction from the University Austral de Chile in 2006. He worked for four years in private practice at several stud farms in the south of Chile. In 2009, Dr. Valenzuela moved to Cambridge, UK to study at the University of Cambridge. He earned his PhD degree in Perinatal Physiology in 2014, investigating



whether overexposure to glucocorticoids in the early neonatal period programs metabolic and endocrine function in later life in the horse.

At the Equine Embryo Laboratory at TAMU he is investigating the relationship of follicle dynamics to the developmental competence of the enclosed oocyte. The specific aim of the study is to evaluate oocytes recovered during the period of follicle growth, time of dominant follicle divergence, and peak preovulatory follicle dominance on the rate of oocyte maturation in vitro and of blastocyst development after ICSI. He is also investigating whether in vitro maturation (IVF), intracytoplasmic sperm injection (ICSI) and in vitro production (IVP) alters placenta development and birth weight of newborn foals.



Above: Immunohistochemical staining of the alpha 5 integrin in uterine luminal epithelial (LE) and conceptus trophectoderm (CE) from Day 25 to 60 of pregnancy in sheep indicates increasing mechanical forces at the maternalconceptus interface. -Will Frank, Ph.D. trainee in Dr. Greg Johnson's lab.

Right: Histoarchitecture of the placentomes from 100% NRC control, 50% NR non-IUGR, and 50% NR IUGR ewes. CAR denotes caruncle and COT denotes cotyledon.

Trainee Spotlight

Ashley Keith, recently completed the requirements for a Ph.D. degree in Physiology of Reproduction within the Department of Animal Science under the guidance of Drs. M. Carey Satterfield and Kathrin Dunlap. Her research experience in the Animal Science Department began as an undergraduate in Dr. Satterfield's laboratory, working primarily with colostrum and mammary tissues from obese ewes supplemented with either arginine or saline during pregnancy. She completed her B.S. in Animal Science from Texas A&M in December 2010. Following graduation, Ashley completed an internship at the Texas AgriLife Re-

search Station in Overton with Dr. Ron Randel, which led to the completion of two abstracts for the annual American Society of Animal Science Southern Section Meeting. These included research: I) analyzing the possible correlations of selecting Brahman heifers for feed efficiency by RFI or ADG and the birth weights of their offspring; and 2) assessing the potential relationship between dam temperament and birth weight in Brahman cattle.

100% NRC

50% NRC IUGR



50% NRC

Non-IUGR

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In the fall of 2011, Ashley returned to College Station and transitioned into a doctoral research program focusing on the effects of maternal nutrient restriction on placental development in ewes. Through this research, she worked to elucidate novel molecular mechanisms regulating placental development and nutrient transfer to the fetus throughout gestation. Maternal nutrient intake and partitioning, uteroplacental blood flow, nutrient transporter activity, and fetoplacental

metabolism mediate nutrient delivery to the fetus. Inadequate delivery of nutrients results in intrauterine growth restriction (IUGR), a leading cause of neonatal morbidity and mortality in humans and livestock species. Her studies exploit natural population variance in nutrient-restricted (NR) ewes to identify subpopulations of IUGR and non-IUGR fetuses as subjects for research to elucidate adaptive mechanisms of fetal-placental development.

EXAS A&N

One of her studies investigated potential mechanisms regulating nutrient availability for fetuses and results indicated that normal fetal growth in a subpopulation of NR ewes is associated with enhanced delivery of a number of amino acids and their metabolites into the fetal circulation, which may at least partially result from upregulation of expression of amino acid transporter mRNAs in the placentome. A subsequent study focused on investigating potential physiological mechanisms regulating placental growth and development in ewes having NR IUGR and NR non-IUGR fetuses. These results suggest that placentome morphology (See Figure) and (continued on page 9)

A Snapshot of IFRB Research

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 4 month period January 1 through May, 2015:

 Alves BR, Cardoso RC, Prezotto LD, Thorson JF, Bedenbaugh M, Sharpton SM, Caraty A, Keisler DH, Tedeschi LO, Williams GL, Amstalden M. Elevated body weight gain during the juvenile period alters neuropeptide Y-gonadotropinreleasing hormone circuitry in prepubertal heifers. Biol Reprod. 2015 Feb;92(2):46.

Arosh JA, Lee J, Starzinski-Powitz A, Banu SK. Selective inhibition of prostaglandin E2 receptors EP2 and EP4 modulates DNA methylation and histone modification machinery proteins in human endometriotic cells. Mol Cell Endocrinol. 2015 Jul 5;409:51-58.

Assaad HI, Hou Y, Zhou L, Carroll RJ, Wu G. Rapid publication-ready MS-Word tables for two-way ANOVA. Springerplus. 2015 Jan 23;4:33. doi: 10.1186/s40064-015-0795-z. eCollection 2015.

Banu SK, Stanley JA, Sivakumar KK, Arosh JA, Barhoumi R, Burghardt RC. Identifying a novel role for X-prolyl aminopeptidase (Xpnpep) 2 in CrVI-induced adverse effects on germ cell nest breakdown and follicle development in rats. Biol Reprod. 2015 Mar;92(3):67. doi: 10.1095/ biolreprod.114.125708.

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Behnia F, Taylor BD, Woodson M, Kacerovský M, Hawkins H, Fortunato SJ, Saade GR, Menon R. Chorioamniotic Membrane Senescence: A Signal for Parturition? Am J Obstet Gynecol. 2015 May 26. pii: S0002-9378(15)00517-7. doi:10.1016/j.ajog.2015.05.041. [Epub ahead of

Bruner-Tran KL, Ding T, Yeoman KB, Archibong A, Arosh JA, Osteen KG. Developmental exposure of mice to dioxin promotes transgenerational testicular inflammation and an increased risk of preterm birth in unexposed mating partners. PLoS One. 2014 Aug 15;9(8):e105084.

Cardoso RC, Alves BR, Sharpton SM, Williams GL, Amstalden M. Nutritional Programming of Accelerated Puberty in Heifers: Involvement of POMC Neurones in the Arcuate Nucleus. J Neuroendocrinol. 2015 May 6. doi: 10.1111/ jne.12291 [Epub ahead of print]

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Basic science of reproductive medicine

and Fertility

Reproduction The Journal of the Society for Reproduction

Research Snapshot (cont'd from page 7)



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(continued on next page)

MOLECULAR ENDOCRINOLOGY

Alltech Young Scientist Graduate Award (cont'd from page 1)



said Wang, adding that his long-term goal is to be an independent scientist "who makes a seminal discovery that makes a world of difference." The goal of his AYS research was to solve what he called "the long-time ignored and mysterious role of high levels of fructose during pregnancy."

"Embryonic mortality is the major constraint to reproductive performance," said Wang, noting that estimates of embryonic death loss are 20 to 40 percent in sheep, pigs and other ruminants. The longrange goal of his work is to increase pregnancy rates and final outcomes of A panel of agriculture industry leaders selected eight finalists from an initial field of nearly 9,000 registrants from 62 countries. pregnancy to improve reproductive performance of livestock.

Dr. Aoife Lyons (left), director of educational initiatives at Alltech, and Dr. Inge Russell (right), director of the Alltech Young Scientist program, present Xiaoqiu (Churchill) Wang with his award as the graduate winner of the 10th annual Alltech Young Scientist program.

Trainee Spotlight (cont'd from page 6)

angiogenic growth factor expression varies in response to maternal nutritional challenge during pregnancy and may play critical roles in regulating fetal growth. This study also suggests that enhanced fetal growth in NR non-IUGR pregnancies is associated with an altered expression of genes related to immune response and function in the placentome. Supplementary to placental development, she also investigated subsequent fetal development, primarily focusing on the liver, kidney, and skeletal muscle. This work has been presented at local, state, and international conferences, including IFRB, TFRS, and SSR. Furthermore, her work has produced manuscripts that are currently in review for publication. She successfully defended her dissertation research entitled "Consequences of Maternal Nutrient Restriction on Ovine Placental Development" on June 8, 2015. Along with her research, she had the opportunity to supervise undergraduate students conducting research in the laboratory. Each semester Ashley oversaw the training of several undergraduate students in molecular biology laboratory techniques. She further taught them how to format and interpret data for abstracts, presentations, and manuscripts.

In graduate school, Ashley developed a strong interest in teaching animal science, reproductive physiology, and production of ruminant species. In addition to her responsibilities for research, she incorporated teaching into her graduate program; specifically, assisting in the development and instruction of the laboratory component of the Reproduction in Farm Animals course. She regularly served as a guest lecturer for Reproduction in Farm Animals as well as Introductory Animal Science. Ashley also often assisted in teaching the laboratory component of the Animal Reproduction Management course. She was a recipient of the Ronnie L. Edwards Graduate Teaching Award in Animal Science for fostering undergraduate education. In conjunction with teaching and research, she was an active officer and member of the Animal Science Graduate Student Association. Serving as Representative for the Department of Animal Science in the Graduate Student Council helped her develop professional skills necessary for collaborating with professors and graduate students in a variety of disciplines.

These experiences allowed her to foster her passion for teaching and led her to a position as Assistant Professor of Animal Science at Louisiana Tech University. At Louisiana Tech, Ashley will be teaching courses such as Principles of Animal Nutrition, Applied Animal Nutrition, Beef Production, and Meat Animal and Carcass Evaluation. She will also be serving as an academic advisor, involved in student recruiting, work with the agricultural community, and conducting research in ruminant nutrition, physiology, and production.

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Mark Westhusin was recognized for Distinguished Research by Association of Former Students, Texas A&M University, May, 2015

IFRB Faculty Spotlight(cont'd from page 3)

placental function, preterm pregnancy, and testicular function. The research team has identified a proinflammatory role of PGE2 down-stream of dioxin action and provide new fundamental knowledge to understand dioxin and PGE2 signaling.

Dr. Arosh also works as a co-investigator/collaborator with Dr. Sakhila K Banu on several NIH-NIEHS funded grants to study the reproductive toxicity of heavy metal endocrine disruptors such as CrVI. Studies carried out to date have shown that gestational or lactational exposure to CrVI induces germ cell/oocyte apoptosis and accelerates germ cell nest breakdown resulting in premature ovarian failure in FI progeny and these effects are partially mitigated by vitamin C and ROS-inhibitor edaravone. This new information expects to fill the substantial gap in knowledge required to protect/preserve the reproductive health in women and female progeny/children exposed to CrVI. Dr. Arosh has served as an ad-hoc member of study sections/review panels for national Institute of Health (NIH) ZRG Endocrinology, Metabolism, Nutrition and Reproductive Sciences (EMNR), Integrative and

Clinical Endocrinology and Reproduction (ICER) Study Section, USDA National Research Initiative (USDA-NRI), USDA U.S.-Egypt Joint Board, USDA-BARD Joint Board, Canadian Institute of Health Research (CIHR), and Natural Sciences and Engineering Research Council (NSERC) of Can ada and reviewed research grant proposals in Reproductive Biology and Endocrinology. He actively serves as an Editorial Board Faculty Member, Faculty of 1000 Medicine; Editorial Board Member, Journal of Veterinary Science and Technology; and Associate Editor, Bioinfo Journals, Veterinary Science Research; Editorial Board Member, SM Journal of Endocrinology & Metabolism; and Guest Editor in Current Women's Health Reviews. He has been actively serving as a member in Society for the Study of Reproduction, Endocrine Society, American Society for Reproductive Medicine, Society for Gynecologic Investigation, World Endometriosis Society, and Society for Reproductive Biology and Comparative Endocrinology. In addition, he is serving as senator in TAMU Faculty Senate and served as member (2012-2015) on the Council of Principal Investigators.

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

* **Dr. Martha Vogelsang**, senior lecturer in the Department of Animal Science, is the recipient of the Equine Science Society's 2015 Distinguished Service in Equine Science Award, the most prestigious honor the organization bestows upon one of its members. to Dr. Martha Vogelsang. The award was presented during the organization's 2015 annual conference held in St. Pete Beach, Fla., May 26-29.

INVITED LECTURES:

* Dr. Fuller W. Bazer was an invited speaker at the new Gordon Conference on Mammalian Reproduction: Translating Basic Science into Clinical Applications held August 10-15, 2014 Colby-Sawyer College, New London, NH. "Conceptus Uterine Cross-Talk: Mechanisms for Pregnancy Recognition Signaling and Conceptus Development." Other invited lectures included: The Donald Henry Barron Lecture titled "The Many Faces of Interferon Tau During Pregnancy" to students and faculty of the Reproduction and Perinatology Faculty, as well as the 2015 Distinguished Animal Scientist Lecturer to the Department of Animal Science, University of Florida, February 25-26;

Invited paper at the American Society for Nutrition 2015 Scientific Session and Annual Meeting's Session on Maternal/ Fetal Nutrition and Programming: What have we learned from farm animal models? Select nutrients and their effects on conceptus development in mammals," March 28; Sydney Asdell Physiology/Endocrinology Invited Lecture titled "Interferon Tau and Estrogen: Pregnancy Recognition Signals and Cell-Specific Gene Expression in the Uterus" to faculty, students and staff at Cornell University, April 15: Invited lecture at the 35th annual meeting of the American Society for Reproductive Immunology, Kingston, Ontario, Canada. "The Many Faces of Interferon Tau at the Maternal-Conceptus Interface" June 2-5.

* Katrin Hinrichs presented the following international

lectures: "Translation of research in equine reproductive biotechnology to clinical practice." December 10, 2014 "Health of horses produced by ART: Embryo transfer, oocyte transfer, ICSI and cloning" Equine Reproduction Symposium, International Embryo Transfer Society, Paris, France, January 10, 2015. "Assisted reproductive techniques in the horse" and demonstration of oocyte collection, Master's Program in Equine Reproduction, University of Extremadura, Cáceres, Spain, May 6-7, 2015. "Collection, culture and assessment of equine oocytes" Visiting lecture, École Nationale Vétérinaire de Lyon, Lyon, France, May 15, 2015. Invited lecture, Physiopathology of Reproduction in Farm Animals Section, University of Bari, Bari, Italy, May 13, 2015

* Qinglei Li was invited to present the Plenary Lecture, "TGF-beta signaling in uterine development and function" at the Texas Forum of Reproductive Sciences, Houston, TX, April 9-10, 2015. Dr. Li has also been invited to present a Plenary Lecture entitled "New Insights into the Function of TGF-beta Signaling in the Uterus" at the 2015 Greenwald Symposium, Kansas University Medical Center in October. The annual Greenwald symposium is held in memory of Dr. Gilbert S. Greenwald, a pioneer in reproductive biology research and founder of the reproductive biology research program at the University of Kansas Medical Center. The symposium is sponsored by the Institute for Reproductive Health and Regenerative Medicine at the Medical Center.

* **Dr. Greg Johnson and Kathrin Dunlap** were invited to serve as a faculty members in the 2015, Frontiers in Reproduction course at the Marine Biological Laboratories, Woods Hole, MA, May 3 - June 14, 2015. They presented sections on Implantation, Development of Reproductive Tract and Transgenesis, and Placental Structure.

The 21th Annual Texas Forum for Reproductive Sciences (TFRS), hosted by Texas A&M University, the University of Texas MD Anderson Cancer Center and **Baylor College of Medicine** was held on April 9-10, 2015 at the Onstead Auditorium of the MD Anderson Cancer Center.

The Texas Forum for Reproductive Sciences (TFRS) was established in 1995 to encourage the exchange of scientific knowledge and collaborations among scientists in Texas in the area of female reproduction. Several years later, this cooperative group included male repro-

duction and began an all-inclusive Forum for **Reproductive Sciences.**

About 100 participants from all major Texas universities registered for the meeting. Plenary speakers included Dr. Marie-

Claude Hofmann, University of Texas MD Anderson Cancer Center, Department of Endocrine Neoplasia and Hormonal Disorders - "Regulation of male germ line stem cell homeostasis" and Dr. Qinglei Li, Department of Veterinary Integrative Biosciences, Texas A&M University - "TGF- β signaling in uterine development and function.'

The annual meeting serves as a venue for the exchange of research ideas and discoveries in the spectrum of reproductive sciences. Platform and poster sessions focus almost exclusively on trainee presentations.



Three trainees were selected for presentation of platform session talks: Dr. Heewon Seo, "Mechanotransduc-tion drives morphogenesis to develop folding at the uterine-placental interface of pigs," Chelsie B. Steinhauser, "Pig endometrium expresses the polyol pathway enzymes necessary to convert glucose to fructose prior to implantation with a shift to chorion expression post-implantation," and Xiaoqiu Wang, "Functional roles of fructose: Induction of proliferation and adhesion of ovine trophectoderm cells via O-linked glycosylation mediated phosphorylation of the Akt/PKB-TSC2-MTOR cell signaling cascade." Trainees selected for poster presentations included, Jacob Brown, "Growth and Development of Rat Pups with Gestational Exposure to Sulfur Based Particulate Matter."

-The logo for the 20th Annual TFRS Meeting was designed by Dr. Greg A. Johnson.

Yang Gao, "Functional analyses of TGF- β receptor I conditionally ablated mouse uterus." Ashley B. Keith, "Adaptive placental transport in nutrientrestricted ewes is associated with altered amino acid transporter and angiogenic factor expression." Alyssa L. Miller, "Gestational exposure to sulfur based particulate matter during gestation alters the fetal and the spleen and thymus."

William Skiles "Oxidative stress as an epigenetic dysregulator in embryonic stem cells.' Matthew D. Snyder, "Suppression of SETDBI during bovine embryonic development results in preimplantation mortality and decreased transcription of transposable elements." Jing Xu, "Regulation of expression of interferon-tau by ovine trophectoderm cells via a toll-like receptor signaling pathway." Several current and former trainees currently in Research Scientist or Postdoctoral positions also presented their work at the meeting including Drs. Xilong Li, and Haijun Gao.

Save the date for the 22nd Annual Texas Forum for Reproductive Sciences, April 21-22, 2016 at the Onstead Auditorium of the University of Texas MD Anderson Cancer Center

21st Annual Raymond O. Berry Memorial Lecturer Selected

Professor Dr. Surendra Sharma, Professor and Deputy Director of Center of **Biomedical Research Excellence at** Women and Infants Hospital, Brown University, Providence, RI was selected by a vote of IFRB faculty to present the 21st Annual Dr. Raymond O. Berry Memorial Lecture which will be held in conjunction with the 9th Annual IFRB Retreat on Friday, Nov. 20, 2015.

Dr. Sharma is an internationally known investigator in the field of immune programming of pregnancy and was recently awarded the Honorary Doctor of Medicine Degree from

Linkoping University Faculty of Health Sciences, Linkoping, Sweden. He serves as a permanent member on review boards for the NIH and the American Diabetes Association andon editorial boards of several journals. His academic interests are as follows. Gestational outcomes are programmed at the time of implantation and during



early pregnancy, apparently in defiance of the normal immunological laws of tissue transplantation. The process of normal implantation and early pregnancy success is regulated by integration of an array of biological processes for which the molecular basis is diverse and not fully understood. Dr. Sharma has a multifaceted research program focused on answering the question of why some women are predisposed to pregnancy complications and whether these problems may originate from abnormal immune and hormonal responses during pregnancy. The hypothesis is that an anti-inflammatory intrauterine milieu controlled by cytokines and pregnancy hormones is crucial to fetal development and pregnancy success.

The Annual Raymond O. Berry Memorial Lecture series is held in honor of Dr. Raymond O. Berry, 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.



Research Snapshot (cont'd from page 12)

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48th SSR Annual Meeting, San Juan, Puerto Rico



The 48th Annual Meeting of the Society for the Study of Reproduction will be held 18 - 22 June 2015, San Juan, Puerto Rico, USA . The theme of the Meeting is "Evolution of Sex." This year, the Historical Perspectives

Keynote Address will be given by Elizabeth Watkins, Ph.D., University of California, San Francisco, "Reconceiving the Pill: From Revolutionary Therapeutic to Lifestyle Drug." State-of-the-Art Lectures include Ina Dobrinski, D.V.M., Ph.D. University of Calgary, Alberta, Canada. "Germ Line Modification to Create Large Animal Models of Human Disease." David P. Bartel, Ph.D. Whitehead Institute for Biomedical Research, Cambridge, MA "MicroRNA Evolution and Function."

This year 4 trainees who have submitted first authored abstracts accepted for presentation at the Annual SSR meeting will receive travel funds to attend the SSR meeting. Trainees include Chelsie Burroughs Steinhauser, Yang Gao, Xiaoqiu (Churchill) Wang, and Jing (jean) Xu. Two trainees, Rui d"Orel Blanco and Anita Snell will present their work at the Joint Meeting of the American Dairy Science Association/American Society of Animal Science

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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, reproductive toxicology, and uterine biology. The outcomes of this research are impacting Texas, our nation and the world.